

The Effects of “Psychological Inoculation” Versus Ventilation on the Mental Resilience of Israeli Citizens Under Continuous War Stress

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Abstract: Anxiety and hopelessness are common reactions of citizens exposed to continuous war threats. Common interventions focus on support, calming, and emotional ventilation, with few attempts to reduce people’s cognitive barriers concerning active coping, which could increase their resilience. This study tested the effects of psychological inoculation (PI), which specifically aims to challenge such barriers, on the mental resilience of Israeli citizens living in Sderot. Participants were randomly assigned to either 2 PI sessions or 2 ventilation sessions, provided over the phone. Anxiety, helplessness, pessimism, and functioning were briefly assessed at baseline and 1 week after interventions. No time, group, or group \times time interactions were observed. However, a time \times group \times sex interaction emerged for helplessness: Men benefited from the PI whereas women benefited from ventilation, in reducing helplessness. Under chronic war stress, it seems difficult to improve people’s resilience, although PI may be partly beneficial for men. Further research is needed to test the effects of PI on mental resilience.

Key Words: Psychological inoculation, continuous war threats, anxiety, helplessness, Rwanda pessimism, ventilation, resilience.

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Beyond injuries and mortality, civil victims of war and political conflicts experience frequent levels of distress ranging, for example, from 10.2% of Israeli medical staff in a bombarded hospital with probable post-traumatic stress disorder (PTSD; Koren et al., 2009), up to 54% to 62% of children in Rwanda with probable PTSD (Neugebauer et al., 2009). Risk factors of war-related distress include exposure to deaths and trauma severity (Neugebauer et al., 2009), exposure to terror and the inability to estimate its duration (Gidron et al., 2004), female gender (Neugebauer et al., 2009), and being displaced and poor maternal functioning in children (Laor et al., 2001).

Cognitive models of distress focus on exaggerated negative appraisals of “neutral” events predicting future distress (e.g., Ehring et al., 2008). One cognitive variable, namely coping self-efficacy, was recently found to predict post-traumatic distress and to mediate effects of negative cognitions on distress (Cieslak et al., 2008). Coping self-efficacy needs to be targeted in interventions.

Despite these findings, many early interventions mainly provide support and calming, and enable people to ventilate their emotions (e.g., Chemtob et al., 1997; Stallard et al., 2005; Weth-

ington et al., 2008). However, studies have not found much support for the efficacy of ventilation-related interventions such as debriefing (van Emmerik et al., 2002). Sharing one’s emotions may not challenge cognitive barriers (e.g., low self-efficacy), prognostic in future distress (Cieslak et al., 2008).

One method that challenges people’s beliefs and barriers is “psychological inoculation” (PI), where people are exposed to challenging sentences, reflecting cognitive barriers impeding functioning or adaptive behavior. In turn, they are guided to systematically refute such sentences. PI was found to prevent unhealthy behaviors in adolescents (e.g., smoking; Duryea et al., 1990; Evans, 1976). However, to the best of our knowledge, the effects of PI on mental health outcomes, and specifically on helping people under war stress, have not been systematically examined.

The purpose of this study was to compare the effects of PI versus emotional ventilation on citizens’ mental resilience, while living under continuous threat in a war zone. PI was expected to improve mental resilience better than ventilation, as the former is thought to increase one’s coping self-efficacy. We also examined whether gender moderated intervention effects, as previously found in relation to psychological interventions in traumatic contexts (e.g., Gidron et al., 2007).

METHODS

The Context

Between 2001 and 2009, residents of the Town of Sderot, in the southwest of Israel, near the Gaza strip, were attacked by Qassam missiles from Gaza. These included nearly daily launches of 1 to 20 missiles, landing in open areas, houses, shops, and schools. Residents had between 8 and 12 seconds after an alert to find shelters. Higher levels of post-traumatic stress symptoms were found among Sderot residents than in residents of nearby Kibbutzim (Dekel and Nuttman-Shwartz, 2009).

Participants, Design, and Procedure

We sampled participants from the adult population of Sderot. Participants had to be over the age of 18 and appearing in the Sderot phone book. The study was approved by an ethics committee of the Tel-Hai Academic College, North of Israel, and by the welfare department of Sderot. A randomized controlled design was used. Participants were randomly assigned either to ventilation or to PI. After providing verbal consent, they provided baseline levels on each of the measures of resilience (T1), underwent their allocated intervention, and provided background information (T1). Approximately 1-week later (T2), they were asked the resilience measures and once again underwent their allocated intervention. A week later (T3) and a month after session 2 (T4), they were only reassessed.

