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Military Psychology

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Military psychology

Military psychology is the research, design and application of psychological theories and experimentation data towards understanding, predicting and countering behaviours either in friendly or enemy forces or civilian population that may be undesirable, threatening or potentially dangerous to the conduct of military operations.

Military psychology is applied towards counseling and treatment of stress and fatigue of military personnel or military families as well as treatment of psychological trauma suffered as a result of military operations.

Another use of military psychology is in interrogation of prisoners who may provide information that would enhance outcomes of friendly military operations or reduce friendly casualties.

Area of study

The goals and missions of current military psychologists have been retained over the years, varying with the focus and strength of intensity of research put forth into each sector. The need for mental health care is now an expected part of high-stress military environments. The importance and severity of post traumatic stress disorder (PTSD) has finally gained more credibility than those suffering from it received in the past, and is being highlighted in treatment programs. More extensive post-deployment screenings take place now to home in on problematic recoveries that used to be passed unnoticed and untreated.

Operational psychology

Operational psychology is the use of psychological principles and skills to improve a military commander's decision making as it pertains to conducting combat and/or related operations. This is a relatively new subdiscipline categorization that has been employed largely by psychologists and behavioral scientists in military, intelligence, and law enforcement arenas. While psychology has been utilized in non-health related fields for many decades, recent years have seen an increased focus on its national security applications. Examples of such applications include the development of counterinsurgency strategy through human profiling, interrogation and detention support, information-psychological operations, and the selection of personnel for special mission units.

Health, organizational, and occupational psychology

Military psychologists perform work in a variety of areas, to include operating mental health and family counseling clinics, performing research to help select recruits for the armed forces, determining which recruits will be best suited for various military occupational specialties, and performing analysis on humanitarian and peacekeeping missions to determine procedures that could save military and civilian lives. Some military psychologists also work to improve the lives of service personnel and their families. Other

military psychologists work with large social policy programs within the military that are designed to increase diversity and equal opportunity.

More modern programs employ the skills and knowledge of military psychologists to address issues such as integrating diverse ethnic and racial groups into the military and reducing sexual assault and discrimination. Others assist in the employment of women in combat positions and other positions traditionally held by men. Some military psychologists help to utilize low-capability recruits and rehabilitate drug-addicted and wounded service members. They are in charge of drug testing and psychological treatment for lifestyle problems, such as alcohol and substance abuse. In modern times, the advisement of military psychologists are being heard and taken more seriously into consideration for national policy than ever before.

There are now more psychologists employed by the United States Department of Defense than by any other organization in the world. Since the downsizing of the military in the 1990s, however, there has been a considerable reduction in psychological research and support in the armed forces as well.

History

Psychological stress and disorders have always been a part of military life, especially during and after wartime, but the mental health section of military psychology has not always experienced the awareness it does now. Even in the present day there is much more research and awareness needed concerning this area.

One of the first institutions created to care for military psychiatric patients was St. Elizabeths Hospital in Washington D.C.. Formerly known as the United States Government Hospital for the Insane, the hospital was founded by Congress in 1855 and is currently in a state of disrepair although operational, with revitalization plans scheduled to begin in 2010.

Early work

In 1890 James McKeen Cattell coined the term "mental tests." Cattell studied under Wundt at Leipzig in Germany at one point during his life and strongly advocated for psychology to be viewed as a science on par with the physical and life sciences. He promoted the need for standardization of procedures, use of norms, and advocated the use of statistical analysis to study individual differences. He was unwavering in his opposition to America's involvement in World War I.

Lightner Witmer, who also spent some time working under Wundt, changed the scene for psychology forever from his position at the University of Pennsylvania when he coined the term "clinical psychology" and outlined a program of training and study. This model for clinical psychology is still followed in modern times. Eleven years later in 1907 Witmer founded the journal The Psychological Clinic.

Also in 1907, a routine psychological screening plan for hospitalized psychiatric patients was developed by Shepard Ivory Franz, civilian research psychologist at St. Elizabeth's Hospital. Two years later, under the leadership of William Alanson White, St. Elizabeth's Hospital became known for research and training of psychiatrists and military medical officers. In 1911 Hebert Butts, a Navy medical officer stationed at St. Elizabeths, published the first protocol for psychological screening of Navy recruits based on Franz's work.

Intelligence testing in the United States military

Lewis M. Terman, a professor at Stanford University, revised the Binet-Simon Scale in 1916, renaming it the Stanford-Binet Revision. This test was the beginning of the "Intelligence Testing Movement" and was administered to over 170,000 soldiers in the United States Army during World War I. Yerkes published the results of these tests in 1921 in a document that became known as the Army Report.

There were two tests that initially made up the intelligence tests for the military: Army Alpha and Army Beta tests. They were developed to evaluate vast numbers of military recruits that were both literate (Army Alpha tests) and illiterate (Army Beta tests). The Army Beta test were designed to "measure native intellectual capacity." The Army Beta test also helped to test non-English speaking service members.

The standardized intelligence and entrance tests that have been used for each military branch in the United States has transformed over the years. Finally, in 1974, "the Department of Defense decided that all Services should use the ASVAB for both screening enlistees and assigning them to military occupations. Combining selection and classification testing made the testing process more efficient. It also enabled the Services to improve the matching of applicants with available job positions and allowed job guarantees for those qualified." This went fully into effect in 1976.
Yerkes and war

Robert M. Yerkes, while he was president of the American Psychological Association (APA) in 1917, worked with E. B. Titchener and a group of psychologists that were known as the "Experimentalists." Their work resulted in formulating a plan for APA members to offer their professional services to the World War I effort, even though Yerkes was known for being opposed to America being involved in the war at all. It was decided that psychologists could provide support in developing methods for selection of recruits and treatment of war victims. This was spurred, in part, by America's growing interest in the work of Alfred Binet in France on mental measurement, as well as the scientific management movement to enhance worker productivity.

In 1919, Yerkes was commissioned as a major in the U.S. Army Medical Service Corps. In a plan proposed to the Surgeon General, Yerkes wrote: "The Council of the American Psychological Association is convinced that in the present emergency American psychology can substantially serve the Government, under the medical corps of the Army and Navy, by examining recruits with respect to intellectual deficiency, psychopathic tendencies, nervous instability, and inadequate self-control."

Also in 1919, the Army Division of Psychology in the Medical Department was established at the medical training camp at Fort Oglethorpe, Georgia, to train personnel to provide mental testing of large groups.

This was also the era when the condition referred to as "shell shock" was first seriously studied by psychologists and standardized screening tests for pilots were administered.

World War II

World War II ushered in an era of substantial growth for the psychological field, centering around four major areas: testing for individual abilities, applied social psychology, instruction and training, and clinical psychology.

During this war, The Army General Classification Test (AGCT) and the Navy General Classification Test (NGCT) were used in place of the Army Alpha and Army Beta tests, for similar purposes.

The United States Army had no unified program for the use of clinical psychologists until 1944, towards the end of World War II. Before this time, no clinical psychologists were serving in Army hospitals under the supervision of psychiatrists. This had to do with psychologists' opposition to this type of service and also to the limited role the Army assigned to psychiatry. At this time, the only psychiatric interview that was being processed on the ever-increasing numbers of military recruits lasted only three minutes and could only manage to weed out the severely disturbed recruits. Under these conditions, it was impossible to determine which seemingly normal recruits would crack under the strain of military duties, and the need for clinical psychologists grew. Finally, by 1945 there were over 450 clinical psychologists serving in the Army.

Military psychology matured well past the areas aforementioned that concerned psychologists up until this time, branching off into sectors that included military leadership, the effects of environmental factors on human performance, military intelligence, psychological operations and warfare (such as Special Forces like PSYOPS), selection for special duties, and the influences of personal background, attitudes, and the work group on soldier motivation and morals.

Korean War

This was the first war where clinical psychologists served overseas. They were positioned in hospitals as well as combat zones. Their particular roles were vague, broad, and fairly undefined, except for the Air Force who provided detailed job descriptions for psychologists' positions. The Air Force also outlined the standardized tests and procedures for evaluating recruits that were to be used.

Vietnam War

There were significant challenges that obstructed the regular use of psychologists to support combat troops in this war. The mental health teams were very small, usually only consisting of one psychiatrist, one psychologist, and three or four enlisted corpsmen. Quite often, medical officers, including psychologists, were working in severe conditions with little or no field experience.

Interrogation Techniques

Interrogation (also called questioning or interpellation) is interviewing as commonly employed by officers of the police, military, and Intelligence agencies with the goal of extracting a confession or obtaining information. Subjects of interrogation are often the suspects, victims, or witnesses of a crime. Interrogation may involve a diverse array of techniques, ranging from developing a rapport with the subject to outright torture.

Interrogation techniques

There are multiple techniques employed in interrogation including deception, torture, increasing suggestibility, and the use of mind-altering drugs.
 Suggestibility

A person's suggestibility is how willing they are to accept and act on suggestions by others. Interrogators seek to increase a subject's suggestibility. Methods used to increase suggestibility may include moderate sleep deprivation, exposure to constant white noise, and using GABAergic drugs such as sodium amytal or sodium thiopental.

Deception

Deception can form an important part of effective interrogation. In the United States, there is no law or regulation that forbids the interrogator from lying about the strength of their case, from making misleading statements or from implying that the interviewee has already been implicated in the crime by someone else.

As noted above, traditionally the issue of deception is considered from the perspective of the interrogator engaging in deception towards the individual being interrogated. Recently, work completed regarding effective interview methods used to gather information from individuals who score in the medium to high range on measures of psychopathology and are engaged in deception directed towards the interrogator have appeared in the literature The importance of allowing the psychopathic interviewee to tell one lie after another and not confront until all of the lies have been presented is essential when the goal is to use the interview to expose the improbable statements made during the interview in future court proceedings.

Good cop/bad cop

Pride-and-ego down

Reid technique

The Reid technique is a trademarked interrogation technique widely used by law enforcement agencies in North America. The technique (which requires interrogators to watch the body language of suspects to detect deceit) has been criticized for being difficult to apply across cultures and eliciting false confessions from innocent people.

Torture

Interrogations may involve torture. When torture is employed in interrogation, the first thing the interrogator typically does is to speculate on the type of information s/he would like to extract from the subject. This assists the interrogator in creating a benchmark that the subject must meet in order to end the painful or uncomfortable conditions that occur in torture.

The process of using torture to extract this targeted information may have three possible outcomes. The first is that the subject knows nothing and provides made-up information or a false confession in order to cause the torture to stop; the second is that the subject has the information that the interrogator seeks but is able to "hold out" or divert the interrogators attention with false information (which can be misconstrued for the previous outcome mentioned); and the third is that the subject capitulates under torture and offers the interrogator truthful information. Interrogation has yielded all three results. However, much controversy surrounds the process of torture because of both its human rights implications and the fact that it remains possible that an innocent person can be tortured. When the subject of torture doesn't actually have information or is innocent, the subject may provide a false confession. If not, that individual must bear with the procedures with the knowledge that s/he cannot stop it. Many human rights organizations and political figures have spotlighted these facts. They have pointed out that torture carries the possibility of being ineffective in extracting accurate information. However, this is true of all interrogation techniques.

The debate over these advantages and disadvantages of torture continues to this day. Nonetheless, clarity has been made in the torture debate over the differences between instances of torture that are used in different contexts. To this end, Richard Posner, a judge on the United States Court of Appeals for the Seventh Circuit, has argued, "If torture is the only means of obtaining the information necessary to prevent the detonation of a nuclear bomb in Times Square, torture should be used—and will be used—to obtain the information. … no one who doubts that this is the case should be in a position of responsibility."

Interrogation around the world

United Kingdom

British legislation that applies to interrogation activities include:

- Human Rights Act 1998
- Regulation of Investigatory Powers Act 2000
- Anti-terrorism, Crime and Security Act 2001
- Terrorism Act 2006

All police officers are trained in interview techniques during basic training, further training in detailed interviewing or specialist interviewing is received in specialist or advanced courses, such as criminal investigation, fraud investigation or child protection.

Military interrogation takes two forms, Tactical Questioning or Detailed Interviewing. Tactical Questioning is the initial screening of detainees, Detailed Interviewing takes place is the more advanced questioning of subjects.

Training for all personnel engaged in both TQ and DI takes place at the Defence Intelligence and Security Centre, Chicksands.

British military personnel were found to have misused a number of techniques during the detention of suspects in Northern Ireland in the early 1970s. Investigations into these techniques resulted in the publication of policy directives that prohibited the use of hooding, stress positions or wall-standing, noise, sleep deprivation and deprivation of food and drink.

During the early stages of Operation Telic in Iraq during 2003 and 2004 some infantry units have been found to have applied these techniques in contravention of standing orders.

The use of torture is explicitly prohibited however Human Rights Watch and Amnesty International have accused officers of the British Intelligence and Security Services of being at least complicit in the extraction of information from subjects under torture by second parties.

USA

Cold War

War On Terror

Torture has never been authorized or permitted for use at Guantanamo Bay or any other U.S. Department of Defense detention/internment/prisoner of war facility on any person be they an enemy prisoner of war, detainee, retainee, protected person, lawful or unlawful enemy combatant though there have been people who have reported being tortured at Guantanamo Bay.

Torture, in this context, is a war crime. Specifically, a grave violation of the Law of Land Warfare. War Crimes are punishable under U.S. Code as well as the U.S. Code of Military Justice. There is no statute of limitations for War Crimes. Instances of criminal behavior by military, civilian, and contract personnel of the U.S. Department of Defense has happened and has happened with regard to Geneva Category prisoners and detainees. Criminal behavior in this context may range from mishandling to abuse to torture. Military Commanders investigate rigorously any accusation of prisoner mishandling, abuse, or torture. The military continues to vigorously prosecute any such unlawful activity.

Army regulations and policy have always been clear, the torture or coercion of an enemy prisoner of war during interrogation, or in any other circumstance, is not only unlawful but also an unproductive and unreliable method for gaining information. In addition, US Army interrogation procedures continue to stress that all detained or captured persons will be treated as Geneva Category Enemy Prisoners of War until determined otherwise by a duly constituted military tribunal.

U.S. Air Force General Jack L. Rives (Deputy Judge Advocate General) advised a U.S. government task force that many of the extreme methods of interrogation would leave service personnel open to legal sanction in the U.S. and foreign countries.

Movement for increased recording of interrogations in the US

Currently, there is a movement for mandatory electronic recording of all custodial interrogations in the United States. "Electronic recording" describes the process of recording interrogations from start to finish. This is in contrast to a "taped" or "recorded confession," which typically only includes the final statement of the suspect. "Taped interrogation" is the traditional term for this process; however, as analog is becoming less and less common, statutes and scholars are referring to the process as "electronically recording" interviews or interrogations. Alaska, Illinois, Maine, Minnesota, and Wisconsin are the only states to require taped interrogation. New Jersey's taping requirement started on January 1, 2006. Massachusetts allows jury instructions that state that the courts prefer taped interrogations. Commander Neil Nelson of the St. Paul Police Department, an expert in taped interrogation, has described taped interrogation in Minnesota as the "best thing ever rammed down our throats."

Good cop/bad cop

Good cop/bad cop, known in British military circles as Mutt and Jeff (from an American newspaper comic strip of that name) and also called joint questioning and friend and foe, is a psychological tactic used for interrogation.

'Good cop/bad cop' tactics involves a team of two interrogators who take apparently opposing approaches to the subject. The interrogators may interview the subject alternately or may confront the subject at the same time.

The 'bad cop' takes an aggressive, negative stance towards the subject, making blatant accusations, derogatory comments, threats, and in general creating antipathy between the subject and himself. This sets the stage for the 'good cop' to act sympathetically: appearing supportive, understanding, in general showing sympathy for the subject. The good cop will also defend the subject from the bad cop. The subject may feel he can cooperate with the good cop out of trust and/or fear of the bad cop. He may then seek protection by and trust the good cop and tell him the needed information.

It is not uncommon for a subject to testify falsely against other subjects under the good-cop/bad-cop duress, only to recant the testimony at a later point when the psychological stress is no longer present.

The technique is especially useful against subjects who are young, frightened, or naïve. Using the technique on those familiar with it may still cause an instinctive psychological response. However, as they are aware of the attempted manipulation, they may just close-down entirely or try to disrupt the procedure (see below). Experienced interrogators assess the subject's level of intelligence and experience with the technique prior to its application. There are various countermeasures available that can disrupt the tactic or cause it to backfire:

An experienced subject may choose to deliberately bait the 'bad cop' with provocative behavior of his own short of violent provocation (derogatory remarks about the bad cop or his family, racial, ethnic and gender slurs if applicable, offensive gestures, etc.), hoping that the 'bad cop' will lose self-control and react violently towards the subject. Most liberal democracies expect the utmost professionalism from law enforcement personnel, so any physical violence towards a subject during interrogation in the absence of bona fide physical provocation could compromise the prosecution's case and/or lead to civil and/or criminal legal consequences for the interrogators.

Severe verbal abuse or otherwise insulting behavior targeted at the 'good cop' has also proven highly disruptive on occasion.

It is a common dramatic technique in American cinema, where the bad cop often goes beyond legal behavior.

Pride-and-ego down

Pride-and-ego down is a US Army term that refers to techniques used by captors in interrogating prisoners to encourage cooperation, usually consisting of "attacking the source's sense of personal worth" and in an "attempt to redeem his pride, the source will usually involuntarily provide pertinent information in attempting to vindicate himself."

Official documents state that such techniques should not go "beyond the limits that would apply to an EPW [enemy prisoner of war]."

US Army Definition from FM 2-22.3

8-45. (Interrogation) The emotional-pride and ego-down approach is based on attacking the source's ego or self-image. The source, in defending his ego, reveals information to justify or rationalize his actions. This information may be valuable in answering collection requirements or may give the [human intelligence] HUMINT collector insight into the viability of other approaches. This approach is effective with sources who have displayed weakness or feelings of inferiority. A real or imaginary deficiency voiced about the source, loyalty to his organization, or any other feature can provide a basis for this technique.

8-46. The HUMINT collector accuses the source of weakness or implies he is unable to do a certain thing. This type of source is also prone to excuses and rationalizations, often shifting the blame to others. An example of this technique is opening the collection effort with the question, "Why did you surrender so easily when you could have escaped by crossing the nearby ford in the river?" The source is likely to provide a basis for further questions or to reveal significant information if he attempts to explain his surrender in order to vindicate himself. He may give an answer such as, "No one could cross the ford because it is mined."

8-47. The objective is for the HUMINT collector to use the source's sense of pride by attacking his loyalty, intelligence, abilities, leadership qualities, slovenly appearance, or any other perceived weakness. This will usually goad the source into becoming defensive, and he will try to convince the HUMINT collector he is wrong. In his attempt to redeem his pride and explain his actions, the source may provide pertinent information. Possible targets for the emotional-pride and ego-down approach are the source's—

- Loyalty.
- Technical competence.
- Leadership abilities.
- Soldierly qualities.
- Appearance.

8-48. There is a risk associated with this approach. If the emotional-pride and ego-down approach fails, it is difficult for the HUMINT collector to recover and move to another approach without losing his credibility. Also, there is potential for application of the pride and ego approach to cross the line into humiliating and degrading treatment of the detainee. Supervisors should consider the experience level of their subordinates and determine specifically how the interrogator intends to apply the approach technique before approving the interrogation plan.

FM 34-52 Intelligence Interrogation

The US Army Field Manual on Interrogation, sometimes known by the military nomenclature FM 34-52, is a 177-page manual describing to military interrogators how to

conduct effective interrogations while conforming with US and international law. It has been replaced by FM 2-22.3 Human Intelligence Collector Operations.

Interrogations during the 'global war on terror'

Release of the replacement manual in 2006

During the American war on terror the Secretary of Defense Donald Rumsfeld issued "enhanced interrogation techniques" that went farther than those authorized in the Army Field Manual. The extended techniques stimulated debate, both within the Bush administration, and outside it. Various revisions of the extended techniques were issued.

Rumsfeld intended the extended techniques to be used only on the captives the United States classified as "illegal combatants." But extended interrogation techniques were adopted in Iraq, even though captives there were entitled to protection under the Geneva Conventions. General Geoffrey Miller, who was then the director of interrogation of detainees held in Guantanamo Bay, and some of his staff were sent to Iraq to help transfer their interrogation experience. Military Intelligence troops had been using extended techniques in Afghanistan, notably Captain Carolyn Wood. General Ricardo Sanchez, the CO of American forces in Iraq, after input from Miller and his team, and from Captain Wood, issued his own set of extended techniques.

Tension with U.S. military tradition and training

Since it was issued by President Dwight D. Eisenhower, who took office shortly after the famous Nuremberg Trials that prosecuted prominent German officials for alleged war crimes committed in World War II involving treatment of detainees and prisoners of war, U.S. military forces have been trained to follow a General Order known as the Code of the U.S. Fighting Force. It provides in relevant part:

   a. When questioned, should I become a prisoner of war, I am required to give name, rank, service number, and date of birth. I will evade answering further questions to the utmost of my ability. I will make no oral or written statements disloyal to my country and its allies or harmful to their cause.

   b. When questioned, a prisoner of war is required by the Geneva Convention and this code to give name, rank, service number (Social Security number) and date of birth. The prisoner should make every effort to avoid giving the captor any additional information. The prisoner may communicate with captors on matters of health and welfare and additionally may write letters home and fill out a Geneva Convention "capture card."

   c. It is a violation of the Geneva Convention to place a prisoner under physical or mental duress, torture or any other form of coercion in an effort to secure information.

As a General Order, violation of the Code is a prosecutable offense under various provisions of the Uniform Code of Military Justice. Although intended to the duties of captured

members of the U.S. military, the Code provides U.S. combatants with an understood definition of the rights of prisoners under the Geneva Convention. It is therefore understandable that members of the military, who are themselves subject to the occupational hazard of being taken prisoner, might resist political pressure to depart from the Geneva Convention's ethic of reciprocity regarding warring powers' treatment of those captured on the battlefield.

Detainee Treatment Act

On July 25, 2005 Senator John McCain — a POW and torture victim during the Vietnam War — submitted an amendment to a military spending bill, intended to restrict all US government interrogators from using interrogation techniques not authorized in the Army Field Manual.

On October 20, 2005 Vice President Dick Cheney met with McCain to try to convince him to agree that his amendment should only apply to military interrogators. Cheney wanted to continue to allow civilian interrogators, working for US intelligence agencies, to use more extended interrogation techniques. McCain did not agree.

