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THE ISRAELI INSTITUTE FOR MILITARY STUDIES

HAVA DAYAN

MAY 1, 1992

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THE PSYCHOLOGICAL EFFECTS OF INTENSE ARTILLERY BOMBARDMENT: THE ISRAELI EXPERIENCE IN THE YOM-KIPPUR WAR (1973)

FINAL REPORT

REUVEN GAL
HAVA DAYAN

MAY 1, 1992

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This work is dedicated to our colleague

SHOSHANA COHEN

who died, before her time, in the course of the study.

Special thanks are conveyed to: COL. Frederick J. Manning, Div. N.P., WRAIR; COL. B. Michaelson, IDF; and numerous veterans of the Jerusalem Brigade, survivors of the Bar-Lev Line.

CONTENT

Executive Summary

The purpose of this study is to learn the lessons from the massive bombardment absorbed by the Israeli forces along the Suez Canal (the Bar-Lev Line), on the outbreak of the Yom Kippur War (1973). The intensity of this bombardment (over 10,000 shells during the first minute) was a direct application of the (then) Soviet Doctrine called "artillery shock" and aimed to "neutralizing all reactive ability of the army under attack, at least for a certain period of time".

The study is based on in-depth interviews and detailed questionnairs administered to a sample of eighty eight Israeli combatants (enlisted men, NCO's and officers) who manned the 16 fortifications along the Bar-Lev Line. Other sources (i.e. military debriefings, documantations, radio-transmissions etc.) were also used. Issues of interest included both unit and individual characteristics, battle conditions, troops reactions and coping and the overall psychological impact of the massive shelling.

The vast amount of variables and factors involved was viewed systematically utilizing a conceptual model and applying both inter-fortifications and intra-fortifictation analyses.

Data analysis included parametric as well as non-parametric statistics.

Following are the main findings of this study:

The study clearly demonstrated that massive artillery shelling has identifiable psychological effects on the combatants on the battlefield.

The frightening impact of massive shelling stems from its surprise, its intensity, its duration, the type of firepower and its frightening elements. For the troops sheltered in the Bar-Lev Line fortifications, the most frightening means of firepower were **air attacks** (by airplanes) and **steep-trajectory** weapons (mortars). The most frightening elements in the bombardment were the **destructive power** of the weapon and the **noise intensity**.

These frightening factors, mediated (as we claimed) by the combatants' cognitive appraisal, produced the following range of responses: A high frequency of dichotomized **emotional responses**, i.e. enhanced self-confidence on the one hand, and helplessness and excitement on the other hand, along with an intense sense of fear. The **physiological** responses consisted mainly of accelerated heartbeat and dryness in the mouth. Among the **cognitive** responses, sharpness and clarity of thought was noted and associations focusing mainly on the near front. No particular social responses were noted.

Among the martial skills, the ones most impaired by the shelling effect are cognitive skills (thinking, concentrating, remembering...); Motor skills are not effected that much by the bombardments.

Battle functioning was found to be affected by various combat-stress factors in a dynamic, rather than a linear, manner: Impaired combat effectiveness was found mainly during the first two hours of the massive shelling, the the first few moments of a renewed bombardment, and/or especially when unit morale declined.

Battle functioning was further impaired among combatants who stayed inside the bunkers for several successive hours, while the shelling continued. Conversley, those commanders and combatants who were busy and active outside the bunker experienced less fear and maintained their normal level of functioning - albeit the high risk of being hit.

Following our conceptual model, we identified three categories of stress-enhancing factors operating in a massive-shelling situation:

Battlefield Factors: The surprise element in the attack; the intensity of the bombardment; its duration; the combination of bombardment with a commando attack; the severity of loss and damage to the fortification.

Group/Unit Factors: Poor combat readiness of the unit (troops and fortification); absence of a senior commanding officer (i.e. Company Commander) in the fortification; poor morale and cohesion; and long stay inside the bunkers.

Individual Factors: Lack of combat experience and poor military training; lower rank (enlisted men and NCO's); lower education level; difficulties at home (critical events at home, concerns, etc.).

Stress-reducing factors were also categorized in three areas:

Battlefield Factors: Armored reinforcement (tanks stationed at, or near, the fortification); no attack following the bombardment; connection (by radio etc.) with other fortifications or with Headquarters.

Group/Unit Factors: Better preparadness and readiness; high morale and unit cohesion; contact with fellow soldiers; contact with the commander of the fortification; faith in the IDF.

Individual Factors: Soldiery level, combat experience and military training; self-confidence; being a reservist (as opposed to a conscript) soldier; Officer rank or command role.

Following Lazarus' classical distinctions between emotion-focused and problem-focused coping strategies, we found two major coping strategies utilized by the combatants of the Bar-Lev Line:

The first mode of coping was an obstinate adherence to the absolute faith in the competence of the IDF, and its ability to repulse any enemy attack to take the Bar-Lev fortifications. This was coupled with the no-less-obstinate conviction that this bombardment was just another version of a "war of attrition" that had already taken place in the past. This rationalization-denial defensive appraisal enabled the combatants not only to control and minimize their early fear reactions, but even to enhance their initial self confidence.

The second mode of coping - and evidently the dominant one - was activity. Whenever combatants could engage themselves in any type of activity, their fear level declined, their battle functioning improved. This was especially applicable to the leaders, who were mostly involved with purposeful activities. The opposite effect was apparent among those combatants who remained completely inactive inside the bunkers and suffered extreme fear.

Our study revealed various psychological influences reported by the combatants as consequences of their Bar-Lev Line experience:

Short-term Influences. Subjects reported difficulties in returning to normal life immediately after the war, or to resuming their military service. Coping with these difficulties was by means of repeated discussions on the war experience, concentrating on work and involvement in altruistic activies. The war experience also affected to some degree our subjects' life decisions about marriage and children (advancing); or tours abroad (postponing). Finally, the Yom-Kippur War experience weakened the sense of commitment of many of our subjects towards Israel and its military.

Long-term Influences. Nineteen years after the event, combatants of the Bar-Lev Line fortifications still reveal long-term influences. While most of them exhibit a high or normal level of general well-being, quite a few also report nervousness and a "stormy" life. The percentage of those who report various symptoms of PTSD (most notably - sensitivity to noise, sleep disturbances etc. -) is substansially higher than among a more-randomly chosen sample of Israeli war veterans.

The last chapter of this report includes a series of recommendations and applications derived from this study. The recommendations pertain to ways of making a massive shelling more effective and - on the contrary side - ways of "innoculating" troops against the horror of a massive bombardment and how to deploy and encourage them to fight.

Finally, attention is drown to two annoying facts: First, that the "Soviet Doctrine", by now, may be obsolete; Second, that the real threat on the future battle-field will come from non-conventional, NBC-type, weapons. In the not-so-far future, we may find ourselves missing the old-time, conventional, artillery bombardment...

1. Introduction

1.A. General

Many destructive forces of different types operate on the battlefield - both the physical destruction of buildings and objectives (and direct hits on people) as well as mental injury by means of fear and terror that cause psychological destruction among the combatants.

In many battles throughout history, victory was achieved in spite of a high abundance of killed and wounded; but these are not the only casualties on the battlefield. A large number of soldiers are evacuated from the battlefield who have not been directly hit by enemy fire, but rather as a result of the difficult conditions created in battle which have eroded their ability to fight, and not just for a brief period of time. The number of those psychologically injured - at all levels, and not from combat shock alone - can be several times higher than the number of wounded. The greater the combat tension the greater the number of those injured physically and psychologically.

While it is possible to quantify and calculate physical injuries, mental injuries resulting in the erosion of combat ability are very difficult to measure.

In attempting to deal with the psychological effect of battle stress, several difficult methodological problems arise. These include the definition of variables, the evaluation of the main effects, the interaction of non-battle elements (such as personality and unit variables), etc.

The first hours of the Yom Kippur War contain a rare combination of stress variables under difficult combat conditions: the powerful intensity of the bombardment, the relatively long period of shelling, the variety of fire power, and the surprising timing which neutralized the level of readiness for battle as a calming and stress-reducing factor.

The Yom Kippur War also provides one of the rare opportunities among the wars of our generation to permit a relatively clear distinction between the shelling stage and its immediate physical impact on the one hand, effects and the subsequent psychological influences on the combatants' functioning, on the other. This opportunity occurred primarily on the southern front, in the fortifications of the Israel Defense Forces (IDF) along the Suez Canal Line (what was called the "Bar-Lev Line").

Indeed, there are many variables in a study of this situation which are difficult to quantify and measure. However, the intensity, timing and characteristics of the attack on the Bar Lev Line fortifications allow a vantage point and research introspection regarding the psychological influences of battle stress and the massive intensity of the shelling.

1. B. Background

On the morning of Yom Kippur, 1973, it had become clear to the Israeli General Headquarters (GHQ) that a war would break out the same day. The General Staff ordered the deployment of Israeli tanks to the water line only in the late afternoon hours. The guess was that the war would begin at 18:00

At 13:55, about 200 Egyptian planes crossed the Suez line and bombed airfields, anti-aircraft batteries, command camps, installations and units, radar stations and artillery positions in Sinai.

Simultaneously with the airstrikes, a heavy artillery bombardment of the Bar Lev line began. "It was conducted by approximately 1,850 indirect fire artillery pieces and heavy mortars, between 100 and 180 millimeters in caliber, and about 1,000 tanks and approximately 1,000 antitank guns in direct fire positions on the embankment. During the first minute, 10,500 artillery shells fell on Israeli positions. The firing continued for 53 minutes, battering and shaking-but not destroying-all of the Bar-Lev strongpoints, known artillery positions, tank concentration areas, and local command posts." (Dupuy, 1984; p.411).

The character of this attack was considerably influenced by the Soviet Military doctrine which the Egyptian Army put into operation by means of the Soviet trainers and experts.

According to this doctrine, a very powerful artillery bombardment for a long period of time creates an "artillery shock" allowing a rapid advance into enemy territory without the enemy being capable of reacting effectively. The assumption is that before the battered enemy is able to recover, the attacking army will already be a "fact in the field".

According to the Soviet doctrine, the rapid advance into enemy territory is made possible by the "artillery shock" neutralizing all reactive ability of the army under attack, at least for a certain period of time. (Donnelly, 1987).

Dr. Cristopher Donnelly, the British expert on the Soviet doctrine, describes this in greater detail:

"Thus, in the realm of artillery fire planning, fire support of the attack must be planned so as to achieve not so much maximum casualties, as maximum shock. The heaviest barrage practicable in modern war would, the Soviets say, incapacitate some 25% of defenders and equipment if these were properly entrenched..." (Futhermore),"the shock of the heavy shelling will paralyze and stupefy them, and they will be sitting in a daze in their trenches when the first Soviet infantry arrives" (Donnely, 1982; p.75).

In the Yom Kippur War the attack was not that of the Soviet army indeed, but the Egyptians acted according to the Soviet doctrine upon which they were trained and believed in.

At the beginning of the Egyptian attack in those afternoon hours of Yom Kippur, 1973, the IDF headquarters in Sinai began receiving excited reports from all the fortifications on the intensity of the bombardment, while the infernal Egyptian firepower prevented the forces in the bunkers from taking effective action. In practice, all that the combatants could do in a majority of the fortifications, was to seek cover in the bunkers due to the fierce fire.

The IDF defense plans - encoded "Dove Cot" ("Shovach Yonim")- were based on the assumption that the water barrier on the front line i.e., the Suez Canal. would leave the time necessary to bring armoured reinforcements up to the canal line and mobilize reserve troops for the front line. According to the rehearsal drills, the fortification commanders were able to call in artillery fire and planes. Tank forces held at 20 to 30 kilometers from the canal were supposed to rush to the aid of the strongpoints and help in breaking the attacks.

At 14:20 about 4000 Egyptian troops crossed the canal while utilizing the empty areas between the strongpoints. They overcame the water barrier by crossing on high ramparts and putting down bridges. At 14:45 another 4000 Egyptian soldiers crossed over to the East Bank of the canal. The first fortification on the Bar-Lev Line -Lahtzanit- was conquered at 15:00.

Within a few hours, the fortifications of the Bar Lev Line were surrounded by Egyptian infantry forces. All 16 fortifications which were manned along the Bar-Lev Line (with one exception, Traklin, located on the shore of the Meditarranean) were attacked by heavy shelling, and in all but three cases followed by attacks of primarily Egyptian commando forces. The three fortifications only shelled were: Drora, Ketuba and Botzer.

In 12 of the fortifications the Israeli troops attempted to escape by foot and vehicle, after a day or two of fighting. Several of these attempts were by way of the enemy lines. Not all of those who had tried this managed to extricate themselves and some were killed before the escape or during the attempt.

The four remaining strongpoints surrendered to the Egyptians at a later stage (after three days of fighting and one of them -"the Quay" after a week of fighting) and the defenders taken prisoner by the Egyptians. Only the one fortification, "Budapest", surrounded by swamps, succeeded in holding out during the duration of the fighting and was not conquered.

From the entire Bar-Lev Line, a total of 154 combatants escaped, 127 were killed and 162 taken prisoner.

1.C. Methodological Difficulties

Three sources of difficulty existed during the data gathering stage of this research. Firstly, the problem of time. Eighteen years have gone by since the event, and in coming to report today (1991) on the events of October 1973, the subjects undoubtedly suffered from distortions of memory, the effects of memory decay, tendencies of "sharpening" and "leveling" and other biases

stemming from the time factor.

Secondly, the factor of traumatization . The subjects in this research were requested to describe an event towards which they were certainly not neutral. For many of them, the memory of those first few hours of the Yom Kippur War is a most traumatic one, full of emotional power, repression and other psychological defenses. Subjective reporting of this type is certainly subject to bias factors and distortions of various degrees.

In addition, the difficulty is even greater for those combatants who became POWs and whose memory is affected by their prison experience in Egypt.

Thirdly, a definitional problem springs from the fact that in many cases it was almost impossible to distinguish between the initial shelling stage (which is the primary defined interest of the research) and the subsequent attack stage - whether due to the overlap or the linkage of times between these two stages or to the mixing of the two in the memories of the informants.

We tried to overcome the distortions of memory in our research by cross-referencing the reports of the combatants who participated in the same event and by the use of the original de-briefing material (audio recordings and written notes) carried out shortly after the event.

In order to minimize as much as possible the bias factors, distortions, and influence of trauma, the combatants were asked to respond to carefully structured questionnaires in which detailed questions, focussing on the specific components of behaviors and reactions, were asked.

In addition to the questionnaires, in-depth interviews were carried out in which the various details were checked one more time.

The combination of detailed and structured questionnaires, in-depth interviews, use of archival material, cross-referencing the subjects and a relatively large sample, should overcome part of the bias factors. Yet this unavoidable reliance in the research on subjective testimony receives support from the works of Lazarus (1966) and Fischoff, Slovic & Lichtenstein (1981) who claim that the subjective evaluation of people in situations of stress - is the most significant mediating factor in the individual's ability to cope with the stress.

In consideration of the traumatization factor, we decided not to include in the research, combatants from the fortifications that endured very difficult attacks (Lituf, Lahtzanit, Orkal and Hizayon). We also tried not to include a large number of former prisoners in consideration of captivity as a masking factor. For those few who were included, the focus of the questioning was, as for all the other participants, the first hours of shelling that began the Yom Kippur War.

1.D. The Objectives of the Research

In war, different types of stress are applied to the combatants: stress stemming from situational factors (such as environment, climate, location of the combatant); type of battle, (attrition, offense, defense); characteristics of the battle (duration, intensity, surprise); characteristics of the fighting unit (such as the strength of the leadership, the group's cohesiveness, the level of training, unit morale); and personal background variables (the combatant's experience, traits, role). (Gal, 1989).

One of the important factors of battle stress is the intensity of fire. This pressure especially increases in cases of a surprise attack since surprise neutralizes the stress-reducing factors of readiness and preparedness.(E. Kam, 1975).

Another significant factor is the difference in firepower of different weapons and their unique psychological influence on the sense of combat stress. For example: Dollard (1944) claimed that steep trajectory weaponry constituted a greater stress factor on combatants than shallow trajectory weaponry.
Studies on the immediate and long term effect of these combat factors are not very frequent and certainly not in regards to cases of massive artillery shelling. This is due, among other things, to the rarity of combat events of this type.

The first hours of the YOM KIPPUR WAR contain a rare combination of the following combat stress factors.

A. Surprise and uncertainty
B. Massive firepower (shelling)
C. Defensive battle (static defense)
D. The duration and type of bombardment

In this perspective, the event of the massive Egyptian shelling on the fortifications of the Bar-Lev line becomes a rare opportunity for a careful study of the functioning of combatants under extreme battle stress conditions: Along the 175 km. long front, 450 fighters entrenched in 16 different fortifications underwent an almost identical experience; the characteristics of the stress conditions (varied fire, intensive firepower, a relatively long period of shelling, surpise timing, etc.) were very much the same, across all 16 positions.

We can assume that the above combat characteristics are only a part of the factors influencing functioning in conditions of stress. It is therefore important to examine what the additional influences of the personal, group and unit factors are on the reaction and battle effectiveness of the combatants in the Bar-Lev fortifications during the first hours of the Yom Kippur War.

Moreover, the event of this massive shelling also constitutes a rare opportunity to examine the basic asumptions underlying the Russian military doctrine regarding "the artillery shock". The fact that the Egyptians operated under the inspiration of the Soviet military doctrine in October, 1973 - only highlights the importance of the situation.

The objectives of the research are, then, to unravel the following riddles:

1. What are the psychological effects of massive artillery shelling on the combatant on the battlefield.

2. Which among the situational, group and personal variables operate as stress enhancing factors in a combat event of this type?

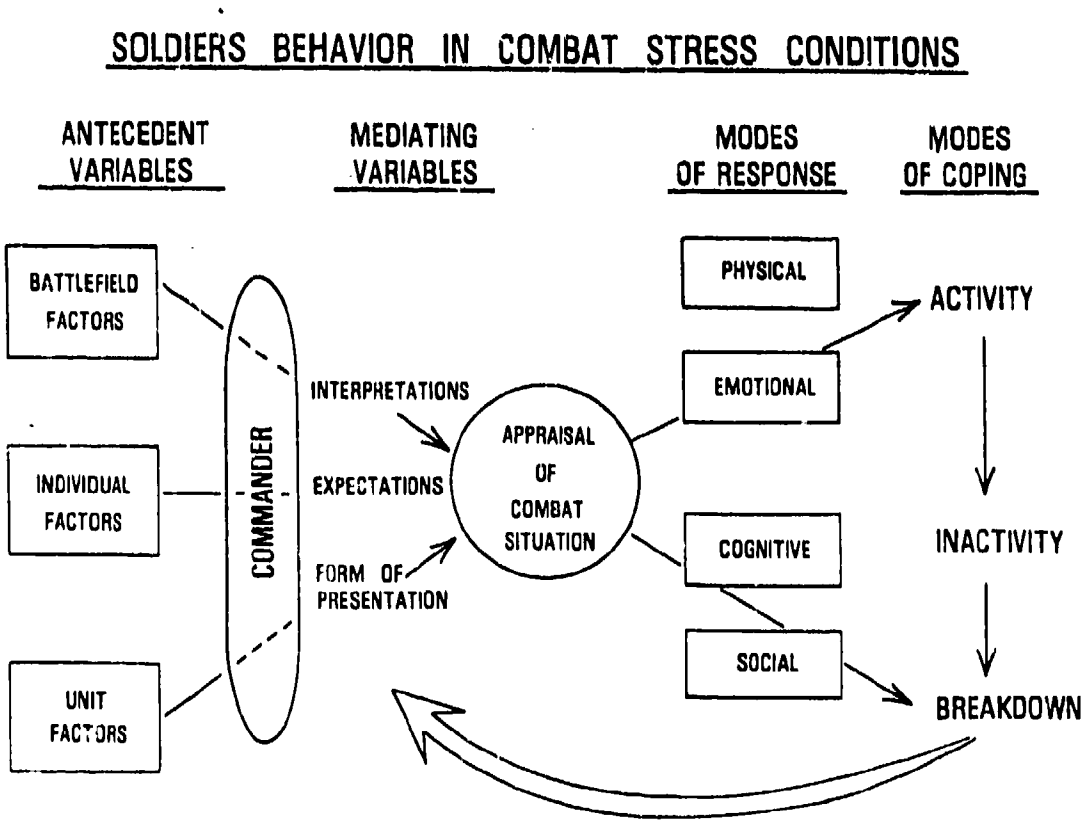
3. Which among the situational, group and personal variables operate as stress reducing factors in a combat event of this type?

4. Is there a relationship between the psychological effects of massive shelling and the combat effectiveness of the fighter? What is the nature of this relationship? Is the combat effectiveness of the fighter improved or flawed as a result of these stress variables?

1.E. Theoretical Model:

The research approach is based on a model of coping with stress (see Figure 1) developed by Dr. Reuven Gal (Gal, 1988). The model proposes that there is not one single stress factor in battle, but rather a combination of many factors. Moreover, these factors operate in different ways on different combatants in different units. While there are certain factors that are stressful without any doubt (such as lack of sleep, difficult weather conditions, cumulative fatigue, a strong intensity of shelling, many casualties, etc.), there are other factors that can operate both to increase and diminish stress: the level of leadership in the unit, the level of group cohesion, previous experience and similar factors. Besides the factors operating in combat, the model also relates to mediating variables, to responses and to coping behavior.

Figure 1



1.E.1 Combat Stress Factors

The model divides the entirety of stress factors to 3 different categories, and regards them as "antecedent variables".

A. Battlefield Factors: Duration, anticipation, location of the combatant, intensity, surprise, uncertainty, exposure to death and corpses.

B. Individual Factors: Age, family situation, personality and previous experience.

C. Group/Unit Factors: Morale and cohesion, the level of command and leadership, ideology and identification with the role of the combatant.

