

Impairment among Soldiers Who were Exposed to Combat During Military Operation

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Abstract

Background and objectives: Soldiers exposed to war are at risk for developing psychological impairment.

Aim: Compare the clinical impairment experienced in three different soldiers who were exposed to combat during military operation.

Methods/Design: Participants included 49 (40.2%) infantry soldiers, 24 (19.7%) pilots and flight engineers, and 49 (40.2%) soldiers engaged in electronic warfare. Our focus was on five domains of soldiers' experience: stress symptoms, coping strategies, self-image, interpersonal functioning, and posttraumatic growth. Participants completed measures of all those measures.

Results: The infantry group had comparatively higher levels of PTSD symptoms ($p = .001$), somatization ($p < .001$), state anxiety ($p = .000$), self-efficacy ($p = .017$), challenge-based coping ($p = .001$) and social support ($p = .011$). However, the infantry group also exhibited comparatively higher posttraumatic growth -PTG ($p < 0.001$).

Conclusions: The implications of the data indicate that infantry soldiers might be at particular risk for psychological impairment following combat. At the same time, infantry soldiers exhibited higher levels of posttraumatic growth as compared to the other two groups.

Keywords: Combat exposure, Impairment, PTSD symptoms, Post Traumatic Growth, Resilience.

Introduction

Soldiers exposed to combat are at an elevated likelihood of clinical impairment [1]. Although past research has – understandingly -- focused on impairment among infantry soldiers, modern warfare increases the exposure of other types of fighting forces in combat. Combat operations usually involve massive air assistance. As well, soldiers use electronic means to gather intelligence or to launch air attacks, for instance using remotely piloted aircraft [2]. Exposed pilots and RPA operators are at an elevated risk for post-traumatic symptoms [3].

Herein, we compared the clinical impairment experienced by infantry soldiers, air team members, and electronic operators who were

exposed to combat during Operation “Protective Edge”, as part of their service in the Israel Defense Forces (IDF). The operation was launched by Israel on 8 July 2014, in response to massive missile attacks launched from the Hamas-ruled Gaza Strip. In the course of the seven weeks of this operation, thousands of missiles landed on Israeli cities, and fierce battles took place in various areas of the Gaza strip. Our focus was on five domains of soldiers' experience: symptoms, coping, self-image, interpersonal functioning, and post-traumatic growth (PTG).

The **symptom domain** consisted PTSD symptoms, as well as anxiety and somatization which are prevalent among exposed soldiers [4]. The **coping domain** tapped into appraisal of the stressful situation as either threatening (maladaptive) or challenging [5]. The **self-image domain** focused on generalized self-efficacy, a trait-based factor pertaining to individuals' stable beliefs that their actions can

produce desirable outcomes [6]. The *interpersonal functioning domain* referred to individuals' perception that they have adequate social support from family and friends [7]. Finally, the *post-traumatic growth domain* was drawn from voluminous research that attests to the possibility that people grow, mature, and develop after traumatic stress [8].

We assumed that the intense exposure to combat would be linearly associated with psychological impairment, thus infantry soldiers, who are the most physically and mentally threatened, would be most impaired, followed by air teams, who are both physically and mentally threatened, and electronic operators, who are only mentally threatened. At the same time, intense exposure to combat might also yield elevated post-traumatic growth (PTG), conforming to a "sadder but wiser" pattern. Hence, we expected the inverse linear pattern for PTG.

Methods

Participants and procedure

Participants were 122 serving IDF male soldiers and officers, who had participated in 'Operation Protective Edge'. Forty-nine (40.2%) soldiers were infantry combatants, recruited from the IDF's infantry battalions or from an armor battalion. They were exposed to difficult scenes, either by watching or running operational combat support positions. Twenty-four soldiers (19.7%) were "air fighters", including fighting pilots and flight engineers who were exposed to injured soldiers. Finally, 49 (40.2%) soldiers were exposed to war scenes either by operating unmanned vehicles or by gathering military intelligence. These three groups are labeled "Infantry", "Air", and "Screen", respectively.