McCain's amendment passed, and is now called the Detainee Treatment Act.

Plans to revise the manual to allow extended techniques

On April 28, 2005 Defense Secretary Rumsfeld announced that the Army would be revising the manual. The revised manual would have spelled out more clearly which interrogation techniques were prohibited.

On December 14, 2005, the New York Times reported that the Army Field Manual had been rewritten by the Pentagon. Previously, the manual's interrogation techniques section could be read freely on the internet. But the new edition includes 10 classified pages in the interrogation technique section, leaving the public no indication about what the government considers not to be torture.

On June 5, 2006 the Los Angeles Times reported that the Pentagon's revisions will remove the proscription against "humiliating and degrading treatment", and other proscriptions from article 3 of the third Geneva Convention. The LA Times reports that the State Department has argued against the revisions because of the effect it will have on the world's opinion of the United States.

In 2006 there was an ongoing debate over whether the interrogation section should be classified. The New York Times reported that the Pentagon was considering making the interrogation section public once again, but the Pentagon made no formal announcement of its intentions.

On September 6, 2006, the U.S. Army announced the publication of Field Manual (FM) 2-22.3, "Human Intelligence Collector Operations." The Army's news release stated that Field

Manual 2-22.3 replaces Field Manual 34-52 (published in 1992). The new manual specifically prohibits many of the controversial enhanced interrogation techniques (including "waterboarding") which brought the matter to public attention, and also stipulates that the list is not all-inclusive of prohibited actions.

Reid technique

The Reid Technique is a method of questioning subjects and assessing their credibility. The technique consists of a non-accusatory interview combining both investigative and behavior-provoking questions. If the investigative information indicates that the subject committed the crime in question, the Reid Nine Steps of Interrogation are utilized to persuade the subject to tell the truth about what they did.

The Reid technique involves three different components — factual analysis, interviewing, and interrogation. While each of these are separate and distinct procedures, they are interrelated in the sense that each serves to help eliminate innocent suspects during an investigation, thereby allowing the investigator to focus upon the person most likely to be guilty. Interrogating that individual then becomes foremost in the effort to learn the truth. Supporters argue the Reid Technique is useful in extracting information from otherwise unwilling suspects, while critics have charged the technique can elicit false confessions from innocent persons, especially children. The use of the Reid Technique on youth is prohibited in Great Britain because of the incidence of false confessions and the wrongful convictions that result.

The term "Reid Technique" is a registered trademark of the firm John E. Reid and Associates, which offers training courses in the method they have devised. The technique is widely used by law-enforcement agencies in North America

Factual Analysis

Both an interview as well as an interrogation are facilitated by analysis of investigative findings. Proper factual analysis assists the investigator in the following ways:

- Eliminate improbable suspects
- Develop possible suspects or leads
- Increase confidence in identifying truthful or guilty suspects through the interview process
- Identify proper interrogation strategies

The Behavior Analysis Interview

The word "interview" refers to a non-accusatory question and answer session with a witness, victim or a suspect. In addition to standard investigative questions, structured "behavior provoking" questions are asked to elicit behavior symptoms from the person

being interviewed which indicate either truth or deception. This structured procedure is referred to as a Behavior Analysis Interview (or BAI).

"Interrogation," on the other hand, is an accusatory process — accusatory only in the sense that the investigator tells the suspect that there is no doubt as to his guilt. The interrogation is in the form of a monologue presented by the investigator, rather than a question and answer format.

The actual demeanor of the investigator during the course of an interrogation is understanding, patient, and non-demeaning. His or her goal is to make the suspect progressively more and more comfortable with acknowledging the truth about what they have done. This is accomplished by offering the subject psychological justification for their behavior.

The first admission of guilt is usually obtained by asking the alternative question - Did you plan this out or did it just happen on the spur of the moment?" Once the subject acknowledges their guilt then active persuasion stops and the interrogator attempts to develop from the subject corroborating information that can be used to establish the credibility of the confession.

The Reid Technique's Nine Steps of Interrogation

- **Step 1** - Direct Confrontation. Lead the suspect to understand that the evidence has led the police to the individual as a suspect. Offer the person an early opportunity to explain why the offense took place.
- **Step 2** - Try to shift the blame away from the suspect to some other person or set of circumstances that prompted the suspect to commit the crime. That is, develop themes containing reasons that will justify or excuse the crime. Themes may be developed or changed to find one to which the accused is most responsive.
- **Step 3** - Try to discourage the suspect from denying his guilt. Reid training video: "If you've let him talk and say the words 'I didn't do it', and the more often a person says 'I didn't do it', the more difficult it is to get a confession."
- **Step 4** - At this point, the accused will often give a reason why he or she did not or could not commit the crime. Try to use this to move towards the confession.
- **Step 5** - Reinforce sincerity to ensure that the suspect is receptive.
- **Step 6** - The suspect will become quieter and listen. Move the theme discussion towards offering alternatives. If the suspect cries at this point, infer guilt.
- **Step 7** - Pose the "alternative question", giving two choices for what happened; one more socially acceptable than the other. The suspect is expected to choose the easier option but whichever alternative the suspect chooses, guilt is admitted. There is always a third option which is to maintain that they did not commit the crime.
- **Step 8** - Lead the suspect to repeat the admission of guilt in front of witnesses and develop corroborating information to establish the validity of the confession.
- **Step 9** - Document the suspect's admission and have him or her prepare a recorded statement (audio, video or written).

Rubber-hose cryptanalysis

In cryptography, rubber-hose cryptanalysis is the extraction of cryptographic secrets (e.g. the password to an encrypted file) from a person by coercion or torture, in contrast to a mathematical or technical cryptanalytic attack.

The euphemistic term refers to beating someone with a rubber hose until they cooperate.

According to Amnesty International and the UN, many countries in the world routinely torture people. It is therefore logical to assume that at least some of those countries use (or would be willing to use) some form of rubber-hose cryptanalysis. In practice, psychological coercion can prove as effective as physical torture. Non-violent but highly intimidating methods include such tactics as the threat of harsh legal penalties. The incentive to cooperate may be some form of plea bargain, such as an offer to drop or reduce criminal charges against a suspect in return for full co-operation with investigators. Alternatively, in some countries threats may be made to prosecute as co-conspirators (or inflict violence on) close relatives (e.g. wife, children or parents) of the person being questioned unless they co-operate.

Although the term is used tongue-in-cheek, its implications are serious: in modern cryptosystems, the weakest link is often the human user. A direct attack on a cipher algorithm, or the cryptographic protocols used, will likely be much more expensive and difficult than targeting the users of the system. Thus, many cryptosystems and security systems are designed with special emphasis on keeping human vulnerability to a minimum. For example, in public-key cryptography, the defender may hold the key to encrypt the message, but not the decryption key needed to decipher it. The problem here is that the defender may be unable to convince the attacker to stop coercion. In deniable encryption, a second key is created which unlocks a second convincing but relatively harmless message (for example, apparently personal writings expressing "deviant" thoughts or desires of some type that are lawful but taboo), so the defender can prove to have handed over the keys whilst the attacker remains unaware of the primary hidden message. The designer expectation is that rational adversaries will realize this, and forgo threats or actual torture.

In some jurisdictions, statutes assume the opposite — that human operators know (or have access to) such things as session keys, an assumption which parallels that made by rubber-hose practitioners. An example is the United Kingdom's Regulation of Investigatory Powers Act, which makes it a crime not to surrender encryption keys on demand from a government official authorized by the act — irrespective of whether or not there are reasonable grounds for even suspecting that the data encrypted held any illegal material.

According to the Home Office, the burden of proof that an accused person is in possession of a key rests on the prosecution; moreover, the act contains a defence for operators who have lost or forgotten a key, and they are not liable if they are judged to have done what they can to recover a key. However in such cases, the prosecution only has to prove that the

accused had the key at some arbitrary time in the past - regardless of whether they still have it.

Resistance to interrogation

R2I or resistance to interrogation is a name for a set of techniques taught to UK, and other NATO soldiers ostensibly to help them, after capture by the enemy, to resist interrogation techniques such as humiliation and torture.

The trainees undergo practices such as hooding, sleep deprivation, time disorientation, prolonged nakedness, sexual humiliation and deprivation of warmth, water and food. Many of these techniques are against international law if used in interrogations.

According to The Guardian this training influenced the interrogation of Iraqi detainees by US soldiers at Abu Ghraib prison. These techniques were allegedly taught specifically to US military intelligence officers who later went to Iraq to perform interrogations. The story in The Guardian tells of a correlation between techniques routinely used in RTI and those allegedly used on prisoners at Abu Ghraib, but offers no definitive proof of causation.

Standard RTI for most special military branches of American and European governments covers both tortures that are condemned by the United Nations and interrogation techniques that are considered legitimate, usually presented along a sliding scale. I.e. a soldier would be subjected to slight discomforts before being subjected to more tortuous techniques.

The most intense RTI was supposedly carried out by the Russian special purpose regiment (Spetsnaz) when the Soviet Union was still intact. The training of this regiment (more accurately referred to as a Corps as there were as many as 20,000 members at its peak) was world-renowned, especially in military circles, for its brutality.

RTI is a product of the market for military information, which has been in place since as early as when Sun Tzu wrote The Art of War. Especially moving into modern times, when information and technology is often more important than numbers in combat, and when torture has been used less often to humiliate and more often to exact information, RTI has become a integral part of military training in most Western countries in one way or another.

Enhanced interrogation techniques

Enhanced interrogation techniques or alternative set of procedures were terms adopted by the George W. Bush administration in the United States to describe interrogation methods used by US military intelligence and the Central Intelligence Agency (CIA) to extract information from individuals captured in the "War on Terror" after the September 11 attacks in 2001.

The Obama administration in 2009 stated it would abide by the Geneva Convention and described some of the techniques as torture.

Central Intelligence Agency

A Congressional bipartisan report in December 2008 established that:

harsh interrogation techniques used by the CIA and the U.S. military were directly adapted from the training techniques used to prepare special forces personnel to resist interrogation by enemies that torture and abuse prisoners. The techniques included forced nudity, painful stress positions, sleep deprivation, and until 2003, waterboarding, a form of simulated drowning.

According to ABC News, former and current CIA officials have come forward to reveal details of interrogation techniques authorized in the CIA. These include:

- Waterboarding: The prisoner is bound to an inclined board, feet raised and head slightly below the feet. Material is wrapped over the prisoner's face and water is poured over them, asphyxiating the prisoner.
- Hypothermia: The prisoner is left to stand naked in a cell kept near 50 degrees Fahrenheit (10 degrees Celsius), while being regularly doused with cold water in order to increase the rate at which heat is lost from the body. (A water temperature of 10 °C (50 °F) often leads to death in one hour.)
- Stress positions: Prisoners are forced to stand, handcuffed and with their feet shackled to an eye bolt in the floor, for more than 40 hours, causing the prisoners weight to be placed on just one or two muscles. This creates an intense amount of pressure on the legs, leading first to pain and then muscle failure.
- Abdomen strikes: A hard, open-handed slap is dealt to the prisoner's abdomen. Doctors consulted over the matter advised against using a punch, which could cause lasting internal damage.
- Slapping: An open-handed slap is delivered to the prisoner's face, aimed at causing pain and triggering fear.
- Shaking: The interrogator forcefully grabs the front of the prisoner's shirt and shakes them.

In December 2007 CIA director Michael Hayden stated that "of about 100 prisoners held to date in the CIA program, the enhanced techniques were used on about 30, and waterboarding used on just three.".

The report, "Experiments in Torture: Human Subject Research and Evidence of Experimentation in the 'Enhanced' Interrogation Program", published by the advocacy group Physicians for Human Rights, described personnel in the CIA's Office of Medical Services (OMS) performing research on the prisoners as the above techniques were used both serially and in combination. This report was based on previously classified documents made available by the Obama administration in 2010.

According to an item on ABC news in 2007 the CIA removed waterboarding from its list of enhanced interrogation techniques in 2006. ABC stated further that the last use of waterboarding was in 2003.

Department of Defense

The following techniques were being used by the U.S. military:

- Yelling
- Loud music, and light control
- Environmental manipulation
- Sleep deprivation/adjustment
- Stress positions
- 20-hour interrogations
- Controlled fear (muzzled dogs)

In November 2006, former US army Brigadier General Janis Karpinski, in charge of Abu Ghraib prison until early 2004, told Spain's El Pais newspaper she had seen a letter signed by United States Secretary of Defense Donald Rumsfeld that allowed civilian contractors to use techniques such as sleep deprivation during interrogation.'"The methods consisted of making prisoners stand for long periods, sleep deprivation ... playing music at full volume, having to sit in uncomfortably ... Rumsfeld authorised these specific techniques." She said that this was contrary to the Geneva Conventions and quoted the Geneva Convention as saying, "Prisoners of war who refuse to answer may not be threatened, insulted, or exposed to any unpleasant or disadvantageous treatment of any kind." According to Karpinski, the handwritten signature was above his printed name and in the same handwriting in the margin was written, "Make sure this is accomplished."

On May 1, 2005, The New York Times reported on an ongoing high-level military investigation into accusations of detainee abuse at Guantánamo, conducted by Lieutenant General Randall M. Schmidt of the Air Force, and dealing with: "accounts by agents for the Federal Bureau of Investigation who complained after witnessing detainees subjected to several forms of harsh treatment. The FBI agents wrote in memorandums that were never meant to be disclosed publicly that they had seen female interrogators forcibly squeeze male prisoners' genitals, and that they had witnessed other detainees stripped and shackled low to the floor for many hours."

On July 12, 2005, members of a military panel told the committee that they proposed disciplining prison commander Major General Geoffrey Miller over the interrogation of Mohammed al Qahtani, who was forced to wear a bra, dance with another man, and threatened with dogs. The recommendation was overruled by General Bantz J. Craddock, commander of US Southern Command, who referred the matter to the army's inspector general.

In an interview with AP on February 14, 2008 Paul Rester, chief military interrogator at Guantanamo Bay and director of the Joint Intelligence Group, said most of the information

gathered from detainees came from non-coercive questioning and "rapport building," not harsh interrogation methods.

Development of techniques, and training

The CIA interrogation strategies were based on work done by James Elmer Mitchell and Bruce Jessen in the Air Force's Survival Evasion Resistance Escape (SERE) program. The CIA contracted with the two psychologists to develop alternative, harsh interrogation techniques. However, neither of the two psychologists had any experience in conducting interrogations. Air Force Reserve Colonel Steve Kleinman stated that the CIA "chose two clinical psychologists who had no intelligence background whatsoever, who had never conducted an interrogation... to do something that had never been proven in the real world." Associates of Mitchell and Jessen were skeptical of their methods and believed they did not possess any data about the impact of SERE training on the human psyche. The CIA came to learn that Mitchell and Jessen's expertise in waterboarding was probably "misrepresented" and thus, there was no reason to believe it was medically safe or effective. Despite these shortcomings of experience and know-how, the two psychologists boasted of being paid $1000 a day plus expenses, tax-free by the CIA for their work.

The SERE program, which Mitchell and Jessen would reverse engineer, was originally designed to be defensive in nature and was used to train pilots and other soldiers on how to resist harsh interrogation techniques and torture were they to fall into enemy hands. The program subjected trainees to torture techniques such as "waterboarding . . . sleep deprivation, isolation, exposure to extreme temperatures, enclosure in tiny spaces, bombardment with agonizing sounds at extremely damaging decibel levels, and religious and sexual humiliation." Under CIA supervision, Miller and Jessen adapted SERE into an offensive program designed to train CIA agents on how to use the harsh interrogation techniques to gather information from terrorist detainees. In fact, all of the tactics listed above would later be reported in the International Committee of the Red Cross Report on Fourteen High Value Detainees in CIA Custody as having been used on Abu Zubaydah.

Stephen Soldz, Steven Reisner and Brad Olson wrote an article describing how the techniques used mimic what was taught in the SERE-program: "the military's Survival, Evasion, Resistance, and Escape program that trains US Special Operations Forces, aviators and others at high risk of capture on the battlefield to evade capture and to resist 'breaking' under torture, particularly through giving false confessions or collaborating with their captors".

The psychologists relied heavily on experiments done by American psychologist Martin Seligman in the 1970s on learned helplessness. In these experiments caged dogs were exposed to severe electric shocks in a random way in order to completely break their will to resist. Mitchell and Jessen applied this idea to Abu Zubaydah during his interrogation. Many of the interrogation techniques used in the SERE program, including waterboarding, cold cell, long-time standing, and sleep deprivation were previously considered illegal under U.S. and international law and treaties at the time of Abu Zubaydah's capture. In fact, the United States had prosecuted Japanese military officials after World War II and

American soldiers after the Vietnam War for waterboarding and as recently as 1983. Since 1930, the United States had defined sleep deprivation as an illegal form of torture. Many other techniques developed by the CIA constitute inhuman and degrading treatment and torture under the United Nations Convention against Torture and Article 3 of the European Convention on Human Rights.

According to Human Rights First:

   Internal FBI memos and press reports have pointed to SERE training as the basis for some of the harshest techniques authorised for use on detainees by the Pentagon in 2002 and 2003.

And Salon stated:

   A March 22, 2005, sworn statement by the former chief of the Interrogation Control Element at Guantánamo said instructors from SERE also taught their methods to interrogators of the prisoners in Cuba.

While Jane Mayer reported for The New Yorker:

   According to the sere affiliate and two other sources familiar with the program, after September 11th several psychologists versed in SERE techniques began advising interrogators at Guantánamo Bay and elsewhere. Some of these psychologists essentially "tried to reverse-engineer" the SERE program, as the affiliate put it. "They took good knowledge and used it in a bad way," another of the sources said. Interrogators and BSCT members at Guantánamo adopted coercive techniques similar to those employed in the SERE program.

and continues to report:

   many of the interrogation methods used in SERE training seem to have been applied at Guantánamo.."

A bipartisan report in released 2008 stated that:

   a February 2002 memorandum signed by President George W. Bush, stating that the Third Geneva Convention guaranteeing humane treatment to prisoners of war did not apply to al-Qaeda or Taliban detainees, and a December 2002 memo signed by former Defense Secretary Donald Rumsfeld, approving the use of "aggressive techniques" against detainees held at Guantanamo Bay, as key factors that lead to the extensive abuses.

 Approval of techniques by U.S. officials

In early 2002, immediately following Abu Zubaydah's capture, top US Government officials including Dick Cheney, Colin Powell, George Tenet, Condoleezza Rice, Donald Rumsfeld, and John Ashcroft discussed at length whether or not the CIA could legally use harsh

techniques against Abu Zubaydah. Condoleezza Rice specifically mentioned the SERE program during the meeting stating "I recall being told that U.S. military personnel were subjected to training to certain physical and psychological interrogation techniques…"

ABC News reported on April 9, 2008 that "the most senior Bush administration officials discussed and approved specific details of how high-value al Qaeda suspects would be interrogated by the Central Intelligence Agency." The article states that those involved included:

Vice President Cheney, former National Security Advisor Condoleezza Rice, Defense Secretary Donald Rumsfeld and Secretary of State Colin Powell, as well as CIA Director George Tenet and Attorney General John Ashcroft.

In addition, in 2002 and 2003, several Democratic congressional leaders were briefed on the proposed "enhanced interrogation techniques." These congressional leaders included Nancy Pelosi, the future Speaker of the House, and Representative Jane Harman. Congressional officials have stated that the attitude in the briefings was "quiet acquiescence, if not downright support." Senator Bob Graham, who CIA records claim was present at the briefings, has stated that he was not briefed on waterboarding in 2002 and that CIA attendance records clash with his personal journal. Harman was the only congressional leader to object to the tactics being proposed. It is of note that in a 2007 report by investigator Dick Marty on secret CIA prisons, the phrase "enhanced interrogations" was stated to be a euphemism for torture. The documents show that top U.S. Officials were intimately involved in the discussion and approval of the harsher interrogation techniques used on Abu Zubaydah.

Condoleezza Rice ultimately told the CIA the harsher interrogation tactics were acceptable, In 2009 Rice stated, "We never tortured anyone." And Dick Cheney stated "I signed off on it; so did others." In 2010, Cheney remained unrepentant, saying, "I was and remain a strong proponent of our enhanced interrogation program." Pressed on his personal view of waterboarding, Karl Rove told the BBC in 2010: "I'm proud that we kept the world safer than it was, by the use of these techniques. They're appropriate, they're in conformity with our international requirements and with US law." During the discussions John Ashcroft is reported as saying "Why are we talking about this in the White House? History will not judge this kindly."

At least one adviser to Condoleezza Rice, Philip Zelikow, opposed the new, harsher interrogation techniques. Upon reading the August 1, 2002 memo which justified the torture, Zelikow authored his own memo contesting the Justice Department's conclusions, believing them wrong both legally and as a matter of policy. The Bush Administration attempted to collect all of the copies of Zelikow's memo and destroy them. Jane Mayer, author of the Dark Side, quotes Zelikow as predicting that "America's descent into torture will in time be viewed like the Japanese internments," in that "(f)ear and anxiety were exploited by zealots and fools."

Initial reports and complaints

Senior law enforcement agents with the Criminal Investigation Task Force told MSNBC.com in 2006 that they began to complain inside the U.S. Department of Defense in 2002 that the interrogation tactics used in Guantanamo Bay by a separate team of military intelligence investigators were unproductive, not likely to produce reliable information, and probably illegal. Unable to get satisfaction from the army commanders running the detainee camp, they took their concerns to David Brant, director of the Naval Criminal Investigative Service (NCIS), who alerted Navy General Counsel Alberto J. Mora.

General Counsel Mora and Navy Judge Advocate General Michael Lohr believed the detainee treatment to be unlawful, and campaigned among other top lawyers and officials in the Defense Department to investigate, and to provide clear standards prohibiting coercive interrogation tactics. In response, on January 15, 2003, Rumsfeld suspended the approved interrogation tactics at Guantánamo Bay until a new set of guidelines could be produced by a working group headed by General Counsel of the Air Force Mary Walker. The working group based its new guidelines on a legal memo from the United States Department of Justice Office of Legal Counsel written by John Yoo and signed by Jay S. Bybee, which would later become widely known as the "Torture Memo." General Counsel Mora led a faction of the Working Group in arguing against these standards, and argued the issues with Yoo in person. The working group's final report was signed and delivered to Guantánamo without the knowledge of Mora and the others who had opposed its content. Nonetheless, Mora has maintained that detainee treatment has been consistent with the law since the January 15, 2003 suspension of previously approved interrogation tactics.