1.E.2 Mediating Variables

The subjective evaluation aspect of the situation is emphasized in this model. The model describes stress as a subjective phenomenon dependent on the individual's appraisal or evaluation, of both the situation and his ability to handle it.

A stressful situation - is one only if the individual involved in it regards it as such; Furthermore, "the same situation may generate different responses depending on the type of interpretation or expectation suggested prior to or during the situation. Likewise an individual or group reaction to battlefield conditions can be determined by the mediating variables (interpretations, expectations, form of presentation) which are primarily controlled by the commander. From these different appraisals will result the different modes of response or coping" (Gal, 1988, p.114).

1.E.3 The Responses to Combat Stress

The stress factors have universal, automatic and immediate influences on the combatant's responses which can be classified into 4 categories:

A. **Physiological Responses** (changes in the hormonal, heart and muscle systems and in the metabolism).

B. **Emotional Responses** (frustration, helplessness, nervousness, aggression, euphoria, and ecstasy).

C. **Cognitive Responses** (narrowing of attention, automatic reactions, clarity or incoherence of thinking).

D. **Social Responses** (isolation, crowding and physical closeness, muteness or non-stop speech).

1.E.4 Modes of Coping With Stress Factors

In contrast to the responses that are universal and immediate, the modes of coping are much more within the control of the combatant. They are personal and are not immediate and automatic. The modes of coping can take various forms along an activity-passivity continuum:

* In **Active Coping**, the combatant is in a state of psychological readiness to take any action whatsoever provided it is directed towards a constructive goal. Such a readiness will be expressed in various activity forms in accordance with the conditions of the situation, but will, in any case, preserve the combatant in an active state.

* In **Passive Coping**, the combatant is in a totally passive state, lacking any activity. From here, in many cases. it is a short way to being totally broken and to combat shock.

According to the model, the responses and coping behavior of the individual are in the end "filtered out" in order to dictate his level of performance. Moreover: as a result of the inital responses and performance, the individual carries out a reevaluation towards his own appraisal of the situation and coping ability. Consequently, this reappraisal once again influences the combatant's responses and coping behavior in the subsequent stressful situations.

1.E.5 Long-Range Effects of a Traumatic Event

Exposure to oppressive stresses in traumatic events such as road accidents, violence, combat and being taken prisoner - is recognized as a pathogenic factor or as an aggravating cause of existing somatic and psychological defects. This can be the etiology of a Post Traumatic Stress Disorder (PTSD).

In this syndrome, sleeping difficulties are common as are sensitivity to noise, anxiety, depression, problems of concentration, etc. The frequent and less serious results are feelings of reduced well-being, moodiness, nervousness, etc.

1.F The Research Questions

Based on the model described above, the following questions were asked in this study:

1. What are the main **stress factors** in the massive shelling?

2. What was the combatants' **appraisal of the situation** before and during the shelling?

3. What are the influences of massive shelling on the **immediate reactions** of the combatant in battle?

4. What are the influences of massive shelling on the **combat effectiveness** of the combatant?

5. What are the calming factors on the combatants at the time of the massive shelling?

6. What are the long term effects of massive shelling on the combatants?

1.G The Study Population: The Forces that Manned the Positions on the Canal Front at the Outbreak of the War

The name "ma'oz" (strongpoint) was given to the 30 fortifications on the East Bank of the Suez Canal. They constituted part of the Israeli Defense system of the Bar-Lev Line. This line had begun being built at the end of 1968, in the wake of two heavy Egyptian shellings that were carried out in September and October 1968, on the IDF positions East of the Suez Canal. This was the beginning of what was later named "The War of Attrition" (1967-1970).

The strongpoint was intended to provide a lookout and control over fire on the water line at a range of about 2 kilometers. The strongpoints were built for independent combat and prevention of the penetration of forces in their vicinity.

In order for the strongpoints to be able to stand up to the heavy shelling, they were covered with an explosive absorbing layer of railroad ties, stones and additional materials. Each fortification included a number of bunkers as well as many firing and lookout positions.

The bunkers connected trenches and earth ramparts and the fortification was surrounded with fencing and mines. The manpower intended to fight from it was on the order of an infantry platoon (The manpower standard budgeted for the fortification stood at from 25 to 30 fighters).

The weapons in the fortification included: a number of machine guns at the front, and several in the rear; occasionally a 20 mm. cannon; three 52 mm. mortars and sometimes an 81 mm. mortar; anti-tank weapons were relatively few and included 2 anti-tank rifles and one 'bazooka'. All this was in addition to the personal weapons of the combatants.

The strongpoints were located at considerable distances, between 8 to 10 kms. from one another at the openings of axes and at strategic points.

Even if able to carry on independent fighting for an extended period of time, the strongpoints were not more than an ingredient in a larger defensive system that included tank forces and artillery batteries.

The assigned mission for the strongpoints was:

1. to serve as a warning post and lookout for Egyptian activities across the canal.

2. In the event of war - to allow the relative smooth entry of more IDF forces to take part in full combat -and in the worst eventuality of war with very short notice - to carry out an initial defensive battle until the arrival of the IDF reserve forces. This was Stage 1 of the "Dove Cot" plan, the plan for the defense of the canal.

According to the "Dove Cot" plan, the strongpoints were supposed to return fire and expect the arrival of the tank forces which would rush to their aid. The tanks were supposed to connect up with the strongpoints and operate from positions within them or alongside them ("ramps"). The strongpoint commanders would be able to direct artillery fire and call in planes on the enemy according to their observations.

***Manning the Fortifications:** In the period between the War of Attrition and the Yom Kippur War, peace prevailed along the canal line. The Commander then of the Southern Front, Gen. Ariel Sharon, ordered the discard of part of the strongpoints. Sixteen manned fortifications remained, located at the principal crossroads, each one containing between 16 and 60 soldiers (See the attached map). All told, there were 450 men in the 16 manned fortifications (14 were not manned at all). This number included infantry, support troops and intelligence staff.

***Armor:** Instead of the 24 tanks that were supposed to be stationed in accordance with the Dove Cot plan at eight company concentrations (from the northern position Budapest to the southern position Mezach*) - only 3 tanks were at the Orkal position in the northern sector. East of the Bar-Lev Line, along the Lateral Road, instead of the 200 tanks that were supposed to be stationed according to the plan, there were only about 100, scattered between the canal and the Lateral Road. (Adan, p.70).

Artillery: Along the Canal Front there were only 28 artillery pieces (against 2800 Egyptian artillery pieces (Carta Atlas, p.70).

***Combatants:**

(A) <u>Northern and Central Sectors</u>
The majority of the forces in the fortifications were reserve soldiers from the 68th Infantry Batallion of the 16th Brigade ("Jerusalem Brigade"). This is an aging reserve batallion composed of a very heterogeneous population and ranging from professors and department heads at the university to peddlers known in the marketplace. In addition to the heterogeneity, many of the troops simply did not know each other.

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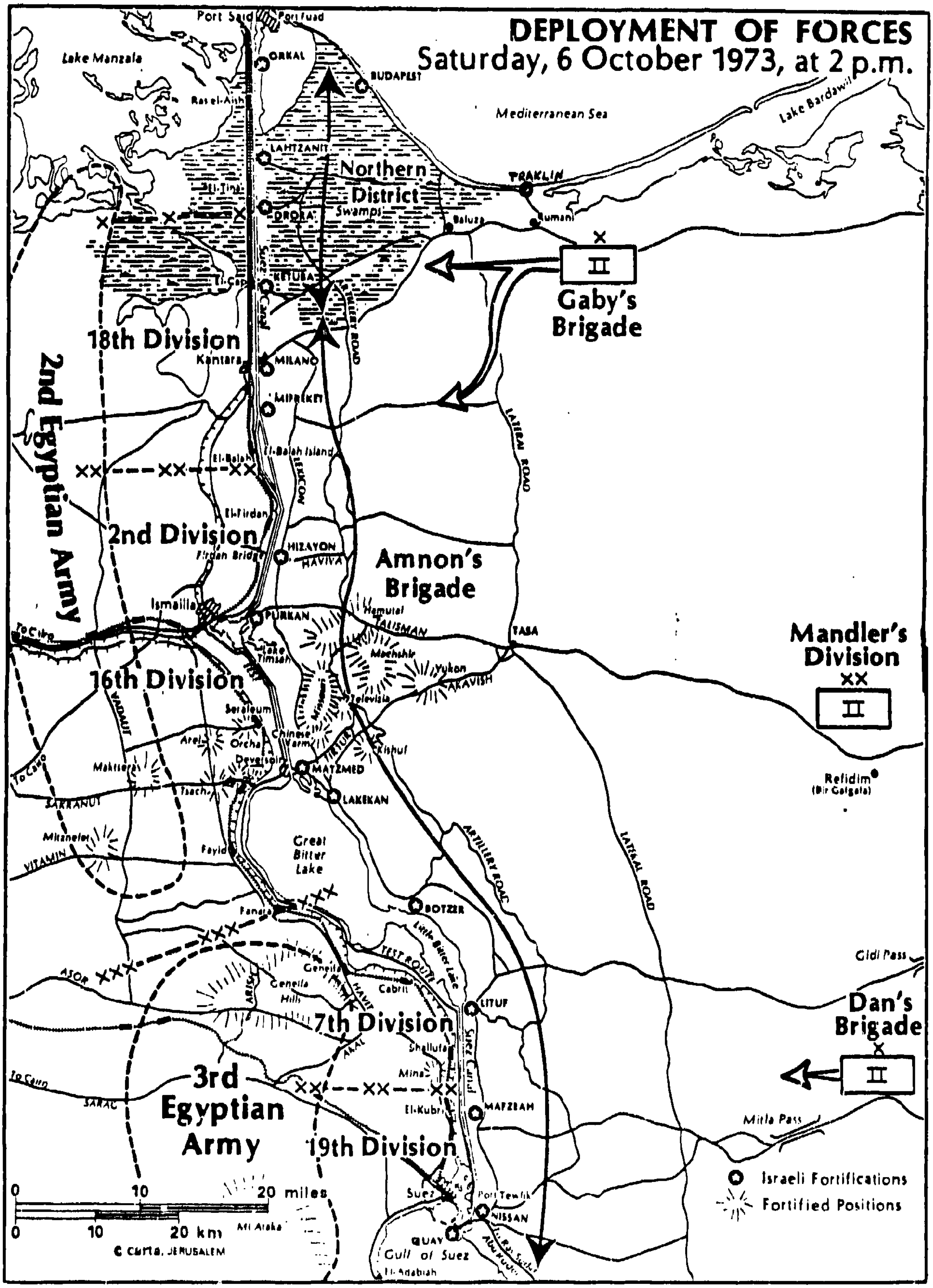
* "Mezach" is Hebrew for "Quay"


DEPLOYMENT OF FORCES
Saturday, 6 October 1973, at 2 p.m.
Port Said
Port Fuad
Lake Manzala
ORKAL
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LAHTZANIT
Northern District
Swamps
TRAKLIN
Baluza
Rumani
DRORA
KATUBA
Gaby's Brigade
18th Division
Kantara
MILANO
MIFREKET
2nd Egyptian Army
El-Balah Island
El-Firdan
2nd Division
Firdan Bridge
HIZAYON
HAVIVA
Amnon's Brigade
Ismailia
PURKAN
Hamutal
TALISMAN
TASA
Mandler's Division
To Cairo
Lake Timsah
Machshir
Yukon
16th Division
AKAVISH
LATERAL ROAD
Serafeum
Chinese Farm
Televisia
Orcha
Deversoir
MATZMED
LAKEKAN
Kishuf
Refidim
(Bir Gafgafa)
SAKRANUT
Mitznefet
Fayid
Great Bitter Lake
VITAMIN
ARTILLERY ROAD
BOTZER
Fanara
Little Bitter Lake
TEST ROUTE
Gidi Pass
ASOR
Geneifa Hills
Cabrit
LITUF
Dan's Brigade
7th Division
Suez Canal
Shallufa
Mina
3rd Egyptian Army
To Cairo
SARAG
El-Kubri
MAFZEAH
Mitla Pass
19th Division
Suez
Port Tewfik
NISSAN
QUAY
Gulf of Suez
Mt Ataka
El-Adabiah
Israeli Fortifications
Fortified Positions
0 10 20 miles
0 10 20 km
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Since this call-up for soldiers on reserve duty occurred during a holiday period, many of them had received special leave and they were replaced by "back-up" soldiers in the batallion (soldiers not supposed to fight due to reasons of health, family problems or defective military preparation). Consequently, and in sharp contrast to the usual feature of Israeli combat units, these soldiers barely knew each other nor did their commanding officers. Moreover the combatants were not distributed to their positions on the basis of belonging to the original companies (a factor which added to the unfamiliarity between the soldiers in the positions).

The batallion arrived at the positions for the first time on September 23, i.e. two weeks before the outbreak of the war. The soldiers of the batallion spent two overlapping days together with the previous units and from the 25th of September they held the line of fortifications on the northern and central sectors of the Bar-Lev Line.

The forces were situated in the following positions:

Traklin -6 combatants
Budapest -63 combatants
(40 artillery men)
Orkal -(A + B +C) 19+17+20 combatants
Lahtzanit- 17 combatants
Drora -17 combatants
Ketuba- 21 combatants
Milano -28 combatants
Mifreket-16 combatants
Hizayon -21 combatants
Purkan - 33 combatants
Matzmed- 34 combatants
Lakekan- 10 combatants-
Botzer - 26 combatants
Lituf - 29 combatants

* In each large fortification (Budapest, Botzer, Orkal, Milano, Drora, Purkan) there was a company commander in addition to the position commander.

* The positions located next to the cross-roads (Milano, Mifreket, Hizayon, Porkan and Matzmed) were especially attacked with extra-heavy fire.

* The positions adjacent to water barriers - Budapest, Botzer, Traklin - absorbed artillery fire but were not attacked with great intensity.

* The northern positions through which there was access to the "Baluza" headquarters were immediately attacked by Egyptian commando forces (Lahtzanit and Orkal).

* In most of the positions, in addition to the reserve forces of Batallion 68, there were a number of regular conscripts who had been sent directly to the positions by the Brigade Headquarters and did not originally belong to the Batallion. These included:

Men of the Ordinance Corps (generator operators); a communications man; intelligence troops sent as observers (not permanent); "Holiday Reinforcements" - religious men, not combatants, who joined the troops for the duration of Yom Kippur for the religious quorum ("minyan") and remained in the fortifications during the attack; fresh medical doctors of the academic reserve without any soldiering or battle experience.

* The Traklin and Lakekan fortifications were manned two days before the outbreak of the war in a random collection of combatants who had been gathered from different positions and commanded by an officer whom they did not know.

(B) Southern Sector

* In the southern sector of the canal, there were units of the "Nahal" (battle troops with agricultural experience called "Fighting Pioneer Youth") of batallion 904, who arrived at the front on the 25th of August and manned the following fortifications:

Maftzeach - 28 combatants
Nisan ("the village") - 20 combatants
Quay ("HaMezach") - 25 combatants
Egrofit (part of the "Quay") - 5 combatants (who manned the position during daylight hours and belonged to the Mezach position.

* The commander of the "Nahal" company was in the Mezach position.

2. Method

2.A General:

The following means were taken to assure maximal reliability of the findings:

a. Focussing on reports of concrete and specific details of the event.

b. Cross-Referencing of information:

1. Reports of different combatants from the same position.
2. Cross referencing of data between combatants and commanders of the same position.
3. Cross referencing of data between senior commanders who were in command of a number of positions (company and battalion commanders).

c. Omission of combatants who endured especially traumatic experiences of particulary severe combat (mostly combatants from the positions: Lituf, Orkal, Lahtzanit, and Hizayon).

d. Analysis of the contents of audio recordings made during the shelling and including the conversations held on the radio system between various positions and the Headquarters.

e. Cross referencing of data with reports from the Division of Behavioral Sciences of the IDF that summarized questionnaires of a morale survey, administered to combatants who had been evacuated from the fortifications about two weeks after the battle for the fortifications (the IDF Division of Behavioral Sciences, 1974).*

f. Analyses of the content of de-briefings carried out with each of the strongpoints, immediately upon the conclusion of the war or after the return of the POW's from Egyptian captivity.

g. Analyses of the content of a radio program held two years after the war: "Fire on the Water" - including reports of combatants from several fortifciations.*

h. Analyses of the content of a recording "A Memorial Evening for the Lituf Fortification" - held a year after the war*.

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* The data of these sources is not reported in this account

2. B. Research Instruments

2.B.1. Analysis of the content of the military de-briefings of the strongpoints

The principal objective of this analysis was to augment the data collected by the questionnaires. An analysis of the content was based on the theoretical model (already described) and focussed on the following issues:

a. Reports on the factors of combat stress in the strongpoint (physical, specific battle conditions, group and personal variables).

b. Reports on the subjective apparaisals of the massive artillery shelling.

c. Reports on the immediate reactions to the artillery shelling (physiological, emotional, social and cognitive).

d. Reports on the modes of coping at the unit (i.e., strongpoint) level and the personal level.

2.B.2. Description of the Questionnaire

For purposes of the present study, a special questionnaire was constructed. A total of 88 questionnaires were distributed among our sample of combatants from the different strongpoints.

* The questionaire contained items relating to the theoretical model and to the research goals:

* Part A of the questionnaire (items 1-36) contains background data on personal variables (includes data found to be related to greater vulnerability to combat reactions such as: recent marriage, wife's pregnancy, economic problems, death of a relative, etc.).

* Part B of the questionnaire (items 37-47) includes data on group variables in the fortification, such as cohesion, morale, training, etc.

* Part C of the questionnaire (items 48-52) includes data on the individual's subjective appraisal of the artillery shelling. This part includes items checking objective data on the activity of the hours that preceded the outbreak of the war.

* Items 53-73 (in Part D of the questionnaire) include data on variables related to battle conditions in each position, such as: the intensity of the bombardment, its duration and type, identification of crossing the Canal by Egyp[illegible] infantry, etc.

* Items 74-93 (in Part D of the questionnaire) include data on the immediate responses to the shelling. The responses pertain to the following spheres: physiological, emotional, social, and cognitive.

* Items 94-104 (in Part D of the questionnaire) include data on the reports of combatants on their coping behavior (personal and group) during the artillery shelling.

* Part E of the questionnaire (items 105-107) includes data on variables related to the command role and its influence during the artillery shelling.

* Part F of the questionnaire (items 108-115) includes data on long-term influences of this combat event.

2.B.3 **Description of the Interviews with the Strongpoints' Commanders:**

Twenty-four interviews were conducted among the command echelon of the positions (Company commanders, strongpoint commanders and senior NCOs in the positions).

The primary objective of these interviews was to obtain data on the operational function of the positions - that was lacking in both the questionnaires and the initial military de-briefings.

2.C. **The Research Procedure**

1. Initial discussions were held with the Deputy Commander of the 68th battalion, the commander of the Nahal Company from the 904th battalion, and the commander of one of the companies in the Central Section (of the 68th Battalion). Tnese discussions provided the basis for developing the Questionnaire and the interview.

2. The adjutant of the 68th Battalion helped in locating addresses of the combatants of the 68th Battalion.

3. The commanders of the southern positions (Battalion 904) helped with finding the names of the fortifications' combatants.

4. A pilot test was conducted, in which the Questionnaire was administered to 8 combatants from different fortifications.

5. The sending out of the Questionnaire was proceded by a telephone conversation with the combatant. The objective of this telephone conversation were:

A. Confirmation that the individual was a combatant in a position on the day the war broke out.

B. Agreement of the combatant to take part in the research.

C. Confirmation of the address of the combatant for the sending out of the questionnaire.

6. The questionnaires were sent to the combatants along with a letter explaining the objective of the research.

Subsequently the following cautious steps were taken:

* In cases where the return of the questionnaire was delayed, a telephone call was made to remind the subject.

* In cases in which the combatants reported difficulties in filling out the Questionnaire, they were helped by means of a telephone conversation or a personal meeting to complete the Questionnaire.

* In cases in which it was felt by the investigators that the Questionnaire caused an emotional reaction, to ensure no further emotional complications, a personal meeting with the combatant was held.

7. The interviews were carried out in a neutral place allowing privacy. The interviews were recorded with the approval of the interviewees. Since these were half-structured interviews, it was necessary to reduce the content to a summary form with several quantitative categories. This was done on the basis of an initial analysis held on the first interviews carried out in the Pilot stage.

.3. RESULTS

3.A. General

In the forthcoming sections, we will, at times, present the findings by means of various indices. An index is a weighted mean score of a number of questions measuring the same "content world" of a particular area. The indices constructed for the purpose of further statistical analysis, pertain to the following areas:

1. Family background characteristics
2. Group support
3. Self-confidence as a combatant
4. The unit's climate
5. Appraisal of the situation
6. Physiological responses to the shelling
7. Emotional responses to the shelling
8. Associations during the shelling
9. Frightening factors in the shelling
10. Index of well being
11. Post-traumatic (PTSD) symptoms
12. Commitment to the IDF and the State of ISrael
13. The degree of openness during the discussion of the deep experience

A Smallest Space Analysis (SSA) was carried out on variables related to combatants' experiences. In addition, a mapping of the combat characteristics was assessed by a statistical analysis in the Partial Order Scale Analysis (POSAC) procedure. The analysis included:

1. The level of the position's combat readiness.
2. The intensity of the Egyptian attack on the position.
3. The severity of loss and casualties in the position.

