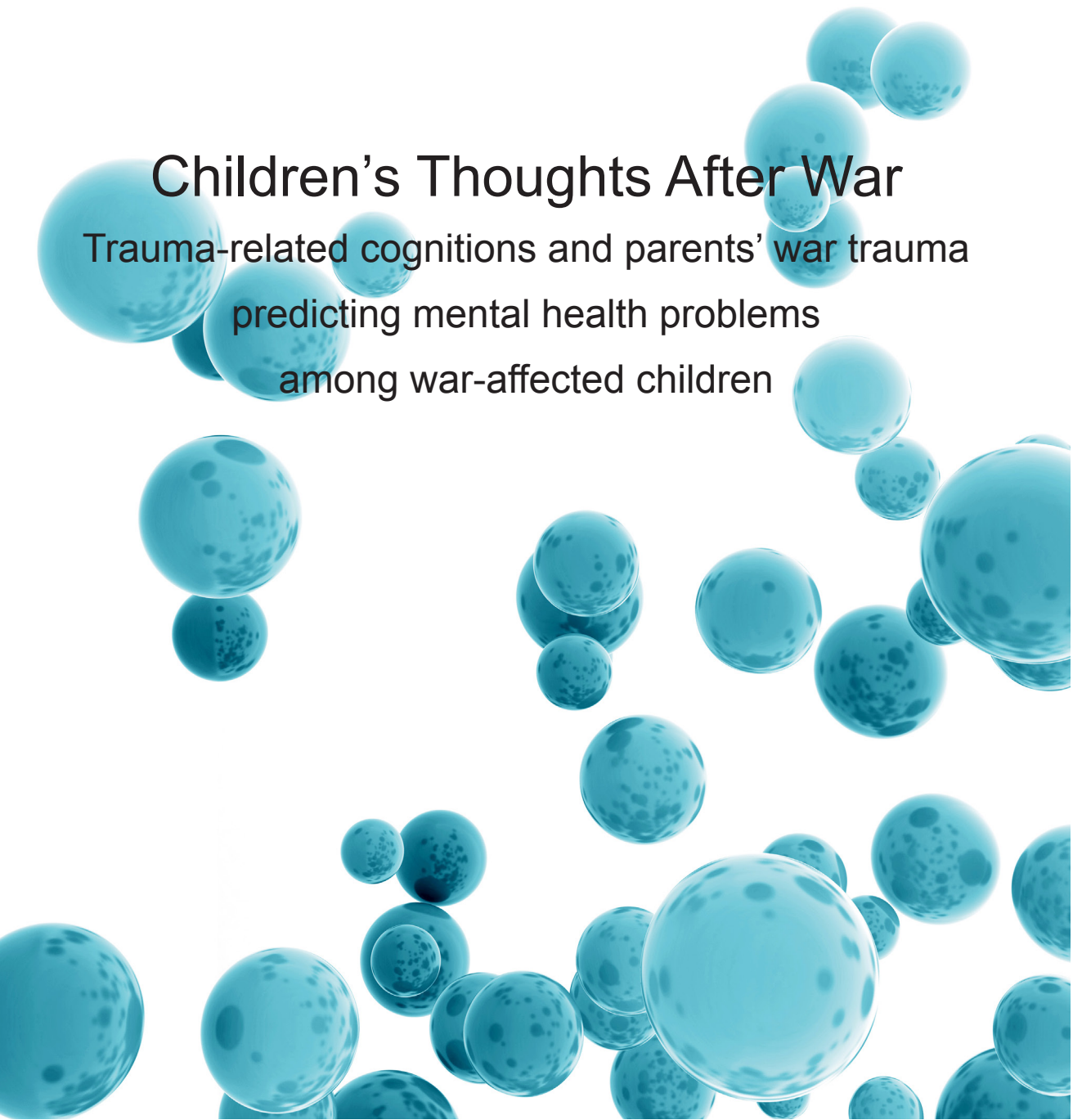


ESA PALOSAARI

Children's Thoughts After War

Trauma-related cognitions and parents' war trauma
predicting mental health problems
among war-affected children





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ACADEMIC DISSERTATION

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UNIVERSITY OF TAMPERE

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This is all that remains:
a handful of burnt papers,
photos, here and there
with rippled backs like maps.
One of us died,
another savors life
in his place.
One of us returned
changed by magic into a small bird
who knows the news in another language.
One of us went crazy
and kept babbling nonsense
for hours, under the sun.
One of us escaped
from the bugs and the officers
to who knows where.
Sidewalk vendors wrap falafel
in the pages of our books.
The entire assembly of gods
has come to help.
On the way to us, they pinch their noses
and watch a woman roll tobacco.
To her, the hand-rolled cigarette
is more wondrous
than the Seven Wonders of the World.
All her relatives have gone abroad.
The boy next door
returned one day,
a tin star on his chest.
He talked too much
about that star
until, one day, he changed
into the tin
of the Martyrs' Monument.
This is all that remains
a handful of meaningless words
engraved on the walls.
We read so absentmindedly
eventually we forget
how, in the short lull
between two wars
we became so old.