Measures

Mental resilience was conceptualized as high levels of daily functioning, and low levels of anxiety, helplessness, and pessimism. To reduce burden on participants as much as possible, we used very brief measures, because assessment took place during a local war.

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Background Information

This included participants' age, sex, marital status, occupation, and number of children. Stress or exposure information included estimated closest distance from a missile hit, presence of a safety room at home, and whether one's house was hit during the last 8 years.

Mental Resilience

Daily functioning was assessed by a 1-item scale, asking "To what extent did you succeed to carry out what you planned during the last week?" (1, not at all; 10, succeeded to do everything). Anxiety was assessed by asking participants "How do you evaluate your level of anxiety at this moment (1, very low; 10, very high). Previous intervention trials used similar single-item scales to assess anxiety (e.g., Sneed et al., 2001). We used the hopelessness scale (Everson et al., 1996) that includes 2 items; one assessing helplessness, the inability to achieve one's goals, and the other assessing pessimism, lack of hope about the future. Each item was rated on a 1 to 10 scale (1, do not agree at all; 10, fully agree).

Interventions

Interventions were conducted over the phone, to reach a larger population, and to be cost beneficial. Phone interventions have positive effects on mental health outcomes (Mozer et al., 2008).

All interventions included 2 phone "sessions," 1-week apart. In the ventilation intervention, participants were asked their opinion about the level of security in Sderot, how they cope with this situation, and which things most help them cope with it. Counselors responded emphatically and encouraged expression of thoughts and feelings, while reinforcing participants' actions. The ventilation aimed to increase support, a buffer of the effects of missile exposure on depressive symptoms in this context (Henrich and Shahar, 2008).

PI followed Duryea et al. (1990), by asking participants to refute 6 "challenging sentences." These reflected constructs from a model of stress such as problem- and emotion-focused coping (Taylor and Aspinwall, 1996), coping self-efficacy, and PTSD symptoms (e.g., avoidance and intrusions). Counselors provided feedback on participants' refutations. In cases of insufficient refutation, counselors then exaggerated the challenging sentence. An example of a challenging sentence concerning negative appraisal and intrusions was as follows: "Every sound you hear must be a siren"! Hearing and refuting challenging sentences reflected psychological immunization.

Statistical Analysis

After testing group equality, the main analysis was a mixed design analysis of variance (ANOVA), where group was the between-subjects factor and time (baseline and postsession assessment) was the within-subjects factor. In the ANOVA, we controlled for any significant baseline differences. To reduce the statistical tests and chances of a type 1 error, we focused here on baseline and postsession 2 measures (T3) alone. The latter was chosen because it reflected the end of intervention and included more participants than T4 assessment.

RESULTS

Baseline Characteristics

Table 1 depicts scores of baseline and 1-week follow-up resilience measures, per group. Concerning background data, between 2/3 and 3/4 of the sample included women or working people, between 1/3 to half of the participants experienced a missile hitting their house, approximately one-third had a security room in their house, and over 71% lived with their husband/wife or partner. Mean estimated closest distance of participants from a missile hit was below 100 m, and the median was 20 m. Despite these figures and the continuing fall of missiles during the study, participants' mean

TABLE 1. Means (SD) of Scores on Resilience Measures at Baseline and 1-Week Postintervention per Group

Variable	Psychological Inoculation		Ventilation	
	Mean	SD	Mean	SD
Helplessness: baseline	3.3	2.5	4.0	3.2
Helplessness: postintervention	2.7	2.4	3.0	2.7
Pessimism: baseline	3.7	3.4	3.7	3.3
Pessimism: postintervention	3.7	2.7	3.8	3.1
Daily functioning: baseline	7.6	2.9	6.1*	3.1
Daily functioning: postintervention	7.6	2.5	7.4	2.8
Anxiety: baseline	3.9	2.7	4.4	3.0
Anxiety: postintervention	3.2	2.7	3.2	2.7

SD indicates standard deviation.

* $P < 0.05$, between groups.

baseline daily functioning approached 7, on a 1 to 10 scale, indicating relatively good functioning.

Correlations Between Baseline Dependent Variables

Scores on the helplessness item were positively significantly correlated with pessimism ($r = 0.53$, $p < 0.001$) and anxiety ($r = 0.212$, $p < 0.01$) and inversely correlated with daily functioning ($r = -0.302$, $p < 0.001$). Levels of pessimism were inversely correlated with daily functioning ($r = -0.147$, $p < 0.05$). Finally, levels of daily functioning were significantly inversely correlated with levels of anxiety ($r = -0.247$, $p < 0.001$). These correlations provide support for the construct validity of the single-item measures used.