We collected data between six to eight months after the end of the military operation. One of our researchers traveled to soldiers' respective military bases and administered a battery of questionnaires to soldiers who were present and willing to participate. Participants signed informed consent forms prior to their participation. This study was approved of by the IDF Human Research Review Board.

Measurement instruments Demographics

A questionnaire developed for this study included questions about age, gender, professional experience, place of residence, and place of service.

Symptom domains

Post-Traumatic Stress Disorder Questionnaire - PTSD - PCL- 5 (PTSD) Checklist: This questionnaire includes 20 items, describing the four main axes of the syndrome corresponding to the DSM-V: intrusive symptoms (e.g., "Sometimes when things remind you of the war, do you feel or act like you are there?"), avoiding symptoms (e.g., "avoiding external factors that made you the traumatic experience [such as people, places, conversations, objects, activities or situations]"), emotional numbness (e.g., "strong negative emotions such as fear or dread, anger, guilt or shame"), and over-arousal symptoms (e.g., "Feeling jumpy or easily startled"; "Being "super

alert" or watchful on guard") [9]. Items are ranked on a 5-point Likert scale (Cronbach's $\alpha = .95$).

State Anxiety Inventory

This is a 20-item self-report measure tapping into state anxiety (e.g., "I am tense", "I am worried"). Items are ranked on a 4-point Likert scale ($\alpha = .77$) [10].

Patient Health Questionnaire (PHQ)

This 15-item questionnaire assesses physical symptoms and their severity. Severity is rated on a 6-point Likert scale ($\alpha = .83$) [11].

Coping domain

Perceiving Problem-Solving Task as a Threat scale

This 14-item questionnaire measures the perceptions that people have about their attitudes and behaviors when trying to resolve interpersonal problems [5]. Items, assessing a perception of threat (7 items) or challenge (7 items), are ranked on a 5-point Likert scale (e.g., "Before performing a task, I feel curious"; "Before performing a task, I feel threatened"). Cronbach's alpha for *Threat* is $\alpha = .76$, and $\alpha = .91$ for *Challenge*.

Self-Image domain

Generalized Self-Efficacy (GSE): The GSE is a 10-item measure of self-efficacy (e.g., "Thanks to my resourcefulness, I know how to handle unforeseen situations") [6]. Items are rated on a 4-point Likert scale ($\alpha = .80$).

Interpersonal domain

Multidimensional Perceived Social Support (MPSS)

This 12-item questionnaire was designed to examine individuals' perceptions of social support from family members, friends, and a significant other. Items such as the following appear in the questionnaire [12]: "My family is truly trying to help me", "I can count on my friends when I have problems", and "I have a close person nearby when I need one". Items are ranked on a 7-point Likert scale (α s = 0.87, 0.85, and 0.91 for family, friends, and significant others, respectively).

PTG domain

The *posttraumatic growth inventory* (PTGI) is a self-report questionnaire assessing positive changes following trauma [13]. The questionnaire consists of 21 items which evaluate growth in five dimensions: life priorities, personal relationships, internal strength, life possibilities, and spirituality. Items are ranked on a 4-point Likert scale. In the present study, we calculated a general PTG score ($\alpha = .95$).

Results

In Table 1, the demographic information characterizing the three groups of soldiers is presented. The Infantry group was much younger than the other two groups, clearly owing to this group's consisting of mandatory conscription soldiers, enlisted when they were 18 years old.