Public positions and reactions

Official position of the Bush Administration

President Bush stated "The United States of America does not torture. And that's important for people around the world to understand." The administration adopted the Detainee Treatment Act of 2005 to address the multitude of incidents of detainee abuse. However, in his signing statement, Bush made clear that he reserved the right to waive this bill if he thought that was needed.

The Washington Post reported in January 2009 that Susan J. Crawford, convening authority of military commissions, stated in response to the interrogation of Mohammed al-Qahtani, one of the so-called "20th hijacker" of the September 11 attacks:

"The techniques they used were all authorized, but the manner in which they applied them was overly aggressive and too persistent... You think of torture, you think of some horrendous physical act done to an individual. This was not any one particular act; this was just a combination of things that had a medical impact on him, that hurt his health. It was abusive and uncalled for. And coercive. Clearly coercive. It was that medical impact that pushed me over the edge", i.e., to call it torture.

The reason Crawford decided not to prosecute al-Qahtani was because his treatment fell within the definition of torture.

Comment from Donald Rumsfeld: "I stand for 8-10 hours a day. Why is standing [by prisoners] limited to four hours?"

According to the February 16, 2008 edition of The Economist, Rumsfeld also wrote in a 2002 memo; "I stand for 8-10 hours a day. Why is standing (by prisoners) limited to four hours?" There have been no comments from either the Pentagon or US army spokespeople in Iraq on Karpinski's accusations.

Debates about whether "enhanced interrogation" constitutes torture

Former President Bush in his published memoirs defends the utility of "enhanced interrogation" techniques and asserts that they are not torture.

However, President Obama, Attorney General Holder, and Guantanamo military prosecutor Crawford called some of the techniques torture. The British government has determined the techniques would be classified as torture, and dismissed President Bush's claim to the contrary. A report by Human Rights First (HRF) and Physicians for Human Rights (PFH) stated that these techniques constitute torture. They also cite the U.S. Office of the Inspector General report which concluded that "SERE-type interrogation techniques constitute 'physical or mental torture and coercion under the Geneva conventions.'" A United Nations report denounced the US abuse of prisoners as tantamount to torture. The UN report called for cessation of the US-termed "enhanced interrogation" techniques, as the UN sees these methods as a form of torture. The UN report also admonishes against secret prisons, the use of which, is considered to amount to torture as well and should be discontinued.

The US press has been hesitant to call enhanced interrogation torture because as Paul Kane of the Washington Post explained, torture is a crime and nobody who engaged in "enhanced interrogation" has been charged or convicted. The New York Times terms the techniques "harsh" and "brutal" while avoiding the word "torture" in most but not all news articles, though it routinely calls "enhanced interrogation" torture in editorials.

Following NPR's controversial ban on using the word torture and Ombudsman Alica Shepard's defense of the policy that "calling waterboarding torture is tantamount to taking sides", Berkeley Professor of Linguistics Geoffrey Nunberg pointed out that virtually all media around the world, other than what he called the "spineless U.S. media", call these techniques torture. In an article on the euphemisms invented by the media that also criticized NPR, Glenn Greenwald discussed the enabling "corruption of American journalism":

This active media complicity in concealing that our Government created a systematic torture regime, by refusing ever to say so, is one of the principal reasons it was allowed to happen for so long. The steadfast, ongoing refusal of our leading media institutions to refer to what the Bush administration did as "torture" -- even in the face of more than 100 detainee deaths; the use of that term by a leading Bush official to describe what was done

at Guantanamo; and the fact that media outlets frequently use the word "torture" to describe the exact same methods when used by other countries --reveals much about how the modern journalist thinks.

Atlantic Monthly writer Andrew Sullivan asserts the first use of a term comparable to "enhanced interrogation" was a 1937 memo by Gestapo Chief Heinrich Muller coining the phrase "Verschärfte Vernehmung," German for (according to Sullivan) "sharpened," "intensified" or "enhanced interrogation" to describe subjection to extreme cold, sleep deprivation, and deliberate exhaustion among other techniques. Sullivan reports that in 1948 Norway prosecuted German officials for what trial documents termed "Verschärfte Vernehmung" including subjection to cold water, and repeated beatings. It is as yet unclear when US government officials first adopted the term enhanced interrogation, and there is no evidence they were aware of its antecedents in Gestapo terminology.

Debates concerning effectiveness or reliability of techniques

Also, according to the New York Times:

Experts advising the Bush administration on new interrogation rules warn that harsh techniques used since 2001 terrorist attacks are outmoded, amateurish and unreliable.

The Washington Post described the report by the Intelligence Science Board:

There is almost no scientific evidence to back up the U.S. intelligence community's use of controversial interrogation techniques in the fight against terrorism, and experts believe some painful and coercive approaches could hinder the ability to get good information, according to a new report from an intelligence advisory group.

The so-called ticking time bomb scenario is frequently used to try to justify extreme interrogation. Michael Chertoff, the Homeland Security Chief under Bush, declared that the TV series 24 "reflects real life" - despite the series depicting its main character as encountering different "ticking time bombs" 12 times a day on average. Dick Cheney stated: "I know specifically of reports... that lay out what we learnt through the interrogation process and what the consequences were for the country", however the only examples publicly released that attempt to support this claim are:

The claim that the waterboarding of Khalid Shaikh Mohammed helped prevent a planned attack on Los Angeles in 2002 - which ignores the fact that he wasn't captured until 2003, and
Ibn al-Shaykh al-Libi who had confessed that Iraq had trained al Qaeda in the use of weapons of mass destruction which was then used as justification for the subsequent invasion of Iraq - a confession now known to be false.

An academic analysis by Professor Shane O'Mara of the Trinity College Institute of Neuroscience concluded that "Prolonged stress from the CIA's harsh interrogations could

have impaired the memories of terrorist suspects, diminishing their ability to recall and provide the detailed information the spy agency sought".

Former Washington Post writer Peter Carlson notes that when it became known U.S. troops were waterboarding Filipino guerrilla fighters in 1898, author Mark Twain remarked,

"To make him confess what? Truth? Or lies? How can one know which it is they are telling? For under unendurable pain a man confesses anything that is required of him, true or false, and his evidence is worthless."

Former CIA operative John Kiriakou in 2007 told CNN's "American Morning" that the torture of Al Qaeda's Abu Zubayda indirectly lead to the arrest of Khalid Sheikh Mohammed:

The former agent, who said he participated in the Abu Zubayda interrogation but not his waterboarding, said the CIA decided to waterboard the al Qaeda operative only after he was "wholly uncooperative" for weeks and refused to answer questions.

All that changed -- and Zubayda reportedly had a divine revelation -- after 30 to 35 seconds of waterboarding, Kiriakou said he learned from the CIA agents who performed the technique.

The terror suspect, who is being held at Guantanamo Bay, Cuba, reportedly gave up information that indirectly led to the the 2003 raid in Pakistan yielding the arrest of Khalid Sheikh Mohammed, an alleged planner of the September 11, 2001, attacks, Kiriakou said.

The CIA was unaware of Mohammed's stature before the Abu Zubayda interrogation, the former agent said.

Former CIA Director Michael Hayden said:

So the point I would make to folks who say, "I don't want you doing this, and it doesn't work anyway," I would point out, "Whoa. Stop. The front half of that sentence, you can say; that's yours, you own that, 'I don't want you doing it.' The back half of that sentence is not yours. That's mine. And the fact is it did work. So here is the sentence you have to give. 'Even though it may have worked, I still don't want you doing it.' That requires courage. That requires you going out to the American people and saying, 'We're looking at a tradeoff here folks, and I want you to understand the tradeoff.'" I can live with that tradeoff. I can live with the person who makes that tradeoff. Either way. That's an honorable position. But I felt duty-bound to be true to the facts.

After the killing of Osama bin Laden, a Washington Post report, quoting U.S. officials including former attorney general Michael Mukasey, asserted that the interrogation of Khalid Sheikh Mohammed and Abu Faraj al-Libbi provided a courier's pseudonym "al-Kuwaiti" which ultimately allowed them to locate Bin Laden. Also Fox News reports that the enhanced interrogation techniques provided key details on Bin Laden's location,

referring to Dick Cheney saying that he "assumes" that enhanced interrogation techniques led to bin Laden's capture. However, Khalid Sheikh Mohammed was not the first one providing this information: U.S. officials said that already shortly after the Sept. 11, 2001, terrorist attacks, detainees in CIA secret prisons told interrogators about the courier's pseudonym "al-Kuwaiti". Later, after Khalid Sheikh Mohammed was captured, he just "confirmed" the courier's pseudonym. After Abu Faraj al-Libbi was captured, he provided bogus information, denying that he knew al-Kuwaiti and making up another name instead.

Military interrogators with knowledge of the sources of the information deny that "enhanced interrogation" eventually led to finding and killing Osama Bin Laden A group of interrogators contradicting former Bush administration Defense Secretary Rumsfeld's claim that "enhanced interrogation" produced the leads that ultimately led to Osama Bin Laden, asserted that the key piece of information, a courier's nickname, was not divulged "during torture, but rather several months later, when [detainees] were questioned by interrogators who did not use abusive techniques."

Columnist Marc Thiessen calls this view "ignorance of how CIA interrogations worked." He asserts that during "enhanced interrogation" the interrogators only asked questions to which they already knew the answers in order "to create a state of cooperation, not to get specific truthful answers to a specific question." They would not have asked for unknown information until after the subject was willing to talk, at which point the techniques would no longer be used.

Senator John McCain, citing CIA Director Leon Panetta, said that the assertion that waterboarding produced information that found Osama Bin Laden is false; all the useful leads were "obtained through standard, noncoercive means." The CIA later provided the Washington Post a letter from CIA Director Penetta to Senator McCain that confirms that enhanced interrogation techniques did not help and may have hindered the search for Bin Laden by producing false information during interrogations. In the letter CIA Director Panetta wrote Senator McCain that

we first learned about the facilitator/courier's nom de guerre from a detainee not in CIA custody in 2002. It is also important to note that some detainees who were subjected to enhanced interrogation techniques attempted to provide false or misleading information about the facilitator/courier. These attempts to falsify the facilitator/courier's role were alerting. In the end, no detainee in CIA custody revealed the facilitator/courier's full true name or specific whereabouts. This information was discovered through other intelligence means.

Destruction of videotapes

In December 2007 it became known that the CIA had destroyed videotapes depicting prisoners being interrogated. Subsequent disclosures in 2010 revealed that Jose Rodriguez Jr., head of the directorate of operations at the CIA from 2004 to 2007, ordered the tapes destroyed because what they showed was so horrific they would be "devastating to the CIA," and that "the heat from destroying is nothing compared to what it would be if the

tapes ever got into public domain." The New York Times reported that according to "some insiders" an inquiry into the C.I.A.'s secret detention program which analysed these techniques "might end with criminal charges for abusive interrogations." In an Op-ed for the New York Times Tom Kean and Lee Hamilton, chair and vice chair of the 9/11 Commission stated:

As a legal matter, it is not up to us to examine the C.I.A.'s failure to disclose the existence of these tapes. That is for others. What we do know is that government officials decided not to inform a lawfully constituted body, created by Congress and the president, to investigate one the greatest tragedies to confront this country. We call that obstruction.

Responding to the so-called "torture memoranda" Scott Horton pointed out

the possibility that the authors of these memoranda counseled the use of lethal and unlawful techniques, and therefore face criminal culpability themselves. That, after all, is the teaching of United States v. Altstötter, the Nuremberg case brought against German Justice Department lawyers whose memoranda crafted the basis for implementation of the infamous "Night and Fog Decree."

Jordan Paust concurred by responding to Mukasey's refusal to investigate and/or prosecute anyone that relied on these legal opinions

it is legally and morally impossible for any member of the executive branch to be acting lawfully or within the scope of his or her authority while following OLC opinions that are manifestly inconsistent with or violative of the law. General Mukasey, just following orders is no defense!

March 2009: ICRC report publicly reported

On March 15, 2009, Mark Danner provided a report in the New York Review of Books (with an abridged version in the New York Times) describing and commenting on the contents of a report by the International Committee of the Red Cross (ICRC), Report on the Treatment of Fourteen "High Value Detainees" in CIA Custody (43 pp., February 2007). Report... is a record of interviews with black site detainees, conducted between October 6 and 11 and December 4 and 14, 2006, after their transfer to Guantánamo. (According to Danner, the report was marked "confidential" and was not previously made public before being made available to him.)

Danner provides excerpts of interviews with detainees, including Abu Zubaydah, Walid bin Attash, and Khalid Shaikh Mohammed. According to Danner, the report contains sections on "methods of ill-treatment" including suffocation by water, prolonged stress standing, beatings by use of a collar, beating and kicking, confinement in a box, prolonged nudity, sleep deprivation and use of loud music, exposure to cold temperature/cold water, prolonged use of handcuffs and shackles, threats, forced shaving, and deprivation/restricted provision of solid food. Danner quotes the ICRC report as saying that, "in many cases, the ill-treatment to which they were subjected while held in the CIA

program, either singly or in combination, constituted torture. In addition, many other elements of the ill-treatment, either singly or in combination, constituted cruel, inhuman or degrading treatment."

Investigation of enhanced interrogation techniques and calls for prosecution

Request for Special Counsel Probe of Harsh Interrogation Tactics

On June 8, 2008, fifty-six House Democrats asked for an independent investigation, raising the possibility that authorising these techniques may constitute a crime by Bush administration officials. The congressmen involved in calling for such an investigation included John Conyers, Jan Schakowsky, and Jerrold Nadler.

The letter was addressed to Attorney General Michael B. Mukasey observing that:

"... information indicates that the Bush administration may have systematically implemented, from the top down, detainee interrogation policies that constitute torture or otherwise violate the law."

The letter continues to state:

"Because these apparent 'enhanced interrogation techniques' were used under cover of Justice Department legal opinions, the need for an outside special prosecutor is obvious."

According to the Washington Post the request was denied because Attorney General Michael B. Mukasey felt that:

officials acted in "good faith" when they sought legal opinions, and that the lawyers who provided them used their best judgment.

The article also reported that:

He warned that criminalizing the process could cause policymakers to second-guess themselves and "harm our national security well into the future."

After Cheney acknowledged his involvement in authorising these tactics Senator Carl Levin, chair of the Armed Services Committee, a New York Times editorial, Glenn Greenwald and Scott Horton stressed the importance of a criminal investigation:

A prosecutor should be appointed to consider criminal charges against top officials at the Pentagon and others involved in planning the abuse.

International calls on Obama to investigate and prosecute

Shortly before the end of Bush's second term newsmedia in other countries were opining that under the United Nations Convention Against Torture the US is obligated to hold those responsible to account under criminal law.

The United Nations Special Rapporteur on torture and other cruel, inhuman or degrading treatment or punishment -Professor Manfred Nowak- on January 20, 2008 remarked on German television that, following the inauguration of Barack Obama as new President, George W. Bush has lost his head of state immunity and under international law the U.S. is now mandated to start criminal proceedings against all those involved in these violations of the UN Convention Against Torture. Law professor Dietmar Herz explained Novak's comments by saying that under U.S. and international law former President Bush is criminally responsible for adopting torture as interrogation tool.

US prevention of disclosure by English courts of allegations of torture

On February 4, 2009 the High Court of England and Wales ruled that evidence of possible torture in the case of Binyam Mohamed, an Ethiopian-born British resident who is held in Guantanamo Bay, could not be disclosed:

   as a result of a statement by David Miliband, the foreign secretary, that if the evidence was disclosed the US would stop sharing intelligence with Britain. That would directly threaten the UK's national security, Miliband had told the court.

Responding to the ruling, David Davis, the Conservative MP and former shadow home secretary, commented:

   The ruling implies that torture has taken place in the [Binyam] Mohamed case, that British agencies may have been complicit, and further, that the United States government has threatened our high court that if it releases this information the US government will withdraw its intelligence cooperation with the United Kingdom.

The High Court judges also stated that a criminal investigation, by the UK's attorney general, into possible torture has begun.

Legality

After the disclosure of the use of the techniques, debates arose over the legality of the techniques—whether or not they had violated U.S. or international law.

US governmental legal opinions
Main article: Torture memos
John Yoo , author of the "torture memos"

Following the September 11 attacks in 2001, several memoranda analyzing the legality of various interrogation methods were written by John Yoo from Office of Legal Counsel. The memos, known today as the torture memos, advocate enhanced interrogation techniques, while pointing out that avoiding the Geneva Conventions would reduce the possibility of prosecution under the US War Crimes Act of 1996 for actions taken in the War on Terror. In addition, a new US definition of torture was issued. Most actions that fall under the international definition do not fall within this new definition advocated by the U.S.

The Bush administration told the CIA in 2002 that its interrogators working abroad would not violate US prohibitions against torture unless they "have the specific intent to inflict

severe pain or suffering", according to a previously secret US Justice Department memo released on July 24, 2008. The interrogator's "good faith" and "honest belief" that the interrogation will not cause such suffering protects the interrogator, the memo adds. "Because specific intent is an element of the offense, the absence of specific intent negates the charge of torture", Jay Bybee, then the Assistant Attorney General, wrote in the memo dated August 1, 2002. The 18-page memo is heavily redacted, with 10 of its 18 pages completely blacked out and only a few paragraphs legible on the others.

Another memo released on the same day advises that "the waterboard," does "not violate the Torture Statute." It also cites a number of warnings against torture, including statements by President Bush and a then-new Supreme Court ruling "which raises possible concerns about future US judicial review of the [interrogation] Program."

A third memo instructs interrogators to keep records of sessions in which "enhanced interrogation techniques" are used. The memo is signed by then-CIA director George Tenet and dated January 28, 2003.

The memos were made public by the American Civil Liberties Union, which obtained the three CIA-related documents under Freedom of Information Act requests.

The less redacted version of the August 1, 2002 memo signed by Assistant Attorney General Jay Bybee (regarding Abu Zubaydah) and four memos from 2005 signed by Principal Deputy Assistant Attorney General Steven Bradbury addressed to CIA and analysing the legality of various specific interrogation methods, including waterboarding, were released by Barack Obama administration on April 16, 2009

Following the release of the CIA documents and now released from non disclosure agreements he had signed Philip Zelikow, a former State Department lawyer and adviser to then-Secretary of State Condoleezza Rice, stated that he had argued it was unlikely that "any federal court would agree (that the approval of harsh interrogation techniques) ... was a reasonable interpretation of the Constitution." He was told to destroy copies of his own memo and claimed that the Bush Administration had ordered that other dissenting legal advice be collected and destroyed.

US Supreme Court Justice Antonin Scalia said on BBC Radio 4 that since these methods are not intended to punish they do not violate the Eighth Amendment to the United States Constitution, barring "cruel and unusual punishment", and as such may not be unconstitutional.

The US Supreme Court ruled in Hamdan v. Rumsfeld that, contrary to what the Bush administration advocated, Common Article 3 of the Geneva Conventions applies to all detainees in the war on terrorism and as such the Military Tribunals used to try suspects were violating the law. The Court reaffirmed that those involved in mistreatment of detainees violate US and international law.

 Opinions of international legal bodies

On May 19, 2006, the UN Committee against Torture issued a report stating the U.S. should stop, what it concludes, is "ill-treatment" of detainees, since such treatment, according to the report, violates international law.
 Opinions of human rights organizations

A report by Human Rights First (HRF) and Physicians for Human Rights (PFH) stated that these techniques constitute torture. Their press release said:

   The report concludes that each of the ten tactics is likely to violate U.S. laws, including the War Crimes Act, the U.S. Torture Act, and the Detainee Treatment Act of 2005.

 Ban on interrogation techniques

On December 14, 2005, the Detainee Treatment Act was passed into law, specifically clarifying that interrogations techniques be limited to those explicitly authorized by the Army Field Manual. On February 13, 2008 the US Senate, in a 51 to 45 vote, approved a bill limiting the number of techniques allowed to only "those interrogation techniques explicitly authorized by the 2006 Army Field Manual." The Washington Post stated:

   The measure would effectively ban the use of simulated drowning, temperature extremes and other harsh tactics that the CIA used on al-Qaeda prisoners after the Sept. 11, 2001, attacks.

President George W. Bush has said in a BBC interview he would veto such a bill after previously signing an executive order that

   allows "enhanced interrogation techniques" and may exempt the CIA from Common Article 3 of the Geneva Conventions.

On March 8, 2008 President Bush vetoed this bill. "Because the danger remains, we need to ensure our intelligence officials have all the tools they need to stop the terrorists," Bush said in his weekly radio address . "The bill Congress sent me would take away one of the most valuable tools in the war on terror - the CIA program to detain and question key terrorist leaders and operatives." Bush said that the methods used by the military are designed for interrogating "lawful combatants captured on the battlefield", not the "hardened terrorists" normally questioned by the CIA. "If we were to shut down this program and restrict the CIA to methods in the Field Manual, we could lose vital information from senior al Qaida terrorists, and that could cost American lives," Bush said.

Massachusetts senator Edward Kennedy described Bush's veto as "one of the most shameful acts of his presidency". He said, "Unless Congress overrides the veto, it will go down in history as a flagrant insult to the rule of law and a serious stain on the good name of America in the eyes of the world."

According to Jane Mayer, during the transition period for then President-elect Barack Obama, his legal, intelligence, and national-security advisers had met at the CIA's

headquarters in Langley to discuss "whether a ban on brutal interrogation practices would hurt their ability to gather intelligence," and among the consulted experts:

There was unanimity among Obama's expert advisers... that to change the practices would not in any material way affect the collection of intelligence.

On January 22, 2009 President Obama signed an executive order requiring the CIA to use only the 19 interrogation methods outlined in the United States Army Field Manual on interrogations "unless the Attorney General with appropriate consultation provides further guidance."

Psychological Operations (United States)

Psychological operations are planned operations to convey selected information and indicators to foreign audiences to influence their emotions, motives, objective reasoning, and ultimately the behavior of foreign governments, organizations, groups, and individuals.

The purpose of United States psychological operations (PSYOP) is to induce or reinforce behaviour favourable to US objectives. They are an important part of the range of diplomatic, informational, military, and economic activities available to the US. They can be utilised during both peacetime and conflict. There are three main types: strategic, operational, and tactical. Strategic PSYOP include informational activities conducted by the US government agencies outside of the military arena, though many utilise Department of Defense (DOD) assets. Operational PSYOP are conducted across the range of military operations, including during peacetime, in a defined operational area to promote the effectiveness of the joint force commander's (JFC) campaigns and strategies. Tactical PSYOP are conducted in the area assigned to a tactical commander across the range of military operations to support the tactical mission against opposing forces.