3.B Description of Background Characteristics of the Combatants Who Participated in the Sample:

The sample in this study included 88 subjects all of whom served as combatants in the Bar-Lev Line fortifications at the time of the outbreak of the war. Their background characteristics, as of the period of the Yom Kippur War, are as follows:

Variable	Number of subjects	Percentage
Corps Classification:		
Jerusalem Brigade (68th Battalion)	58	64%
"Nahal" Battalion (908)	14	16%
Artillery Company	11	12%
Others (armor, intelligence, support etc.)	7	8%
Rank:		
enlisted men	47	54%
NCOs	25	28%
officers	16	18%
Type of Service:		
Regular	26	30%
Reserves	60	68%
Standing Army	2	2%

Distribution according to fortifications:

		Percentage of those interviewed among all the combatants of fortification
Budapest	19	30%
Drora	9	47%
Ketuba	7	33%
Milano	8	25%
Mifreket	3	19%
Purkan	12	36%
Lakekan	2	20%
Botzer	6	23%
Maftzeach	7	25%
Mezach	8	27%
Traklin	2	33%
Matzmed	5	17%

Variable	Number of subjects	Percentage
Country of birth:		
Israel	66	75%
Abroad (average length of stay in Israel-18 years)		
Europe	4	4%
Asia	6	7%
Africa	11	13%
America	1	1%
Occupational Distribution:		
Farmers-"Kibbutzniks"	14	16%
Self-employed	5	6%
Liberal Professions	16	18%
Craftsmen	36	41%
Clerical Staff	7	8%
Others	10	11%
Origin:		
Oriental ("Mizrahi")	41	46%
European ("Ashkenazi")	42	48%
Mixed	5	6%
Family Status:		
Married (40% of whom had from 1 to 4 children)	48	54%
Single	40	46%
Educational level:		
Elementary	15	17%
Incompleted High School	22	25%
High School	31	35%
Advanced	20	23%
Religiousity:		
Secular	49	56%
Traditional	25	28%
Orthodox	14	16%
Taken POW at the End of the Fighting:	23	26%

Length of Stay in the Positions before the outbreak of the war:		
Between a week and 2 weeks	65	74%
From 3 weeks to 2 months	16	18%
More than 2 months	7	8%
Received decorations for their part in the fighting:	10	11%
Were deployed again after evacuation of the positions:	38	43%
Hospitalized as a result of the fighting:	20	23%
Of These 20 hospitalized:		
During the evacuation of the position	6	30%
After the war	4	20%
In Imprisonment	3	15%
After imprisonment	7	35%
Reasons for Hospitalization:		
Physical	16	79%
Mental	4	21%
Also participated in the Lebanon War:	27	31%
Also participated in the "Intifada"	22	25%

From these background variables, our sample can be seen to be quite representative of the various elements that comprised the Bar-Lev Line before the outbreak of the war. There is, however, a slight overrepresentation of the artillerists and a slight underrepresentation of the 68th Battalion:

* Of the forces holding the line, 9% were artillerists; while in our sample they represent 12%.

* 74% of the forces that held the line were combatants of the 68th Infantry Battalion (The Jerusalem Brigade); while in our sample they constitute 64%.

* Finally, 17% of the forces that held the line were from the "Nahal" 908th Battalion; in our sample they constitute 16%.

The sample includes 12 of the 16 fortifications that were manned at that time. Of these 12, four fortifications - Mifreket, Lekekan, Matzmed and Traklin- were not included in the forthcoming within-position analyses, due to the paucity of sample combatants (5 or less in each); they were, however, included in all overall or between-positions analyses. The remaining 8 fortifications are represented in a proportion between 23% and 47% of their original forces.

3.C. Combat Readiness Level before the Beginning of the Artillery Shelling

3.C.1. Personal readiness of the Combatants

Combatants were asked about different variables regarding their personal readiness (orientation briefing, personal readiness, involvement in preparations, etc.) Here is the distribution of their repsonses:

At the Beginning of the Shelling:

Was in alert position (with weapon, pack, helmet)	77%
Received briefing on Friday or Saturday	59%
Was carrying out his duty during the hours just prior to the shelling	54%
Was in a bunker at the outbreak of the shelling	47%
Was resting during the hours just prior to the shelling	25%
Was carrying out preparations during the hours just prior to the shelling	21%

As can be seen from this distribution, the majority of the combatants of the Bar-Lev Line were in a personal alert position at the outbreak of the shelling, were engaged in preparations or were doing their duty before the outbreak of the shelling, and more than half of them had received a briefing before the outbreak of the fighting.

3. C. 2 Combat Readiness of the Fortifications:

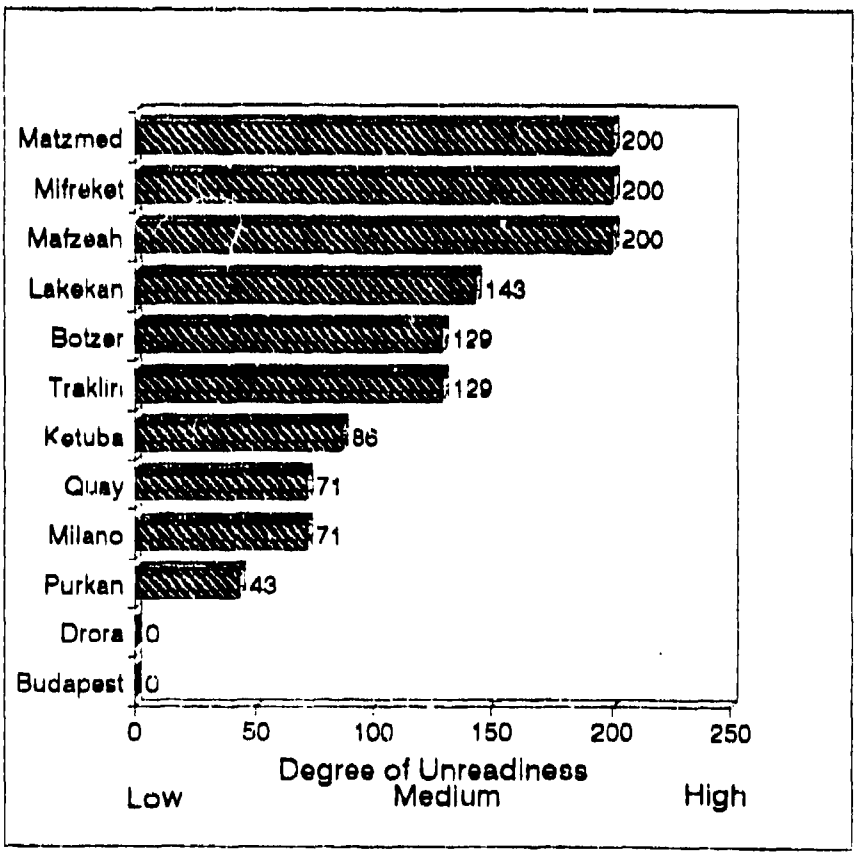
Four variables were used to assess combat readiness at the unit-(fortification) level. These variables were derived from the following questions:

(a) "Were the troops in the foritification briefed on Saturday?"
(b) Were the troops in the bunkers at the outbreak of the shelling?"
(c) "Were the tanks stationed in the fortification?"
(d) "Was a senior Commanding Officer (Company Commander, Deputy Company Commander), present in the fortification?"

The 12 fortifications were analyzed according to the above 4 variables, using the POSAC method. In this method, first a Gutman Scale is created with all relevant variables and subsequently units are arranged in descending order. The POSAC analysis revealed that from among the variables comprising the sense of readiness - the most important variable was "tanks stationed in the fortification". The next most important variable was "the presence of a senior commanding officer in the fortification". Of least importance and almost evenly balanced were the variables of "briefed on Saturday", and "staying in the bunker".

Figure No. 3 presents the 12 fortifications in our study according to the degree of their unreadiness; The score of 200 indicates the level of maximum unreadiness relative to the remaining positions in the sample; and the score of 0 represents the minimum degree of unreadiness (i.e. a relatively high degree of readiness compared to the remaining positions.

Figure No.3: Degree of Unreadiness of the Fortifications.



Using the index of "fortification combat readiness" as the dependent variable, we conducted a regression analysis with various predicting variables. The single variable which predicted significantly (R=.36; p. 001)) was "soldiery level": The higher was the combatants' soldiery level (felt trained; served in same occupation as trained; was familiar with terrain and enemy positions; had been under shelling before) - the better was the perceived fortification combat readiness level.

3. C. 3 How Did They Imagine the Situation Would Develop? (What was their Scenario?)

To the question how the troops imagined the situation would develop (to the extent that they were briefed before the beginning of the shelling), they responded:

"If there is a tough shelling, I rely on the armor units to arrive to help us and bring the situation under control."	41%
"In the worst case, there will be a day of artillery shelling of the 'attrition' type*"	21%
"Probably a war will begin"	16%
"There will be a tough battle but we will get out of it okay."	7%
"We won't get out of this alive."	3%

It appears that before the outbreak of the shelling, the majority of the combatants thought that even if there would be a tough shelling or "a bombardment of the attrition type", the IDF would, in any case, arrive to aid them and take control of the situation. Only 16% believed that indeed an all-out war would begin. A tiny minority feared "the worst eventuality."

* refers to the War of Attrition (1968-1970), when artillery shelling was a daily occurance.

3. C. 4. Were the Combatants Surprised?

The distribution of answers to this question was as follows:

not at all	to a certain degree	to a large degree	to a very large degree
22%	25%	24%	30%

This sense of surprise also emerges from the original de-briefings carried out at the end of the fighting:

"...It seems to me nevertheless that we can say that for the majority of the soldiers in the fortification - the war came as a surprise for them. Although there were signs, that today we could interpret as indicating a possible war or something similar; but it is clear to me that the war came as a total surprise for us" (Company Commander in a de-briefing).

In taking into account that the majority of the positions were briefed and in readiness, and a majority of the combatants were in personal alert (see the preceding paragraphs) - it seems incongruous that the combatants were so surprised by the events. What in effect surprised them?

3.C. 5 The Surprise Factors in the Attack

The subjects were asked what specifically surprised them, in the attack. The following is the distribution of their answers:

The very fact of the attack itself	timing of the attack	duration of the attack	intensity of the attack	type of attack	not at all
31%	9%	3%	31%	6%	2%

18% indicated that they were not surprised by the various attack factors.

It can be detrmined then that the primary surprise factors were the mere fact of the shelling and its intensity.

Similarly to the reports of the combatants, the principal surprise factors indicated by the commanders in their interviews were also the very fact of the attack and its intensity. Commanders tend to emphasize the "style of the attack" as a surprise factor and add another one: "The lack of the IDF's reaction" (as was expected by them).

It is possible that the variation in the commanders' answers stems from the essence of their role. As commanders, they were not prepared to cope with this military tactic, and they were also the first who saw that the IDF plans did not function as intended (because they did not receive reinforcements in armor and artillery, in spite of their repeated requests).

Commanders distinguished between two types of surprises:

1. Immediate surprise from the attack itself, its intensity and type. (about 1/4 of the commanders indicated this).

2. Enduring surprise from the absence of the IDF response. (about 1/2 of the commanders indicated this).

3. D. Intensity of the Egyptian Attack.

3. D. 1. Intensity of the Egyptian Attack - an Objective Assesment:

We carried out an analysis using the POSAC method on various components of the intensity of the attack, accross the different fortifications.

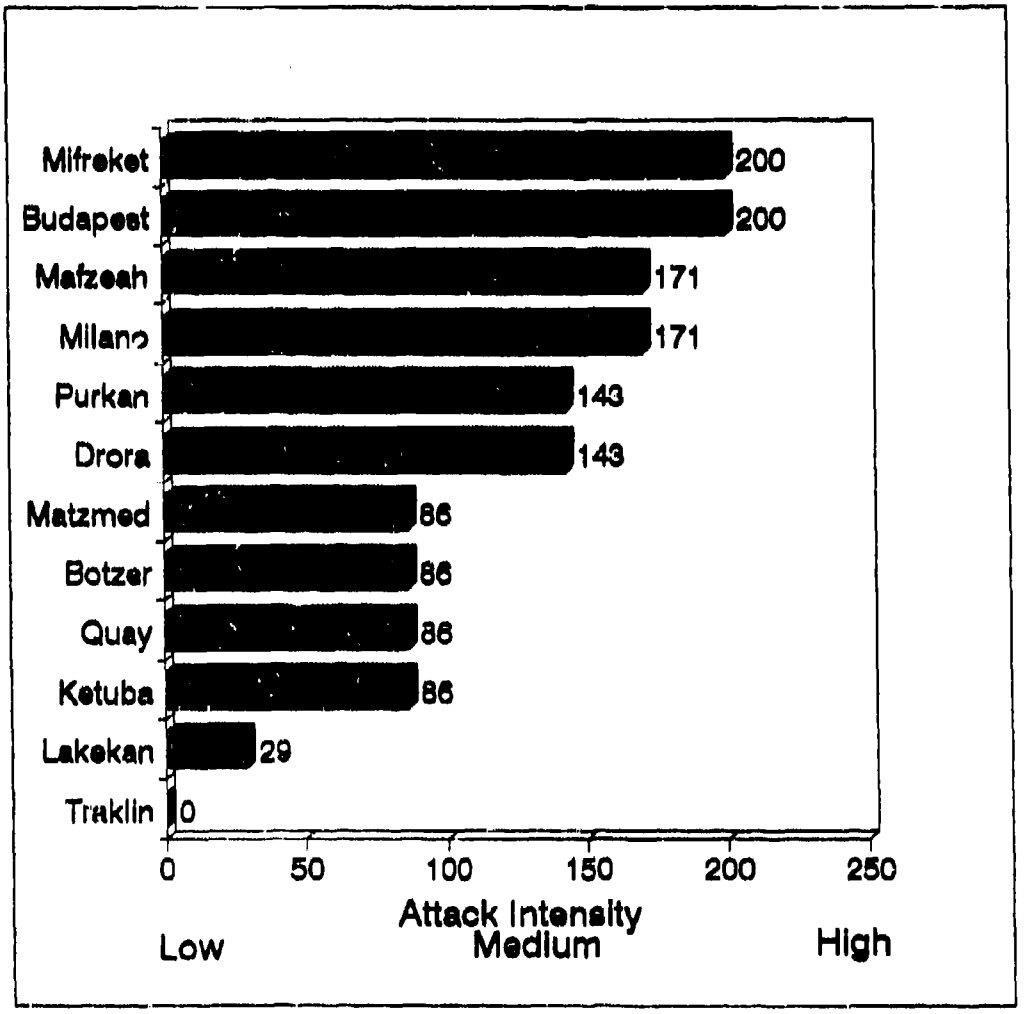
For the purposes of this analysis, we incorporated variables gathered from the archival data (briefings and debriefings, documents, radio communications, etc.). These variables included:

(a) duration of the shelling;
(b) intensity of the shelling;
(c) identification of the enemy force;
(d) attack on the position by the enemy;
(e) enemy attack on a neighboring fortification.

Surprisingly enough, it was found that among the variables comprising the intensity of the attack - the most important variable was "the lack of enemy attack on a neighboring fortification" (apparently, among the positions inlcuded in the sample, in the event that a neighboring position was not attacked, the position itself was attacked). Next in importance was the variable of "attack on the position") followed by the variable of "identification of the enemy force" and then "intensity of shelling". Last of all appeared the variable of "duration of the shelling".

Figure No. 4 depicts the rank order of the 12 fortifications as described above according to the intensity of the attack. The intensity of the attack is expressed by scores ranging from 0 (the relatively lowest intensity of attack) to 200 (the relatively highest intensity, compared to the other fortifications).

Figure No.4: The intensity of the Egyptian Attack By Fortifications.



3. D. 2. Intensity of the Egyptian Attack - a Subjective Assesment.

The combatants were asked to describe how they perceived the shelling intensity on various dimensions:

3.D.2.a. Time that Expired Until the Majority of Shells Landed Within the Fortification Itself:

"From the very first minutes"	75.0%
"After a quarter of an hour"	9.2%
"After more than an hour"	9.2%
"After half an hour"	3.9%
"Did not at all fall within the fortification"	2.6%

3.D.2. b. The Ranges Within Which Most of the Shells Fell During the First Half Hour:

Within the Position	100-200 meters	200-500 meters	500-1000 meters	1000-2000 meters from the position
76.0 %	14.7%	4.0%	1.3%	4.0%

3.D.2.c. The Frequency With Which the Shells Fell in the Area of the Fortification

every few seconds	every 2-4 minutes	every 5-10 minutes	every 10-20 minutes	Other*
52.6%	19.7%	7.9%	3.9%	15.8%

*"Other" : Mostly reports of combatants from positions that caught a shelling of a lower frequency such as Lakekan and Traklin.

3.D.2.d. The Type of Shell Fired on the Fortification:

medium mortars	heavy mortars	artillery	other*
5.4%	28.4%	24.3%	41.9%

*"Other": Refers to the firing of missiles, tank shells or "all of the above".

3.D.2.e. The Length of Time Which the Artillery Shelling Lasted Around the Fortification:

several hours	about an hour	half an hour	there was no bombardment
77.4 %	9.5%	8.3%	2.4%

3.D.2.f. Was an Egyptian Crossing of the Canal Identified During the First Few Hours?

Identified During the First Two Hours	Identified After the First Two Hours
39.6%	60.4%

3.D.2.g. Was There an Assault of Egyptian Forces on the Fortification (During the First Few Hours)?

The majority of the combatants (72.7%) report that they experienced an assault of the Egyptian forces on their position. Of these, most of the reported assaults were after the first few hours of the massive shelling.

Identified an Egyptian Assault During the First Two Hours	Identified an Egyptian Assault After the First Two Hours	No Assault Identified
29.2%	43.5%	27.3%

From the combatants' reports on the Egyptian intensity of shelling, it emerges that the artillery fire included shells of different types. Already from the first minutes of the shelling most of the shells landed in the fortifications themselves, at a frequency of a number of seconds or minutes during several continuous hours.

Most of the combatants reporting that they identified Egyptians fording the canal - indicate that this was after the first few hours of the massive shelling of their position. Most fortifications were also attacked (by commando assault or Egyptian armor), only after a number of hours of massive shelling. (Positions that were attacked simultaneously with the beginning of the shelling were not included in our study).

The subjective intensity of the shelling finds expression in the following subjective descriptions taken from the military de-briefings and from interviews with commanders.

"...There was a heavy bombardment until the air was black with the strong smell of explosives and soot particles" (combatant questionnaire).

"... Everything flew up in the air casting heat about...the environment changed in a plastic way - the earth began to vomit its guts, your whole reality changed..." (interview with a commander).

"...Due to the intensity of fire, it was impossible to get up from our posts -not in any way possible! Not even the biggest hero...When I got up to the periscope post to observe, the first thing I saw was a (tank) cannon standing opposite us, and just like a free style shooting range was casting one shell after another...." (military debriefing).

"...An unusual shelling began with the opening of fire and I remember that the bunker really moved...they poured in hell fire on us..." (military debreifing).

"...It was a very massive and precise shelling I was counting all the time - volleys of 4 shells at a frequency of every few seconds, sometimes at the rate of 5-6 volleys per minute. Not all of them were exact but the rear part of the fortification was progresively destroyed..." (military de-briefing).

"... the shelling began - something utterly unreal , every second I think, 5 shells of an abnormal
intensity and abnormal noise..." (military debriefing).

"...it was a terrible shelling but I don't remember there was fear..." (military de-briefing).

"In the first shelling we were in the bunkers, then we heard the shells in a dull thud. Then we didn't know what this shelling was but we were outside and then each shell was something abnormal. Everything shook ..." (military debriefing).

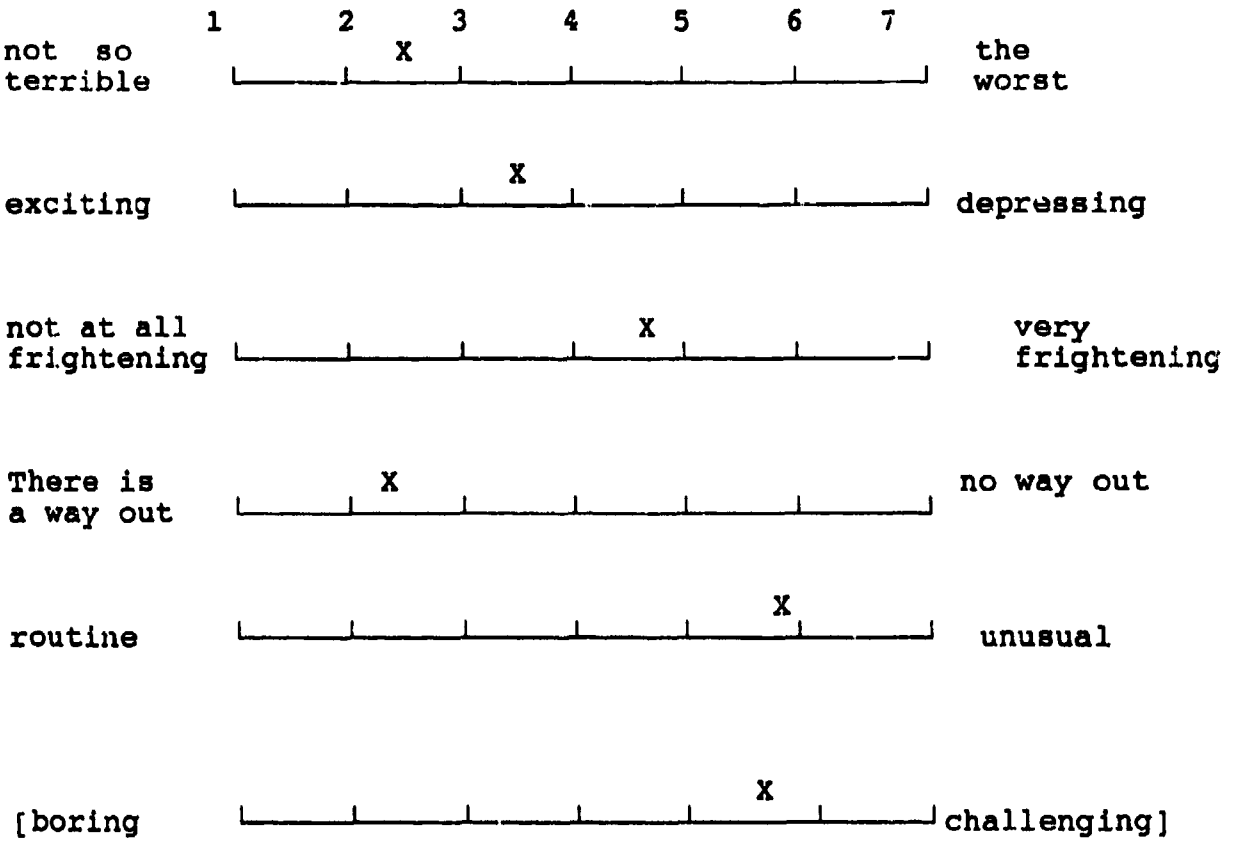
"...A terrible feeling, the entire bunker shook, you could really see the movements! And outside you heard the dull thud that breaks up into many small thunderclaps - and it seems and that all the hellfire of the world is on top of you..." (recording of a combatant on the radio program, at the end of the war).