Table 1: Study population

Variables	Warriors N = 49		Behind the screening N = 49		Exposed to injured soldiers N = 24		Total		P#
	Count	%	Count	%	Count	%	Count	%	
Gender:									
Male	49	100	33	68.8	23	95.8	105	86.8	<0.001
Female	0	0	15	31.2	1	4.2	16	13.2	
Military Seniority (by year):									0.005
<1	2	4.1	3	6.1	0		5	4.1	
≥1<2	25	51.0	13	26.5	3	12.5	41	33.6	
≤2	22	44.9	33	67.3	21	87.5	76	62.3	
Operational event:									<0.001
first	27	55.1	15	31.9	1	4.3	43	36.1	
2-5	19	38.8	21	44.7	14	60.9	54	45.4	
5 and above	3	6.1	11	23.4	8	34.8	22	18.5	
Age:									<0.001
18-<20	13	2.5	9	18.4	0	0	22	18.0	
20-<24	33	67.3	16	32.7	1	4.2	50	41.0	
24 and above	3	6.1	24	49.0	23	95.8	50	41.0	
Rank:									<0.001
Junior	46	100	27	60.0	1	4.2	74	64.3	
Mid	0	0	10	22.2	14	58.3	24	20.9	
Senior	0	0	8	17.8	9	37.5	17	14.8	
Combat unit:									<0.001
Yes	49	100	29	59.2	23	95.8	101	82.8	
No	0	0	20	40.8	1	4.2	21	17.2	
Academic Education:									<0.001
Yes	1	2.1	13	27.7	15	65.2	29	24.8	
No	46	97.9	34	72.3	8	34.8	88	75.2	
Family status:									<0.001
Single	44	89.8	35	71.4	9	37.5	88	72.1	
Married	1	2.0	13	26.5	15	62.5	29	23.8	
Divorced	0	0	1	2.0	0	0	1	0.8	
Other	4	8.2	0	0	0	0	4	3.3	
Mental preparation (before):									0.476
Yes	11	22.9	7	14.9	3	13.0	21	17.8	
No	37	77.1	40	85.1	20	87.0	97	82.2	
Mental preparation (After):									0.181
Yes	9	18.8	15	30.6	3	13.0	27	22.5	
No	39	81.2	34	69.4	20	87.0	93	77.5	

Note: #Pearson Chi-Square test

In Table 2, we present means, standard deviations, and zero-order correlations among the study variables. As expected, moderate-to-strong correlations were found between the variables. In Table 3, we present means and standard deviations of the study variables in each of the three groups of soldiers. This table served as a basis for the aforementioned GLM analyses.

Table 2: Means, standard deviations, and intercorrelations among the study variables

	PCL	SAI	PHQ	COP-T	COP-C	EFF	SUP	PTG
PCL	1.00	---	---	---	---	---	---	---
SAI	0.34 ^c	1.00	---	---	---	---	---	---
PHQ	0.64 ^c	0.20 ^a	1.00	---	---	---	---	---
COP-T	0.30 ^c	0.47 ^c	0.15 ^{ns}	1.00	---	---	---	---

COP-C	-0.44 ^c	-0.31 ^c	-0.43 ^c	0.02 ^{ns}	1.00	---	---	---
GSE	-0.40 ^c	-0.40 ^c	-0.29 ^c	-0.29 ^b	0.39 ^c	1.00	---	---
MPSS	-0.36 ^c	-0.22 ^a	-0.12 ^{ns}	-0.13 ^{ns}	0.22 ^a	0.21 ^a	1.00	---
PTGI	0.26 ^b	0.19 ^a	0.31 ^c	0.18 ^a	-0.02 ^{ns}	-0.12 ^{ns}	-0.03 ^{ns}	1.00
M	29.60	40.37	4.08	15.70	23.55	3.35	72.60	1.92
SD	13.00	10.62	17.30	4.80	6.71	0.38	11.95	0.73

Notes: ^a $p < .05$; ^b $p < 0.01$; ^c $p < 0.001$, ^{ns} Non-significant; PCL = PTSD symptoms; SAI = State Anxiety; PHQ = Somatization; COP-T = Threat-based coping; COPE-C = Challenge-based coping; GSE = Generalized self-efficacy; PTGI = Post-Traumatic Growth; MPSS = Social support.