PSYOP can encourage popular discontent with the opposition's leadership and by combining persuasion with a credible threat, degrade an adversary's ability to conduct or sustain military operations. They can also disrupt, confuse, and protract the adversary's decision-making process, undermining command and control. When properly employed, PSYOP have the potential to save the lives of friendly or enemy forces by reducing the adversary's will to fight. By lowering the adversary's morale and then its efficiency, PSYOP can also discourage aggressive actions by creating disaffection within their ranks, ultimately leading to surrender.

PSYOP is a component of information operations:

The integrated employment of the core capabilities of electronic warfare, computer network operations, psychological operations, military deception, and operations security, in concert with specified supporting and related capabilities, to influence, disrupt, corrupt or usurp adversarial human and automated decision making while protecting our own. Also called IO.

Products

PSYOP involves the careful creation and dissemination of a product message. There are three types of propaganda that are used to create these messages. They include White propaganda which is used in overt operations and Gray and Black propaganda which are used in covert PSYOP. White, Gray, and Black don't refer to the propaganda's content but rather the methods used to carry out the operation.

In order for PSYOP to be successful they must be based in reality. All messages must be consistent and must not contradict each other. Any gap between the propaganda and reality will be quickly noticed. A credible "truth" must be presented which is consistent to all audiences. Primarily it is a component of offensive counterinformation but can be used defensively as well. PSYOP are used in support of special operations, unconventional warfare, and counterinsurgency (COIN) operations. PSYOP can include military operations other than warfare and also include joint operations. They include counterterrorism operations, peace operations, noncombatant evacuation, enforcement of sanctions and maritime interception operations, strikes and raids, etc.

White PSYOP

Is attributal to the source of the PSYOP product.
U.S. Army PSYOP soldiers with Detachment 1080, 318th Psychological Operations Company distribute newspaper products in the East Rashid region of Baghdad, Iraq, July 11, 2007.

White is acknowledged as an official statement or act of the U.S. Government, or emanates from a source associated closely enough with the U.S. Government to reflect an official viewpoint. The information should be true and factual. It also includes all output identified as coming from U.S. official sources.

Authorized to engage in white activity directed at foreign audiences are: The State Department, USIA, the Foreign Operations Administration (a predecessor of the Agency for International Development), the Defense Department and other U.S. Government departments and agencies as necessary

Gray PSYOP

The source of the gray PSYOP product is deliberately ambiguous.

The true source (U.S. Government) is not revealed to the target audience. The activity engaged in plausibly appears to emanate from a non-official American source, or an indigenous, non-hostile source, or there may be no attribution.

Gray is that information whose content is such that the effect will be increased if the hand of the U.S. Government and in some cases any American participation are not revealed. It is

simply a means for the U.S. to present viewpoints which are in the interest of U.S. foreign policy, but which will be acceptable or more acceptable to the intended target audience than will an official government statement.

Black PSYOP

The activity engaged in appears to emanate from a source (government, party, group, organization, person) usually hostile in nature. The interest of the U.S. Government is concealed and the U.S. Government would deny responsibility. It is best used in support of strategic plans.

Covert PSYOP is not a function of the U.S. military but instead is used in special operations due to their political sensitivity and need for higher level compartmentalization. Further, black PSYOP, to be credible, may need to disclose sensitive material, with the damage caused by information disclosure considered to be outweighed by the impact of successful deception. In order to achieve maximum results and to prevent compromise of overt PSYOP, overt and covert operations need to be kept separate. Personnel involved in one must not be engaged in the other.

Media

PSYOP convey messages via visual, audio, and audiovisual mediums. Military psychological operations, at the tactical level, are usually delivered by loudspeaker. For more deliberate campaigns, they may use leaflets, radio or television. Strategic operations may use radio or television broadcasts, various publications, airdropped leaflets, or, as part of a covert operation, with material placed in foreign news media.

Process

In order to create a successful PSYOP the following must be established: 1) clearly define the mission so that it aligns with national objectives 2) need a PSYOP estimate of the situation 3) prepare the plan 4) media selection 5) product development 6) pretesting - determines the probable impact of the PSYOP on the target audience 7) production and dissemination of PSYOP material 8) implementation 9) posttesting - evaluates audience responses 10) feedback

Before these steps can occur, intelligence analysts must profile potential targets in order to determine which ones it would be most beneficial to target. In order to figure this out, analysts must determine the vulnerabilities of these groups and what they would be susceptible to. The analysts also determine the attitudes of the targets toward the current situation, their complaints, ethnic origin, frustrations, languages, problems, tensions, attitudes, motivations, and perceptions, and so on. Once the appropriate target(s) have been determined, the PSYOP can be created.

Psychological operations should be planned carefully, in that even a tactical message, with modern news media, can spread worldwide and be treated as the policy of the United

States. The US Army is responsible for military psychological warfare doctrine See the World War I section for an example of how a tactical leaflet, not properly coordinated, can cause national-level harm.

Psychological operations, at any level, must be consistent with the policies of higher levels of command

The message to be delivered can be adapted to tactical situations, but promises made must be consistent with national policy.

U.S. PSYOP forces are forbidden to target (i.e., attempt to change their opinions) U.S. citizens at any time, in any location globally, or under any circumstances. However, commanders may use PSYOP forces to provide public information to U.S. audiences during times of disaster or crisis. The use of PSYOP forces to deliver necessary public information to a U.S. audience was established in relief activities after Hurricane Andrew in 1992. Tactical Psychological Operations teams (TPTs) were employed to disseminate information by loudspeaker on locations of relief shelters and facilities. Information support to a noncombatant evacuation operation (NEO) by PSYOP forces to provide evacuation information to U.S. and third-country nationals would also adhere to the order.

As an example of the use of PSYOP in a humanitarian relief operation Major General Anthony Zinni, Director of Operations for Unified Task Force Somalia, said

   Psychological operations were a key Battlefield Operating System used extensively to support Unified Task Force (UNITAF) Somalia operations. In order to maximize the PSYOP impact, we established a Joint PSYOP Task Force under the supervision of the Director of Operations, integrated PSYOP into all plans and operations, and limited the PSYOP focus to the operational and tactical levels. Psychological operations do not accomplish missions alone. They work best when they are combined with and integrated in an overall theater campaign plan. In Operation RESTORE HOPE, we were successful in doing that.

Psychological Operations Units

The bulk of US military psychological units are in the Army. White psyop can come from the Voice of America or regional radio/TV. Central Intelligence Agency units are apt to have responsibility, on a strategic level, for black and some gray propaganda. White propaganda, especially at the strategic level, comes from the Voice of America or United States Information Agency.

In the United States Department of Defense, Psychological Operations units exist as the Army's 4th Psychological Operations Group and Air Force with COMMANDO SOLO units under the Air Force Special Operations Command's 193rd Special Operations Wing. The United States Navy also plans and executes limited PSYOP missions.

United States PSYOP units and soldiers of all branches of the military are prohibited by law from conducting PSYOP missions on domestic audiences. While PSYOP soldiers may offer

non-PSYOP related support to domestic military missions, PSYOP can only target foreign audiences. Though, it is worth noting that this does not rule out PSYOP targeting foreign audiences of allied nations. Additionally, in the Information Operations Roadmap made public January 2006 but originally approved by Defense Secretary Donald Rumsfeld in October 2003, it stated "information intended for foreign audiences, including public diplomacy and PSYOP, increasingly is consumed by our domestic audience and vice-versa."

Army

U.S. Army PSYOP Force structure

Until recently, the Army's Psychological Operations elements were administratively organized alongside Civil Affairs to form the US Army Civil Affairs and Psychological Operations Command (USACAPOC), forming a part of the U.S. Army Special Operations Command (USASOC). However, in May 2006 USCAPOC was reorganized to instead fall under the Army reserve command, and all active duty PSYOP elements were placed directly into USASOC. While reserve PSYOP forces no longer belong to USASOC, that command retains control of PSYOP doctrine. Operationally, PSYOP individuals and organizations support Army and Joint maneuver forces or interagency organizations.

Army Psychological Operations support operations ranging from strategic planning down to tactical employment.

PSYOP Support Elements generally support Corps sized elements. Tactical Psychological Operations Companies typically support Division sized elements, with Tactical Control through G-3. Brigades are typically supported by a Tactical PSYOP Detachment. The PSYOP Commander maintains Operational Control of PSYOP elements, advises the Commander and General Staff on the psychological battlespace.

The smallest organizational PSYOP element is the Tactical PSYOP Team (TPT). A TPT generally consists of a PSYOP team chief (Staff Sergeant or Sergeant), an assistant team chief (Sergeant or Specialist), and an additional soldier to serve as a gunner and to operate the speaker system (Specialist). A team is equipped with a Humvee fitted with a loud speaker, and often works with a local translator indigenous to the host or occupied country.

Generally, each maneuver battalion-sized element in a theater of war or operational area has at least one TPT attached to it. Women are not allowed to serve on TPTs in a war zone due to a PSYOP team's high chance of contact with the enemy.
U.S. Army PSYOP branch of service collar insignia and regimental distinctive insignia.

PSYOP soldiers are required to complete nine weeks of Basic Combat Training. After basic training (BCT), the active duty-component PSYOP soldier is then required to attend Airborne training. All enlisted PSYOP soldiers report to Fort Bragg to complete the 13-week Psychological Operation Advanced Individual Training (AIT) course. Sometime after initial training, PSYOP soldiers will spend up to a year (or perhaps more for specific languages) in

foreign language qualification training. Certain reserve soldiers serving in units designated as Airborne are also required to attend Airborne training, while language training and Airborne qualification for PSYOP soldiers assigned to non-Airborne units is awarded on a merit and need basis.

Army Units

There are only three Psychological Operations Groups in the Army:

- 2nd Psychological Operations Group
- 4th Psychological Operations Group (Airborne)
- 7th Psychological Operations Group

The 4th Psychological Operations Group, based in Fort Bragg, is the only active duty PSYOP element in the United States Army, constituting 26 percent of all U.S. Army Psychological Operations units. The remaining 74 percent is split between the 2nd and 7th Psychological Operations Groups in the Army Reserve.

Inactive Units

The 345th also deployed post 9-11 to Afghanistan working with U.S. Army Special Forces. In 2003 the 345th deployed to Iraq in support of Operation Iraqi Freedom. Since November 2001, the 345th Tactical Psychological Operations Company (Airborne) has continuously had a detachment of deployed soldier's in Afghanistan and / or Iraq.

Air Force

The Air National Guard provides support for Psychological Operations using a modified C-130 Hercules aircraft named EC-130 COMMANDO SOLO, operated by the 193d Special Operations Wing. The purpose of COMMANDO SOLO is to provide an aerial platform for broadcast media on both television and radio. The media broadcast is created by various agencies and organizations. As part of the broader function of information operations, COMMANDO SOLO can also jam the enemy's broadcasts to his own people, or his psychological warfare broadcasting.

The Commando Solo aircraft currently is the only stand-off, high-altitude means available to PSYOP forces to disseminate information to large denied areas. Two orbits were established during Operation Iraqi Freedom, the 2003 invasion of Iraq, one in the northern area and one in the southern part of the country, both far enough from harm's way to keep the aircraft out of reach of potential enemy attack. At their operational altitude of 18,000 feet (5,500 m) and assuming clear channels, these aircraft can transmit radio and TV signals approximately 170 miles (270 km), which does not reach the objective areas near Baghdad. Straightforward physics dictate the range, given the power installed and the antenna configuration and assuming clear channels.

The enhanced altitude capability of the Commando Solo EC–130J (now funded) is increasing transmitter range. While this is an improvement over 130E capability, it is a small step, since the increase in altitude is only 7,000 feet (less than 50 percent) and the range increase is governed by a square root function (that is, a 14 percent increase in range).

A challenge to COMMANDO SOLO is the increasing use of cable television, which will not receive signals from airborne, ground, or any other transmitters that the cable operator does not want to connect to the system. At best, in the presence of cable TV, COMMANDO SOLO may be able to jam enemy broadcasts that are not, themselves, transmitted by cable.

Navy

Navy psychological operations policy is specified in OPNAVINST 3434.1, "Psychological Operations". The Navy provides support to Joint PSYOP programs by providing assets (such as broadcast platforms using shortwave and very high frequency (VHF) frequencies) for the production and dissemination of PSYOP materials. With the ability of naval vessels (especially the larger task forces) to produce audio-visual materials the Navy can often produce PSYOP products for use in denied areas. Leaflets are dropped utilizing the PDU-5B dispenser unit (aka Leaflet Bomb). The Navy coordinates extensively with the Army as the majority of PSYOP assets reside within USASOC. PSYOP planning and execution is coordinated through the Naval Network Warfare Command (NETWARCOM) and the Naval Information Operations Command (NIOC), both located in Norfolk, VA.

The US Navy possesses the capability to produce audiovisual products in the Fleet Audiovisual Command, Pacific; the Fleet Imagery Command, Atlantic; the Fleet Combat Camera Groups; Naval Imaging Command; various film libraries; and limited capability from ships and aircraft of the fleet. A Naval Reserve PSYOP audiovisual unit supports the Atlantic Fleet. Navy personnel assets have the capability to produce documents, posters, articles, and other material suitable for PSYOP. Administrative capabilities exist ashore and afloat that prepare and produce various quantities of printed materials. Language capabilities exist in naval intelligence and among naval personnel for most European and Asian languages. The Fleet Tactical Readiness Group provides equipment and technical maintenance support to conduct civil radio broadcasts and broadcast jamming in the amplitude modulation frequency band. This unit is not trained to produce PSYOP products and must be augmented with PSYOP personnel or linguists when necessary. The unit is capable of being fully operational within 48 hours of receipt of tasking. The unit's equipment consists of a 10.6 kW AM band broadcast radio transmitter; a broadcast studio van; antenna tuner; two antennas (a pneumatically raised 100-foot (30 m) top-loaded antenna mast and a 500-foot (150 m) wire helium balloon antenna); and a 30 kW generator that provides power to the system.

Central Intelligence Agency

Psychological operations was assigned to the pre-CIA Office of Policy Coordination, with oversight by the Department of State. The overall psychological operations of the United

States, overt and covert, were to be under the policy direction of the U.S. Department of State during peacetime and the early stages of war:

The Secretary of State shall be responsible for:

(1) The formulation of policies and plans for a national foreign information program in time of peace. This program shall include all foreign information activities conducted by departments and agencies of the U. S. Government.

(2) The formulation of national psychological warfare policy in time of national emergency and the initial stages of war.

(3) The coordination of policies and plans for the national foreign information program and for overt psychological warfare with the Department of Defense, with other appropriate departments and agencies of the U.S. Government, and with related planning...

(4) Plans prepared by this organization for overt psychological warfare in time of national emergency or the initial stages of war shall provide for:

a. Coordination of overt psychological warfare with:

- Covert psychological warfare.
- Censorship.
- Domestic information.

b. The employment and expansion, insofar as is feasible, of the activities and facilities which compose the national foreign information program in time of peace, in order to assure rapid transition to operations in time of national emergency or war.

c. Control of the execution of approved plans and policies by: (1) the Department of Defense in theaters of military operations; (2) the Department of State in areas other than theaters of military operations.

d. Transmittal of approved psychological warfare plans and policies to theater commanders through the Joint Chiefs of Staff.

After the OPC was consolidated into the CIA, there has been a psychological operations staff, under various names, in what has variously been named the Deputy Directorate of Plans, the Directorate of Operations, or the National Clandestine Service.

History of US Psychological Warfare

World War I

During World War I, the Propaganda Sub-Section was established under the American Expeditionary Force (AEF) Military Intelligence Branch within the Executive Division of the

General Staff in early 1918. Although they produced most propaganda, the AEF Propaganda Sub-Section did not produce a few of the leaflets. General Pershing is supposed to have personally composed Leaflet "Y," Austria Is Out of the War, which was run off on First Army presses, but distributed by the Propaganda Sub-Section. That Sub-Section, perhaps reflecting some professional jealousy, thought the leaflet sound in principle, but too prolix and a little too "brotherly." Corps and Army presses issued several small leaflet editions containing a "news flash," after the Sub-Section had approved their content. But in one or two cases that approval was not obtained, and in one unfortunate example a leaflet in Romanian committed the Allies and the United States to the union of all Romanians in Austria-Hungary with Romania. Such geopolitics was emphatically not the job of AEF propaganda and had the potential to cause serious embarrassment.

World War II

There was extensive use of psychological operations in World War II, from the strategic to the tactical. National-level white propaganda was the responsibility of the Office of War Information, while black propaganda was most often the responsibility of the Morale Operations branch of the Office of Strategic Services (OSS).

Psychological operations planning started before the US entry into the war, with the creation of the Office of the Coordinator of Inter-American Affairs (CIAA), under Nelson Rockefeller, with the responsibility for psychological operations targeted at Latin America. Special operations and intelligence concerning Latin America was a bureaucratic problem throughout the war. Where the OSS eventually had most such responsibilities, the FBI had its own intelligence system in Latin America.

On 11 July 1941, William Donovan was named the Coordinator of Information, which subsequently became the OSS. At first, there was a unit called the Foreign Information Service inside COI, headed by Robert Sherwood, which produced white propaganda outside Latin America.

To deal with some of the bureaucratic problems, the Office of War Information (OWl) was created with Elmer Davis as director. FIS, still under Sherwood, became the Overseas Branch of OWl, dealing in white propaganda. OSS was created at the same time. Donovan obtained considerable help from the British, especially with black propaganda, from the British Political Warfare Executive (PWE), part of the Ministry of Economic Warfare. PWE was a sister organization to the Special Operations Executive, which conducted guerilla warfare. The British Secret Intelligence Service (SIS, also known as MI6), was an essentially independent organization. For the US, the OSS included the functions of SIS and SOE, and the black propaganda work of PWE.

The OSS Morale Operations (MO) branch was the psychological operations arm of OSS. In general, its units worked on a theater-by-theater basis, without a great deal of central coordination. It was present in most theaters, with the exception of the Southwest Pacific theater under Douglas MacArthur, who was hostile to OSS.

OSS was responsible for strategic propaganda, while the military commanders had operational and tactical responsibility. Dwight Eisenhower was notably supportive of psychological operations, had psychological warfare organization in the staff of all his commands, and worked with OSS and OWI. The military did theater-level white propaganda, although the black propaganda function varied, often carried out by joint US-UK organizations.

For the first time in U.S. history, American psywarriors employed electronic psywar in the field, in September 1944. Engineers of the 1st Radio Section of the 1st MRBC recorded POW interviews for front- line broadcasts, and reproduced the sound effects of vast numbers of tanks and other motor vehicles for Allied armored units in attempts to mislead German intelligence and lower enemy morale.

Leaflets were delivered principally from aircraft, but also with artillery shells.

Korea

Psychological operations were used extensively during the Korean War. Especially for the operations directed against troops of the Democratic Republic of Korea (DPRK; North Korea), it was essential to work with Republic of Korea (ROK; South Korea personnel) to develop propaganda with the most effective linguistic and cultural context.

Since the war was a United Nations operation, political sensitivities were high. UN propaganda probably lost opportunities due to rules against mentioning the Peoples Republic of China or the Soviet Union, first due to fear it would increase their intervention, and later because it might demoralize ROK civilians.

Various methods were used to deliver propaganda, with constraints imposed by exceptionally rugged terrain and that radios were relatively uncommon among DPRK and PRC troops. Loudspeaker teams often had to get dangerously close to enemy positions. Artillery and light aircraft delivered leaflets on the front lines, while heavy bombers dropped leaflets in the rear. There was a somewhat artificial distinction made between strategic and tactical leaflets: rather than differentiating by the message, tactical leaflets were delivered within 40 miles (64 km) of the front lines and strategic leaflets were those delivered farther away.

Less direct and immediate correlation between tactical PSYOP efforts and target audience behavior may still be substantiated after the fact, especially by means of polling and interviews. For example, in the Korean War, approximately one-third of the total prisoner of war (POW) population polled by the United Nations (UN) forces claimed to have surrendered at least in part because of the propaganda leaflets. The contributions of PSYOP in the first Persian Gulf War have also been corroborated through POW interviews. Ninety-eight percent of the 87,000 POWs captured either possessed or had seen PSYOP leaflets that provided them with instructions on how to approach U.S. troops to surrender. Fifty-eight percent of the prisoners interviewed claimed to have heard coalition radio broadcasts, and 46 percent believed that the coalition broadcasts were truthful despite

coming from their enemy. Again, some portion of the surrenders might have occurred even without PSYOP encouragement; but certainly, there would appear to be a correlation between PSYOP, which offered the enemy a way to escape the onslaught of U.S. military power, and their compliance with those instructions.

One such operation, is Operation Moolah. The objective of the psychological operation was to target Communist pilots to defect to South Korea with a MiG-15, in order for the U.S. to conduct analysis of the capabilities of the MiG.
 Guatemala

The CIA's operation to overthrow the Government of Guatemala in 1954 marked an early zenith in the Agency's long record of covert action. Following closely on two successful operations, one of which was the installation of the Shah as ruler of Iran in August 1953, the Guatemalan operation, known as PBSUCCESS, was both more ambitious and more thoroughly successful than either precedent. Rather than helping a prominent contender gain power with a few inducements, PBSUCCESS used an intensive paramilitary and psychological campaign to replace a popular, elected government with a political non-entity. In method scale and conception it had no antecedent, and its triumph confirmed the belief of many in the Eisenhower Administration that covert operations offered a safe, inexpensive substitute for armed force in resisting what they declared was Communist inroad in the Third World.

Vietnam

Psychological operations were extensively used in Vietnam, with white propaganda under the United States Information Agency and Military Assistance Command Vietnam, and grey and black propaganda under the Central Intelligence Agency and the Studies and Observation Group.

  As early as August 1964, almost one year before the activation of the Joint U.S. Public Affairs Office (JUSPAO), General William Westmoreland told a CA and PSYOP conference that "psychological warfare and civic action are the very essence of the counterinsurgency campaign here in Vietnam…you cannot win this war by military means alone." Westmoreland's successor, Creighton Abrams, is known to have sent down guidelines to the 4th Psychological Operations Group that resulted in the drawing up of no less than 17 leaflets along those lines. In fact, the interest in PSYOP went all the way up to the Presidency; weekly reports from JUSPAO were sent to the White House, as well as to the Pentagon and the Ambassador in Saigon. In sum, it is a myth that the United States, stubbornly fixated on a World War II-style conventional war, was unaware of the "other war."