"Between Two Wars" by Dunya Mikhail. Translated by Elizabeth Winslow.
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ABSTRACT

This study analyzed potential mechanisms behind war-affected children's mental health problems in Gaza, Palestine. The sample was 482 10–13 –year-old school children, half of whom were randomly selected to a mental health intervention based on Teaching Recovery Techniques (TRT) given in school classes. The children and their parents answered to questionnaires at three time points: three, five, and eleven months after a war in 2009.

Cognitive theories of posttraumatic stress disorder have emphasized the pivotal role of negative thoughts or cognitions (posttraumatic cognitions, PTCs) in the development of chronic trauma-related mental health problems. Negative appraisals of oneself, symptoms, and the world are thought to lead to maladaptive coping strategies and feelings of threat which perpetuate posttraumatic stress symptoms and make them chronic. In the thesis, the role of PTCs in the development of chronic symptoms of posttraumatic stress (PTS symptoms; i.e. symptoms which are part of the diagnosis of posttraumatic stress disorder, PTSD) was analyzed by estimating the relative predictive power of PTCs and PTS symptoms on each other over time and by testing whether PTCs are the mediating mechanism through which early PTS symptoms develop into chronic PTS symptoms (Article I). The results confirmed the importance of negative cognitions which predict posttraumatic stress symptoms. Furthermore, PTCs was not a mechanism through which stress symptoms at three months develop into chronic ones because PTS symptoms did not predict PTCs. This result might have been observed because the stress symptoms had already influenced negative cognitions by three months after the war.

In addition to PTCs, PTS symptoms among children have many risk factors. The hypothesis tested was that the risk factors of PTS symptoms would also be the risk factors of PTCs and the PTCs would mediate their effects on PTS symptoms (Article II). The results confirmed that risk factors related to children's relationships with their peers (loneliness or unpopularity), siblings (conflict), and parents (psychological maltreatment) did predict PTCs and, via PTCs, PTS symptoms. Parental psychological maltreatment in turn has been hypothesized to be an evolutionarily adaptational response to parents' own experiences of war. This was confirmed only among fathers (Article III). Contrary to expectations, mothers' war-related life-

threat was negatively associated with children's reports of psychological maltreatment by their parents.

The effectiveness of a cognitive-behavioral group intervention was studied (Article IV). The intervention might have had a temporary effect on PTS symptoms among girls with a low level of peritraumatic dissociation. However, additional analyses did not find an effect of the intervention on cognitions, and there were no significant effects of the intervention on PTS symptoms, either, if the probability of finding false significant results because of multiple tests was taken into account.

The results and literature in general point to the importance of cognitive appraisals in the development of chronic mental health problems among war-affected children and others affected by traumatic stress. Cognitive appraisals appear to be a point where risk factors turn into posttraumatic stress symptoms and where interventions reduce the symptoms.

TIIVISTELMÄ

Tutkimuksessa analysoitiin sodan kokeneiden gazalaisten lasten mielenterveyteen vaikuttavia tekijöitä. Otos koostui 482 10–13-vuotiaasta koululaisesta, joista puolet arvottiin mielenterveysongelmia ehkäisemään pyrkivään interventioon. Interventio perustui Teaching Recovery Techniques (TRT) –käsikirjaan ja se järjestettiin koululuokissa. Kaikki lapset vastasivat kyselyihin kolmena ajankohtana: kolme, viisi, ja yksitoista kuukautta sodan jälkeen vuonna 2009. Lasten vanhemmat vastasivat kyselyyn 11 kuukautta sodan jälkeen.

Kognitiiviset teoriat traumaperäisestä stressihäiriöstä (engl. posttraumatic stress disorder, PTSD) ovat painottaneet trauman jälkeisten kielteisten ajatusten tai kognitioiden (engl. posttraumatic cognitions, PTCs) keskeistä roolia kroonisten traumaperäisten mielenterveysongelmien kehittymisessä. Teorioiden mukaan kielteiset arviot itsestä, oireista, ja maailmasta johtavat epätarkoituksenmukaisten selviytymiskeinojen käyttämiseen ja uhan tunteisiin, jotka pitävät yllä traumaperäisiä stressioireita. Tässä työssä estimoitiin trauman jälkeisten kognitioiden ja traumaperäisten stressioireiden suhteellista ennustevoimaa toisiinsa ristiviivemallissa ja testattiin välittävätkö trauman jälkeiset kognitiot varhaisten traumaperäisten stressioireiden kehitystä kroonisiksi traumaperäisiksi stressioireiksi (Artikkeli I). Tulokset tukivat käsitystä trauman jälkeisten kognitioiden merkittävydestä. Trauman jälkeiset kognitiot ennustivat myöhempiä traumaperäisiä stressioireita. Trauman jälkeiset kognitiot eivät välittäneet varhaisten traumaperäisten stressioireiden kehitystä kroonisiksi, koska traumaperäiset stressioireet eivät ennustaneet traumaperäisiä kognitioita. Tuloksen syy oli mahdollisesti se, että traumaperäiset stressioireet olivat vaikuttaneet kognitioihin jo ennen ensimmäistä mittausajankohtaa kolme kuukautta sodan jälkeen.