3. D 3. **Appraisal of the Situation at the Outbreak of the Shelling.**

What was the subjective perception, by the different combatants, of the situation at the outbreak of the attack and during the first two hours of the massive shelling?

The combatants were asked to describe an evaluation of their subejective situation with the beginning of the war on a six step semantic differential scale, that described 6 dichotomic perceptions. The following is the average distribution of these scales.

"The situation was... "



(comment: A factor analysis performed on the above scales, revealed that the variable "challenging-boring" did not coalesce with the other variables but created a separate factor. Two indices were therefore created : " Adverse Appraisal" and "Benign Appraisal").

From these reports the conclusion can be drawn that in the course of the first two hours of the massive shelling in the War of Yom Kippur, the common apraisal among the combatants who were in the positions was that: "all in all the situation is not so terrible" (80% indicated answers between 1 and 5), that the situation is "quite exciting" (82% indicated answers between 1 and 5), and "unusual" (94% indicated answers between 3 and 7), that the situation is "really frightening" (89% indicated answers between 3 and 7), but "there is a way out of it" (86% indicated answers between 1 and 5). In addition, they appraised the situation as "quite challenging" (97% indicated answers between 3 and 7).

Similar findings emerge from the anlaysis of the military debriefings. Following are a number of citations:

"I thought it would just be a half an hour shelling".

"I thought this was some kind of another "War of Attrition".

"I asked the Lieutenant what was up, and he said to me: 'Nothing at all, there is a shelling - tell the guys to drink water and calm down. Everything will be okay'..."

"We were a bit afraid of the shelling but there was no feeling of war or anything like that. We thought that it was just a shelling and would be over."

"...Shells fell in the direction of the gate like you light up a Hannukiah (8 armed candelabrum used for the the holiday of Hannukah) in a row. I told them -hey guys - the shells are coming down - don't be afraid-it's only just a shelling for half an hour..."

"The feeling was in fact good, that this was going to be a War of Attrition and we had nothing to worry about, one of the guys even suggested watching a film..."

"We were still in a good mood in the situation and thought that it was a kind of War of Attrition. I tried to make several jokes in the bunker..."

In examining differences in the appraisal of the situation according to different background variables, significant (or close to significant) effects were found (only with the "Adverse Appraisal") in the following variables: type of service, military rank and ethnic origin. From these differences it emerges that the situation was more negatively appraised by combatants of Oriental origin, among those of NCO ranks and among combatants who were then in regular conscript service.

According to the type of service: It was found that the reservists' appraisal of the situation was more positive than the one percieved by the conscript combatants (3.3 on the 1 to 7 scale as opposed to 3.9 ($P < .05$).

According to Rank: A tendency to appraise the situation more negatively ($P < .07$) was found among the combatants with the rank of NCOs (3.5) as compared to enlisted men (3.7), and officers (4.3).

By Origin: A close-to-significant difference ($P < .10$) was found between combatants of Oriental origin, who perceived the situation in a more negative fashion (3.6), as opposed to the combatants of "Ashkenazi" origin (3.8)., and combatants of mixed origin who appraised the situation in a more positive fashion (4.8).

3.D.3.a **Correlates of Appraisals.**

In searching for variables which are related to the combatant's appraisals of the situation, we performed a Regression Analysis in which the "adverse appraisal" served as the dependent (criterion) variable. Four independent variables contributed signifivantly to this "negative" appraisal: Physiological response, soldiery level (see page 25) and emotional responses (of the "active" category). Table no. 1 presents the simple (Pearson) and partial correlations, the multiple ("model") correlations and the beta ("B") levels of the four steps in the Stepwise Regression Analysis.

Table 1

Stepwise Regression Analysis with "Adverse Appraisal"

Independent Variables	Step	Pearson R	Partial R	Model	B
Physiological Response	1	.35	.26	.26	.36
High Soldiery Level (high familiarity with sector)*	2	-.41	.09	.36	.21
Low Soldiery Level (low familiarity with sector)*	3	.21	.06	.41	.28
Emotional Responses (Self Confidence, Lack of fear, Nervousness)	4	.41	.04	.46	.23

R Square = .46 Adjusted R Square = .04

*Our POSAC Analysis yeilded that "Familiarity with Sector" served as a discriminant variable, dividing "soldiery Level" into these two categories.

Thus, in congruence with our conceptual model, an adverse appraisal of the situation is positvely correlated with the frequency of physiological responses evoked in this situation; this appraisal is invertly correlated with "deficiencies" in soldiery level (either low familiarity with the nearby sector or low level of soldiery) and with the "active" type of emotional responses.

3. E. Frightening Factors in the Shelling

Among the various types of fire directed at them - which especially frightened the Israeli combatants?

Machinegun Fire	Planes	Shallow Trajectory Weapons	Steep Trajectory Weapons	Other
30%	75%	46%	54%	13%

From the table it can be seen that the most frightening means of fire was airplane attacks followed by steep trajectory weapons and then shallow trajectory weapons. Machineguns were the means of fire least feared.

3. E. 1. What Aspects of Fire Caused Special Fear?

The Destructive Power	The Intensity of the Noise	The Accuracy	The Shrapnel
37%	33%	19%	11%

The two most frequent aspects cited as frightening were: the destructive power of the shell and its noise intensity. In an examination of the differences between the frightening factors among the combatants according to their background characteristics, the following significant effects were found: The Dostructive Power of the shelling was assessed differently according to Corps classification and at different fortifications; the Intensity of noise factor was assessed differently according to family status.

3.E.1.a. The Destructive Power as a Frightening Factor:

According to corps classification: The Nahal combatants ranked the destructive power (as the most frightening facotr) at a higher score (average) than the combatants of the Jerusalem Brigade and the artillerists (0.42 as opposed to 0.20 of the 16th Brigade and 0.15 among the artillerists). One possible explanation of this is that the artillerists and many of the Jerusalem Brigade soldiers were familiar with the shelling from

their previous experience, as opposed to the Nahal soldiers who were not familiar with this type of weapon.

According to fortifications: A significant effect (P<0.5) of the fortification variable on fear of the "destructive power was found:

Combatants in the fortifications Purkan, Mezach, Maftzeach and Botzer considred this factor more frightening (between 0.46 and 0.33), followed by the Ketuba position (0.25) and then Budapest and Milano (between 0.16 and 0.14). The Drora fortification did not specify this factor as frightening at all.

3.E.1.b. **The Intensity of Noise as a Frightening Factor:**

A significant effect was found (P<0.5) according to the background variable of family status: Married combatants reported with greater frequency that the predominant firghtening factor in the shelling was the noise of the firing - as opposed to single combatants (1.9 for married combatants compared to 0.8 for single combatants).

3.E.1.c. **The Destructive power as a Frightening Factor:**

The combatants also literally expressed their principal fears from the destructive power and of the shelling and the uncertainty factor related to it (item 86 in the questionnaire) :

53% indicated the fear of a direct personal hit.
25% indicated the fear that the position would be hit and destroyed.
22% indicated the uncertainty factor.

Somewhat different from the combatants (indicating primarily their fear of the destructive power), commanders in the interviews cited the most frightening factor in the massive shelling as the uncertainty:

	*UNC.	NS.	FOBH	DP	PLSNSS	WHIST
Proportion of commanders indicating	2/3	1/2	1/2	1/4	1/4	1/4
number of times indicated	15	12	11	6	6	5

*abbreviations = UNC=uncertainty, NS=noise; FOBH=fear of being hit, DP=destructive power; PLSNSS=powerlessness; WHIST=whistling (of shell)

3. E. 2. **To What Degree Did They Feel a Danger of Being Wounded or Killed in the Shelling?**

Not at all	A Bit	To a Certain Extent	To a Great Extent	To a Very Great Extent
7%	13%	21%	31%	27%

It can be said that most of the combatants (58%) felt that their personal chances of being hit from this shelling were very high.

3. E. 3. **The Severity of Loss and Casualties to The Fortifications.**

We carried out an analysis with the POSAC method on the severity of the a shell hits on the different fortifications.

For the purpose of the analysis, the following objective parameters were taken into account, from de-briefings and archival data:

* During the first three hours of the shelling - were there any combatants wounded?

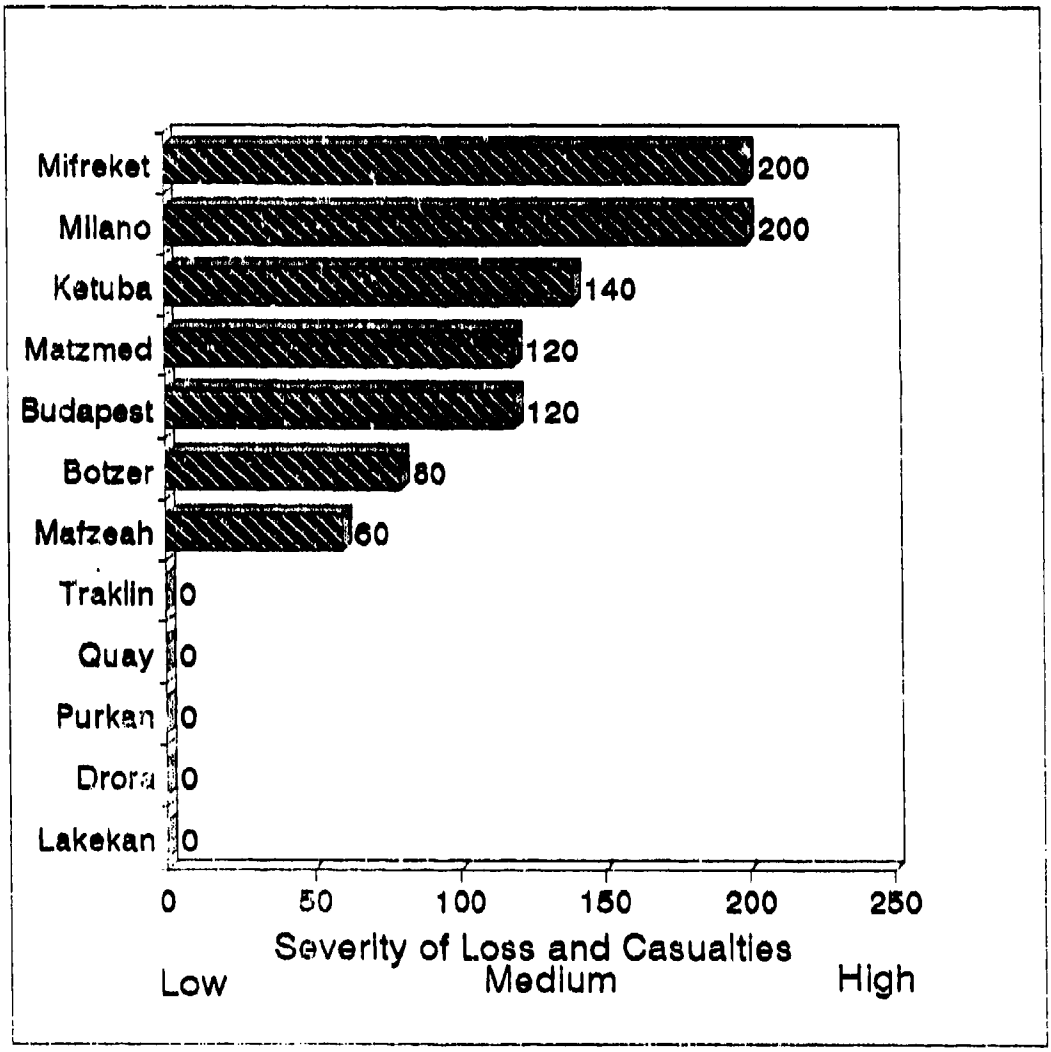
* Were there any combatants killed?

* Was the fortification commander hit?

It was found that among the variables comprising the severity of loss and casualties, there are two parameters which are almost equally weighted: "Hit on the Fortification Commander", and the variable "Combatants Killed"; The variable "Combatants Wounded" is third in order of importance.

Figure No. 5 presents the ranking of the 12 fortifications in our study, based on the severity of their losses and casualties. The severity level is expressed by scores from 0 (a relatively lower severity of hit compared to the remaining fortifications) up to 200 (a relatively high severity of hit compared to the remaining fortifications).

Figure No. 5: Severity of Loss and Casualties According to Fortifications.



3. F What Were the Combatants' Responses to the Massive Shelling?

We divided the combatants' responses into 4 categories: physiological, emotional, social and cognitive,

3. F. 1. Physiological Responses

The folowing table shows the distribution of percentages related to the reported frequencies of the various physiological responses felt by the combatants during the first hours of the shelling.

Table 2

Distribution of Physiological Responses

	Not at all	to some degree	to a certain degree	to a great degree	to a very great degree
Accelerated heartbeat	14%	12%	35%	26%	12%
Loss of breath or breathing difficulties	78%	12%	5%	3%	3%
Stomach Aches	72%	9%	9%	6%	4%
Sense of fainting	94%	1%	4%	-	1%
Sense of Fatigue	68%	6%	17%	3%	6%
Sense of Dryness in the mouth	37%	16%	17%	13%	17%
Shaking, quivering	57%	20%	14%	4%	5%

It can be seen that the two most common physiological responses are heart throbs (38% cited that they felt this to a great extent or to a very great extent) and dryness in the mouth (30% indicated feeling this to a great extent or to a very great

extent).

A typical example emerges from the following report:

"Due to the shelling, I went into shock... Dryness in the mouth was extremely pronounced and I sharply remember this right up to today. My entire body hurt from the strain of the muscles at the time I took shelter from the shells, and I remember that it was only with great difficulty that I succeeded in swallowing some food at the time of the break in the shelling." (combatant questionnaire).

Educational level apparently influences the intensity of the physiological responses: combatants with an elementary education reported a greater degree of physiological disturbances as opposed to combatants with a highschool education and beyond: 2.6 as opposed to 1.7 ($P<.05$).

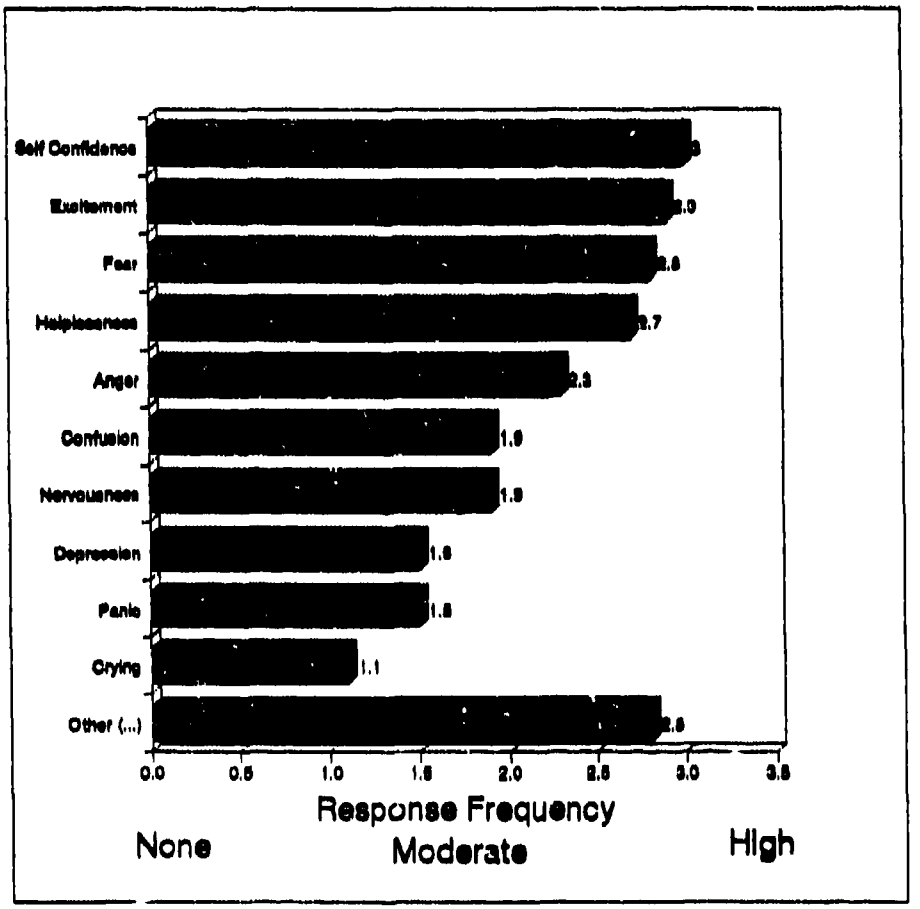
In a regression analysis, it was found that physiological responses were reported to a greater degree as the situation was more negatively apparaised and to the extent that the combatant was concerned about the situation back at home, his family, etc. (R SQUARE = 0.22).

3. F. 2. Emotional Responses

3.F.2.a Frequency

The following figure portrays the answers of the combatants to the question: "To What Degree Did You Have the Following Feelings"?

Figure No. 6: Mean Scores of Emotional Responses During the Shelling.



The five most frequent emotional responses were: self-confidence (40% indicated this to a great extent or a very great extent), helplessness (39%), excitement (34%), anger (31%), and fear (23%).

The differences in the emotional responses were found to be connected to the following background variables: type of service (conscripts or reserves), rank, and location of the combatants at the time of the shelling.

According to type of service: A significant difference was found ($P<0.5$) between the two types of service, regarding emotional responses: reservists reported on emotional reactions to a

greater extent (2.9 than combatants serving in the regular army (2.5).

According to rank: A significant effect was found (P<0.5) by rank groups only with regard to the feeling of depression: the group with the highest reported depression (on the average), was the group of NCOs (1.9). They were followed by the enlisted combatants (1.4), while the lowest level of depression feeling was reported by the officers (1.1).

It is possible that the NCOs felt more depressive feelings, because, unlike their enlisted men, they had a responsibility; but in oppostion to the officers (who also had a responsibility) - they did not have sufficient training to function in a command role.

According to the location of the combatant during the shelling: Combatants who stayed during the shelling outside of the bunkers (in lookouts, on reconnaisance, firing posts) reported on emotional feelings to a greater degree (p<0.6) than combatants who stayed within the bunkers during the course of the shelling. (2.9 as opposed to 2.5 within the bunkers).