Safe conduct pass.

During the Vietnam era, the organization of the 4th Psychological Operations Group was very different. The four battalions of the group were divided by geographic region rather than area of expertise as they are now.

- The 6th PSYOP Battalion was stationed at Bien Hoa and provided services to the tactical units, both American and Vietnamese, and to the various political entities such as provinces and cities in the area of III Corps.
- The 7th PSYOP Battalion was stationed in Da Nang and provided service to I Corps.
- The 8th PSYOP Battalion was based at Nha Trang, but it its B Company, which was its field teams, was based out of Pleiku nearly 100 kilometers away. The 8th Battalion served the II Corps area of Vietnam.
- The 10th PSYOP Battalion was stationed in Can Tho and served IV Corps.

The A company of each battalion consisted of a command section, S-1, S-2, S-3, and a Psyop Development Center (PDC). Additionally, they generally had extensive printing facilities.

The B companies consisted of the field teams that were stationed throughout their respective corps billeted with MACV teams and combat units.

Nicaragua

CIA wrote a manual for the Contras entitled Psychological Operations in Guerrilla Warfare.

Sweden

U.S. submarines and other vessels "frequently" and "regularly" operated in the territorial waters of neutral Sweden, including in Stockholm harbor, as part of an elaborate psychological warfare operation whose target was the Swedish people. The Swedish people and government were led to believe that the vessels were Soviet. U.S. operations were likely conducted by the National Underwater Reconnaissance Office (NURO) and aspects of the operations were coordinated with the secret NATO "stay-behind" network deployed in Sweden. See Strategy of tension and Operation Gladio. British submarines also participated in such secret operations. The campaign was successful in totally changing the psychology of the Swedish people: the Swedish population was convinced of the "present danger" posed by the desired enemy, the Soviet Union, and was prepared for war against it. Also, since the Swedish government continued to release "enemy" submarines, large parts of the Swedish population turned against their government's conciliatory attitude and adopted more hard-line views.

Grenada and Panama

Most PSYOP activities and accomplishments in Panama were hardly noticed by either the U.S. public or the general military community. But the special operations community did notice. The lessons learned in Panama were incorporated into standing operating procedures. Where possible, immediate changes were made to capitalize on the PSYOP successes of the Grenada and Panama operations. This led to improved production, performance, and effect in the next contingency, which took place within 6 months after the return of the last PSYOP elements from Panama. Operations [in Iraq] employed PSYOP of

an order of magnitude and effectiveness which many credit to the lessons learned from Panama.

The broader scope of information operations in Panama included denying the Noriega regime use of their own broadcasting facilities. A direct action mission removed key parts of the transmitters. After-action reports indicate that this action should have had a much higher priority and been done very early in the operation.

An unusual technique, developed in real time, was termed the "Ma Bell Mission", or, more formally, capitulation missions. There were a number of Panamian strongpoints that continued to have telephone access. By attaching Spanish-speaking Special Forces personnel to a combat unit that would otherwise take the strongpoint by force, the Spanish-speaking personnel would phone the Panamian commander, tell him to put away his weapons and assemble his men on the parade ground, or face lethal consequences. Because of the heavy reliance on telephones, these missions were nicknamed "Ma Bell" operations. "During this ten day period, TF BLACK elements were instrumental in the surrender of 14 cuartels (strongpoints), almost 2,000 troops, and over 6,000 weapons without a single U.S. casualty. Several high-ranking cronies of Manuel Noriega who were on the "most wanted" list were also captured in Ma Bell operations.

Psychological operations sometimes are intimately linked to combat operations, with the use of force driving home the propaganda mission. During the Panamanian operation, it was necessar Ft. Amador, an installation shared by the U.S. and Panamanian Defence Forces (PDF). There were US dependents at the installation, but security considerations prevented evacuating them before the attack. Concern for US citizens, and rules of engagement (ROE) that directed casualties be minimized, PSYOP loudspeaker teams, from the 1st Bn, 4th PSYOP Gp, became a key asset. When the PDF did not surrender after initial appeals, the message changed, with the tactical commander warning "that resistance was hopeless in the face of overwhelming firepower and a series of demonstrations took place, escalating from small arms to 105 mm howitzer rounds. Subsequent broadcasts convinced the PDF to give up. The entire process allowed Ft. Amador to be secured with few casualties and minimal damage."

United States PSYOP became a part of popular culture during the U.S. invasion of Panama, the America public watched on TV as PSYOP soldiers blasted rock music into the Vatican Embassy to drive out ousted leader Manuel Noriega. However, it is widely believed inside the PSYOP community that the reasoning for the music was not actually to drive Noriega out, but to keep American news reporters from listening in on the negotiations for Noriega's surrender.

The 1991 Gulf War

Psychological Operations was extremely valuable during the Gulf War due to the Iraqi military's desire to avoid combat. Through leaflets and loudspeaker broadcasts, PSYOP forces walked many enemy soldiers through successful surrender.

Coalition forces worked extensively with Saudi, Kuwaiti, and other partners, to be sure psychological operations were culturally and linguistically appropriate. One unusual technique involved dropping leaflets telling Iraqi troops that they would be bombed, the next day, by B-52 bombers, and urged them to surrender and save their lives. After the bombing the next day, which was not done in a manner to maximize casualties, another set of leaflets were dropped, saying the promise was kept and the survivors should surrender to save themselves. Variants of this technique were used on other units, telling them the specific unit that had been bombed the previous day. By the number of prisoners who surrendered, presenting the leaflet that identified itself as a safe-conduct pass, this program was effective.

Bosnia and Kosovo

United States PSYOP was widely employed in both Bosnia and Kosovo, most famously for their "mine awareness" campaign and its Superman comic.

The broader scope of information operations in Bosnia included denying groups, breaking the peace agreement, of the use of their own broadcasting facilities, with capture or destruction of the transmitters.

Global War on Terrorism

Controversies

CNN and NPR interns incident

In the 1990s it came to light that soldiers from the 4th Psychological Operations Group had been interning at the American news networks Cable News Network (CNN) and National Public Radio (NPR). The program was an attempt to provide its PSYOP personnel with the expertise developed by the private sector under its "Training with Industry" program. The program caused concern about the influence these soldiers might have on American news and the programs were terminated.

National Public Radio reported on April 10, 2000:

   The U.S. Army's Psychological Operations unit placed interns at CNN and NPR in 1998 and 1999. The placements at CNN were reported in the European press in February of this year and the program was terminated. The NPR placements will be reported this week in TV Guide.

Toppling of Saddam Hussein statue

Arguably the most visible image of the 2003 invasion of Iraq was the toppling of a statue of Saddam Hussein in Firdos Square in central Baghdad. While media coverage of the event, at first glance, gave the impression that the act was a spontaneous action of the citizens of the city, it was actually an idea hatched by an Army psychological operations team. Allegations

surfaced that the group of people surrounding the statue and cheering was in fact smaller than it was made out to be in the official story, and that the group were by some accounts not local to the area but were instead brought in by the military for the specific purpose of watching and lending credence to the planned toppling.

Use of music in the interrogation of prisoners

PSYOP pamphlet disseminated in Iraq. The text translates as "This is your future al-Zarqawi," and depicts al-Qaeda terrorist al-Zarqawi caught in a rat trap which is being held by an Iraqi Army soldier or an Iraqi Policeman.

In 2003 Sergeant Mark Hadsell claimed to have used loud music during the interrogation of Iraqi prisoners:

   "These people haven't heard heavy metal. They can't take it. If you play it for 24 hours, your brain and body functions start to slide, your train of thought slows down and your will is broken. That's when we come in and talk to them."

Other reports of the use of music during interrogation have occasionally plagued PSYOP.

On 9 December 2008 the Associated Press reported that various musicians were coordinating their objections to the use of their music as a technique for softening up captives through an initiative called Zero dB. However, not all musicians have taken issue with the possibility that their music is being used during interrogations. Stevie Benton of the group Drowning Pool commented supportively:

    "I take it as an honor to think that perhaps our song could be used to quell another 9/11 attack or something like that."

Afghanistan burning bodies incident

On 1 October 2005 in Gumbad, Afghanistan, Soldiers from the 173rd Airborne decided to burn the bodies of two Taliban fighters killed in a firefight the previous day for hygienic reasons. Despite Islamic customs that forbid cremation, they chose to proceed. The Platoon Leader also failed to properly notify his Battalion Commander of the decision prior to burning the bodies. When his Battalion Commander was notified, he ordered the flaming bodies extinguished. An official investigation into the incident found evidence of poor decision making, poor judgement, poor reporting, a lack of knowledge and respect for local Afghan custom and tradition. The Infantry Officer received a General Officer letter of reprimand. Reserve PSYOP soldiers were involved because they heard about the incident and used the information to incite Taliban fighters in another area where freelance journalist Stephen Dupont was located. Dupont reported that the PSYOP soldiers claimed the bodies were to be burned due to hygiene concerns.

During the War on Terror, U.S. PSYOP teams often broadcast abrasive messages over loudspeakers to try tempting enemy fighters into a direct confrontation where the

Americans have the upper hand. Other times, they use their loudspeaker to convince enemy soldiers to surrender. In the Afghanistan incident, a PSYOP sergeant allegedly broadcast the following message to the Taliban:

Attention, Taliban, you are all cowardly dogs. You allowed your fighters to be laid down facing west and burned. You are too scared to retrieve their bodies. This just proves you are the lady boys we always believed you to be.

Another soldier stated:

You attack and run away like women. You call yourself Talibs but you are a disgrace to the Muslim religion and you bring shame upon your family. Come and fight like men instead of the cowardly dogs you are.

However, according to the Army Times, the SBS broadcast did not include audio of the soldiers broadcasting the message.

U. S. authorities investigated the incident and the two Reserve PSYOP Soldiers received administrative punishment for broadcasting messages which were not approved. Investigators found no evidence that the bodies were burned for a psychological effect. They concluded that the broadcast violated standing policies for the content of loudspeaker messages and urged that all Soldiers in the command undergo training on Afghan sensitivities.

2009 congressional delegation to Afghanistan

In February 2011, journalist Michael Hasting published an article in Rolling Stone reported that Lt. Colonel Michael Holmes, the supposed leader of a PSYOP group in Afghanistan, alleged that Lt. Gen. William B. Caldwell a three-star General in charge of training troops in Afghanistan, ordered Holmes and his group to perform in-depth research on visiting U.S. congressmen in order to spin presentations and visits. According to Holmes, his team was tasked with "illegally providing themes and messages to influence the people and leadership of the United States." Reported targets included United States Senators John McCain, Joe Lieberman, Jack Reed, Al Franken, Carl Levin, Rep. Steve Israel of the House Appropriations Committee; Adm. Mike Mullen of the Joint Chiefs of Staff; the Czech ambassador to Afghanistan; the German interior minister, and think-tank analysts. Under the 1948 Smith–Mundt Act, such operations may not be used to target Americans. When Holmes attempted to seek counsel and to protest, he was placed under investigation by the military at the behest of General Caldwell's chief of staff.

Caldwell's spokesman, Lt. Col. Shawn Stroud, denied Holmes's assertions, and other unnamed military officials disputed Holmes's claims as false and misleading, saying there are no records of him ever completing any PSYOP training. Subsequently Holmes conceded that he was not a Psychological Operations officer nor was he in charge of a Psychological Operations unit and acknowledged that Caldwell's orders were "fairly innocuous." Officials say that Holmes spent his time in theater starting a strategic communications business

with Maj. Laural Levine, with whom he conducted an improper relationship in Afghanistan. A former aid said, "At no point did Holmes ever provide a product to Gen. Caldwell". General David Petraeus has since ordered an investigation into the alleged incident.

Portrayals in popular culture

- The general's daughter from both the novel and blockbuster movie The General's Daughter was a PSYOP officer.
- A USACAPOC combat patch (FWS-SSI) can be seen being worn by a soldier in the film X-Men 3 in the president's command center.
- Welcome to the Jungle by Guns N' Roses was the first song played when soldiers blasted rock music into the Holy Vatican Apostolic Nunciature (Embassy) to drive out ousted leader Manuel Noriega. However, the rock music was actually played for bored soldiers in the 82nd Airborne waiting outside the Apostolic Nunciature. When a journalist asked if they were playing to annoy Noriega, the team leader answered 'yes' and the story took on a life of its own. At least that is the "official version". The "unofficial version" is that the rock music blasted over the speaker systems allowed the negotiations to continue unfettered and unreported by the media. The media had high power directional microphones trained at the windows of the building in an attempt to "scoop" every detail as it occurred of the surrender of General Noriega. Had this "scoop" happened, given the personality profile of General Noriega, a surrender would never have occurred.
- The book and film The Men Who Stare at Goats deal extensively with PSYOPs
- The USACAPOC patch can be seen being worn by all characters portrayed by Spike Jonze, Ice Cube and Mark Wahlberg in the movie Three Kings.
- In the game by Westwood Studios, Red Alert 2, a Soviet campaign involves protecting Russia and a laboratory from American led Allied forces. But in the campaign, a small truck with unusually large speakers in the back is seen driving around a small village trying to gather supporters to help the Allied forces.
- In the movie Apocalypse Now Colonel Kilgore orders that music is played during a helicopter attack on an enemy village by asking his men to "put on psy war op, make it loud". The music used during the attack is Richard Wagner's "Ride of the Valkyries".
- The novel "Tree of Smoke" by writer Denis Johnson revolves around PSYOPs.

Psychological warfare

Psychological warfare (PSYWAR), or the basic aspects of modern psychological operations (PSYOP), have been known by many other names or terms, including Psy Ops, Political Warfare, "Hearts and Minds," and Propaganda. Various techniques are used, by any set of groups, and aimed to influence a target audience's value systems, belief systems, emotions, motives, reasoning, or behavior. It is used to induce confessions or reinforce attitudes and behaviors favorable to the originator's objectives, and are sometimes combined with black

operations or false flag tactics. Target audiences can be governments, organizations, groups, and individuals.

The U.S. Department of Defense defines psychological warfare as:

"The planned use of propaganda and other psychological actions having the primary purpose of influencing the opinions, emotions, attitudes, and behavior of hostile foreign groups in such a way as to support the achievement of national objectives."

During World War II the United States Joint Chiefs of Staff defined psychological warfare more broadly stating "Psychological warfare employs any weapon to influence the mind of the enemy. The weapons are psychological only in the effect they produce and not because of the weapons themselves."

History

Cyrus the Great

Although the first Great king of the Achaemenid Empire was known as a conquerer, he is also remembered for his tolerance towards those he defeated. Link

To ensure that the new conquered peoples did not revolt, Cyrus the Great showed respect to their customs and allowed them to continue to practice their religions. He also freed 40000 jewish slaves in Babylon, sent them back to Palestine and funded the building of a new temple in Jerusalem, which gave him the title "Liberator" and Messiah in the Old Testament.

Alexander the Great

Although not always accredited as the first practitioner of psychological warfare, Alexander the Great undoubtedly showed himself to be effective in swaying the mindsets of the populaces that were conquered in his campaigns.

To keep the new Macedonian state and assortment of powerful Greek tribes from revolting against their leader, Alexander the Great left some of his men behind in each city to introduce Greek culture, control it, oppress dissident views, and interbreed. Alexander paid his soldiers to marry non-Greek women. He wanted to assimilate people of all nations.

The Mongols

Genghis Khan, leader of the Mongols in the 13th century AD, united his people to eventually create the largest contiguous empire in human history. Defeating the will of the enemy was the top priority.

Before attacking a settlement, the Mongol generals demanded submission to the Khan, and threatened the initial villages with complete destruction if they refused to surrender. After winning the battle, the Mongol generals fulfilled their threats and massacred the survivors.

Examples include the destruction of the nations of Kiev and Khwarizm. Consequently, tales of the encroaching horde spread to the next villages and created an aura of insecurity that undermined the possibility of future resistance.

Subsequent nations were much more likely to surrender to the Mongols without fighting. Often this, as much as the Mongols' tactical prowess, secured quick Mongol victories.

Genghis Khan also employed tactics that made his numbers seem greater than they actually were. During night operations he ordered each soldier to light three torches at dusk to give the illusion of an overwhelming army and deceive and intimidate enemy scouts. He also sometimes had objects tied to the tails of his horses, so that riding on open and dry fields raised a cloud of dust that gave the enemy the impression of great numbers. His soldiers used arrows specially notched to whistle as they flew through the air, creating a terrifying noise.

The Mongols also employed other gruesome terror tactics to weaken the will to resist. One infamous incident occurred during Tamerlane's Indian campaign. Tamerlane, an heir to the Mongol martial tradition, built a pyramid of 90,000 human heads in front of the walls of Delhi, to convince them to surrender.

Other tactics included firing severed human heads from catapults into enemy lines and over city walls to frighten enemy soldiers and citizens and spread diseases in the close confines of a besieged city. The results were thus not only psychological since in 1347, the Mongols under Janibeg catapulted corpses infected with plague into the trading city of Kaffa in Crimea, making it one of the first knowns uses of biological warfare.

Vlad Tepes

Vlad Tepes physically and psychologically tortured his enemies. His most well-known psychological tactic was an incident involving impalement (earning him the title "Vlad the Impaler"), where he had the bodies of thousands of Ottoman soldiers suspended in the air, impaled through the heart or rectum with sharpened stakes.

Spanish Civil War

After the beginning of the Spanish Civil War, the Nationalist General Queipo de Llano started broadcasting transmissions to be heard by Republican zone listeners. Over loudspeakers he could be heard saying: "Red soldiers, abandon arms. Franco forgives and redeems. Follow the example set by your comrades who have joined our ranks. Only then you will achieve victory, happiness at home, and peace in your heart."

World War II

An example of a World War II era leaflet meant to be dropped from an American B-17 over a German city. See the file description page for a translation.

One of the first leaders to inexorably gain fanatical support through the use of microphone technology was Nazi Germany's Adolf Hitler. By first creating a speaking environment, designed by Joseph Goebbels, he was able to exaggerate his presence to make him seem almost messianic. Hitler also coupled this with the resonating projections of his orations for effect. British Prime Minister Winston Churchill made similar use of radio for propaganda against the Nazis.

The British set up the Political Warfare Executive to produce and distribute black and white propaganda. Through the use of powerful transmitters, broadcasts could be made across Europe. Sefton Delmer managed a successful black propaganda campaign through several radio stations which were designed to be popular with German troops while at the same time introducing news material that would weaken their morale under a veneer of authenticity.

During World War II, psychological warfare was used by the military. The invasion of Normandy was considered successful in part because of the displayed fusion of psychological warfare and military deception.

As an example, before D-Day, Operation Quicksilver, one element of operation Fortitude, which itself was part of a larger deception strategy (Operation Bodyguard), created a fictional "First United States Army Group" (FUSAG) commanded by General George Patton that supposedly would invade France at the Pas-de-Calais. American troops used false signals, decoy installations and phony equipment to deceive German observation aircraft and radio interception operators.

When the actual invasion began, the success of Fortitude was that it misled the German High Command into believing the landings were a diversion and of keeping reserves away from the beaches. Erwin Rommel was the primary target of the psychological aspects of this operation. Convinced that Patton would lead the invasion, Rommel was caught off-guard and unable to react strongly to the Normandy invasion, as Patton's illusory FUSAG had not "yet" landed. Confidence in his own intelligence and judgement rendered the German response to the beachhead ineffectual.

Modern psychological warfare operations

Most uses of the term psychological warfare refers to military methods such as:

- Distributing pamphlets, e.g. in the Persian Gulf War, encouraging desertion or (in World War II) supplying instructions on how to surrender
- Propaganda radio stations, such as Lord Haw-Haw in World War II on the "Germany calling" station

- Renaming cities and other places when captured, such as Ho Chi Minh City
- Shock and awe military strategy
- Projecting repetitive and annoying sounds and music for long periods at high volume towards groups under siege. In Iraq and Afghanistan, U.S. troops used music, most commonly American heavy metal or rock music, to confuse or scare insurgents.
- Use of loudspeaker systems to communicate with enemy soldiers
- Direct phone calls to intimidate enemy commanding officers and their families

Most of these techniques were developed during World War II or earlier, and have been used to some degree in every conflict since. Daniel Lerner was in the OSS (the predecessor to the US CIA) and in his book, attempts to analyze how effective the various strategies were.

He concludes that there is little evidence that any of them were dramatically successful, except perhaps surrender instructions over loudspeakers when victory was imminent. It should be noted, though, that measuring the success or failure of psychological warfare is very hard, as the conditions are very far from being a controlled experiment.

Germany

The other side of the above leaflet. This is the text of a speech given by Franklin D. Roosevelt, translated into German. Click here for a translation.

In the German Bundeswehr, the Zentrum Operative Information and its subordinate Bataillon für Operative Information 950 are responsible for the PSYOP efforts (called Operative Information in German). Both the center and the battalion are subordinate to the new Streitkräftebasis (Joint Services Support Command, SKB) and together consist of about 1,200 soldiers specialising in modern communication and media technologies. One project of the German PSYOP forces is the radio station Stimme der Freiheit (Sada-e Azadi, Voice of Freedom), heard by thousands of Afghans. Another is the publication of various newspapers and magazines in Kosovo and Afghanistan, where German soldiers serve with NATO.

People's Republic of China

You may not be interested in psychological warfare, but psychologic warfare's interested in you.
    —Xu Hezhen, a major general in the Chinese Army

Realist military strategists and foreign policy analysts are bracing for major Chinese onslaughts by way of psychological warfare. According to U.S. military analysts, attacking the enemy's mind is among the chief strategies China will use in order to catch its adversaries off-guard. Psychological warfare would disarm an enemy in a way even nuclear

weapons cannot, and so many say the U.S. must prepare for psychological warfare on an unprecedented level.

This type of warfare, being rooted in Chinese Stratagems outlined in words such as Sun Tzu's The Art of War and The Thirty-Six Stratagems, has become so engrained in Chinese culture that the same applies to military strategy and foreign policy strategy. In its dealings with its rivals, China is expected to utilize Marxist dialectics to mobilize communist loyalists, as well as flex its economic and military muscle to persuade other nations to do what it wants. The Chinese government will try to control the media to keep a tight hold on propaganda efforts for its people, though the success of this will be mitigated by the ever-increasing global availability of information. U.S. analysts take so seriously the concept of ji (planning) that they take any sign of Chinese military cooperation (e.g., sending troops to Sudan or giving information about Iran's nuclear program) cautiously.