Table 3: Means and standard deviations of the study variables in each of the three groups

	SCREEN		INFANTRY		AIR	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
PCL	26.10	10.77	34.21	15.40	27.08	7.92
SAI	37.67	11.46	44.72	8.61	36.54	9.72
PHQ	15.97	3.10	18.92	4.97	16.37	1.90
COP-T	15.08	5.05	16.58	4.91	15.16	3.84
COP-C	24.95	5.34	21.33	7.83	25.70	4.91
GSE	3.40	0.37	3.27	0.38	3.47	0.36
MPSS	75.45	11.33	69.23	12.82	74.29	9.28
PTG	1.67	0.64	2.23	0.71	1.75	0.75

Notes: PCL = PTSD symptoms; SAI = State Anxiety; PHQ = Somatization; COP-T = Threat-based coping; COPE-C = Challenge-based coping; EFF = Generalized self-efficacy; PTG = Post-Traumatic Growth; MPSS = Social support.

To test our hypotheses, we conducted general linear modeling (GLM) analyses to test H1 and H2. GLM analyses were conducted for each of the study variables. The single independent variable (IV) of these GLM analyses was levels of exposure, operationalized by the three groups. Because we had a-priori hypotheses, specific contrasts were run. First, we compared the Infantry group to Air and Screen, with a “2, -1, -1” linear contrast. Next, we compared Air and Screen using a “0, 1, -1” contrast.

The contrast comparing Infantry vs. Air and Screen was statistically significant for all but one of the outcomes. Specifically, the Infantry group had comparatively higher levels of symptoms (PTSD symptoms: $F_{[1, 118]} = 10.42, p = .001$; somatization: $F_{[1, 118]} = 14.29, p = .000$; state anxiety: $F_{[1, 118]} = 16.35, p = .000$); self-efficacy: $F_{[1, 118]} = 5.79, p = .017$), challenge-based coping ($F_{[1, 118]} = 10.83, p = .001$), and social support ($F_{[1, 118]} = 6.61, p = .011$). Although the Infantry group had comparatively higher levels of threat-based coping, the difference was evinced in a non-significant trend ($F_{[1, 118]} = 2.63, p = .10$).

The above contrast was also statistically significant with respect to PTG ($F_{[1, 118]} = 15.39, p = 0.000$). The Infantry group fared better than Air and Screen in terms of post-traumatic growth.

Finally, we ran the contrast comparing Screen vs. Air (“0, 1, -1”). In none of the analyses were the differences between the groups statistically significant. We surmise that this was because the “air-born” soldiers were older and, hence, more experienced and “in control” during battle.

Discussion

Thus, Israeli infantry soldiers exhibited a significantly higher level of symptoms (PTSD, anxiety, and somatic), and significantly lower

levels of challenge-based coping, self-efficacy, and social support than the other two groups. At the same time, the “Infantry” group also exhibited higher post-traumatic growth compared to the two other groups.

The findings regarding the elevated impairment of infantry soldiers is consistent with past research, but they also extend this research by showing that this impairment is substantially higher than that experienced by soldiers participating in fights from the air or via electronic means [1]. It is noteworthy that this elevated impairment on the part of infantry soldiers extends beyond symptoms of anxiety and PTSD, and included somatization, self-image, and interpersonal problems. For infantry soldiers, who are expected to be mentally tough, somatization, might serve as a “legitimate” way to express distress following combat. The impairment in self-image and interpersonal problems is highly disconcerting, not only because it represents the wide adverse effects of exposure to combat, but also because of the fact that such an exposure might derail protective factors --- self-efficacy and social support – that are supposed to assist soldiers in times of stress.

At the same time, we found that infantry soldiers exhibited higher levels of post-traumatic growth (PTG) as compared to the other two groups. It is noteworthy that PTG was found in past research to be positively associated with PTSD and other symptoms, a finding that is also replicated in this study (see Table 2) [14]. One possible explanation for this finding is that, for the infantry group, combat experiences can be shared with close brothers in arms, so stress symptoms can develop into PTG. Such a supposition is consistent with Tedeschi and McNally’s model for enhancing veterans’ PTG, which emphasizes the importance of promoting cohesion and mutual support among combatant teams during routine [15].