3.F.2.b. Intensity

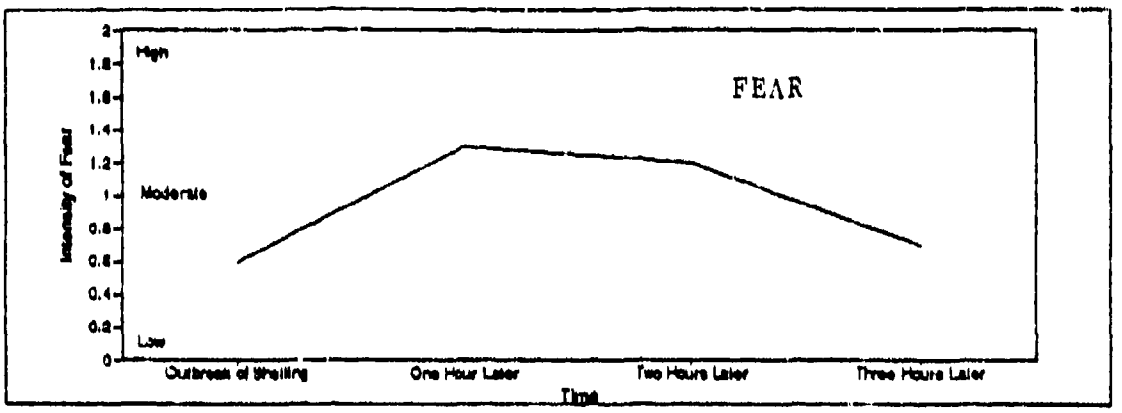
In response to the question "What was your Strongest Feeling" (during the first hours of shelling), the following emotional feelings (of the strongest intensity) were reported:

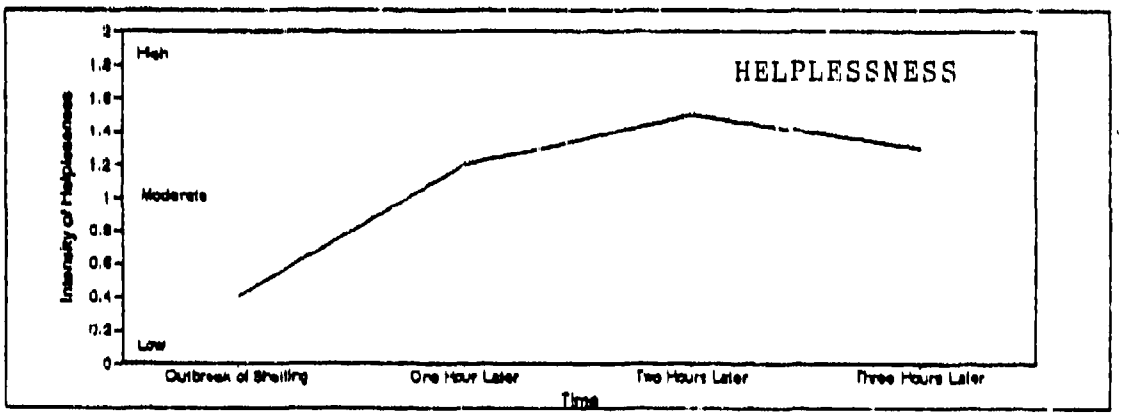
feeling of fear	- 31%
feeling of helplessness	- 24%
sense of self-confidence	- 17%

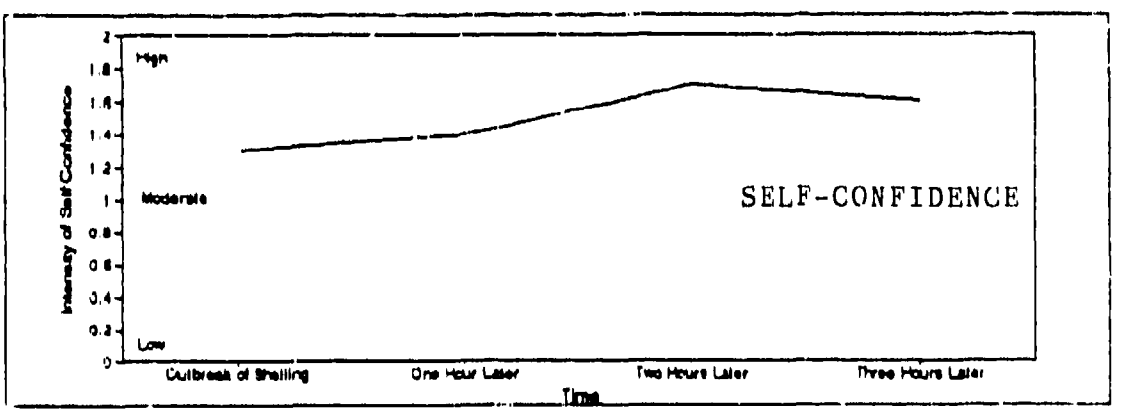
The curves of these "strongest feelings" in the course of the first three hours of the war show a distinctive rise in the intensity of the feeling reported during the first hour of the outbreak of shelling, a stabilization (or a more moderate rise) in the course of the second hour of the offesnive, and stabilization (or a slight decline) in feeling intensity towards the end of third hour of the offensive.

The graphic description of these three feelings throughout the first three hours of the war appears in the following figure:

Figure No.7: Curves of the Strongest Feelings During the First Three Hours of Shelling





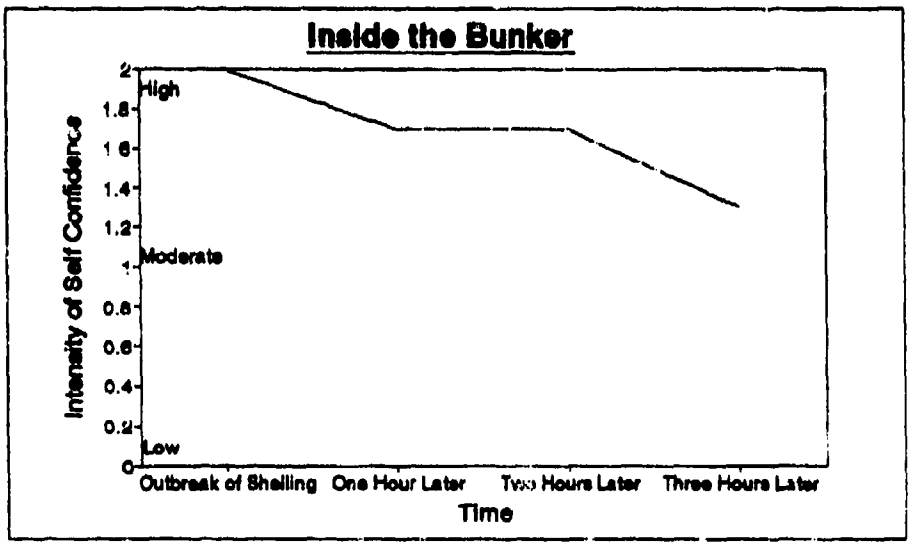


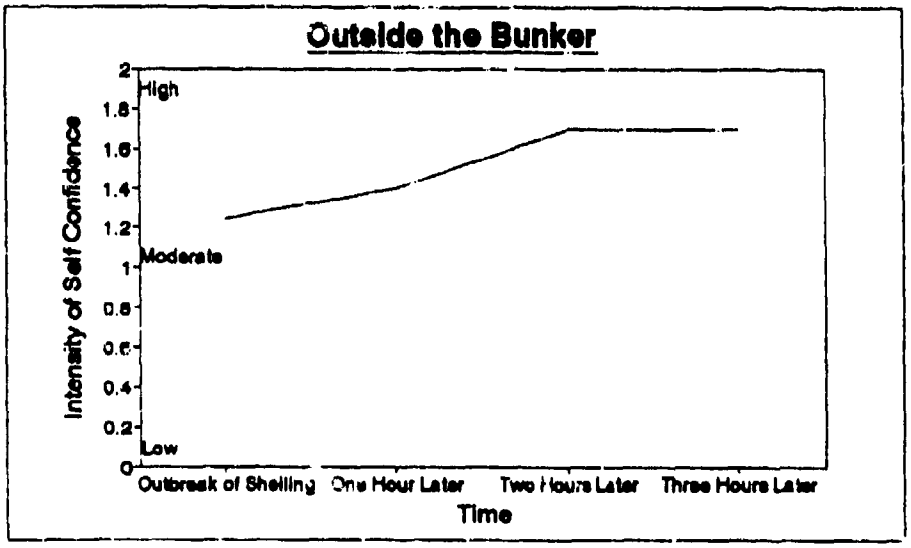
An analysis of the intensity of the three feelings mentioned above, by location of the combatants (within the bunker or outside the bunker) reveals different curves with regard to each feeling separately.

Self-Confidence:

While among the combatants who stayed in the bunkers the sense of self-confidence dropped as time went by, the level of self-confidence of the combatants who stayed outside the bunker during the shelling showed a gradual rise.

Figure No. 8: Sense of Self-Confidence of Combatants Inside the Bunker and Outside the Bunker.

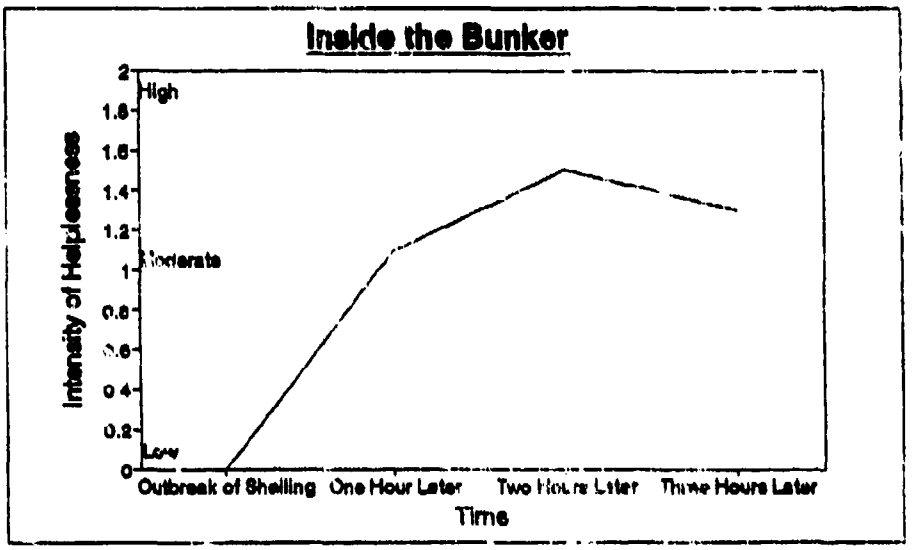


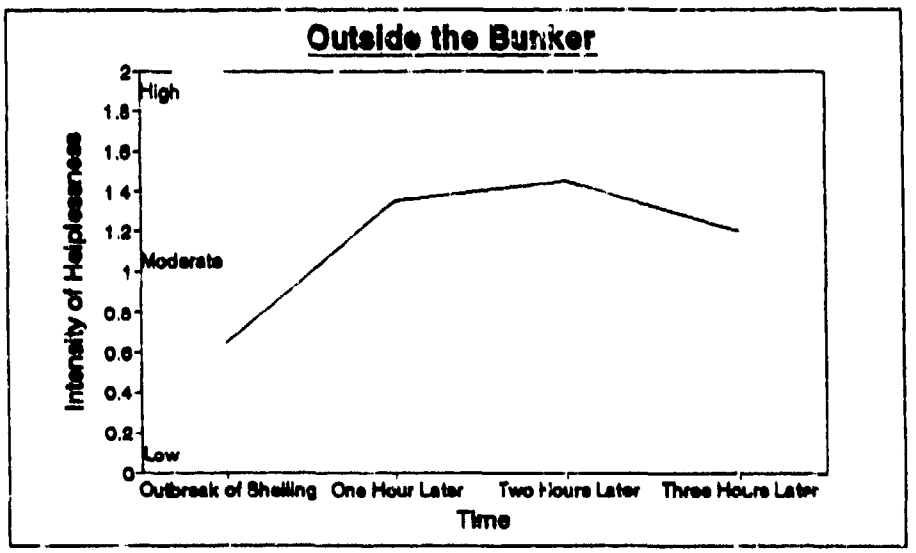


Helplessness:

A very sharp rise was found in the feeling of helplessness among the combatants who stayed in the bunker - as opposed to a slighter rise in that feeling among the combatants who remained outside the bunker during the course of the shelling.

Figure No. 9: Sense of Helplessness of Combatants Inside the Bunker and Outside the Bunker.

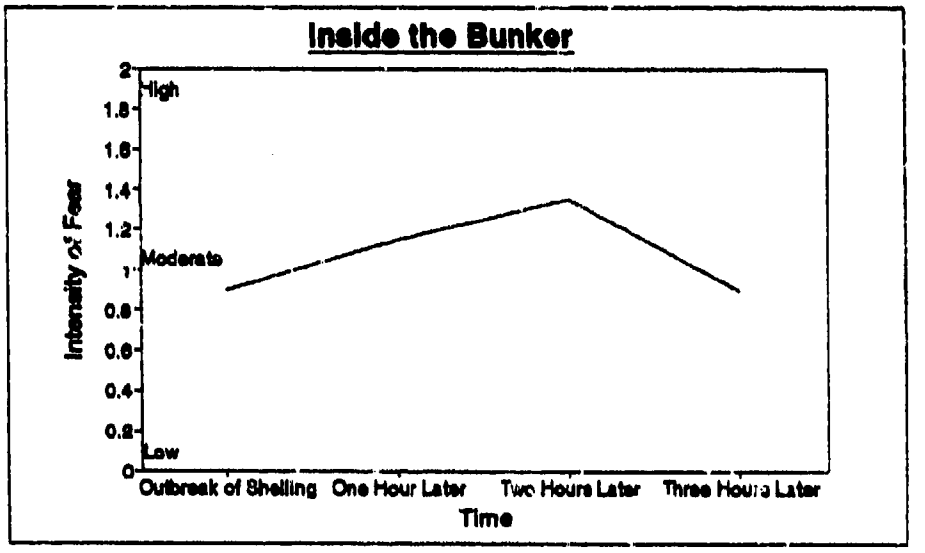


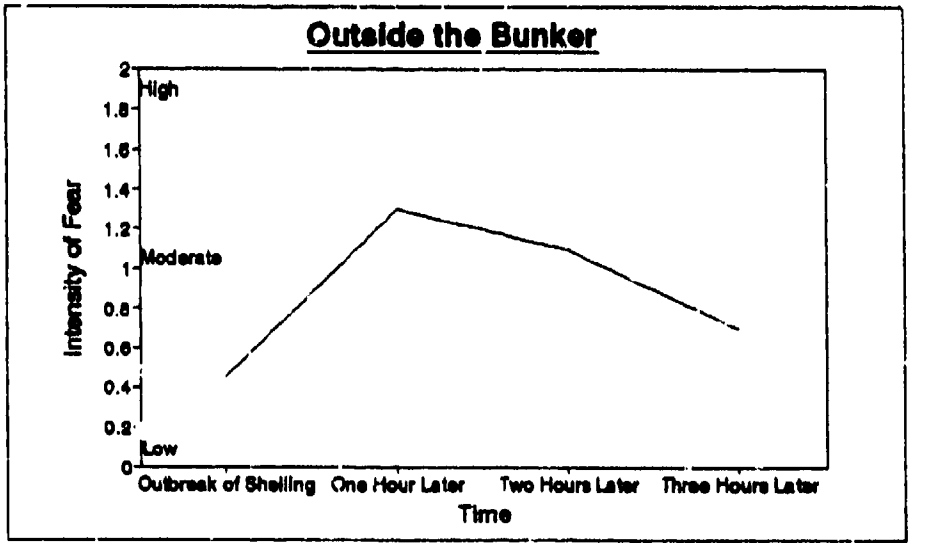


The Intensity of Fear:

During the course of the first hour, the combatants outside the bunker show an increase in their fear level, but they calm down and begin to adapt to the situation towards the second and third hour of the shelling. Conversely, among the combatants who stayed in the bunker, the intensity of fear continues during the first two hours to rise and begins to fall only after the third hour.

Figure No. 10: **Sense of Fear of the Combatants Inside the Bunker and Outside the Bunker.**



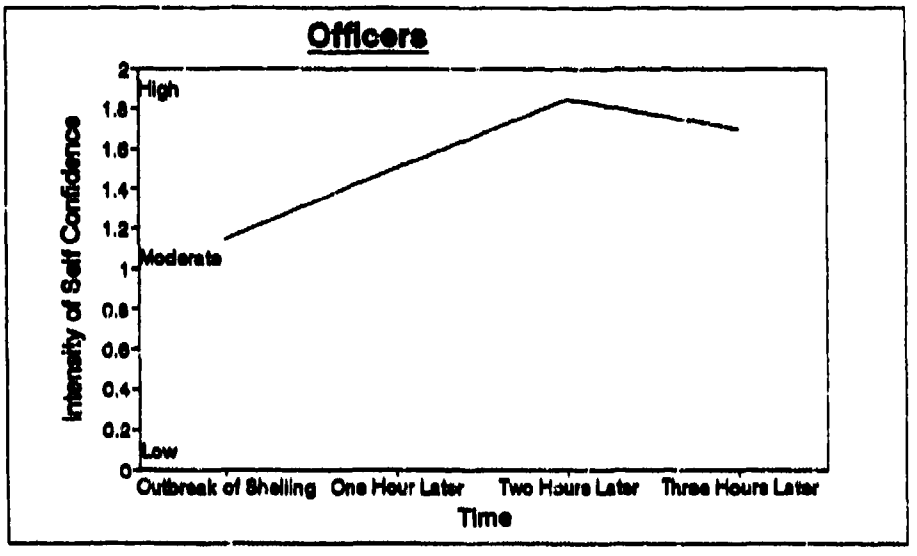


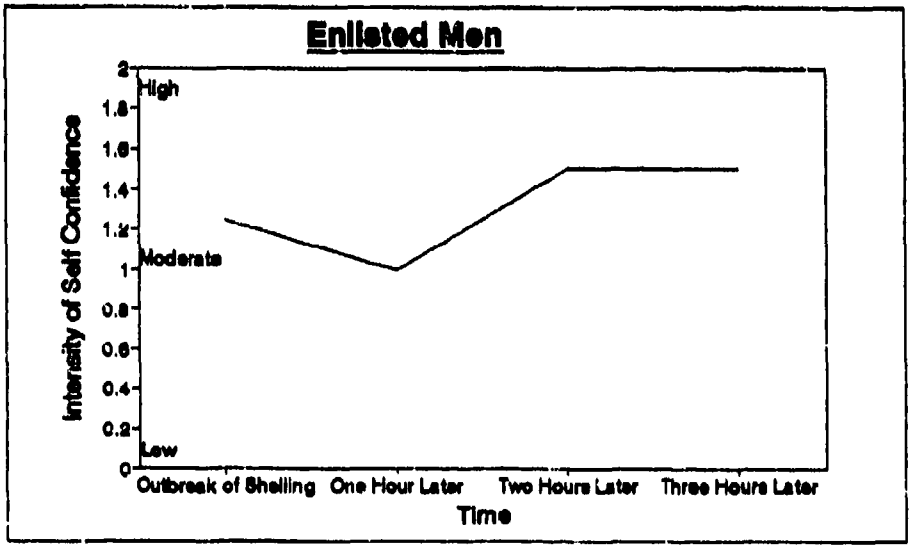
In regards to two of these senses - self-confidence and fear - significant differences were also found according to rank (officers vs. enlisted men).

Self-Confidence:

While the officer's self-confidence (as reported by themselves) rose during the first two hours of the shelling, and stabilized after three hours of shelling at a higher level than the beginning stage (before the shelling), the self-confidence of the enlisted men, according to their own reports, dropped during the first hour and returned to stabilize at its initial level only towards the third hour.

Figure No. 11: Sense of Self-Confidence Among Officers and Enlisted Men.

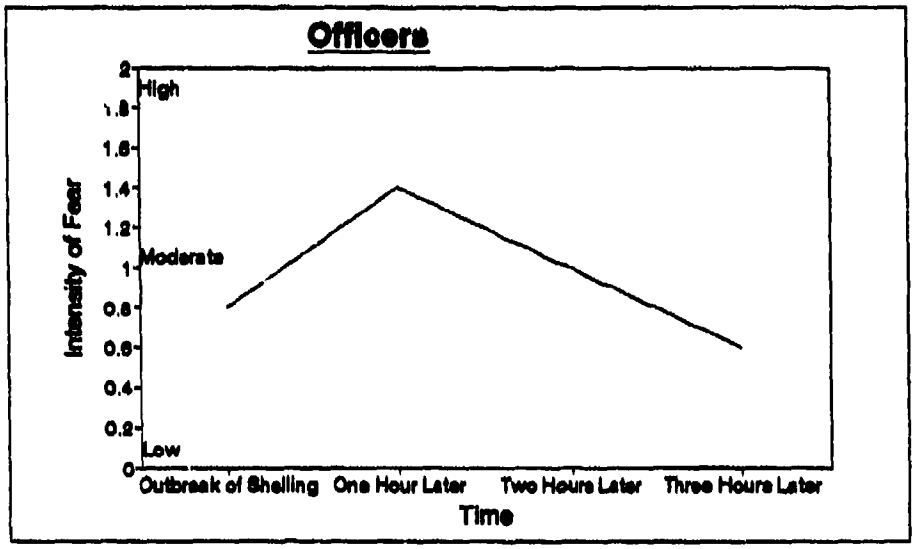


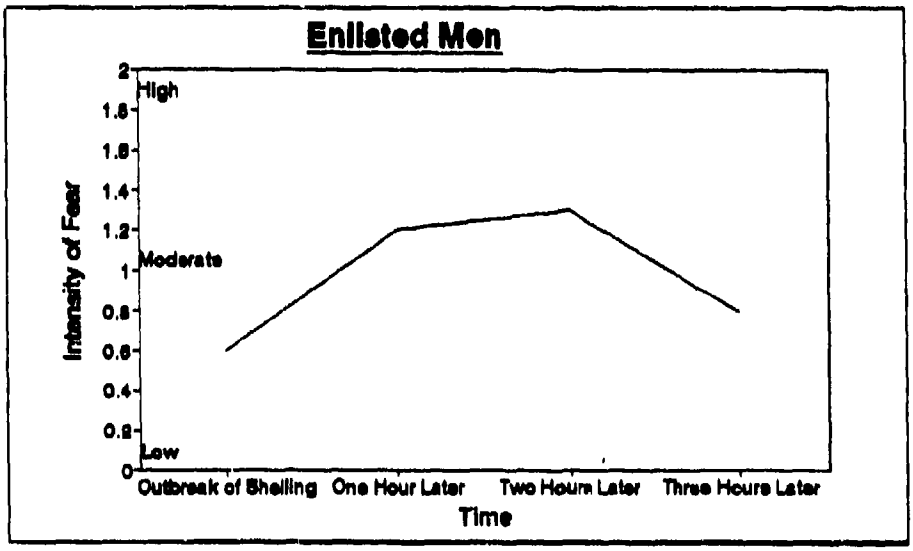


The Intensity of Fear:

While the officers' level of fear rose significantly during the first hour, but dropped sharply and consistently during the next two hours, the enlisted men's intensity of fear also rose during the first hour (similar to the officers'), but stayed at this level, and began to drop only towards the third hour.

Figure No.12: **Sense of Fear Among Officers and Enlisted Men.**





3. F. 3. **Social Responses:**

No outstanding social reaction was found among the gamut of social responses reported by the combatants.

20% indicated that they preferred to speak sparingly during the shelling

15% indicated that they preferred to "stick close" to buddies during the shelling.

12% indicated that they preferred to be alone during the shelling.

12% indicated that they preferred to talk a lot during the shelling.

6% indicated that they preferred to stick close to the commander.

35% of the subjects indicated that they preferred other social responses. From an analysis of these answers, it emerges that these subjects are primarily the commanders and the NCOs who indicate that they did not engage in any kind of social activity but rather were occupied with battle tasks, such as the assigning of men to missions and thinking operations.

In an examination of the differences in the social responses according to various background reactions, no significant effect was found at all.