United Kingdom

In the British Armed Forces, PSYOPS are handled by the tri-service 15 Psychological Operations Group. (See also MI5 and Secret Intelligence Service). The British were one of the first major military powers to use psychological warfare in World War II, especially against the Japanese. The Gurkhas, who are Nepalese soldiers in British service, have always been feared by the enemy due to their use of a curved knife called the kukri.

The British used this fear to great effect, as Gurkhas were used to terrorize Japanese soldiers through nighttime raids on their camps.

United States

The purpose of United States psychological operations is to induce or reinforce attitudes and behaviors favorable to US objectives. The Special Activities Division (SAD) is a division of the Central Intelligence Agency's National Clandestine Service, responsible for Covert Action and "Special Activities". These special activities include covert political influence (which includes psychological operations) and paramilitary operations. SAD's political influence group is the only US unit allowed to conduct these operations covertly and is considered the primary unit in this area.

Dedicated psychological operations units exist in the United States Army. The United States Navy also plans and executes limited PSYOP missions. United States PSYOP units and soldiers of all branches of the military are prohibited by law from targeting U.S. citizens with PSYOP within the borders of the United States(Executive Order S-1233, DOD Directive S-3321.1, and National Security Decision Directive 130.) While United States Army PSYOP units may offer non-PSYOP support to domestic military missions, they can only target foreign audiences. During the Waco Siege, the FBI and BATF conducted psychological operations on the men, women and children inside the Mount Carmel complex. This included using loudspeakers to play sounds of animals being slaughtered, drilling noises and clips from talk shows about how much their leader David Koresh was hated. In addition, very bright, flashing lights were used at night.

The United States ran an extensive program of psychological warfare during the Vietnam War. The Phoenix Program had the dual aim of assassinating Viet Cong personnel and terrorizing any potential sympathizers or passive supporters.

When members of the VCI were assassinated, CIA and Special Forces operatives placed playing cards in the mouth of the deceased as a calling card. During the Phoenix Program, over 19,000 Viet Cong supporters were killed.

The CIA made extensive use of Contra death squads in Nicaragua to destabilize the Sandinista government, which the U.S. maintained was communist. The CIA used psychological warfare techniques against the Panamanians by broadcasting pirate TV broadcasts. The CIA has extensively used propaganda broadcasts against the Cuban government through TV Marti, based in Miami, Florida. However, the Cuban government has been somewhat successful in jamming the signal of TV Marti.

In the Iraq War, the United States used the shock and awe campaign to psychologically maim, and break the will of the Iraqi Army to fight.

More recently, an article in Rolling Stone magazine alleges the United States has conducted psychological operations on its own senators and other decision makers in order to influence foreign policy. The article quotes U.S. Army Lt. Col. Michael Holmes describing how the U.S. Army illegally ordered a team of soldiers specializing in "psychological operations" to manipulate visiting American senators into providing more troops and funding for the war. According to Holmes, the orders came from the command of Lt. Gen. William B. Caldwell, a three-star general in charge of training Afghan troops. Gen. David Petraeus commander of the forces in Afghanistan ordered an investigation into the allegations made in the article.

Categories of psychological warfare

In his book Daniel Lerner divides psychological warfare operations into three categories:

White [Omissions + Emphasis]
   Truthful and not strongly biased, where the source of information is acknowledged.

Grey [Omissions + Emphasis + Racial/Ethnic/Religious Bias]
   Largely truthful, containing no information that can be proven wrong; the source may or may not be hidden.

Black [Commissions of falsification]
   Intended to deceive the enemy.

Mr. Lerner points out that grey and black operations ultimately have a heavy cost, in that the target population sooner or later recognizes them as propaganda and discredits the source. He writes, "This is one of the few dogmas advanced by Sykewarriors that is likely to

endure as an axiom of propaganda: Credibility is a condition of persuasion. Before you can make a man do as you say, you must make him believe what you say.":28 Consistent with this idea, the Allied strategy in World War II was predominantly one of truth (with certain exceptions).

Music in psychological operations

Music has been used in psychological operations. The term music torture is sometimes used by critics of the practice of playing loud music incessantly to prisoners or people besieged.

The United Nations and the European Court of Human Rights have banned the use of loud music in interrogations, but it is still being widely used. The term torture is sometimes used to describe the practice. While it is acknowledged by US interrogation experts that it causes discomfort, it has also been characterized by them as causing no "long term effects."

Instances of use

A BBC News report claimed that music by band Metallica, and from children's TV programs Barney and Sesame Street, was being used to cause sleep deprivation and culturally offend the prisoners.

Claimed to being used by the United States 361st Psychological Operations Company by Sergeant Mark Hadsell:

"These people haven't heard heavy metal. They can't take it. If you play it for 24 hours, your brain and body functions start to slide, your train of thought slows down and your will is broken. That's when we come in and talk to them."

Manuel Noriega

"When the United States invaded Panama in December 1989, Noriega took refuge in the Holy See's embassy on December 24, which was immediately surrounded by U.S. troops. After being continually bombarded by hard rock music, including Van Halen's hit song Panama, and "The Howard Stern Show" for several days, Noriega surrendered on January 3, 1990."

Guantanamo Bay

According to the FBI:

"W[itness] observed sleep deprivation interviews w/strobe lights and loud music. Interrogator said it would take 4 days to break someone doing an interrogation 16 hrs w/lights and music on and 4 hrs off. Handwritten note next to typed synopsis says "ok under DoD policy".

"Rumors that interrogator bragged about doing lap dance on d[etainee], another about making d[etainee] listen to satanic black metal music for hours then dressing as a Priest and baptizing d[etainee] to save him - handwritten note says 'yes'."

"W[itness] saw d[etainee] in interview room sitting on floor w/Israeli flag draped around him, loud music and strobe lights. W suspects this practice is used by DOD DHS based on who he saw in the hallway."

The Washington Post, quoting a leaked Red Cross report, wrote:

"The physical tactics noted by the Red Cross included placing detainees in extremely cold rooms with loud music blaring, and forcing them to kneel for long periods of time, the source familiar with the report said."
Iraq

According to Amnesty International:

"Detainees have reported being routinely subjected to cruel, inhuman or degrading treatment during arrest and detention. Many have told Amnesty International that they were tortured and ill-treated by US and UK troops during interrogation. Methods often reported include prolonged sleep deprivation; beatings; prolonged restraint in painful positions, sometimes combined with exposure to loud music; prolonged hooding; and exposure to bright lights. Virtually none of the allegations of torture or ill-treatment has been adequately investigated by the authorities."

Israel

On January 12, 1998 the Supreme Court of Israel declined to ban the use of loud music as an interrogation technique.

The use of music as a weapon in fiction and popular culture

In the movie A Clockwork Orange a rebellious outsider is subjected to brutal experimental brain-washing techniques that in an accidental coincidence causes him to be in physical pain if he listens to Beethoven's symphony no. 9.

In Back to the Future, Marty used music made by Van Halen to scare his dad, George McFly, awake, implying that since that kind of music didn't exist in that time, it would scare him.

In The Drew Carey Show, Mimi played "Panama" by Van Halen repeatedly to drive Drew and Friends from his house.

In an episode of the hit USA television show "Burn Notice," Sam Axe plays loud music to a prisoner to break his will.

Public awareness of the use of this technique is widespread enough that it can be used in satirical attacks on popular culture:

"Hollywood — Several days after Paris Hilton announced that she will release a music album, the Pentagon has decided to buy 50,000 copies of her upcoming album to use against insurgents in the volatile Anbar province in western Iraq."

Royalty payments

The Guardian reported that the US military may owe royalty payments to the artists whose works were played to the captives.

Musicians' protests

On 9 December 2008 the Associated Press reported that various musicians were coordinating their objections to the use of their music as a technique for softening up captives through an initiative called Zero dB. Zero dB is an initiative against music torture set up by legal charity Reprieve, which represents over thirty prisoners in Guantanamo Bay. Zero dB aims to stop torture music by encouraging widespread condemnation of the practice and by calling on governments and the UN to uphold and enforce the Convention Against Torture and other relevant treaties. The initiative is backed by the Musicians Union which is calling on British musicians to voice their outrage against the use of music to torture.

Musicians and the wider public are making their own silent protests against music torture which are being shown on Zero dB. A series of silent protests and actions are planned through 2009. Participating musicians will include minutes of silence in their concerts to draw their audience's attention to the USA's use of deafening music against captives.

According to the Associated Press FBI agents stationed at Guantanamo Bay reported that the use of deafening music was common. According to the Associated Press Guantanamo Bay spokesmen Commander Pauline Storum:

"...wouldn't give details of when and how music has been used at the prison, but said it isn't used today. She didn't respond when asked whether music might be used in the future."

Among the musicians united in their objections were Christopher Cerf, a composer for the children's show Sesame Street, Bob Singleton, who wrote "I Love You", the theme song for the children's show Barney & Friends, and Tom Morello of Rage Against the Machine and Audioslave. Others include R.E.M., The Roots, Rise Against, Rosanne Cash, Pearl Jam, Bonnie Raitt, Trent Reznor, Billy Bragg, Michelle Branch, Jackson Browne, T-Bone Burnett, David Byrne, Marc Cohn, Steve Earle, the Entrance Band, and Joe Henry.

The Associated Press reported that Stevie Benton of the group Drowning Pool commented:

"I take it as an honor to think that perhaps our song could be used to quell another 9/11 attack or something like that."

Military simulation

Military simulations, also known informally as war games, are simulations in which theories of warfare can be tested and refined without the need for actual hostilities. Many professional contemporary analysts object to the term wargames as this is generally taken to be referring to the civilian hobby, thus the preference for the term simulation. However historically this name has been used e.g. Strategic War Game of 1905,

Simulations exist in many different forms, with varying degrees of realism. In recent times, the scope of simulations has widened to include not only military but also political and social factors, which are seen as inextricably entwined in a realistic warfare model.

Whilst many governments make use of simulation, both individually and collaboratively, little is known about it outside professional circles. Yet modelling is often the means by which governments test and refine their military and political policies. Military simulations are seen as a useful way to develop tactical, strategical and doctrinal solutions, but critics argue that the conclusions drawn from such models are inherently flawed, due to the approximate nature of the models used.

The simulation spectrum

Military Simulations range from field exercises through computer simulations to analytical models; the realism of live manoeuvres is countered by the economy of abstract simulations

The term Military Simulation can be used to cover a wide spectrum of activities, ranging from full scale field exercises, to abstract computerised models that can proceed with little or no human involvement such as the Rand Strategy Assessment Center (RSAC).

As a general scientific principle, the most reliable data is produced by actual observation and the most reliable theories are based on it. This is also true in military analysis, where analysts look towards live field exercises and trials as providing data that is likely to be realistic (depending on the realism of the exercise) and verifiable (it has been gathered by actual observation). It can be readily discovered, for example, how long it takes to construct a pontoon bridge under given conditions with given manpower, and this data can then be used to provide norms for expected performance under similar conditions in the future, or to refine the bridge-building process. It is true that any form of training can be regarded as a 'simulation' in the strictest sense of the word (inasmuch as it simulates an operational environment); however, many if not most exercises are carried out not to test new ideas or models, but to provide the participants with the skills to operate within existing ones.

Full-scale military exercises, or even smaller scale ones, are not always feasible or even desirable. Availability of resources, including money, is a significant factor — it is an expensive endeavor to release men and materiel from any standing commitments, transport them to a suitable location, and then cover additional expenses such as Petroleum Oil Lubricants (POL) usage, equipment maintenance, supplies and consumables replenishment and other items. In addition, certain warfare models are not amenable to verification using this realistic method. It would, for example, be impossible to accurately test an attrition scenario by killing one's own troops.

Moving away from the Field Exercise, it is often more convenient to test a theory by reducing the level of personnel involvement. Map exercises can be conducted involving senior officers and planners, but without the need to physically move around any troops. These retain some human input, and thus can still reflect to some extent the human imponderables that make warfare so challenging to model, with the advantage of reduced costs and increased accessibility. A map exercise can also be conducted with far less forward planning than a full scale deployment, making it an attractive option for more minor simulations that would not merit anything larger, as well as for very major operations where cost, or secrecy, is an issue. (This was true in the planning of OPERATION AI.)

Increasing the level of abstraction still further, simulation moves towards an environment readily recognised by civilian wargamers. This type of simulation can be manual, implying no (or very little) computer involvement, computer-assisted, or fully computerised.

Graf Helmuth von Moltke is nowadays regarded as the grandfather of modern military simulation. Although not the inventor of Kriegspiel, he was greatly impressed by it as a young officer, and as Chief of Staff of the Prussian Army promoted its use as a training aid.

Manual simulations have probably been in use in some form since mankind first went to war. Chess can be regarded as a form of military simulation (although its precise origins are debated). In more recent times, the forerunner of modern simulations was the Prussian game Kriegspiel, which appeared around 1811 and is sometimes credited with the Prussian victory in the Franco-Prussian War. It was distributed to each Prussian regiment and they were ordered to play it regularly, prompting a visiting German officer to declare in 1824, "It's not a game at all! It's training for war!" Eventually so many rules sprang up, as each regiment improvised their own variations, two versions came into use. One, known as "rigid Kriegspiel", was played by strict adherence to the lengthy rule book. The other, "free Kriegspiel", was governed by the decisions of human umpires. Each version had its advantages and disadvantages: rigid Kriegspiel contained rules covering most situations, and the rules were derived from historical battles where those same situations had occurred, making the simulation verifiable and rooted in observable data, which some later American models discarded. However, its prescriptive nature acted against any impulse of the participants towards free and creative thinking. Conversely, free Kriegspiel could encourage this type of thinking, as its rules were open to interpretation by umpires and could be adapted during operation. This very interpretation, though, tended to negate the verifiable nature of the simulation, as different umpires might well adjudge the same

situation in different ways, especially where there was a lack of historical precedent. In addition, it allowed umpires to weight the outcome, consciously or otherwise.

The above arguments are still cogent in the modern, computer-heavy military simulation environment. There remains a recognised place for umpires as arbiters of a simulation, hence the persistence of manual simulations in war colleges throughout the world. Both computer-assisted and entirely computerised simulations are common as well, with each being used as required by circumstances. The Rand Corporation is one of the best known designers of Military Simulations for the US Government and Air Force, and one of the pioneers of the Political-Military simulation. Their SAFE (Strategic And Force Evaluation) simulation is an example of a manual simulation, with one or more teams of up to ten participants being sequestered in separate rooms and their moves being overseen by an independent director and his staff. Such simulations may be conducted over a few days (thus requiring commitment from the participants): an initial scenario (for example, a conflict breaking out in the Persian Gulf) is presented to the players with appropriate historical, political and military background information. They then have a set amount of time to discuss and formulate a strategy, with input from the directors/umpires (often called Control) as required. Where more than one team is participating, teams may be divided on partisan lines — traditionally Blue and Red are used as designations, with Blue representing the 'home' nation and Red the opposition. In this case, the teams will work against each other, their moves and counter-moves being relayed to their opponents by Control, who will also adjudicate on the results of such moves. At set intervals, Control will declare a change in the scenario, usually of a period of days or weeks, and present the evolving situation to the teams based on their reading of how it might develop as a result of the moves made. For example, Blue Team might decide to respond to the Gulf conflict by moving a carrier battle group into the area whilst simultaneously using diplomatic channels to avert hostilities. Red Team, on the other hand, might decide to offer military aid to one side or another, perhaps seeing an opportunity to gain influence in the region and counter Blue's initiatives. At this point Control could declare a week has now passed, and present an updated scenario to the players: possibly the situation has deteriorated further and Blue must now decide if they wish to pursue the military option, or alternatively tensions might have eased and the onus now lies on Red as to whether to escalate by providing more direct aid to their clients.

Computer-assisted simulations are really just a development of the manual simulation, and again there are different variants on the theme. Sometimes the computer assistance will be nothing more than a database to help umpires keep track of information during a manual simulation. At other times one or other of the teams might be replaced by a computer-simulated opponent (known as an agent or automaton). This can reduce the umpires' role to interpreter of the data produced by the agent, or obviate the need for an umpire altogether. Most commercial wargames designed to run on computers (such as Blitzkrieg, the Total War series and even the Civilization games) fall into this category.

Where both human teams are replaced by agents, the simulation can be fully computerised and, with minimal supervision, left to run by itself. The main advantage of this is the ready accessibility of the simulation — beyond the time required to program and update the

computer models, no special requirements are necessary. A fully computerised simulation can be run at virtually any time and in almost any location, the only equipment needed being a laptop computer. There is no need to juggle schedules to suit busy participants, acquire suitable facilities and arrange for their use, or obtain security clearances. An additional important advantage is its ability to perform many hundreds or even thousands of iterations in the time that it would take a manual simulation to run once. This means statistical information can be gleaned from such a model; outcomes can be quoted in terms of probabilities, and plans developed accordingly.

Removing the human element entirely means the results of the simulation are only as good as the model itself. Validation thus becomes extremely significant — data must be correct, and must be handled correctly by the model: the modeller's assumptions ("rules") must adequately reflect reality, or the results will be nonsense. Various mathematical formulae have been devised over the years to attempt to predict everything from the effect of casualties on morale to the speed of movement of an army in difficult terrain. One of the best known is the Lanchester Square Law formulated by the British engineer Frederick Lanchester in 1914. He expressed the fighting strength of a (then) modern force as proportional to the square of its numerical strength multiplied by the fighting value of its individual units. The Lanchester Law is often known as the attrition model, as it can be applied to show the balance between opposing forces as one side or the other loses numerical strength.

Heuristic or stochastic?

Another method of categorising military simulations is to divide them into two broad areas.

Heuristic simulations are those that are run with the intention of stimulating research and problem solving; they are not necessarily expected to provide empirical solutions.

Stochastic simulations are those that involve, at least to some extent, an element of chance.

Most military simulations fall somewhere in between these two definitions, although manual simulations lend themselves more to the heuristic approach and computerised ones to the stochastic.

Manual simulations, as described above, are often run to explore a 'what if?' scenario and take place as much to provide the participants with some insight into decision-making processes and crisis management as to provide concrete conclusions. Indeed, such simulations do not even require a conclusion; once a set number of moves has been made and the time allotted has run out, the scenario will finish regardless of whether the original situation has been resolved or not.

Computerised simulations can readily incorporate chance in the form of some sort of randomised element, and can be run many times to provide outcomes in terms of probabilities. In such situations, it sometimes happens that the unusual results are of more interest than the expected ones. For example, if a simulation modelling an invasion of

nation A by nation B was put through one hundred iterations to determine the likely depth of penetration into A's territory by B's forces after four weeks, an average result could be calculated. Examining those results, it might be found that the average penetration was around fifty kilometres — however, there would also be outlying results on the ends of the probability curve. At one end, it could be that the FEBA is found to have hardly moved at all; at the other, penetration could be hundreds of kilometres instead of tens. The analyst would then examine these outliers to determine why this was the case. In the first instance, it might be found that the computer model's random number generator had delivered results such that A's divisional artillery was much more effective than normal. In the second, it might be that the model generated a spell of particularly bad weather that kept A's air force grounded. This analysis can then be used to make recommendations: perhaps to look at ways in which artillery can be made more effective, or to invest in more all-weather fighter and ground-attack aircraft.

Political-military simulations

Since Carl von Clausewitz' famous declaration that war is merely a continuation of Politics by other means, military planners have attempted to integrate political goals with military goals in their planning with varying degrees of commitment. Post World War II, political-military simulation in the West, initially almost exclusively concerned with the rise of the Soviet Union as a superpower, has more recently focused on the global 'war on terror'. It became apparent that in order to model an ideologically motivated enemy in general (and asymmetric warfare in particular), political factors had to be taken into account any realistic strategic simulation.

This differed markedly with the traditional approach to military simulations. Kriegspiel was concerned only with the movement and engagement of military forces, and the simulations that followed were similarly focused in their approach. Following the Prussian success in 1866 against Austria at Sadowa, the Austrians, French, British, Italians, Japanese and Russians all began to make use of wargaming as a training tool. The United States was relatively late to adopt the trend, but by 1889 wargaming was firmly embedded in the culture of the US Navy (with the Royal Navy as the projected adversary).

Political-military simulations take a different approach to their purely military counterparts. Since they are largely concerned with policy issues rather than battlefield performance, they tend to be less prescriptive in their operation. However, various mathematical techniques have arisen in an attempt to bring rigor to the modeling process. One of these techniques is known as game theory — a commonly-used method is that of non-zero-sum analysis, in which score tables are drawn up to enable selection of a decision such that a favorable outcome is produced regardless of the opponent's decision.

It was not until 1954 that the first modern political-military simulation appeared (although the Germans had modeled a Polish invasion of Germany in 1929 that could be fairly labeled political-military), and it was the United States that would elevate simulation to a tool of statecraft. The impetus was US concern about the burgeoning nuclear arms race (the Soviet Union exploded its first nuclear weapon in 1949, and by 1955 had developed their first true

'H' bomb). A permanent gaming facility was created in The Pentagon and various professional analysts brought in to run it, including the social scientist Herbert Goldhamer, economist Andrew Marshall and MIT professor Lincoln P Bloomfield.

Notable US political-military simulations run since World War II include the aforementioned SAFE, STRAW (Strategic Air War) and COW (Cold War). The typical political-military simulation is a manual or computer-assisted heuristic-type model, and many research organizations and think-tanks throughout the world are involved in providing this service to governments. During the Cold War, the Rand Corporation and the Massachusetts Institute of Technology, amongst others, ran simulations for the Pentagon that included modeling the Vietnam War, the fall of the Shah of Iran, the rise of pro-communist regimes in South America, tensions between India, Pakistan and China, and various potential flashpoints in Africa and South-East Asia. Both MIT and Rand remain heavily involved in US military simulation, along with institutions such as Harvard, Stanford, and the National Defense University. Other nations have their equivalent organizations, such as Cranfield Institute's Defense Academy (formerly the Royal Military College of Science) in the United Kingdom.