Traumaperäisillä stressioireille on monia riskitekijöitä trauman jälkeisten kognitioiden lisäksi. Työssä testattiin hypoteesia, että traumaperäisten stressioireiden riskitekijät ovat myös trauman jälkeisten kognitioiden riskitekijöitä ja että trauman jälkeiset kognitiot välittävät näiden riskitekijöiden vaikutuksia traumaperäisiin stressioireisiin (Artikkeli II). Tulosten mukaan riskitekijät, jotka liittyvät lasten suhteisiin ikätovereihinsa (yksinäisyys tai epäsuosio), sisaruksiinsa (konflikti) ja vanhempiinsa (psykologinen kaltoinkohtelu), ennustivat trauman jälkeisiä kognitioita ja—kognitioiden kautta—traumaperäisiä stressioireita. Vanhempien psykologisen

kaltoinkohtelun on arveltu olevan evolutionaarisesti adaptationaalista sotaisassa ympäristössä. Hypoteesien mukaisia tuloksia saatiin isien osalta (Artikkeli III). Vastoin odotuksia, äitien sotiin liittyvät kokemukset kuolemanvaarasta olivat yhteydessä vähäisempään lasten raportoimaan psykologisen kaltoinkohtelun kokemiseen.

Kognitiivis-behavioraalisen ryhmäintervention tehokkuutta tutkittiin satunnaistetussa ja kontrolloidussa kokeessa (Artikkeli IV). Interventiolla saattoi olla hetkellinen vaikutus vähäistä trumanaikaista dissosiaatiota raportoivien tyttöjen traumaperäisiin stressioireisiin. Interventiolla ei ollut vaikutusta kognitioihin eikä interventiolla ollut yhtään tilastollisesti merkitsevää vaikutusta mielenterveysongelmiin, jos useiden testien tekemisestä johtuva kohonnut todennäköisyys väärin merkitseviin tuloksiin otettiin huomioon.

Tulokset ja tutkimuskirjallisuus viittaavat siihen, että soden kokeneiden lasten negatiivisilla arvioilla on merkittävä rooli pitkäaikaisten mielenterveysongelmien kehittämisessä. Kognitioden kautta riskitekijät muuttuvat traumaperäisiksi stressioireiksi ja interventiot vähentävät oireita.

LIST OF ORIGINAL PUBLICATIONS

- Article I Palosaari, E., Punamäki, R.-L., Diab, M., & Qouta, S. (2013). Posttraumatic cognitions and posttraumatic stress symptoms among war-affected children: A cross-lagged analysis. *Journal of Abnormal Psychology*, 122(3), 656–661. <http://doi.org/10.1037/a0033875>
- Article II Palosaari, E., Punamäki, R.-L., Peltonen, K., Diab, M., & Qouta, S. (2015). Negative social relationships predict posttraumatic stress symptoms among war-affected children via posttraumatic cognitions. *Journal of Abnormal Child Psychology*. <http://doi.org/10.1007/s10802-015-0070-3>
- Article III Palosaari, E., Punamäki, R.-L., Qouta, S., & Diab, M. (2013). Intergenerational effects of war trauma among Palestinian families mediated via psychological maltreatment. *Child Abuse & Neglect*, 37(11), 955–968. <http://doi.org/10.1016/j.chiabu.2013.04.006>
- Article IV Qouta, S. R., Palosaari, E., Diab, M., & Punamäki, R.-L. (2012). Intervention effectiveness among war-affected children: A cluster randomized controlled trial on improving mental health. *Journal of Traumatic Stress*, 25(3), 288–298. <http://doi.org/10.1002/jts.21707>

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All the errors remaining are mine.

Tampere, 16.12.2015

Esa Palosaari

BACKGROUND

1 Introduction

War means death, loss, disabilities, and destruction. In addition to the physical destruction and emotional suffering, children's mental health and mental capacity to function can deteriorate when they experience and witness war. After wars, many children report symptoms of depression and posttraumatic stress (Attanayake, McKay, Joffres, Singh, Burkle, & Mills, 2009).