3. F. 4. Cognitive Responses:

The folowing table shows the distribution of percentages related to the reported frequencies of the various cognitive responses felt by the combatants during the first hours of the shelling.

Table 3.

Distribution of Cognitive Responses

	Not at all	To some degree	To a certain degree	To a great degree	To a very great degree
Inability to Concentrate	52%	17%	20%	9%	2%
Sharpness, Lucidity Clarity of Thought	11%	7%	24%	40%	18%
Focussing on One Specific Thought	30%	10%	17%	30%	14%
Total Impermeability ("Block")	81%	5%	6%	3%	5%

It can be seen that from the gamut of cognitive responses - the most frequent reaction was that of "sharpness of thought": 58% indicated this response occurred to a great degree or a very great degree. Another cognitive response - that of "focussing on one thought" was found in a bi-polar dichotomy: 30% indicated that they did not experience such a reaction at all - as opposed to 44% who indicated that they experienced this reaction to a great and very great degree. Responses of total impermeability ("block") and lack of concentration - were reported with a very low frequency.

In an examination of differences in cognitive responses, according to different background variables, significant differences ($P<.05$) were found in two cognitive responses: "inability to concentrate" and "focussing on one thought":

"Inability to concentrate": Combatants with a lower education reported on a higher frequency of this response; 34% of combatants with an elementary education reported on lack of concentration to a great and very great degree, as opposed to 7% of combatants with a high school and more advanced education, who reported so.

"Focussing on one thought": Combatants with a lower education reported higher frequency on this response: 82% of combatants with an elementary education reported on focussing on one thought to a great and a very great degree as opposed to 37% among the combatants with a high school and more advanced education, who reported the same.

3.F. 5. Associations of Combatants in the Course of the Shelling.

Table 4 represents the various thoughts and associations that preoccupied the combatnats during the first hours of the shelling.

Table 4

Distribution of Associations During Shelling

	Not at all	To a minor degree	To a certain degree	To a great degree	To a very great deyree
The situation at home	33%	23%	14%	13%	17%
The situation in the rear	43%	25%	14%	11%	7%
The situation at the front	7%	5%	5%	40%	43%
What will happen to fortification	5%	8%	9%	17%	61%
What will happen to friends in the fortification	2%	3%	13%	26%	56%

It is clear from the above distribution that the frequent thoughts among the combatants during the first hours of the shelling were about the situation at the front (their own fortification, the front line in general and the fate of their comrades in the fortifications): Between 78% and 83% indicated that they thought about these items to a great or a very great degree. Worries about home and the rear were less frequent (between 18% and 30%).

Significant effects ($P<0.5$) were found between the associations in the course of the shelling, according to educational level and by fortifications.

According to education: Combatants with a lower education tended to think less frequently about the fate of the position and the frontline (2.6), in comparison with the combatants of higher education (3.3).

By fortification: Several differences were found between the fortifications regarding associations in the course of the sheling: the men who thought the least (in relative terms) about the fate of their fortification and the frontline in general were in Milano (2.5), followed by Mezach, and Drora (between 2.7 and 3.2). The positions in which men reported high frequency of associations on the fate of the position and the front were Botzer, Purkan, Ketuba, Mefatzeach. (Between 3.6 and 3.8). However, no relationship was found between this rank order of the fortification and any of the indications of the intensity of the attacks on the respective fortifications.

Commanders (Officers and N.C.O.s) were asked (in their interviews) about the issues which they concentrated their thoughts on in the course of the shelling:

Thoughts about oneself	Thoughts about the fate of the troops	Matters connected with the functioning of the fortification	*Other
6.9%	10.3%	61.1%	20.7%

*Other :mixed thoughts including all the issues together, or issues in the combat operational sphere.

The majority of the commanders report that their primary thoughts were on matters connected with the fortification, and its combat functioning.

3. G. The Influence of the Shelling on the Battle Functioning of the Combatants

The influence of the shelling on the performance and the overall functioning of the combatants was examined according to the following parameters:

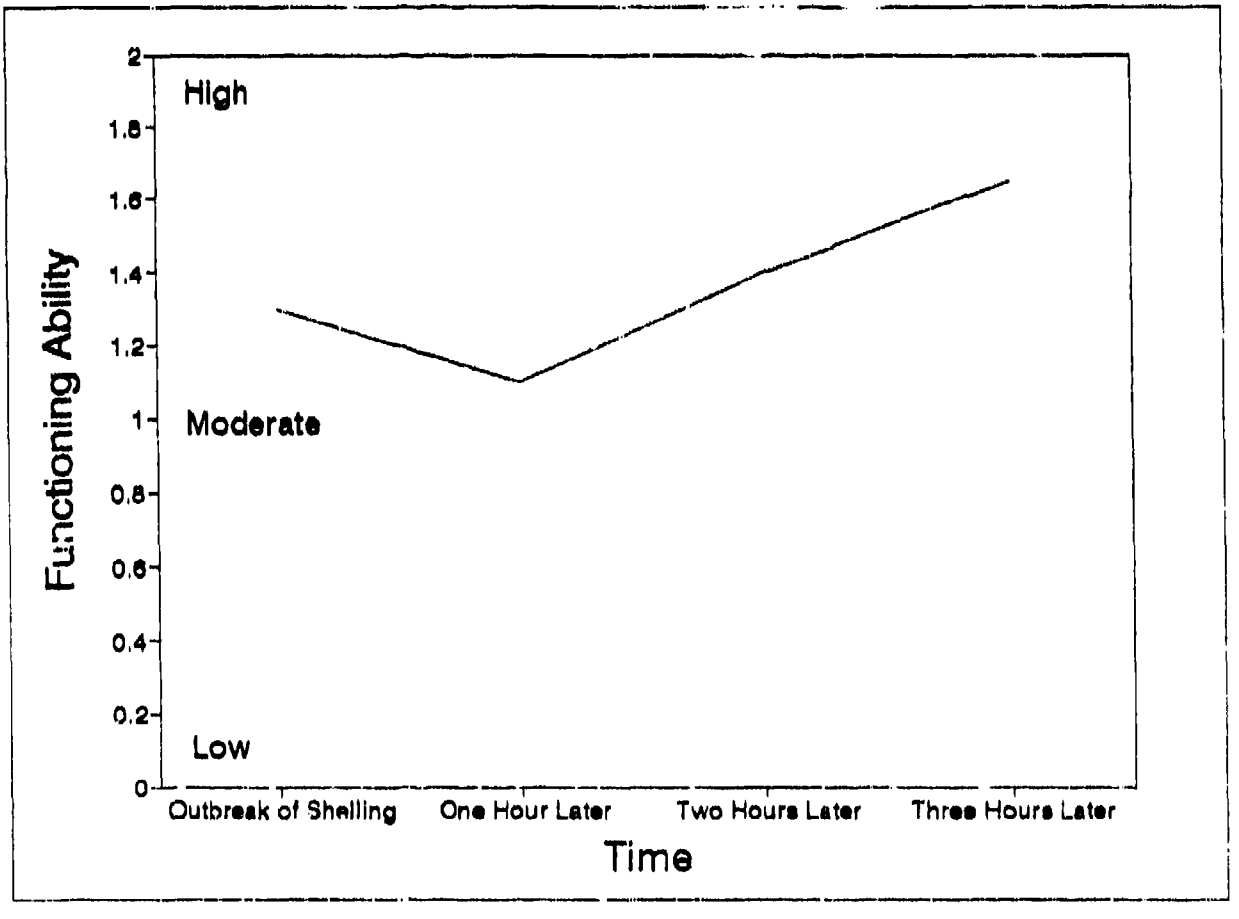
1. Combatants' ability to function
2. Charecteristic behavior
3. The quality of functioning
4. Interference with functioning
5. Breakdown pehnomena
6. Overall evaluation of functioning.

3. G. 1. The Influence of the Shelling on the Combatants' Ability to Function

The combatants were asked on their abilty to function during the course of the first hours of the shelling. Figure No. 13 describes the average curve of functioning ability over the first three hours of the shelling. From the Figure it is possible to see an initial declining tendency in the ability of combat functioning during the first hour of the shelling, followed by a

steady and moderate rise during the second and third hours of shelling. After three hours, combatants reach a level of even a higher functioning ability than their initial functioning level.

Figure No. 13: Functioning Ability of the Combatants During the First Three Hours of the Shelling.



3. G. 2. Characteristic Behavior of the Combatants During the First Hours of Shelling.

Subjects were aske to select the answer that best described the character of their behavior during the first hour of shelling. The following is the dirstribution of their answers:

Regular behavior	36%
Hyperactive behavior	24%
Slower behavior than normal	20%
Automatic behavior without thinking	17%
Paralysis - without the ability to move	4%

The most frequent characteristic behavior reported on was regular behavior (36%), followed by hyperactive behavior (24%), or slower behavior than normal (20%).

3. G. 3. Quality of Battle Functioning During the First Hours of Shelling.

Subjects were asked to assess their battle functioning during the first hours of the attack, using relative terms (in comparison to their usual level of functioning). The following is the distribution of their answers:

Functioning decreased at first and then improved	32%
Functioning was usual at the beginning of the shelling and then improved after a short time	22%
Functioning was no different than usual	16%
Functioning was better than usual	10%
Function declined considerably from the usual	7%
Functioning was as usual at the beginning of the shelling and declined after a while	5%
There was no functioning at all	5%
Functioning declined somewhat from the usual	4%

The reports indicate that the typical battle functioning during shelling was as usual or declined at the beginning - but in any case improved subsequently

3. G. 4. How the Shelling Interferes with Combat Functioning?

(Information about this aspect of the combatants' functioning was not available from combatants' questionnaires. Hence, the following is derived from commanders' interviews).

All the commanders interviewed (N=24) indicated that the shelling

caused disturbances in combat functioning. From the reports of the commanders, it emerges that the combatants' functioning in battle is impaired as a result of the physiological and psychological responses in three primary spheres:

a. Disturbances in the sphere of thinking. (metnioned 12 times)
b. Distrubances in the physio-motor sphere (mentioned 11 times).
c. Disturbances in the psycho-motor sphere. (mentioned 6 times).

3. G. 4. a. **Disturbances in the Sphere of Thinking:**

In this sphere, various cognitive disturbances were mentioned. Such disturbances are reflected in automatic reactions, lack of concentration, hysterical thinking and confusion. The commanders especially indicated that complicated command skills such as decision-making, estimating the range of shells, and the issuing of orders were mostly the skills which were impaired in the wake of the shelling:

"With each 'boom' and whistle one gets into a state of shock, and it is very difficult to give orders and concentrate, when there is a 'boom' every few seconds".

"Thinking is impaired, one turns into a robot, you find yourself in a situation of traumatic anxiety and are unable to think...There were only a few brief moments when thought was outside the boundary of automatic response ...In shelling, it is important that the noise not succeed in silencing the fragile voice of thought..." (interview with a commander).

"Uncertainty does not allow the solider to plan and prepare himself for a reaction or coping with a shell that may fall on him in any place..." (interview with commander).

"...The triumph of reason and the suppression of the fear instinct gives you a lot of mental power to continue and prove yourself..."(combatant's questionnaire).

Likewise, commanders cited an accumulative influence on functioning ability of the commander in cognitive mapping of the combat area:

"You are in a place, and then you go from it for a few minutes and then return and it has already changed, been destroyed. All the time you have to make a new map of the place you are in."

3. G. 4. b. **Disturbances in the Physio-Motor Sphere:**

Disturbances in the body-motor sphere were mentioned: combatants tend to "freeze" and "curl up", or bend over with the sound of each shell. The combatant's motions become somewhat limited:

"The body instinctively curls up...you are not tullly functioning, not in shape. Every few seconds, you come to a stop."

"With each whistling shriek of a shell, you curl up and bend you head over and get down on the ground."

3. G. 4. c. Disturbances in the Psycho-Motor Sphere:

Disturbances in the psychological sphere were mentioned: introversion, passivity, a kind of psychological "digging-in":

"Shelling is like a lottery - either it falls on your head or it doesn't - and in the long run it exhausts you..." (Interview with commander)".

"To cling to the corner of the position, to wrap yourself up, to be as small as possible and as close to the ground as you can, as if you want to disappear completely..." (interview with combatant).

3. G. 5. Breakdown Phenomena

The combatants were asked to indicate to what degree "symptoms of breakdown" appeared in the fortification in the course of the first hours of the shelling.

The following are frequencies of breakdown symptoms as reported by combatants:

	Low	Medium	High
Refusals to obey orders	89%	11%	--
Desertions	80%	15%	5%
Not reporting for duty	88%	9%	3%
"Bluffing"	64%	26%	--
Hysteria & panic	56%	37%	8%
Paralysis	65%	20%	14%
Battle Shock	76%	22%	2%

From the large pool of potential breakdown symptoms in situations of combat stress - combatants reported on a low frequency across the gamut of reactions. Especially rare were phenomena of refusing orders, and not reporting for duty. Two reactions found relatively more frequently were paralysis and hysteria (or panic).

No relationship was found between reporting on these phenomena and overall evaluation of the functioning of the fortification.

3. G. 6. Overall Evaluation of Personal and Fortification Effectiveness:

The combatants were asked to evaluate their personal functioning and that of the fortification as a whole, during the course of these hours.

	Poor	Not so good	Good enough	Good	Very Good
Overall evaluation of personal functioning	4%	12%	34%	33%	17%
Overall evaluation of fortification functioning	4%	9%	28%	29%	30%

In general, there is a tendency to evaluate the functioning of the fortification better than the personal functioning: 50% evaluated their personal functioning between 'good' and 'very good', compared to 59% who evaluated the functioning of their fortification at this level. As expected, the correlation between these two evaluations is positive and relatively high. ($r=.53$ $P<.05$).

3. G. 7. Influence on Combatants' Functioning and Background Variables

What is the relationship between a combatant's behavior in battle and his background characteristics? What makes the difference between an effective soldier (during heavy bombardment) and a non-effective soldier? From the commanders' interviews (N=24) we could derive background variables that distinguished highly-functioning soldiers from poorly-functioning ones:

Background Variables of the Soldier	Number of times cited
Personal characteristics (character, personality)	17
Combat experience/training	11
Role: soldier or leader	6
MOS type: services\combat	6
One's own unit	2
Age	1
Problems at home	1

Based on the Commanders' views, the most significant reason why certain soldiers functioned better than others was due to their having a "stronger personality".

Likewise, commanders connect the better functioning of the different combatants with the fact of their being **experienced** in battle or in training, or being **combat** soldiers (as opposed to being service or support troops), and to the fact of the soldier having a role with responsibility towards other soldiers, i.e.: a **command** role of any type.

The positive influence of the very fact of a command role on coping with the shelling also finds expression in the answers of the commanders in the questionnaire.

In reply to the question "Did the command role help or hinder coping", the responses, were as follows: (NCOs and officers only; N=41).

The Command Role Helped	The Command Role Hindered	Other*
80.8%	7.7%	11.5%

*both helped and hindered.

3. H. <u>Calming Factors at the Time of the Massive Shelling</u>

What calms combatants during a massive artillery shelling? What helps them to function better?

The following factors were indicated by the subjects as calming:

Calming Factors	%
Faith in the IDF	62%
Contact with the other combatants	52%
Confidence in my ability to function	47%
Confidence in the strength of the fortification	31%
Confidence in the commander of the fortification	21%
Contact with the commander	18%

The three most calming factors found are first and foremost (62%) faith in the IDF, followed by the connection with other combatants (52%), and then self-confidence (47%).

Interestingly enough, leadership as a calming factor comes relatively low: Even if one combines the two lradership items ("Confidence in Commander of the Fortification" and "contact with the Commander"), it is still 39% who indicated this as the most calming factor - ranked after the three other calming factors.

Commanders were also asked separately on the factors calming combatants during the artillery shelling. Their answers were classified in three categories:

A .al Factors

	Number of Times Cited
Contact with other combatants/ solidarity, support	11
Contact with the commander	7
Encouragement and raising morale	5
Connection with the rear	1

B. Factors Related to Information and Trust

Critical information about what is happening	8
Trust in the commander	6
Faith in the strength of the fortification	3
Belief in the justness of the war	2
Faith in God	1

C. Functioning Factors:

Preoccupation in combat-related technical or social activities	11
Automatic functioning based on practice and previous previous training	5
Standard Operation Procedure (SOP)	4
Observing other IDF forces operating in the area	3

From the reports of the commanders it emerges that the most significant calming factors were:
The trust and connection with the commander (13), the connection

with other combatants (11), being involved in any activity at all (11), and vital information about what's happening (8).

From a comparison between the interviews with the commanders on the one hand, and the questionnaires of the combatants, on the other hand, it appears that while the soldiers cite their faith in the IDF and the contact with comrades as primary calming factors, the commanders emphasize the trust in the commander and the soldier's dependence on him - especially receiving positive reports, encouragement and raising morale.

3. I. Long Term Influences on the Lives of the Combatants.

In an analysis of the long term influences of the shelling experience in the strongpoints of the Bar-Lev Line, we categorized the influences into five spheres, as follows:

* Difficulties in returning to civilian life and ways of of coping with these difficulties.
* Influences on decisions in life.
* Influences on commitment to the State.
* Influences on well-being.
* Post-traumatic symptoms.

3.I.1. Difficulties in Returning to Civilian Life.

The folowing is the distribution of subjects' answers to the question "How difficult was it for you returning to civilian life, after the war, in each of the following areas?"

	Very Difficult	Quite Difficult	Not So Difficult	Not at all Difficult
In Work	11.1%	20.6%	23.8%	44.4%
In Studies	9.8%	12.2%	24.4%	53.7%
In Relations with Spouse	8.3%	3.3%	21.7%	66.7%
In Family Life	5.9%	11.8%	17.6%	64.7%
In Relations with The Children	5.4%	5.4%	10.8%	78.4%
In Social Circles	-	14.1%	17.2%	68.7%
In Continuation of Regular Army Service (for those who were not discharged)	14.3%	19%	4.8%	61.9%

It can be seen that the main difficulties were in the work sphere (32% reported that it was quite difficult or very difficult to return) and in continuing studies (22% reported that it was quite difficult or very difficult to return). Among the soldiers of the regular army (who continued their military service after the war), 33% had difficulties in the continuation of their regular service.

3. I. 1. A. Ways of Coping with the Difficulties

The subjects were asked about their modes of coping in the period after the war. (The numbers indicate the percentage of those responding that they used each one of the following ways of coping.):

Discussing their experiences with others	60%
Focussing on work	29%
Helping others	27%
Withdrawal, turning into oneself	23%
Hobbies	23%
Making future plans	22%
New occupations	19%
Search for others who experienced the same	18%
Writing and painting	10%
Turning to religion	7%
Turning away from religion	7%
Turning to a sect or cult	2%

From this distribution of the subjects' ways of coping, it emerges that the most frequent modes the combatants made use of upon their return to civilian life were : discussions about the experience (60%); focussing on work (29%); help to others (27%); occupied with hobbies (23%); and self-absorption (23%). It seems that coping with post-war difficulties can take the direction of either socializing and sharing with others, or focussing on one's self and one's work.

3. I. 2. Influence on the Timing of Important Decisions in Life.

Combatants were asked on the influence of their participation in this event on the timing of important decisions in their lives.

	Postponed	Did Not Change	Advanced
Birth of Children	-	73.6%	26.4%
Marriage	7.4%	77.8%	14.8%
Trips Abroad	11.5%	82.7%	5.8%
Beginning of Permanent Work	9.6%	86.5%	3.8%
Leaving their Parents' Home	3.9%	88.2%	7.8%
Beginning of Advanced Education	3.8%	88.5%	7.7%
Studies Abroad	4.3%	95.7%	-

The most prevalent influencence on the timing of decisions in life had to do with advancing the time of having children (26%), the advancing of marriage (15%), and the postponement of trips abroad (12%). Leaving the parents' home and starting advanced education were also effected to some degree (8%), by war experiences.

3. I. 3. Influence on Commitment to the State.

The subjects were asked about the influence of the event in the following spheres:

	Increased	Did Not Change	Weakened
Faith in the ability of the IDF to guard the security of the State of Israel	23.1%	42.3%	34.6%
Willingness to fight in coming wars	13.9%	60.8%	25.3%
Willingness to Live in Israel	34.2%	58.2%	7.6%

The most frequent response, in all the above spheres, was that the war did not change the level of commitment to the State or to the military. However, while the war experience strengthened -

more than weakened- the willingness of the Bar-Lev Line veterans to live in Israel, it had a reverse effect on the other aspects of commitment: A higher number of combatants reported that the war weakened their confidence in the IDF and their willingness to fight in future wars - as compared to those who felt the war had made them more committed in these spheres.

When analyzed by background variables, only the ethnic-origin variable came close to a significant effect ($P<.06$): For combatants of mixed origin and "Ashkenazi" origin, the sense of commitment to the State andto the army was relatively weakened (2.4 and 2.7 respectively). The sense of obligation to the State of combatants of Oriental origin was less substantially weakened (2.2).

3.I.4. Influence on General Well-Being

Subjects were asked about the possible influence of their participation in the Bar-Lev Line battles, on their current general well-being. Well-being was assessed by six items - three of them deal with general life characteristics of the combatants; the other three items focus on the combatants' mood and general feelings.

The following tables present pecentage distributions of combatants' answers on these six items:

3. I. 4. a. In general, how do you view your life?

Very good life	22.6%
Good life	66.7%
Life is not so good	8.3%
Life is not good at all	2.4%

It is quite apparent that the majority (almost 90%) of the combatants perceive their lives, currently, as good, or very good.

3. I. 4. b. Was your life up to this point interesting or boring?

Very interesting	Interesting	Not so interesting	Boring
19.0%	71.4%	8.3%	1.2%

The majority of the combatants reported that their lives up to this point had been interesting and very interesting.