Participants in the Pentagon simulations were sometimes of very high rank, including members of Congress and White House insiders as well as senior military officers. The identity of many of the participants remains secret even today. It is a tradition in US simulations (and those run by many other nations) that participants are guaranteed anonymity. The main reason for this is that occasionally they may take on a role or express an opinion that is at odds with their professional or public stance (for example portraying a fundamentalist terrorist or advocating hawkish military action), and thus could harm their reputation or career if their in-game persona became widely known. It is also traditional that in-game roles are played by participants of an equivalent rank in real life, although this is not a hard-and-fast rule and often disregarded. Whilst the major purpose of a political-military simulation is to provide insights that can be applied to real-world situations, it is very difficult to point to a particular decision as arising from a certain simulation — especially as the simulations themselves are usually classified for years, and even when released into the public domain are sometimes heavily censored. This is not only due to the unwritten policy of non-attribution, but to avoid disclosing sensitive information to a potential adversary. This has been true within the simulation environment itself as well — former US president Ronald Reagan was a keen visitor to simulations conducted in the 1980s, but as an observer only. An official explained: "No president should ever disclose his hand, not even in a war game".

Political-military simulations remain in widespread use today: modern simulations are concerned not with a potential war between superpowers, but more with international cooperation, the rise of global terrorism and smaller brushfire conflicts such as those in Kosovo, Bosnia, Sierra Leone and the Sudan. An example is the MNE (Multinational Experiment) series of simulations that have been run from the Atatürk Wargaming, Simulation and Culture Center in Istanbul over recent years. The latest, MNE 4, took place in early 2006. MNE includes participants from Australia, Canada, Finland, France, Germany, Sweden, the United Kingdom, the North Atlantic Treaty Organization (NATO) and the

United States, and is designed to explore the use of diplomatic, economic and military power in the global arena.

Simulation and reality

A soldier competing in a combat simulation as part of the Best Warrior competition at Fort Lee.

Ideally military simulations should be as realistic as possible — that is, designed in such a way as to provide measurable, repeatable results that can be confirmed by observation of real-world events. This is especially true for simulations that are stochastic in nature, as they are used in a manner that is intended to produce useful, predictive outcomes. Any user of simulations must always bear in mind that they are, however, only an approximation of reality, and hence only as accurate as the model itself.

Validation

In the context of simulation, validation is the process of determining the degree to which the intended simulation accurately represents the real world. A model is tested by supplying it with historical data and comparing its output to the known historical result. If a model can reliably reproduce known results, and if estimates of the intended simulation's accuracy are acceptable, the model may be useful for providing predictive outputs (within a reasonable degree of uncertainty).

Developing realistic models has proven to be somewhat easier in naval simulations than on land. One of the pioneers of naval simulations, Fletcher Pratt, designed his "Naval War Game" in the late 1930s, and was able to validate his model almost immediately by applying it to the encounter between the German pocket battleship Admiral Graf Spee and three British cruisers in the Battle of the River Plate off Montevideo in 1939. Rated on thickness of armour and gunpower, Graf Spee should have been more than a match for the lighter cruisers, but Pratt's formula correctly predicted the ensuing British victory.

In contrast, many modern operations research models have proven unable to reproduce historical results when they are subjected to the validation process; the Atlas model, for instance, in 1971 was shown to be incapable of achieving more than a 68% correspondence with historical results. Trevor Dupuy, a prominent American historian and military analyst known for airing often controversial views, has said that "many OR analysts and planners are convinced that neither history nor data from past wars has any relevance". In Numbers, Predictions, and War, he implies a model that cannot even reproduce a known outcome is little more than a whimsy, with no basis in reality.

Historically, there have even been a few rare occasions where a simulation was being tested as it was being carried out. One notable such occurrence was just before the famous Ardennes offensive in World War II, when the Germans attacked allied forces during a period of bad weather in the winter of 1944, hoping to reach the port of Antwerp and force the Allies to sue for peace. According to German General Friedrich J Fangor, the staff of Fifth

Panzerarmee had met in November to game defensive strategies against a simulated American attack. They had no sooner begun the exercise than reports began arriving of a strong American attack in the Hűrtgen area — exactly the area they were gaming on their map table. Generalfeldmarschall Walther Model ordered the participants (apart from those commanders whose units were actually under attack) to continue playing, using the messages they were receiving from the front as game moves. For the next few hours simulation and reality ran hand-in-hand: when the officers at the game table decided that the situation warranted commitment of reserves, the commander of the 116th Panzer Division was able to turn from the table and issue as operational orders those moves they had just been gaming. The division was mobilised in the shortest possible time, and the American attack was repulsed.

Validation is a particular issue with political-military simulations, since much of the data produced is subjective. One controversial doctrine that arose from early post-WWII simulations was that of signalling — the idea that by making certain moves, it is possible to send a message to your opponent about your intentions: for example, by conspicuously conducting field exercises near a disputed border, a nation indicates its readiness to respond to any hostile incursions. This was fine in theory, and formed the basis of East-West interaction for much of the cold war, but was also problematic and dogged by criticism. An instance of the doctrine's shortcomings can be seen in the bombing offensives conducted by the United States during the Vietnam War. US commanders decided, largely as a result of their Sigma simulations, to carry out a limited bombing campaign against selected industrial targets in North Vietnam. The intention was to signal to the North Vietnamese high command that, whilst the United States was clearly capable of destroying a much greater proportion of their infrastructure, this was in the nature of a warning to scale down involvement in the South 'or else'. Unfortunately, as an anonymous analyst said of the offensive (which failed in its political aims), "they either didn't understand, or did understand but didn't care." It was pointed out by critics that, since both Red and Blue teams in Sigma were played by Americans — with common language, training, thought processes and background — it was relatively easy for signals sent by one team to be understood by the other. Those signals, however, did not seem to translate well across the cultural divide.

Problems of simulation

Many of the criticisms directed towards military simulations derive from an incorrect application of them as a predictive and analytical tool. The outcome supplied by a model relies to a greater or lesser extent on human interpretation and therefore should not be regarded as providing a 'gospel' truth. However, whilst this is generally understood by most game theorists and analysts, it can be tempting for a layman — for example, a politician who needs to present a 'black and white' situation to his electorate — to settle on an interpretation that supports his preconceived position. Tom Clancy, in his novel Red Storm Rising, illustrated this problem when one of his characters, attempting to persuade the Soviet Politburo that the political risks of war with NATO were acceptable, used as evidence the results of a simulation carried out to model just such an event. It is revealed in the text that there were in fact three sets of results from the simulation; a best-,

intermediate- and worst-case outcome. The advocate of war chose to present only the best-case outcome, thus distorting the results to support his case.

Although fictional, the above scenario may however have been based on fact. The Japanese extensively wargamed their planned expansion during World War II, but map exercises conducted before the Pacific War were frequently stopped short of a conclusion where Japan was defeated. One often-cited example prior to Midway had the umpires magically resurrecting a Japanese carrier sunk during a map exercise, although Professor Robert Rubel argues in the Naval War College Review their decision was justified in this case given improbable rolls of the dice. Given the historical outcome, it is evident the dice rolls were not so improbable, after all. There were however equally illustrative fundamental problems with other areas of the simulation, mainly relating to a Japanese unwillingness to consider their position should the element of surprise, on which the operation depended, be lost.

Tweaking simulations to make results conform with current political or military thinking is a recurring problem. In US Naval exercises in the 1980s, it was informally understood no high-value units such as aircraft carriers were allowed to be sunk, as naval policy at the time concentrated its tactical interest on such units. The outcome of one of the largest ever NATO exercises, Ocean Venture-81, in which around 300 naval vessels, including two carrier battle groups, were adjudged to have successfully traversed the Atlantic and reached the Norwegian Sea despite the existence of a (real) 380-strong Soviet submarine fleet as well as their (simulated) Red Team opposition, was publicly questioned in Proceedings, the professional journal of the US Naval Institute. The US Navy managed to get the article classified, and it remains secret to this day, but the article's author and chief analyst of Ocean Venture-81, Lieutenant Commander Dean L. Knuth, has since claimed two Blue aircraft carriers were successfully attacked and sunk by Red forces.

There have been many charges over the years of computerised models, too, being unrealistic and slanted towards a particular outcome. Critics point to the case of military contractors, seeking to sell a weapons system. For obvious reasons of cost, weapons systems (such as an air-to-air missile system for use by fighter aircraft) are extensively modelled on computer. Without testing of their own, a potential buyer must rely to a large extent on the manufacturer's own model. This might well indicate a very effective system, with a high kill probability (Pk). However, it may be the model was configured to show the weapons system under ideal conditions, and its actual operational effectiveness will be somewhat less than stated. The US Air Force quoted their AIM-9 Sidewinder missile as having a Pk of 0.98 (it will successfully destroy 98% of targets it is fired at). In operational use during the Falklands War in 1982, the British recorded its actual Pk as 0.78.

Another factor that can render a model invalid is human error. One notorious example was the US Air Force's Advanced Penetration Model, which due to a programming error made US bombers invulnerable to enemy air defences by inadvertently altering their latitude or longitude when checking their location for a missile impact. This had the effect of 'teleporting' the bomber, at the instant of impact, hundreds or even thousands of miles away, causing the missile to miss. Furthermore, this error went unnoticed for a number of years. Other unrealistic models have had battleships consistently steaming at seventy knots

(twice their top speed), an entire tank army halted by a border police detachment, and attrition levels 50% higher than the numbers each force began with.

Issues of enemy technical capability and military philosophy will also affect any model used. Whilst a modeller with sufficiently high security clearance and access to the relevant data can expect to create a reasonably accurate picture of his own nation's military capacity, creating a similarly detailed picture for a potential adversary may be extremely difficult. Military information, from technical specifications of weapons systems to tactical doctrine, is high on the list of any nation's most closely guarded secrets. However, the difficulty of discovering the unknown, when it is at least known that it exists, seems trivial compared to discovering the unguessed. As Len Deighton famously pointed out in Spy Story, if the enemy has an unanticipated capability (and he almost always does), it may render tactical and strategic assumptions so much nonsense. By its very nature, it is not possible to predict the direction every new advance in technology will take, and previously undreamt-of weapons systems can come as a nasty shock to the unprepared: the British introduction of the tank during World War I caused panic amongst German soldiers at Cambrai and elsewhere, and the advent of Hitler's vengeance weapons, such as the V-1 "flying bomb", caused deep concern amongst Allied high command.

Human factors have been a constant thorn in the side of the designers of military simulations — whereas political-military simulations are often required by their nature to grapple with what are referred to by modellers as "squishy" problems, purely military models often seem to prefer to concentrate on hard numbers. Whilst a warship can be regarded, from the perspective of a model, as a single entity with known parameters (speed, armour, gun power, and the like), land warfare often depends on the actions of small groups or individual soldiers where training, morale, intelligence, and personalities (leadership) come into play. For this reason it is more taxing to model — there are many variables that are difficult to formulate. Commercial wargames, both the tabletop and computer variety, often attempt to take these factors into account: in Rome: Total War, for example, units will generally rout from the field rather than stay to fight to the last man. One valid criticism of some military simulations is these nebulous human factors are often ignored (partly because they are so hard to model accurately, and partly because no commander likes to acknowledge men under his command may disobey him). In recognition of this shortcoming, military analysts have in the past turned to civilian wargames as being more rigorous, or at least more realistic, in their approach to warfare. In the United States, James F. Dunnigan, a prominent student of warfare and founder of the commercial tabletop wargames publisher Simulations Publications Incorporated (SPI, now defunct), was brought into the Pentagon's wargaming circle in 1980 to work with Rand and Science Applications Incorporated (SAI) on the development of a more realistic model. The result, known as SAS (Strategic Analysis Simulation), is still being used.

All the above means that models of warfare should be taken for no more than they are: a non-prescriptive attempt to inform the decision-making process. The dangers of treating military simulation as gospel are illustrated in an anecdote circulated at the end of the Vietnam War, which was intensively gamed between 1964 and 1969 (with even President Lyndon Johnson being photographed standing over a wargaming sand table at the time of

Khe Sanh) in a series of simulations codenamed Sigma. The period was one of great belief in the value of military simulations, riding on the back of the proven success of operations research (or OR) during World War II and the growing power of computers in handling large amounts of data.

The story concerned a fictional aide in Richard Nixon's administration, who, when Nixon took over government in 1969, fed all the data held by the US pertaining to both nations into a computer model — population, gross national product, relative military strength, manufacturing capacity, numbers of tanks, aircraft and the like. The aide then asked the question of the model, "When will we win?" Apparently the computer replied, "You won in 1964!"

Simulated thermonuclear bombing of American cities

During the Cold War, the Strategic Air Command's 1st Combat Evaluation deployed radar bomb scoring units from Barksdale Air Force Base on board military railroad cars to score simulated thermonuclear bombing of cities in the continental United States.

"The RBS technicians cranked and tuned their black boxes and radar dish, to track and score the theoretical point of impact for the bomber crew's electonic thermonuclear weapon. When all of the B-52s black boxes accomplished the preset magic the designers intended, there were no targets anyplace on planet earth that could not be obliterated with unerring accuracy...."

—Maier

Military simulation journals

This table lists peer-reviewed research journals that focus on military simulation research and general simulation publications that may include military simulation articles. The table also provides journal impact factors as published by Journal Citation Reports. The impact factor is the average number of citations per article.

Human factors

Human factors science or human factors technologies is a multidisciplinary field incorporating contributions from psychology, engineering, industrial design, statistics, operations research and anthropometry. It is a term that covers:

- The science of understanding the properties of human capability (Human Factors Science).
- The application of this understanding to the design, development and deployment of systems and services (Human Factors Engineering).

▪ The art of ensuring successful application of Human Factors Engineering to a program (sometimes referred to as Human Factors Integration). It can also be called ergonomics.

In general, a human factor is a physical or cognitive property of an individual or social behavior, which is specific to humans and influences functioning of technological systems as well as human-environment equilibriums.

In social interactions, the use of the term human factor stresses the social properties unique to or characteristic of humans.

Human factors involves the study of all aspects of the way humans relate to the world around them, with the aim of improving operational performance, safety, through life costs and/or adoption through improvement in the experience of the end user.

The terms human factors and ergonomics have only been widely used in recent times; the field's origin is in the design and use of aircraft during World War II to improve aviation safety. It was in reference to the psychologists and physiologists working at that time and the work that they were doing that the terms "applied psychology" and "ergonomics" were first coined. Work by Elias Porter, Ph.D. and others within the RAND Corporation after WWII extended these concepts. "As the thinking progressed, a new concept developed - that it was possible to view an organization such as an air-defense, man-machine system as a single organism and that it was possible to study the behavior of such an organism. It was the climate for a breakthrough."

Specialisations within this field include cognitive ergonomics, usability, human computer/ human machine interaction, and user experience engineering. New terms are being generated all the time. For instance, "user trial engineer" may refer to a human factors professional who specialises in user trials. Although the names change, human factors professionals share an underlying vision that through application of an understanding of human factors the design of equipment, systems and working methods will be improved, directly affecting people's lives for the better.

Human factors practitioners come from a variety of backgrounds, though predominantly they are psychologists (engineering, cognitive, perceptual, and experimental) and physiologists. Designers (industrial, interaction, and graphic), anthropologists, technical communication scholars and computer scientists also contribute. Though some practitioners enter the field of human factors from other disciplines, both M.S. and Ph.D. degrees in Human Factors Engineering are available from several universities worldwide.

The Formal History of American Human Factors Engineering

The formal history describes activities in known chronological order. This can be divided into 5 markers:

Developments prior to World War I

Prior to WWI the only test of human to machine compatibility was that of trial and error. If the human functioned with the machine, he was accepted, if not he was rejected. There was a significant change in the concern for humans during the American civil war. The US patent office was concerned whether the mass produced uniforms and new weapons could be used by the infantry men. The next development was when the American inventor Simon Lake tested submarine operators for psychological factors, followed by the scientific study of the worker. This was an effort dedicated to improve the efficiency of humans in the work place. These studies were designed by F W Taylor. The next step was the derivation of formal time and motion study from the studies of Frank Gilbreth, Sr. and Lillian Gilbreth.

Developments during World War I

With the onset of WWI, more sophisticated equipment was developed. The inability of the personnel to use such systems led to an increase in interest in human capability. Earlier the focus of aviation psychology was on the aviator himself. But as time progressed the focus shifted onto the aircraft, in particular, the design of controls and displays, the effects of altitude and environmental factors on the pilot. The war saw the emergence of aeromedical research and the need for testing and measurement methods. Still, the war did not create a Human Factors Engineering (HFE) discipline, as such. The reasons attributed to this are that technology was not very advanced at the time and America's involvement in the war only lasting for 18 months.

Developments between World War I and World War II

This period saw relatively slow development in HFE. Although, studies on driver behaviour started gaining momentum during this period, as Henry Ford started providing millions of Americans with automobiles. Another major development during this period was the performance of aeromedical research. By the end of WWI, two aeronautical labs were established, one at Brooks Airforce Base, Texas and the other at Wright field outside of Dayton, Ohio. Many tests were conducted to determine which characteristic differentiated the successful pilots from the unsuccessful ones. During the early 1930s, Edwin Link developed the first flight simulator. The trend continued and more sophisticated simulators and test equipment were developed. Another significant development was in the civilian sector, where the effects of illumination on worker productivity were examined. This led to the identification of the Hawthorne Effect, which suggested that motivational factors could significantly influence human performance.

Developments during World War II

With the onset of WW II, it was no longer possible to adopt the Tayloristic principle of matching individuals to preexisting jobs. Now the design of equipment had to take into account human limitations and take advantage of human capabilities. This change took time to come into place. There was a lot of research conducted to determine the human

capabilities and limitations that had to be accomplished. A lot of this research took off where the aeromedical research between the wars had left off. An example of this is the study done by Fitts and Jones (1947), who studied the most effective configuration of control knobs to be used in aircraft cockpits. A lot of this research transcended into other equipment with the aim of making the controls and displays easier for the operators to use. After the war, the Army Air Force published 19 volumes summarizing what had been established from research during the war.

Developments after World War II

In the initial 20 years after the WW II, most activities were done by the founding fathers: Alphonse Chapanis, Paul Fitts, and Small. The beginning of cold war led to a major expansion of Defense supported research laboratories. Also, a lot of labs established during the war started expanding. Most of the research following the war was military sponsored. Large sums of money were granted to universities to conduct research. The scope of the research also broadened from small equipments to entire workstations and systems. Concurrently, a lot of opportunities started opening up in the civilian industry. The focus shifted from research to participation through advice to engineers in the design of equipment. After 1965, the period saw a maturation of the discipline. The field has expanded with the development of the computer and computer applications.

Founded in 1957, the Human Factors and Ergonomics Society is the world's largest organization of professionals devoted to the science of human factors and ergonomics. The Society's mission is to promote the discovery and exchange of knowledge concerning the characteristics of human beings that are applicable to the design of systems and devices of all kinds.

The Cycle of Human Factors

Human Factors involves the study of factors and development of tools that facilitate the achievement of these goals. In the most general sense, the three goals of human factors are accomplished through several procedures in the human factors cycle, which depicts the human operator (brain and body) and the system with which he or she is interacting. First it is necessary to diagnose or identify the problems and deficiencies in the human-system interaction of an existing system. After defining the problems there are five different approaches that can be used in order to implement the solution. These are as follows:

- Equipment Design: changes the nature of the physical equipment with which humans work.
- Task Design: focuses more on changing what operators do than on changing the devices they use. This may involve assigning part or all of tasks to other workers or to automated components.
- Environmental Design: implements changes, such as improved lighting, temperature control and reduced noise in the physical environment where the task is carried out.

- Training the individuals: better preparing the worker for the conditions that he or she will encounter in the job environment by teaching and practicing the necessary physical or mental skills.
- Selection of individuals: is a technique that recognizes the individual differences across humans in every physical and mental dimension that is relevant for good system performance. Such a performance can be optimized by selecting operators who possess the best profile of characteristics for the job.

Human Factors Science

Human factors are sets of human-specific physical, cognitive, or social properties which either may interact in a critical or dangerous manner with technological systems, the human natural environment, or human organizations, or they can be taken under consideration in the design of ergonomic human-user oriented equipment. The choice or identification of human factors usually depends on their possible negative or positive impact on the functioning of human-organizations and human-machine systems.

The human-machine model

The simple human-machine model is a person interacting with a machine in some kind of environment. The person and machine are both modeled as information-processing devices, each with inputs, central processing, and outputs. The inputs of a person are the senses (e.g., eyes, ears) and the outputs are effectors (e.g., hands, voice). The inputs of a machine are input control devices (e.g., keyboard, mouse) and the outputs are output display devices (e.g., screen, auditory alerts). The environment can be characterized physically (e.g., vibration, noise, zero-gravity), cognitively (e.g., time pressure, uncertainty, risk), and/or organizationally (e.g., organizational structure, job design). This provides a convenient way for organizing some of the major concerns of human engineering: the selection and design of machine displays and controls; the layout and design of workplaces; design for maintainability; and the design of the work environment.

Example: Driving an automobile is a familiar example of a simple man-machine system. In driving, the operator receives inputs from outside the vehicle (sounds and visual cues from traffic, obstructions, and signals) and from displays inside the vehicle (such as the speedometer, fuel indicator, and temperature gauge). The driver continually evaluates this information, decides on courses of action, and translates those decisions into actions upon the vehicle's controls—principally the accelerator, steering wheel, and brake. Finally, the driver is influenced by such environmental factors as noise, fumes, and temperature.

No matter how important it may be to match an individual operator to a machine, some of the most challenging and complex human problems arise in the design of large man-machine systems and in the integration of human operators into these systems. Examples of such large systems are a modern jet airliner, an automated post office, an industrial plant, a nuclear submarine, and a space vehicle launch and recovery system. In the design of such systems, human-factors engineers study, in addition to all the considerations previously mentioned, three factors: personnel, training, and operating procedures.

• Personnel are trained; that is, they are given appropriate information and skills required to operate and maintain the system. System design includes the development of training techniques and programs and often extends to the design of training devices and training aids.

• Instructions, operating procedures, and rules set forth the duties of each operator in a system and specify how the system is to function. Tailoring operating rules to the requirements of the system and the people in it contributes greatly to safe, orderly, and efficient operations.

Human Factors Engineering

Human Factors Engineering (HFE) is the discipline of applying what is known about human capabilities and limitations to the design of products, processes, systems, and work environments. It can be applied to the design of all systems having a human interface, including hardware and software. Its application to system design improves ease of use, system performance and reliability, and user satisfaction, while reducing operational errors, operator stress, training requirements, user fatigue, and product liability. HFE is distinctive in being the only discipline that relates humans to technology.

Human factors engineering focuses on how people interact with tasks, machines (or computers), and the environment with the consideration that humans have limitations and capabilities. Human factors engineers evaluate "Human to Human," "Human to Group," "Human to Organizational," and "Human to Machine (Computers)" interactions to better understand these interactions and to develop a framework for evaluation.