Study limitations include: (1) the cross-sectional design, which limits causal inference; (2) (3) our exclusive use of self-report measures, which may have inflated the shared method variance; and (3) the relatively modest sample size may have prevented the differences concerning threat-based coping from reaching statistical significance. Nevertheless, our study is the first – to the best of our knowledge – to compare infantry, air, and “screen” soldiers, in terms of symptomatology and impairment after a fierce exposure to battle, with findings indicating a substantial impairment on the part of infantry soldiers [16].

References

1. Dekel R, Enoch G, Solomon Z (2008) The contribution of captivity and posttraumatic stress disorder to marital adjustment of Israeli couples. *Journal of Social and Personal Relationships* 25: 497-510.
2. Reardon S (2013) Drone School: Not a Cushy Number. *New Scientist* 217: 46-49.
3. Wood J, Chappelle W, Correll T, Heaton J, Hubner M et al. (2016) Prevalence of posttraumatic stress disorder in remotely piloted aircraft operators in the United States Air Force.
4. Hoge CW, Terhakopian A, Castro CA, Messer SC, Engel CC (2007) Association of posttraumatic stress disorder with somatic symptoms, health care visits, and absenteeism among Iraq war veterans. *American Journal of Psychiatry* 164:150-153.
5. Orbach I, Blomenson R, Mikulincer M, Gilboa-Schechtman E, Rogolsky M et al. (2007) Perceiving a Problem-Solving Task as a Threat and Suicidal Behavior in Adolescents. *Journal of Social & Clinical Psychology* 8: 968-992.
6. Schwarzer R, Jerusalem M (1995) Generalized Self-Efficacy Scale. In J. Weinman S. Wright, M Johnston Measures in health psychology: A user's portfolio. Causal and control beliefs 35-37.
7. Cohen S (2004) Social relationships and health. *American Psychologist* 59: 676-684
8. Tedeschi RG, Calhoun LG (2004) Posttraumatic growth: Conceptual foundations and empirical evidence. *Psychological Inquiry* 15: 1-18.
9. Weathers FW, Litz BT, Keane TM, Palmieri PA, Marx BP et al. (2013) The PTSD checklist for DSM-5 (PCL-5). Scale available from the National Center for PTSD. www.ptsd.va.gov.
10. Spielberger CD, Gorsuch RL, Lushene R (1970) Manual for the State- Trait Anxiety Inventory. Palo Alto, CA: Consulting Psychologist Press.
11. Kroenke K, Spitzer RL, Williams JBW (2012) The PHQ-15: Validity of a new measure for evaluating somatic symptom severity. *Psychosomatic Medicine* 64: 258-266.
12. Zimet GD, Dahlem NW, Zimet SG, Farley GK (1988) The Multidimensional Scale of Perceived Social Support. *Journal of Personality Assessment* 52: 30-41.
13. Tedeschi RG, Calhoun LG (1996) The posttraumatic growth inventory: Measuring the positive legacy of trauma. *Journal of Traumatic Stress* 9: 455-471.
14. Blix I, Birkeland MS, Hansen MB, Heir T (2016) Posttraumatic growth—An antecedent and outcome of posttraumatic stress: Cross-Lagged associations among individuals exposed to terrorism. *Clinical Psychological Science* 4: 620-628.
15. Tedeschi RG, McNally RJ (2011) Can we facilitate posttraumatic growth in combat veterans? *American Psychologist* 66: 19-24.
16. Pietrzak RH, Goldstein MB, Malley JC, Rivers AJ, Johnson DC et al. (2010) Posttraumatic growth in veterans of operations enduring freedom and iraqi freedom. *Journal of Affective*

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