Effects of Group and Gender on Outcomes

Because of the significant differences on baseline functioning, percentages of houses hit and of working participants between groups, ANOVA tests of main and interaction effects were done, controlling for these 3 baseline background factors. There were no significant time \times group interaction effects for helplessness [$F(1,63) = 0.21$, $p = 0.65$], pessimism [$F(1,63) = 0.07$, $p = 0.80$], daily functioning [$F(1,64) = 1.15$, $p = 0.29$], or anxiety [$F(1,63) = 0.05$, $p = 0.83$].

Considering gender as a moderator, a significant time \times group \times sex interaction effect was observed in relation to helplessness [$F(1,61) = 6.10$, $p = 0.02$]. Paired t -tests then revealed that in men, the PI led to reductions in helplessness over time [$t(11) = 2.24$, $p < 0.05$], whereas ventilation did not lead to significant changes in helplessness [$t(10) = 0.40$, $p > 0.05$]. In contrast, in women, the PI did not lead to significant reductions in helplessness [$t(22) = 0.42$, $p > 0.05$], whereas the ventilation led to significant reductions in helplessness over time [$t(21) = 2.57$, $p < 0.05$; see Fig. 1]. There were no time \times group \times sex interactions for other outcomes (all $P > 0.05$).

DISCUSSION

This study compared 2 intervention methods aiming at increasing mental resilience in Israeli citizens exposed to continuous war threats. Mental resilience was operationalized by assessing perceived helplessness, pessimism, daily functioning, and anxiety. Two major findings were observed in this study. First, no changes over time were observed in either intervention group on any study outcome. Second, when considering gender as a selected moderator, different intervention effects were observed: PI seemed to reduce helplessness in men whereas structured ventilation seemed to reduce helplessness in women. Thus, increasing the mental resilience of

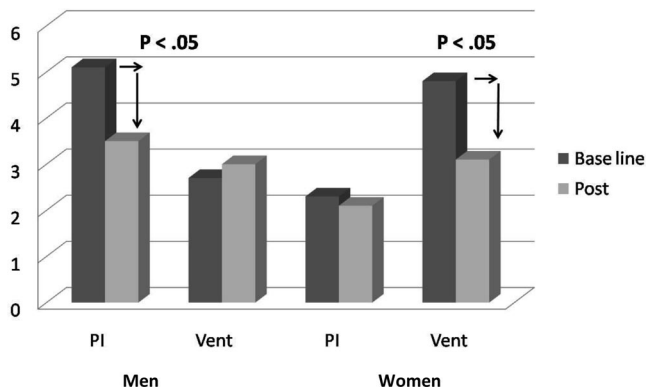


FIGURE 1. Effects of time and group on helplessness by gender.

people in the context of continuous war threats is not a trivial issue, and background variables (e.g., gender) need to be considered as possible moderators of the effects of psychological interventions. The fact that neither intervention had a clear effect on most outcomes, including a supporting ventilation intervention, also challenges current clinical practice and calls for doing further research. These findings have implications for guiding policies in mental health provided in the context of traumatic events (Hobfoll et al., 2007).

Sex emerged as a moderator, where PI was beneficial for men and ventilation was beneficial for women, in relation to helplessness. Sex has been found to moderate the effects of other forms of mental health interventions (e.g., Gidron et al., 2007). Findings from neuroimaging research may shed some light on this interaction. One study found that in response to a stressor, women exhibited greater limbic activation, whereas men showed mainly frontal activation: increased right and reduced left frontal activity (Wang et al., 2007). It is possible that for women, ventilation, which includes support and verbal expression, may calm an overactive limbic stress response (Hariri et al., 2000). In men, the PI method, which relies on logic and verbal processing, may increase primarily left prefrontal activity (Goel et al., 2007), to possibly regulate their stress. Future research needs to test these issues more in depth.

The similarity between the effects of the PI and ventilation can be explained by the fact that both interventions include some components from the 5 evidence-based therapeutic elements suggested by Hobfoll et al. (2007). In PI, these may be enhancement of self-efficacy and hope, whereas in ventilation, this may include calming, connectedness, and hope. These elements may be important in reducing helplessness, but by different mechanisms in each gender. Future studies should identify the specific populations who may benefit from each of the methods used in this study and from their combination.

CONCLUSIONS

Our findings, though preliminary, support the need to test intervention efforts for aiding people under such hardships. An evidence-based approach can help prevent harm and increase tailored benefits, supporting the aim of increasing mental resilience of people in such circumstances most effectively.

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