3. I. 4. c. **Is your life "stormy" or quiet?**

Very Stormy	Stormy	Somewhat Quiet	Quiet
3.6%	19.0%	59.5%	17.9%

Most of the combatants reported that their lives are somewhat quiet and very quiet. About 1/5 of the combatants report a stormy life.

3. I. 4. d. **The Prevalent General Mood**

Very Good	Good	Not so good	Bad
18.3%	78.0%	3.7%	-

Almost all of the combatants report that their prevalent general mood is good. Not one combatant reported on a bad prevalent general mood.

3. I. 4. e. **To what degree do you feel nervous?**

Very Nervous	Nervous	Not So Nervous	Not at all
3.6%	22.6%	52.4%	21.4%

Most of the combatants report that they generally feel nervousness to some degree (very nervous, nervous or not so nervous). Only 1/5 of the combatants reported that they don't feel nervous at all.

3. I. 4. f. **To What Degree Do You Feel Your Age?**

Younger than my age	My Age	Older than my age
51.2%	42.9%	6.0%

Almost all the combatants (94%) report that they feel younger than their age or their actual age. Only a few feel older than their age.

From the reports of the combatants on the general well-being of their lives, it emerges that the majority view their lives as good, interesting, and relatively quiet. About one-fifth report that their lives are stormy. Furthermore the combatants' reports on their personal feelings show that they generally feel in a good mood, and younger than their ages or at their ages. Besides this, it is interesting to note that about 3/4 of them report on feelings of nervousness in various degrees.

Certain diffrences were found with regard to components of the general well-being of the combatants - depending on ethnic criteria: Combatants of Oriental origin in comparison to those of

Ashkenazi or "mixed" origin, report on higher level of nervousness (3.2 compared with 2.7 respectively; P<0.5).

The long term influences of the shelling were also found related to the variable "level of soldiery". In our survey, the level of soldiery of the combatant is composed of the following variables: Does he serve in the function in which he was trained?; Does he identify with his role as a combatant?; Is he familiar with the sector and the enemy?; Is he sufficiently trained for his function?; and is he experienced in combat? The results showed that the level of soldiery moderates the long term influences: The higher the level of soldiery of the combatant was, the less vulnerable (according to the combatants' reports) he is in general well being, and the fewer pathological post-traumatic symptoms encountered - such as depression, anxiety, use of drugs and alcohol. (P<0.5).

Finally, general well-being and "stormy" life were found related to a certain fortification characteristic: Significant correlations were found between the fortification's level of readiness and preparadness and its combatants later well-being (R=.29; P < .05) and "stormy" life (R=.25; P<.03).

3. I. 5. **Post-Traumatic Stress Disorder (PTSD) :**

The subjects were asked about possible experiences from among seven symptoms characterizing PTSD. A factor analysis based on their answers to this question divided the symptoms into two categories:

Pathological Symptoms : depression, anxiety and use of drugs and alcohol.

Disturbance Symptoms : dreams and nightmares, sensitivity to noise, memory difficulties, sleep difficulties.

Among all the Bar-Lev Line combatants the following Post-Traumatic Stress Disorder symptoms stand out:

46% report on <u>sensitivity to noise</u> (among them 64% with a great and very great frequency)

30% report on <u>dreams and nightmares</u> (among them 30% with a great and very great frequency)

22% report on <u>sleep difficulties</u> (among them 41% with a great and very great frequency)

17% report on feelings of <u>anxiety</u> (among them 8% with a great and very great frequency)

16% report on <u>concentration difficulties</u> (among them 27% with a great and very great frequency)

13% report on feelings of <u>depression</u> (among them 36% with a great and very great frequency)

4% report on consumption of <u>alcohol</u>

The most reported symptom according to the subjects was sensitivity to noise (46% reported that they are affected by this symptom today). Furthermore, the frequency of this symptom is relatively high. Dreams and nightmares are also reported by 30% of the subjects, although at a lesser frequency. Phenomena of sleep difficulties and a feeling of anxiety were reported but at a lesser degree (22% and 17% respectively).

In this sphere of post-traumatic stress disorders, differences were found among the combatants according to origin, education and fortification:

By origin: Combatants of Oriental origin report on fewer (1.6) disturbance symptoms (difficulties in sleep, concentration, sensitivity to noise and dreams and nightmares) than combatants of Ashkenazi origin (1.8) or "mixed" ancestry (2.0); ($P<.05$).

By education: In both the disturbance and the pathological symptoms, a general tendency exists ($P<0.5$) according to which combatants with a higher (post-elementary) education level reported on more symptoms (1.9 in both categories) than combatants of a lower educational level (1.6 in both categories). The education variable constitutes 18% of the variance of the PTSD symptoms.

A regression analysis was performed, in which PTSD symptoms served as the dependent variable. A very strong relationship was found ($R=.78$; $P<.0001$) between the pathological symptoms (anxiety, depression, use of drugs and alcohol) and occurrence of critical events before the outbreak of the war (economic problems, death of a family member, trouble with spouse, etc.).

Another relationship was found ($R=.20$; $P<.06$) between the severity of the attack on the combatant's fortification and the subsequent occurence of disturbance PTSD symptoms: The more severe (in terms of loss and casualties) the attack on the position was - the more frequently symptoms were reported such as sensitivity to noise, nightmares and sleep difficulties, from combatants of that position.

In general, then, it may be said that combatants of Ashkenazi and mixed origin, those who have higher education, who have endured critical events before the war and who were members of the fortifications which were attacked most severely - were the ones who reported a higher level of PTSD symptoms.

4. Discussion

It is a difficult task to sum up the entirety of the experiences undergone by the combatants of the fortifications during the first three hours of the Yom Kippur War. Nevertheless, on the basis of the data collected in this study, it is possible to answer several important questions such as: in what ways were the combatants affected by the shelling? How surprised were they? What surprised them? What were they afraid of? How did they react? What helped them to cope with these stresses? And what were the long term influences of this traumatic event?

In analyzing and interpreting the vast body of findings in this study, we will make use again of the different categories of our conceptual model (see Fig. 1 in the introduction chapter). Hence, the discussion on the results of the research will be held in the following areas:

4.A. The combatants' appraisal of the situation.

4.B. Frightening factors in the massive shelling.

4.C. Combatants' responses to the massive shelling.

4.D. The influences of massive shelling on the battle functioning of the combatant.

4.E. Battle conditions and unit factors.

4.F. Individual factors and background variables of the combatant.

4.G. The influences of massive shelling according to the differences between fortifications.

4.H. Calming factors on the combatants during the massive shelling.

4.I. The long term influences of massive shelling on the combatant.

4. A. The Combatants' appraisal of the Situation.

The situation appraisal made by the combatants of the Bar-Lev Line was affected by two main points: On the one hand there was the actual situation. Realistically, it may be said that the shelling was truly very massive along the 175 km. long line of fortifications - and from the reports of the soldiers and commanders it was very frightening.

On the other hand, the appraisal was also affected by prior knowledge and information. It was based on the previous IDF experience in relatively short and local massive shellings, and on the confidence in the Israeli armored corps and airforce as well as reliance on the previous military plans ("Dove Cot"). Furthermore, to the best of the soldiers' knowledge, there was no

expectation of an all-out war. No one along the Israeli side of the Suez Canal really anticipated what was bound to happen. As a result most of the Israeli combatants held a quite moderate appraisal of the situation during the first three hours of the war. This is reflected in the following citation:

"...At the beginning of our reserve duty, we were concerned because we saw Egyptian forces, but we were told that this was just an exercise. So we got used not to regard our observations as war preparartions ...even when the shelling began, and in spite of the facts now being known in Real Time - I still din't evaluate their true significance, that this was really a cataclysmic war. Due to our distorted expectations we continued to interpret the happenings as a 'local' incident..." (from an interview with a commander).

The frightening effect of the shelling was thus "moderated" by the appraisal that was made on the cognitive level; and consequently, in spite of the fact that the shelling was very frightening - the situation was generally not regarded as terrible or apocalyptic. Thus it is understandable how we find two dichotomous reactions among the combatants:

On the one hand an emotional reaction of fear from the unexpected intensity of the shelling (for example, 58% of the combatants reported that they felt they were in danger of being wounded or killed in this shelling); On the other hand, there was the "knowledge" that this was just a limited 'local' event and that the IDF would easily handle it. The common result of these two attitudes led to the overall 'mixed' appraisal that the situation was "really firghtening" but "not so terrible" and that "there is a way out of it". The following quotations (from the original de-briefings) clearly demonstrate this phenomenon:

"...In the first few seconds I was in shock and didn't know what was happening to me... and then I looked at my watch and waited all the time, and said to myself: "maximum - five minutes before I hear the sound of our planes bringing an end to this" (from a military de-briefing).

"It was an awful bombardment, but I don't remember panic. We were confident ....that soon the tanks will arrive and we will wipe them out" (from a de-briefing).

Interestingly, in our analysis of the emotional responses to the massive shelling (see paragraph 3 in the discussion), we again find this dichotomous distribution - between the feeling of helplessness on the one hand, and the sense of self-confidence on the other.

4.B. **Frightening Factors in the Massive Shelling :**

Among the various means of firepower used against the combatants during the shelling, the most frightening one was **air attack**. In descending order this was followed by steep trajectory weapons (mortars) and shallow trajectory weapons (cannons and tanks). A less frightening factor was machinegun fire.

Part of the explanation for this rank order has to do with retaliation options: While the fortifications were equipt to respond to machinegun fire and to most other shallow-tragectory weapons, they were not at all able to retaliate air attacks or heavy mortar bombardment. Another explanation may be found in the combatants' reports about the frightening elements in the diffrent types of arms:
The combatants noted that the most frightening elements were the destructive power of the firing weapons and their noise intensity. These two particularly apply to airplanes and to steep trajectory weapons.
Among the frightening factors in the massive shelling the fear of destructive power stands out. This fear includes the anxiety of being hit personally as well as fearing a hit on the fortification.

Does Noise by Itself Instill Fear?

Half of the commanders (12) cited in their interviews that the very fact of the noise , the "boom" effect, constitutes a serious fear factor, independently of the results of the actual damage.

Thus, beyond the noise itself as a terrifying element, it also becomes a "conditioned stimulus" -if we take into account that combatants know that in the wake of the noise comes the actual blow. So over time the combatants develop a fear of the stimulus itself (the noise), as if it itself is the actual blow. In the words of one commander: "This shakes up your nerves because you know that the 'boom' is not somebody playing a musical instrument but something trying to strike you..."

4. C. Combatants' responses to the Massive Shelling.

The combination of all the stress factors and the cognitive appraisals of the combatant resulted in a variety of responses: emotional, physiological, social and cognitive (as well as associations).

4. C. 1. Emotional Responses.

The most <u>frequent</u> emotional reactions in the course of the massive shelling were self confidence (40%), helplessness (39%) and excitement (34%).
Reactions of anger, fear, and confusion were reported at a lower frequency. Responses of depression, nervousness, panic and weeping were reported at a very low frequency.

Regarding the <u>intensity</u> of the various emotional feelings, the following ones were ranked as the strongest: fear (31%), helplessness (24%), self confidence (17%).

On the surface, it seems strange that the two most frequent feelings were **self confidence** and its almost absolute opposite - **helplessness**. However we do know from studies on stressful situations that in cases like these there may be contradictory feelings at the same time. Furthermore, we found that helplessness was reported primarily by enlistee combatants, while self confidence was more prevalent among commanders.

Nevertheless, this finding does not explain why some combatants in a given situation sense helplessness while others (with a similar background) feel self confidence.
One possible explanantion can be that the combatants ascribed to the term "self confidence" a meaning that is not in a personal sense (self confidence of the combatant himself) - but rather "the confidence in the IDF", as an army they belonged to and thus, they reported a sense of self confidence. They meant that they felt completely confident that the IDF would defend them and rush to their aid in case of need.

This is clearly reflected in the verbatim material of the interviews and the military de-briefings:

"From the first moment we had complete confidence in the IDF and the whole time it seemed to us that it was just a matter of time before they would reach us..." (from a military de-briefing). "...We lived on the "victory albums" and had been brought up to believe in the great IDF..." (interview with a commander).

4. C. 2. Physiological Responses

Among the entirety of possible physiological responses, the most reported by the combatants were heart throbs and dryness in the mouth. About 1/3 of the combatants indicated these reactions as quite prominent in the course of the shelling.

Though the physiological responses are not so extremely pronounced in the combatants' reports, they do seem to be strongly related to the individual's appraisal of the situation: The more adverse the combat situation was perceived by the combatant - the more prevalent were his physiological responses.

4. C. 3. Social Responses:

No outstanding social reaction was especially reported by the combatants and there were no significant differences in this regard, by various background variables.

On the other hand it was found that a majority of the officers and NCOs noted that they were not involved at all in any social activity but rather in performing tasks connected with the execution of their roles (such as giving orders, gathering information, thinking, etc.).

The importance of activity - <u>any</u> activity - seems to be predominant under those conditions, perhaps even more than that of social support.

It is interesting to note that only a few among the combatants reported that at the time of the shelling they preferred to hang on to the commander. This finding resembles the finding that will be described later on dealing with the calming factors at the time of the shelling: Also there, combatants reported that what they were inclined to do and what especially calmed them was

contact with buddies - and not necessarily with the commander. This is in opposition to the opinion of the commanders who indicated in their interviews that the primary calming factor for the combatants had been contact with them.

4. C. 4. Cognitive Responses:

From among the spectrum of the cognitive responses - the most frequent one was of **sharpness of thought:** Close to 60% cited it as the most outstanding reaction.

Commanders related this reaction to the "instinctive" alertness that arises in the wake of a survival situation - as the shelling engendered. Here is one example:
"I became a kind of "animal" - sharpened senses, alertness, concentration, flexibility, and speed of reaction"...(interview with commander).

An interesting phenomenon emerged regarding another cognitive responses - that of **focussing on one thought** : It seems that this reaction primarily characterized combatants with a low education. On the other hand, combatanst with a high level of education almost never experienced this.

Reactions of a mental "block", impermeability and lack of concentration were almost never reported.

4. C. 5. **Associaitons During the Shelling :**

What did the combatants think about during the shelling? What were their principal preoccupations? What did they worry about?

Generally, it may be said that during the shelling, the principal thoughts of the combatants were devoted to the front: The great majority indicated that they were concerned about the fate of the fortification or their comrades in the fortification, or that they were thinking about the fate of the entire front. Worrying about the home and the rear were rarer and absorbed less than 1/3 of the combatants.

Differences in the type of associations and thoughts at the time of the shelling are connected with the combatant's level of education: The higher the education level of the combatants, the more they tended to engage in thoughts about the fate of the front and the fortification. Differences in this regard were also found between the different fortifications - differences apparently connected with the proximity of these fortifications to the area in which combat conditions were difficult.

4. D. **The Influence of Massive Shelling on the Battle Functioning of the Combatant**

The "battle functioning", or the <u>performance level</u> of the combatant is, after all, the ultimate purpose of this analysis. Because of the heterogenity of combatants' MOS's and for various other reasons, there was no way to clearly assess the performance level of the different combatants, at different fortification,

during the first hours of the battles on the Bar-Lev Line. Instead, we referred to several aspects of "battle functioning": Chatacteristic behavior; quality of functioning (or performance); and overall functioning ability.

Characteristic Behavior: The distribution of the combatants' answers points out a "normal ditribution" of their behavior during the shelling. The most common behavior is the ordinary behavior of the combatant. Less frequent is slower behavior or faster (hyperactive) behavior.

Quality of Functioning: Here too there is no pronounced deviation from the norm. The majority of combatants report on a customary level of performence or on a certain decrese in the first hour followed by recovery and improvement in the next two hours.

Overall Functioning Ability : The overall functioning curve is characterized by a decrease in the beginning and substantial improvement later on.

Commanders indicated three primary spheres in which combat ability was adversely affected: the cognitive, physio-motor and psycho-motor spheres.

In the cognitive sphere, the shelling primarily influenced command skills such as decision making, tactical evaluations,distance estimations, etc. - which are the critical skills for combat leadership.

In the physio-motor sphere the problem was simply in body movements and in locomotion. One has to "fight his own body" in order to move from one point to another, under the shelling conditions.

The psycho-motor sphere is, in a certain sense, an extension of the previous one: the cumulative stress sometimes causes withdrawal within oneself, isolation and a mental "digging-in".

4. E. Battle conditions and Unit Factors.

Commanders and soldiers indicate that battle functioning is mostly affected under the following combat situations:

1. In the first two hours at the beginning of the shelling.

2. After a pause, at the beginning of every renewed shelling. (a strong but short influence).

3. When the situation of the unit is difficult in terms of casualties, loss of equipment and morale.

4. When the combatants are situated in a closed place in a static (passive) position.

4. E. 1. The Influence of Massive Shelling During the First Two Hours:

Commanders indicate that the extent of the psychological influence of massive shelling (as impeding combat functioning) is especially strong during the first few hours (between 60% and 90% of the intensity of the influence); the influence diminshes afterwards drastically to an intensity of 20% to 30%. It is impossible, however, to define a precise formula regarding critical time span of the shelling effect.

4. E. 2. The Influence of Massive Shelling After a Pause (Renewed) :

Notwithstanding the drastic decline in the extent of the shelling's influence after the first few hours, soldiers and commanders indicated that in spite of the adaptation, each time a new shelling began there was a renewed shock. The time to recover from the renewed shock was much less than in the first shock and lasted only for a few minutes. Here is a typical quotation in this regard:

"During every 10 to 15 minutes of renewed shelling - there is again confusion and fear" (interwiew with a commander).

4. E. 3. The Influence of The Massive Shelling When the Situation of the Unit and its Morale Were Difficult:

The only fortifications surviving a week under the bombardments and repeated attacks were the two - Mezach and Budapest. From interviews with commanders in these two positions, a similar picture emerges:
The more the situation of the fortification deteriorated from the point of view of wounded, equipment loss, lack of ammunition and morale - the more the bombardment had a significant effect in lowering the combatants' fighting spirit - almost to the point of their breakdown. Here are two examples:

"The shelling did not cause much damage or wounded - but it destroyed morale. Morale continually decreased - and it was depressing. If it had not been for the shelling, we woudl not have surrendered..." (interview with a commander).

"Masisve shelling has a significant effect only when there is no longer faith, but rather pessimism, in the possibility of getting out of the situation and when the siege under shelling seems endless" (interview with a commander).

4. E. 4. The Influence of the Massive Shelling on the Combatants - in a Closed Place and in a Static Situation:

From the combatants' reports we learn that staying inside a bunker has various consequences: While during the first period

(the first one or two hours), the combatants felt relatively secure inside the bunker, the self-containment in the bunker after a while increases the sense of helplessness - in comparison with staying outside the bunker.

From interviews with commanders, it also emerges that the stay in the bunker (during the shelling) is more frigthening than being located outside, and increases the sense of helplessness and insecurity even more. Commanders indicated that inside the bunker the effect of the shelling is amplified because the sounds of the shelling receive a greater intensity and due to the shaking of the bunker walls and the dust. In addition to this, the sense of helplessness increases due to the crowded stay, in dim light, without true information about what's happening on the outside:

"...Each shell that fell shook the bunker, shook dust and appeared as a direct hit... Standing (uncovered) in the fire position is much less frightening than the stay in the bunker." (from the combatants' questionnaire).

"Being located in the bunker intensifies and strengthens the tendencies towards fear, panic, and paralysis... it strengthens anxiety..." (interview with a commander).

"The bunker creates a feeling of a prison, depression and helplesness....like rats in a cage". (interview with a commander).

"In conditions like these it is most frightening for those who are not fighting, who are forced to nevertheless remain below in the bunker: they don't know what's happening, nor are they active, and they are anxious that they might be forgotten...(from an interview with a commander).

"The guys in the bunker were alarmed because of the uncertainty...the moment they emerged outside, they calmed down." (interview with a commander).

"Above (outside the bunkers), in spite of the fact that it is objectively more dangerous - it is less frightening than below (in the bunker) - because there is uncertainty and time for thoughts..." (from an interview with a commander).

In addition to these commanders' verbal testimonies concerning the "double-edged" protection provided by the bunkers, we also received empirical support from the analyses of the combatants' reports: In a discriminant-analysis of two sets of curves ("inside the bunker" and "outside the bunker" showing the intensity of the combatants' strongest feelings during the massive shelling (fear, self confidence and helplessness), we found findings supporting the claims of the commanders:

Among the combatants who stayed in the bunkers for some time, the level of fear and helplessness continued to be high also beyond the first hour, while among the combatnts who stayed outside the bunkers these feelings decreased or were moderated during the second hour of the shelling. Likewise, the self-confidence of the combatants who stayed in the bunkers declined, while the opposite tendency was noted for those on the outside.

In this sense, a gap exists between the tactical-operational preference supporting, as it were, that combatants remain in bunkers - and between the more negative psychological influences affecting the combatants staying inside the bunker. These psychological influences stem from the uncertainty, inactivity, the sense of lacking control and the inability to distract oneself from the frightening thoughts and associations. In a prolonged shelling then, although the combatant is objectively protected (by the bunker) - he is thus exposed more to the psychological damage of massive shelling.

4. F. Individual Factors and Combatants' Background Variables:

Whom primarily among the combatants does massive shelling influence? From an analysis of the commmandrs' interviews and the questionnaire data, it emerges that there are four principal reasons for the inter-personal differences in the cobatants' functioning:

1) Background and personality differences.
2) Difference in level of training and combat experience.
3) Differences in rank: officers vs. enlisted men.
4) Differences in combat roles.

4.F.1 Background and Personality Differences:

From the findings of the questionnaires, it emerges that married combatants reacted with greater sensitivity to the noise factor in the shelling - in comparison with single men; Combatants with low education reported on more frequent physiological influences and greater lack of concentration and thoughts on the rear - in comparison with those of a high education.
About 3/4 (17) of the commanders also referred to character and personality variables. In their own words:

"Whoever is a man is a man; a "macho is a macho"...(interview with a commander).