Human Factors engineering activities include: 1. Usability assurance 2. Determination of desired user profiles 3. Development of user documentation 4. Development of training programs.

Usability assurance

Usability assurance is an interdisciplinary concept, integrating system engineering with Human Factors engineering methodologies. Usability assurance is achieved through the system or service design, development, evaluation and deployment.

- User interface design comprises physical (ergonomic) design, interaction design and layout design.
- Usability development comprises integration of human factors in project planning and management, including system specification documents: requirements, design and testing.
- Usability evaluation is a continuous process, starting with the operational requirements specification, through prototypes of the user interfaces, through usability alpha and beta testing, and through manual and automated feedback after the system has been deployed.

User Interface Design

Human-computer interaction is a discipline concerned with the design, evaluation and implementation of interactive computing systems for human use and with the study of major phenomena surrounding them. This is a well known subject of Human Factors within the Engineering field. There are many different ways to determine human computer interaction at the user interface by usability testing.

Human Factors Evaluation Methods

Human Factors evaluation methods are part of Human Factors methodology, which is part of Human Factors Engineering.

Besides evaluation, Human Factors Engineering also deals with methods for usability assurance, for assessing desired user profiles, for developing user documentation and training programs, etc.

Until recently, methods used to evaluate human factors ranged from simple questionnaires to more complex and expensive usability labs.

Recently, new methods were proposed, based on analysis of logs of the activity of the system users.

Actually, the work in usability labs and that of the new methods is part of Usability Engineering, which is part of Human Factors Engineering.

Brief Summary of Human Factors Evaluation Methods

Ethnographic analysis: Using methods derived from ethnography, this process focuses on observing the uses of technology in a practical environment. It is a qualitative and observational method that focuses on "real-world" experience and pressures, and the usage of technology or environments in the workplace. The process is best used early in the design process.

- **Focus Groups**: Focus groups are another form of qualitative research in which one individual will facilitate discussion and elicit opinions about the technology or process under investigation. This can be on a one to one interview basis, or in a group session. Can be used to gain a large quantity of deep qualitative data, though due to the small sample size, can be subject to a higher degree of individual bias. Can be used at any point in the design process, as it is largely dependent on the exact questions to be pursued, and the structure of the group. Can be extremely costly.

- **Iterative design**: Also known as prototyping, the iterative design process seeks to involve users at several stages of design, in order to correct problems as they emerge. As prototypes emerge from the design process, these are subjected to other forms of analysis as outlined in this article, and the results are then taken and

incorporated into the new design. Trends amongst users are analyzed, and products redesigned. This can become a costly process, and needs to be done as soon as possible in the design process before designs become too concrete.

▪ **Meta-analysis**: A supplementary technique used to examine a wide body of already existing data or literature in order to derive trends or form hypotheses in order to aid design decisions. As part of a literature survey, a meta-analysis can be performed in order to discern a collective trend from individual variables.

▪ **Subjects-in-tandem**: Two subjects are asked to work concurrently on a series of tasks while vocalizing their analytical observations. This is observed by the researcher, and can be used to discover usability difficulties. This process is usually recorded.

▪ **Surveys and Questionnaires**: A commonly used technique outside of Human Factors as well, surveys and questionnaires have an advantage in that they can be administered to a large group of people for relatively low cost, enabling the researcher to gain a large amount of data. The validity of the data obtained is, however, always in question, as the questions must be written and interpreted correctly, and are, by definition, subjective. Those who actually respond are in effect self-selecting as well, widening the gap between the sample and the population further.

▪ **Task analysis**: A process with roots in activity theory, task analysis is a way of systematically describing human interaction with a system or process to understand how to match the demands of the system or process to human capabilities. The complexity of this process is generally proportional to the complexity of the task being analyzed, and so can vary in cost and time involvement. It is a qualitative and observational process. Best used early in the design process.

▪ **Think aloud protocol**: Also known as "concurrent verbal protocol", this is the process of asking a user to execute a series of tasks or use technology, while continuously verbalizing their thoughts so that a researcher can gain insights as to the users' analytical process. Can be useful for finding design flaws that do not affect task performance, but may have a negative cognitive affect on the user. Also useful for utilizing experts in order to better understand procedural knowledge of the task in question. Less expensive than focus groups, but tends to be more specific and subjective.

▪ **User analysis**: This process is based around designing for the attributes of the intended user or operator, establishing the characteristics that define them, creating a persona for the user. Best done at the outset of the design process, a user analysis will attempt to predict the most common users, and the characteristics that they would be assumed to have in common. This can be problematic if the design concept does not match the actual user, or if the identified are too vague to make clear

design decisions from. This process is, however, usually quite inexpensive, and commonly used.

▪ **"Wizard of Oz"**: This is a comparatively uncommon technique but has seen some use in mobile devices. Based upon the Wizard of Oz experiment, this technique involves an operator who remotely controls the operation of a device in order to imitate the response of an actual computer program. It has the advantage of producing a highly changeable set of reactions, but can be quite costly and difficult to undertake.

Problems with Human Factors Methods

Problems in how usability measures are employed include:
(1) measures of learning and retention of how to use an interface are rarely employed during methods and
(2) some studies treat measures of how users interact with interfaces as synonymous with quality-in-use, despite an unclear relation.

Weakness of Usability Lab Testing

Although usability lab testing is believed to be the most influential evaluation method, it does have some limitations. These limitations include:

(1) Additional resources and time than other methods
(2) Usually only examines a fraction of the entire market segment
(3) Test scope is limited to the sample tasks chosen
(4) Long term ease-of-use problems are difficult to identify
(5) May reveal only a fraction of total problems
(6) Laboratory setting excludes factors that the operational environment places on the products usability

Weakness of Inspection Methods

Inspection methods (expert reviews and walkthroughs) can be accomplished quickly, without resources from outside the development team, and does not require the research expertise that usability tests need. However, inspection methods do have limitations, which include:

(1) Do not usually directly involve users
(2) Often do not involve developers
(3) Set up to determine problems and not solutions
(4) Do not foster innovation or creative solutions
(5) Not good at persuading developers to make product improvements

Weakness of Surveys, Interviews, and Focus Groups

These traditional human factors methods have been adapted, in many cases, to assess product usability. Even though there are several surveys that are tailored for usability and that have established validity in the field, these methods do have some limitations, which include:

(1) Reliability of all surveys is low with small sample sizes (10 or less)
(2) Interview lengths restricts use to a small sample size
(3) Use of focus groups for usability assessment has highly debated value
(4) All of these methods are highly dependent on the respondents

Weakness of Field Methods

Although field methods can be extremely useful because they are conducted in the users natural environment, they have some major limitations to consider. The limitations include:

(1) Usually take more time and resources than other methods
(2) Very high effort in planning, recruiting, and executing than other methods
(3) Much longer study periods and therefore requires much goodwill among the participants
(4) Studies are longitudinal in nature, therefore, attrition can become a problem.

Application of Human Factors Engineering

Before World War II, HFE had no significance in the design of machines. Consequently, many fatal human errors during the war were directly or indirectly related to the absence of comprehensive HFE analyses in the design and manufacturing process. One of the reasons for so many costly errors was the fact that the capabilities of the human were not clearly differentiated from those of the machine.

Furthermore, human performance capabilities, skill limitation, and response tendencies were not adequately considered in the designs of the new systems that were being produced so rapidly during the war. For example, pilots were often trained on one generation of aircraft, but by the time they got to the war zone, they were required to fly a newer model. The newer model was usually more complex than the older one and, even more detrimental, the controls may have had opposing functions assigned to them. Some aircraft required that the control stick be pulled back toward the pilot in order to pull the nose up. In other aircraft the exact opposite was required; namely, in order to ascend you would push the stick away from you. Needless to say, in an emergency situation many pilots became confused and performed the incorrect maneuver, with disastrous results.

Along the same line, pilots were subject to substitution errors due mostly to lack of uniformity of control design, inadequate separation of controls, or the lack of a coding system to help the pilot identify controls by the sense of touch alone. For example, in the early days of retractable landing gear, pilots often grabbed the wrong lever and mistakenly raised the landing gear instead of the flaps. Sensory overload also became a problem,

especially in cockpit design. The 1950s brought a strong program of standardizing control shapes, locations and overload management.

The growth of human factors engineering during the mid- to late-forties was evidenced by the establishment of several organizations to conduct psychological research on equipment design. Toward the end of 1945, Paul Fitts established what came to be known as the Behavioral Sciences Laboratory at the Army Corps Aeromedical Laboratory in Dayton, Ohio. Around the same time, the U.S. Navy established the Naval Research Laboratory at Anacostia, Maryland (headed by Frank V. Taylor), and the Navy Special Devices Center at Port Washington, New York (headed by Leonard C. Mead). The Navy Electronics Laboratory in San Diego, California, was established about a year later with Arnold M. Small as head.

In addition to the establishment of these military organizations, the human factors discipline expanded within several civilian activities. Contract support was provided by the U.S. Navy and the U.S. Air Force for research at several noted universities, specifically Johns Hopkins, Tufts, Harvard, Maryland, Holyoke, and California (Berkeley). Paralleling this growth was the establishment of several private corporate ventures. Thus, as a direct result of the efforts of World War II, a new industry known as engineering psychology or human factors engineering was born.

Why is HFE important to the military?

Until today, many project managers and designers are still slow to consider Human Factors Engineering (HFE) as an essential and integral part of the design process. This is sometimes due to their lack of education on the purpose of HFE, in other instances it is due to others being perfectly capable of considering HFE related issues. Nevertheless, progress is being made as HFE is becoming more and more accepted and is now implemented in a wide variety of applications and processes. The U.S. military is particularly concerned with the implementation of HFE in every phase of the acquisition process of its systems and equipment. Just about every piece of gear, from a multi-billion dollar aircraft carrier to the boots that servicemen wear, goes at least in part through some HFE analyses before procurement and throughout its lifecycle.

Lessons learned in the aftermath of World War II prompted the U.S. War Department (now U.S. Department of Defense) to take some steps in improving safety in military operations. U.S. Department of Defense regulations require a comprehensive management and technical strategy for human systems integration (HSI) be initiated early in the acquisition process to ensure that human performance is considered throughout the system design and development process.

HFE applications in the U.S. Army

In the U.S. Army, the term MANPRINT is used as the program designed to implement HSI. The program was established in 1984 with a primary objective to place the human element (functioning as individual, crew/team, unit and organization) on an equal footing with

other design criteria such as hardware and software. The entry point of MANPRINT in the acquisition process is through requirements documents and studies.

What is MANPRINT?

MANPRINT (Manpower and Personnel Integration) is a comprehensive management and technical program that focuses attention on human capabilities and limitations throughout the system's life cycle: concept development, test and evaluation, documentation, design, development, fielding, post-fielding, operation and modernization of systems. It was initiated in recognition of the fact that the human is an integral part of the total system. If the human part of the system can't perform efficiently, the entire system will function sub-optimally.

MANPRINT's goal is to optimize total system performance at acceptable cost and within human constraints. This is achieved by the continuous integration of seven human-related considerations (known as MANPRINT domains) with the hardware and software components of the total system and with each other, as appropriate. The seven MANPRINT domains are: Manpower (M), Personnel (P), Training (T), Human Factors Engineering (HFE), System Safety (SS), Health Hazards (HH), Soldier Survivability (SSv). They are each expounded on below:

Manpower (M)

Manpower addresses the number of military and civilian personnel required and potentially available to operate, maintain, sustain, and provide training for systems. It is the number of personnel spaces (required or authorized positions) and available people (operating strength). It considers these requirements for peacetime, conflict, and low intensity operations. Current and projected constraints on the total size of the Army/organization/unit are also considered. The MANPRINT practitioner evaluates the manpower required and/or available to support a new system and subsequently considers these constraints to ensure that the human resource demands of the system do not exceed the projected supply.

Personnel (P)

Manpower and personnel are closely related. While manpower looks at numbers of spaces and people, the domain of personnel addresses the cognitive and physical characteristics and capabilities required to be able to train for, operate, maintain, and sustain materiel and information systems. Personnel capabilities are normally reflected as knowledge, skills, abilities, and other characteristics (KSAOs). The availability of personnel and their KSAOs should be identified early in the acquisition process and may result in specific thresholds. On most systems, emphasis is placed on enlisted personnel as the primary operators, maintainers, and supporters of the system. Personnel characteristics of enlisted personnel are easier to quantify since the Armed Services Vocational Aptitude Battery (ASVAB) is administered to potential enlistees.

While normally enlisted personnel are operators and maintainers; that is not always the case, especially in aviation systems. Early in the requirements determination process, identification of the target audience should be accomplished and used as a baseline for assessment. Cognitive and physical demands of the system should be assessed and compared to the projected supply. MANPRINT also takes into consideration personnel factors such as availability, recruitment, skill identifiers, promotion, and assignment.

Training (T)

Training is defined as the instruction or education, on-the-job, or self development training required to provide all personnel and units with their essential job skills, and knowledge. Training is required to bridge the gap between the target audiences' existing level of knowledge and that required to effectively operate, deploy/employ, maintain and support the system. The MANPRINT goal is to acquire systems that meet the Army's training thresholds for operation and maintenance. Key considerations include developing an affordable, effective and efficient training strategy (which addresses new equipment, training devices, institutional, sustainment, and unit collective tactical training); determining the resources required to implement it in support of fielding and the most efficient method for dissemination (contractor, distance learning, exportable packages, etc.); and evaluating the effectiveness of the training.

Training is particularly crucial in the acquisition and employment of a new system. New tasks may be introduced into a duty position; current processes may be significantly changed; existing job responsibilities may be redefined, shifted, or eliminated; and/or entirely new positions may be required. It is vital to consider the total training impact of the system on both the individuals and the organization as a whole.

Human Factors Engineering (HFE)

The goal of HFE is to maximize the ability of an individual or crew to operate and maintain a system at required levels by eliminating design-induced difficulty and error. Human factors engineers work with systems engineers to design and evaluate human-system interfaces to ensure they are compatible with the capabilities and limitations of the potential user population. HFE is conducted during all phases of system development, to include requirements specification, design and testing and evaluation. HFE activities during requirements specification include: evaluating predecessor systems and operator tasks; analyzing user needs; analyzing and allocating functions; and analyzing tasks and associated workload. During the design phase, HFE activities include: evaluating alternative designs through the use of equipment mockups and software prototypes; evaluating software by performing usability testing; refining analysis of tasks and workload; and using modeling tools such as human figure models to evaluate crew station and workplace design and operator procedures. During the testing and evaluation phase, HFE activities include: confirming the design meets HFE specification requirements; measuring operator task performance; and identifying any undesirable design or procedural features.

System Safety (SS)

System Safety is the design features and operating characteristics of a system that serve to minimize the potential for human or machine errors or failures that cause injurious accidents. Safety considerations should be applied in system acquisition to minimize the potential for accidental injury of personnel and mission failure.

Health Hazards (HH)

Health Hazards addresses the design features and operating characteristics of a system that create significant risks of bodily injury or death. Along with safety hazards, an assessment of health hazards is necessary to determine risk reduction or mitigation. The goal of the Health Hazard Assessment (HHA) is to incorporate biomedical knowledge and principles early in the design of a system to eliminate or control health hazards. Early application will eliminate costly system retrofits and training restrictions resulting in enhanced soldier-system performance, readiness and cost savings. HHA is closely related to occupational health and preventive medicine but gets its distinctive character from its emphasis on soldier-system interactions of military unique systems and operations.

Health Hazard categories include acoustic energy, biological substances, chemical substances, oxygen deficiency, radiation energy, shock, temperature extremes and humidity, trauma, vibration, and other hazards. Health hazards include those areas that could cause death, injury, illness, disability, or a reduction in job performance.

Organisational and Social

The seventh domain addresses the human factors issues associated with the socio-technical systems necessary for modern warfare. This domain has been recently added to investigate issues specific to Network Enabled Capability (NEC) also known as Network Centric Warfare (NCW). Elements such as dynamic command and control structures, data assimilation across mulitple platforms and its fusion into information easily understood by distributed operators are some of the issues investigated.

A soldier survivability domain was also proposed but this was never fully integrated into the MANPRINT model.

Domain Integration

Although each of the MANPRINT domains has been introduced separately, in practice they are often interrelated and tend to impact on one another. Changes in system design to correct a deficiency in one MANPRINT domain nearly always impact another domain.

Human Factors Integration

Areas of interest for human factors practitioners may include: training, staffing evaluation, communication, task analyses, functional requirements analyses and allocation, job descriptions and functions, procedures and procedure use, knowledge, skills, and abilities;

organizational culture, human-machine interaction, workload on the human, fatigue, situational awareness, usability, user interface, learnability, attention, vigilance, human performance, human reliability, human-computer interaction, control and display design, stress, visualization of data, individual differences, aging, accessibility, safety, shift work, work in extreme environments including virtual environments, human error, and decision making.

Real World Applications of Human Factors - MultiModal Interfaces

Multi-Modal Interfaces

In many real world domains, ineffective communication occurs partially because of inappropriate and ineffective presentation of information. Many real world interfaces both allow user input and provide user output in a single modality (most often being either visual or auditory). This single modality presentation can often lead to data overload in that modality causing the user to become overwhelmed by information and cause him/her to overlook something. One way to address this issue is to use multi-modal interfaces.

Reasons to Use Multimodal Interfaces

- Time Sharing – helps avoid overloading one single modality
- Redundancy – providing the same information in two different modalities helps assure that the user will see the information

Allows for more diversity in users (blind can use tactile input; hearing impaired can use visual input and output)

- Error Prevention – having multiple modalities allows the user to choose the most appropriate modality for each task (for example, spatial tasks are best done in a visual modality and would be much harder in an olfactory modality)

Examples of Well Known Multi-Modality Interfaces

Cell Phone – The average cell phone uses auditory, visual, and tactile output through use of a phone ringing, vibrating, and a visual display of caller ID.

ATM – Both auditory and visual outputs

Early Multi-Modal Interfaces by the Experts

Bolts "Put That There" – 1980 – used speech and manual pointing

Cohen and Oviatt's "Quickset" – multi user speech and gesture input

Worker Safety and Health

One of the most prevalent types of work-related injuries are musculoskeletal disorders. Work-related musculoskeletal disorders (WRMDs) result in persistent pain, loss of functional capacity and work disability, but their initial diagnosis is difficult because they are mainly based on complaints of pain and other symptoms. Every year 1.8 million U.S. workers experience WRMDs and nearly 600,000 of the injuries are serious enough to cause workers to miss work. Certain jobs or work conditions cause a higher rate worker complaints of undue strain, localized fatigue, discomfort, or pain that does not go away after overnight rest. These types of jobs are often those involving activities such as repetitive and forceful exertions; frequent, heavy, or overhead lifts; awkward work positions; or use of vibrating equipment. The Occupational Safety and Health Administration (OSHA) has found substantial evidence that ergonomics programs can cut workers' compensation costs, increase productivity and decrease employee turnover. Therefore, it is important to gather data to identify jobs or work conditions that are most problematic, using sources such as injury and illness logs, medical records, and job analyses.

Job analysis can be carried out using methods analysis, time studies, work sampling, or other established work measurement systems.

- **Methods Analysis** is the process of studying the tasks a worker completes using a step-by-step investigation. Each task in broken down into smaller steps until each motion the worker performs is described. Doing so enables you to see exactly where repetitive or straining tasks occur.

- **Time studies** determine the time required for a worker to complete each task. Time studies are often used to analyze cyclical jobs. They are considered "event based" studies because time measurements are triggered by the occurrence of predetermined events.

- **Work Sampling** is a method in which the job is sampled at random intervals to determine the proportion of total time spent on a particular task. It provides insight into how often workers are performing tasks which might cause strain on their bodies.

- **Predetermined time systems** are methods for analyzing the time spent by workers on a particular task. One of the most widely used predetermined time system is called Methods-Time-Measurement or MTM. Other common work measurement systems include MODAPTS and MOST.

Human-machine system

Human-machine system is a system in which the functions of a human operator (or a group of operators) and a machine are integrated. This term can also be used to emphasize the view of such a system as a single entity that interacts with external environment.

A manual system consists of hand tools and other aids which are coupled by a human operator who controls the operation. Operators of such systems use their own physical energy as the power source. The system could range from a person with a hammer to a person with a super-strength giving exoskeleton.

Human machine system engineering is different from the more general and well known fields like human-computer interaction and sociotechnical engineering in that it focuses on complex, dynamic control systems that often are partially automated (such as flying an airplane). it also studies human problem-solving in naturalistic settings or in high-fidelity simulation environments.

Human-Machine Choreography

The area of human-machine choreography is yet to be extensively explored. How body structure can be extended through machine mechanisms points to how the body can perform beyond its biological form and functions as well as beyond the local space it inhabits. How human movement is transduced into machine motion and then can be both expressed and extended into virtual performance on the web promises new possibilities in both conceptual approach and aesthetic application. For example, incorporating virtual camera views of the performing human-machine system enriches the choreography and intensifies the artistic result.

The Muscle Machine

The Muscle Machine is a hybrid human-robot walking machine. Designed by artist James Stelarc (who has also created other such systems), it is an exoskeleton with 6 robotic legs that are controlled by the leg and hand movements of its pilot.

Mechanism

The rubber muscles contract when inflated and extend when exhausted. This results in a more reliable and robust engineering design. The body stands on the ground within the chassis of the machine, which incorporates a lower body exoskeleton connecting it to the robot. Encoders on the hip joints provides the data that will allow the human controller to move and direct the machine as well as vary the speed at which it will travel. The action of the human operator lifting a leg lifts the three alternate machine legs and swings them forward. By turning its torso, the body makes the machine walk in the direction it is facing. Thus the interface and interaction is more direct, allowing an intuitive human-machine choreography. The walking system, with attached accelerometer sensors generates data that is converted to sounds that augment the acoustical pneumatics and machine mechanism operation. Once the machine is in motion, it is no longer applicable to ask whether the human or machine is in control as they become fully integrated and move as one. The 6-legged robot both extends the body and transforms its bipedal gait into a 6-legged insect-like movement. The appearance and movement of the machine legs are both limb-like and winglike motion.

In Popular Culture

Human-machine systems have been portrayed in the media on many accounts.Cyborgs, seen in movies such as The Terminator and Robocop, are fantastical depictions of what human-machine systems may, one day, look like.

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