"The very fact of the (combat) situation is the moment of truth: There is no time for bluffing - in this situation a person's character is revealed. All the "bullshit artists" are revealed as weak..."(interview with a commander).

4.F.2 Combat Experience and Training:

From the findings of the questionnaires it emerges that soldiers with a higher level of soldiery (i.e. felt better trained; served in same occupation as trained; was familiar with terrain and enemy positions; had been under shelling before) showed better coping (in terms of subjective perception of the situation, physiological and other reactions) with the shelling situation - in comparison to those of a lower level of soldiery.

Similarly, about 1/2 (11) of the commanders indicated that the functioning of those combatants with combat training and prior military experience did not drop far below the usual - while non-

combat soldiers (support troops in communications, ordinance, etc.) or those without previous military experience suffered a substantial loss of functioning.

4.F.3. **Differences by Ranks :**

From an analysis of the strong - feelings curves by ranks (officers vs. enlisted men), clear differences were found in self confidence and the feeling of fear during the early hours of the shelling:

For officers, the sense of self confidence gradually rose, while that of fear declined, during the early hours of the shelling. For enlisted men, on the other hand, the opposite pattern occured: there was an initial decline in self confidence and a continuous rise in the sense of fear.

4.F.4. **Differences by Command Role:**

Beyond the differences just mentioned between officers and enlisted men, differences were also found in battle functioning between combatants who had a command role and those who did not have any role whatsoever.

In answering the question about the influence of a command position on coping with the shelling, 81% among the officers and NCOs responded that the very fact of their leadership role helped them to cope better with the shelling.

This finding was also demonstrated in the interviews carried out with the commanders:
From an a analysis of these interviews (as well as the open answers in the combatants' questionnaires), it emerges that the command role has an "innoculation effect" against the psychological influences of massive shelling; This applies to both officers and NCOs:

Over 80% of the commanders indicated that the very fact of the command post helped them to cope with the stressful situation. In their interviews the commanders indicated that the leadership role and responsibility for their soldiers had a great significance on the quality of their functioning in situations of stress.

"I had to function and overcome myself. I knew that everyone was looking at me - and that helped me to function..." (interview with a commander).

"The concern for the other soldiers in a certain sense helped me to forget my own situation." (from an interview with a combatant).
"From hearing my own voice and the need to convince someone else, I was able to feel the intonation of my voice and better control myself". (from an interview with a combatant).
"When I saw death staring me in the face, I saw the bullets flying and imagined that in a moment I would be nothing, I said to myself: Get the Hell out of here! but the very fact that you are somebody, somebody with an obligation, means you have to remain and give your men an answer and not just to yourself..."

(interview with a commander).

The commanders noted that the leadership role affected their thought patterns: While the shelling situation forced the soldeirs to struggle with fear - the same situation forced the commanders to struggle with problem-solving issues: What to do, how to deal with the situation, how to take care of his men, etc. In the words of the commanders, the "possibility" to deal with such dilemmas removes the fear factor in the shelling itself.

"...The issue is not `fear' - because everyone is afraid. The issue is your ability to overcome the fear... and here, there is a difference between a soldier and a commander, because the former is preoccupied with fear while the latter is preoccupied with "what to do about it and what answers to give in this matter."

4.G. The Influence of the Massive Shelling According to Differences between the Fortifications :

Using a statistical analysis of the Partial Order Scalogram Analysis (POSAC) type, we characterized the fortifications according to a collection of parameters: Readiness - level of the fortifications for shelling; the duration of the shelling; intensity of the shelling;, identification of enemy forces; attack on a neighboring fortification; attack on the fortification itself; casualties caused by the shelling; type of casualties (wounded, killed); casualties among leaders.

In the process of this analysis, the above parameters clustered into three main dimentions:

* **Pre-shelling** - the level of the fortification's readiness and preparadness;

* **In-shelling** - the intensity of the Egyptian bombardment on the fortification;

* **Post-shelling** - the severity of loss to the fortification.

The POSAC procedure thus generated a rank-ordering of the different fortifications, according to their Pre-, In- and Post-shelling characteristics.

However, when we attempted to relate the POSAC rank-ordering to other variables, no meaningful relation was noted. Though several significant differences were found between the fortifications regarding variables such as: `fear of the shelling's destructive power', `concern for the front and the fortification', and pathological symptoms of PTSD - we could not prove any satisfactory explanation for these differences.
In other words, there was a considerable high variance between the fortifications - but, surprisingly, not according to the combat characteristcis of the fortification. It may be that the explanation is in other factors such as cohesion, leadership, etc.

Differences between the fortifications yielded, however, some relationship to long term influences of the shelling:

Combatants in the fortifications which were less prepared and ready, also reported on later more "stormy" life and on a lower lever of general well-being; combatants in the fortifications that absorbed a more severe attack in terms of loss and casualty, reported on more disturbance symptoms of PTSD, such as sensitivity to noise, sleep difficulties, difficulties in concentration, etc.

4.H. Calming Factors on the Combatants during the Massive Shelling.

Among the different calming factors about which the combatants were asked, the following ones stood out:
Faith in the IDF, the connection with other combatants and confidence in one-self. Here is an example to the important calming effect of connection with fellow soldiers:
"For the first hour and a half I was all by myself in the bunker. I ran from one entrance in the bunker to the other. I could not calm down. Afterwards, other soldiers arrived and just having them calmed me." (from a combatant's questionnaire").

Similiarly, about half of the commanders indicated the importance of the connection between combatants as a calming and reasuring factor. However, unlike the soldiers, the commanders did not emphasize faith in the IDF and self confidence as principal calming factors, but rather they stressed the importance of confidence in the commander and the connection with him.

In comparing, then, the commanders' answers with those of the combatants, it emerges that there is a gap between the conception of the commanders of themselves as a calming resource for the soldeirs - and the lower weight attributed to this by the soldeirs. This is not to say that commanders do not function as a calming factor for the soldiers in the fortification under combat stress; It is probable that in this case, in a combat stress situation of the massive artillery shelling type (when the combatants are not active and fighting but rather passive and idle) - the principal calming factor is not the commander but the connection and contact with fellow soldiers, the faith in themselves and the trust in the higher achelons (the IDF).

An additional calming factor that stood out both in the reports of the commanders and from the open-ended answers of the soldiers, was the factor of activity. Many commanders stressed that in contrast to the enforced passivity on the soldiers at the time of the shelling, energetic activity of any kind (and preferably in the combat sphere) calms the soldiers and provides them with a sense of mastery and control. Here are some examples:

"Due to the fact that a defensive battle is more difficult psychologically because the initiative is not in your hands (as a combat given), a commander must initiate activities (organize things, preparations, etc.) - in order to neutralize the element of helplessness..." (interview with a commander).

"...Whenever there was action in the position, whenever there were attempts to fire on the crossing Egypitans - it gave an illusion of energetic activity, as opposed to the sense of passivity and helplessness....." (from a combatant's questionnaire).

In addition, the commanders emphasize that the activites took on the character of strengthening the self-confidence and the self-esteem of the soldiers:

"To engage them in something productuve, to integrate them in something where they feel useful and able to utilize their knowledge, to give them a sense of success instead of a feeling of failure: If a soldier knows how to pray - let him pray, if he knows how to cook, let him cook..." (from an interview with a commander).

The soldiers themselves report that the energetic activities divert the stress and tension and thus calm one:

"Any activity would do, whether mental or physical, that takes you out of your withdrawing thoughts ..." (from an interview with a soldier).

4. I. Long Term Influences of the Massive Shelling on the Combatants.

In this part of the study - unlike in the remainder of the analyses - we refer to the entirety of the combat experiences felt by the combatants during the first week of the war. The study relates to the combatants, in this sense, as a group that underwent an extremely traumatic experience.

We will deal with the following spehers in the discussion:
1) Difficulties in returning to civilian life.
2) Ways of coping with the difficulties.
3) Influence on the timing of decisions in life.
4) Influence on commitment to the State and the army.
5) Influence on general well being in life.
6) Reports on post traumatic symptoms.

4.I.1 Difficulties in returning to Civiliam Life:

The main difficulties which the combatants reported on were in the sphere of the work cycle and returning to studies. Also the sphere of returning to the circle of friends was reported on as a source of difficulty, but to a lesser frequency and intensity. For the regular soldiers who continued their military service after the war, the relapse into routine military service posed a substantial difficulty.

4.I.2. Ways of Coping with the Difficulties :

From the analysis of the different modes of coping with the difficulties stemming from this event, it emerges that this meant foremost discussions with others on the war experience, concentrating on work, and helping others. Coping by means of finding other ways to spend time, hobbies and withdrawal were less frequent.

4.I.3. Influences on the Timing of Decisions in Life :

In an examination of the influence of this war experience on the timing of life decisions, influences were found accounting for advancing marriage and having children, and for postponing tours abroad: Between 12 and 26 percent changed their decisions in these areas under the influence of the war.

4.I.4. Influence on Commitment to the State and army :

It appears that the experiences of fighting in the unavailing strongholds of the Bar-Lev Line upset to a great degree the extent of commitment and the faith and confidence of those combatants who survived.
This is expressed in the substantialy lower percentage of them who expressed readiness to return and fight in coming wars and a weakening of the desire to live in Israel. The faith in the IDF was also affected among these combatants as a result of the war experiences they underwent.

4.I.5 Influence on General Well-Being in Life :

In general, the war experiences in the Bar-Lev Line fortifications did not substantially influence the sense of well-being of the combatants over the long range.

Bewteen 90 and 94 percent reported they presently have a good and interesting life and are generally in good mood. On the other hand there are quite a few (over 20%) who indicate that they have a stormy life or are nervous: these reports are more frequent among the combatants of Oriental origion and among the NCOs.

4.I.6. Post-Traumatic Symptoms :

The most common Post-Traumatic Symptoms among the combatants are sensitivity to noise, repetitive dreams and nightmares and difficulties in sleeping. These symptoms are more frequent among combatants of Ashkenazi origin, and among combatants with a high education.

The frequency of PTSD symptoms reported by the Bar-Lev combatants (between 4% up to 46%) is substantially higher than frequencies found in another sample, more randomly selected, of Israeli veterans of <u>three</u> (including the Yom-Kippur) wars (Desivilya, 1991).

5. Summary and Conclusions

5.A. General.

We now return back to our stated objectives (see p.9) and questions (p.13) for this research. We have looked at the psychological effects of a massive shelling on the individual (combatant) behavior and on the group (unit) effectiveness; we have searched for the stress-enhancing and stress-reducing factors; we have unravelled the main relationships between the stress factors and the combat effectiveness of the stressed individuals; and we identified the more explicit repercussions of such an event on the long-term span.

The conceptual model (Gal, 1988) which we used (see p.10), helped us in integrating and interpreting the vast volume of findings that we have accumulated. In summarizing these findings, however, we will not necessarily follow the model sequence; rather, we will present the main findings according to the original stated objectives. The next (and final) chapter will deleneate the recomendations and applications derived from this study.

5.B. Psychological and Behavioral Effects.

Our study clearly demonstrated that massive artillery shelling has identifiable psychological effects on the combatants on the battlefield.

The psychological effects of the shelling are mediated (and, to an extent, moderated) by a cognitive appraisal process which is mostly affected by existing expectations and former experiences (Lazarus, 1966). In our case, the cognitive appraisal made by the Israeli soldiers manning the Bar-Lev Line, at the break of the Yom-Kippur War, was strongly shaped by their full confidence in the IDF's capability to repulse an Egyptian attack and by their previous experience with artillery bombardments during the War of Attrition.

The frightening impact of massive shelling stems from its surprise, its intensity, its duration, the type of firepower and its frightening elements. (Dupuy et at., 1984). For the troops sheltered in the Bar-Lev Line fortifications, the most frightening means of firepower were **air attacks** (by airplanes) and **steep-trajectory** weapons (mortars). This is partially congruent with previous findings (Dollard, 1944). The most frightening elements in the bombardment were the **destructive power** of the weapon and the **noise intensity**.

These frightening factors, mediated (as we claimed) by the combatants' cognitive appraisal, produced the following range of responses: A high frequency of dichotomized **emotional responses**, i.e. enhanced self-confidence on the one hand, and helplessness and excitement on the other hand, along with an intense sense of fear. The physiological responses consisted mainly of accelerated

heartbeat and dryness in the mouth. Among the cognitive responses, sharpness and clarity of thought was noted and associations focusing mainly on the near front. No particular social responses were noted.

Among the martial skills, the ones most impaired by the shelling effect are cognitive skills (thinking, concentrating, remembering...); Motor skills are not effected that much by the bombardments.

5.C. Relationship between the Stress Factors and Combat Effectiveness.

The relationship between stress and performance is known to be non-linear. Our study is no exception in this regard. Battle functioning* was found to be affected by various combat-stress factors in a dynamic, rather than a linear, manner: Impaired combat effectiveness* was found mainly during the first two hours of the massive shelling, the first few moments of a renewed bombardment, and/or especially when unit morale declined.

Battle functioning was further impaired among combatants who stayed inside the bunkers for several successive hours, while the shelling continued. Conversley, those commanders and combatants who were busy and active outside the bunker experienced less fear and maintained their normal level of functioning - albeit the high risk of being hit.

The overall effect of the stress factors on individuals' and fortifications' effectiveness can be divided, then, into stress-enhancing and stress-reducing factors:

5.C.1. Stress-Enhancing Factors.

Following our conceptual model, we identified three categories of stress-enhancing factors operating in a massive-shelling situation:

Battlefield Factors: The surprise element in the attack; the intensity of the bombardment; its duration; the combination of bombardment with a commando attack; the severity of loss and damage to the fortification.

Group/Unit Factors: Poor combat readiness of the unit (troops and fortification); absence of a senior commanding officer (i.e. Company Commander) in the fortification; poor morale and cohesion; and long stay inside the bunkers.

Individual Factors: Lack of combat experience and poor military training; lower rank (enlisted men and NCO's); lower education level; difficulties at home (critical events at home, concerns, etc.).

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* We use the terms "battle functioning" and "combat effectiveness" almost interchangeably; however, the former implies more to individual functioning, while the latter is usually used to emphasize unit effectiveness.

5.C.2. Stress-Reducing Factors.

Here, too, the stress-reducing factors were categorized in three areas:

Battlefield Factors: Armored reinforcement (tanks stationed at, or near, the fortification); no attack following the bombardment; connection (by radio etc.) with other fortifications or with Headquarters.

Group/Unit Factors: Better preparadness and readiness; high morale and unit cohesion; contact with fellow soldiers; contact with the commander of the fortification; faith in the IDF.

Individual Factors: Soldiery level, combat experience and military training; self-confidence; being a reservist (as opposed to a conscript) soldier; Officer rank or command role.

5.D. Coping with the Massive Shelling.

Following Lazarus' classical distinctions between emotion-focused and problem-focused coping strategies (Lazarus, 1966; Lazarus & Folkman, 1984), we found two major coping strategies utilized by the combatants of the Bar-Lev Line:

The first mode of coping was an obstinate adherence to the absolute faith in the competence of the IDF, in its operational plans ("Dove Cot") and its ability to repulse any enemy attempt to take the Bar-Lev fortifications. This was coupled with the no-less-obstinate conviction that this bombardment was just another version of a "war of attrition" that had already taken place in the past. This mode of coping (based on a rationalization-denial defensive appraisal on the part of the combatants) enabled the combatants not only to control and minimize their early fear reactions, but even to enhance their initial self confidence.

The second mode of coping - and evidently the dominant one - was activity. Whenever combatants could engage themselves in any type of activity, their fear level declined, their battle functioning improved. This was especially applicable to the leaders, who were mostly involved with purposeful activities. The opposite effect was apparent among those combatants who remained completely inactive inside the bunkers and suffered extreme fear.

This finding is in absolute congruence with major lessons learned (by American psychiatrists) from WW-11, and the Korean war and further extrapolated to future possible warfares (Glass, 1956):

"Military experience strongly indicates that with the resumption of purposeful activity, fear is diminished or dissipated. It would seem that when a person responds correctly to the urgent demands of the situation, tension is discharged. On the other hand, inaction under threatening circumstances fosters the building up of fearful sensations which only inhibit further, and thus a vicious cycle of worsening noneffective behavior is established." (p.631)

Furthermore, the importance of activity as a critical coping mode in combat situations is consistent with the more general existing knowledge about the role of activity in stressful situations (e.g. Gal and Lazarus, 1975).

5.E. Psychological Consequences of the Massive-shelling Experience.

Admittedly, it is impossible to isolate the direct impact of the massive shelling from that of the entire war - when it comes to the short-and long-term influences on the combatants' lives. This provision notwithstanding, our study revealed various psychological influences reported by the combatants as consequences of their Bar-Lev Line experience.

5.E. 1. Short-term Influences.

Our subjects reported difficulties in returning to normal life immediately after the war, or to resuming their military service. Coping with these difficulties was by means of repeated discussions on the war experience, concentrating on work and involvement in altruistic activies. The war experience also affected to some degree our subjects' life decisions about marriage and children (advancing); or tours abroad (postponing). Finally, the Yom-Kippur War experience weakened the sense of commitment of many of our subjects towards Israel and its military.

5.E. 2. Long-term Influences

Nineteen years after the event, combatants of the Bar-Lev Line fortifications still reveal long-term influences. While most of them exhibit a high or normal level of general well-being, quite a few also report nervousness and a "stormy" life. The percentage of those who report various symptoms of PTSD (most notably - sensitivity to noise, sleep disturbances etc. -) is substansially higher than among a more-randomly chosen sample of Israeli war veterans.

6. Recommendations and Applications

6. A. Effectiveness of Massive-Shelling.

6.A.1. Massive-Shelling is more psychologically effective when employed on troops that have the following characteristics:

* Are not sufficiently trained.
* Are not comprised of original, stable, personnel.
* Have relatively lower level of education.
* Suffer morale problems.

6.A.2. Massive-shelling has a stronger psychological impact on troops hiding for long periods in bunkers than on troops operating in the open.

6.A.3. Massive-shelling is more effective when applied in the following manner:

* A sudden and very condensed "opening strike"
* Preferably - bombardment "from above": airplane attack and steep-trajectory fire.
* Continuous "dropping" of shells during intervals in the massive-shelling.
* One massive-shelling every few hours.
* Attack (by infantry or armor) closely adjacent to bombardment.

6.B. Stress innoculation against massive-shelling.

While the following recommendations are not tailored specifically to massive-shelling in particular, they may provide, nevertheless, some "preventive measures" in order to innoculate combatants against the stress of heavy bombardment:

6.B.1. Improve level of soldiery of combatants, including adequate training, building self-confidence as a soldier, and enhancing commitment to unit and mission.

6.B.2. In preparation for a defensive mission - provide detailed information about the sector, enemy's positions, enemy's weapons, etc.

6.B.3. Make all efforts to keep "organic unit" in the same stronghold. Combatants and leaders should know each other well and long before engaging in combat activities.

6.B.4. Unit cohesion is of paramount importance.

6.B.5. Special attention should be given to those combatants who went through critical events before their deployment. In particular, cases of death in the family, economic problems etc.

6.C. How to Locate and Deploy the Troops?

The combination of a massive-shelling and a fortification implies an obvious solution in terms of optimal location of the troops. The results of our study refute this obviousness.

6.C.1. Under massive-shelling, and especially when a consequent attack is anticipated, troops should not remain for long inside the bunkers.

6.C.2. Never leave a single soldier by himself in a post, certainly not in a bunker.

6.C.3. Under massive-shelling, when the commander is outside for observation etc., a deputy-commander should stay with the hiding troops.

6.D. Calming Factors during Massive Shelling.

6.D.1. Enable contact between combatants.

6.D.2. Ensure contact between combatants and commander.

6.D.3. Constantly provide updated information to combatants in bunkers.

6.D.4. Constantly engage combatants in purposeful activity.

7. Concluding Remarks.

The purpose of the present work was to provide military authorities with information regarding the psychological effects of massive bombardment. The case of the Egyptian attack on the Bar-Lev Line fortifications in the Yom-Kippur (1973) war was chosen for two main reasons: First, the intensity of the artillery bombardment during the first hours of that war, at that sector, was unprecedented in terms of conventional warfare (notwithstanding its relatively short durability). Second, this bombardment was conducted according to the (then) Soviet doctrine, which aims to achieve a "psychological shock" through the shelling's effect.

Almost twenty years have past and vast political and strategical changes have occured since. Most relevant to our case are the end of the "Cold War", the collapse of the Soviet 'empire' and the several wars which have occurred since 1973 (most notably - Vietnam, Afganistan, Iran-Iraq and the Gulf War). Whether the Soviet-military doctrine (-if it exists at all any more!) is still an impending threat for the 'West' (another anachronism?), is highly doubtful. Other ideologies (e.g. Fundamentalism, Maoism, Terrorism...) have generated in recent years their own militant doctrines, which now impose new threats on the free-world militaries.

Even more intriguing is the question about the psychological effects of a non-conventional attack. While such an attack has not occured since Hiroshima and Nagasaki, the threat of such an occurance is constantly growing, especially in the form of chemical weapons. The option of chemical war-heads was a realistic threat for troops in all the recent wars mentioned above, and especially in the Gulf wars. Such a non-conventional threat is far more frightening than even the worst conventional bombardment - as was recently found in a study on reactions of Israelies to the SCUD missile attacks. (Gal, 1991). Evidently the psychological effects of a non-conventional attack may not be just a simple extension of a conventional warfare (Gal, et al., 1987).

The analysis of the Bar-Lev Line case may thus be dated for forthcoming wars. More recent confrontations have provided us, inauspiciously, with opportunities for further and more 'advanced' research.

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