Posttraumatic stress disorder (PTSD) is one of the most salient mental health problems when witnessing or experiencing a life-threatening event, which is a requirement of its diagnosis. The previous diagnostic criteria in the 4th edition of *The Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR*; American Psychiatric Association, 2000) included the idea that the objective severity of the event alone is not sufficient for the definition trauma but required a subjective reaction. The role of subjective experience was changed in the most recent diagnostic criteria (*DSM-5*; American Psychiatric Association, 2013), which exclude the criterion of subjective experience of fear, helplessness or horror during trauma as one of the characteristics of PTSD. *The International Classification of Diseases (ICD-10*; World Health Organization, 1992) does not include a subjective stressor criterion either. However, *DSM-5* now considers negative alterations in thoughts and expectations as a criterion of PTSD. The interpretation of empirical literature about the role of subjective experience and meaning in diagnostic manuals has therefore shifted from the immediate emotional experience to more general meanings and cognitions. In this thesis, I report empirical studies of determinants of PTSD and of the role of posttraumatic cognitions (PTCs).

1.1 Symptoms of posttraumatic stress disorder are related but separate

Posttraumatic stress disorder (PTSD) consists of related groups of symptoms. There are many hypotheses and relatively few empirical studies about the number of symptom groups and about how they are related to each other over time. We do not have a very good understanding of them.

When the American Psychiatric Association (1980) recognized PTSD as a diagnosable disorder it was proposed to consist of three groups of symptoms: (1) intrusions or re-experiencing, (2) avoidance, and (3) hyperarousal. An unwanted mental image of the traumatic event is an example of an intrusive symptom, avoidance consists of effortful avoidance of reminders of trauma such as the place where the event happened, and hyperarousal includes symptoms such as exaggerated startle response.

According to an influential model (Horowitz, 2011), people attempt to make sense of trauma, that is, to assimilate the trauma with earlier knowledge. Because thinking and remembering trauma is difficult to withstand, people will first avoid the trauma information until they are able to work on it. This is a hypothesized reason for avoidance symptoms. When avoidance of trauma information eventually fails, intrusions bring the information to consciousness to allow working through of the trauma until avoidance again pushes it out of consciousness. In this way intrusions and avoidance take turns until trauma is processed. Creamer, Burgess, and Pattison (1992) suggested a model similar to Horowitz (2011) with the difference that intrusions appear first and determine later avoidance.

Marhsall, Schell, Glynn, and Shetty (2006) measured avoidance, intrusion, and hyperarousal three times within a year and found that neither Horowitz's (2011) nor Creamer and colleagues' (1992) model fitted well with their data and only hyperarousal preceded and predicted both later re-experiencing and avoidance. A similar study measuring intrusiveness, avoidance, and hyperarousal a year, two years, and twenty years after a war found that hyperarousal was the strongest predictor of the other two symptom groups in later years but intrusiveness also predicted avoidance across one year (Solomon, Horesh, & Ein-Dor, 2009) giving some support for the model by Creamer and colleagues (1992).

Emotional numbing has been suggested to be a fourth symptom group in PTSD. Hypothesized causes of emotional numbing have included chronic arousal (Litz, 1992) and both hyperarousal and avoidance (Foa, Riggs, & Gershuny, 1995). When the hypotheses were tested empirically, only hyperarousal predicted emotional numbing (Schell, Marshall, & Jaycox, 2004). Hyperarousal was also the most powerful predictor of re-experiencing and avoidance and chronicity of PTSD. Re-experiencing made a small contribution to later symptoms of hyperarousal and avoidance, consistent in part with Creamer and colleagues' (1992) model.

Closer study of hyperarousal symptoms in PTSD has distinguished between dysphoric arousal (irritability, sleep disturbance, difficulty concentrating) and anxious or fearful arousal (hypervigilance and exaggerated startle response) (Pietrzak

et al., 2014). In a study of responders to the 9/11 attacks in the US, Pietrzak and colleagues (2014) found that the most stable association over time was from dysphoric arousal to numbing within 3, 6, and 8 years the trauma. Anxious arousal predicted re-experiencing and re-experiencing predicted emotional numbing in three out of four times. Avoidance predicted later re-experiencing and numbing only among non-professional responders.

In summary, dysphoric and anxious arousal symptoms mainly drive the development of other symptoms of PTSD: avoidance, re-experiencing, and emotional numbness. This is observed on time scales of months, years, and decades. As noted by Pietrzak et al. (2014), the importance of dysphoric and anxious arousal in the development of other symptoms is consistent with findings that hyperarousal symptoms are the first develop after trauma (followed by avoidance; Bremner, Southwick, Darnell, & Charney, 1996), heart rate moderately predicts the development of PTSD (Bryant, Harvey, Guthrie, & Moulds, 2003), and hyperarousal induced by hyperventilation in the laboratory predicts intrusive memories (Nixon, Nehmy, & Seymour, 2007). The success of exposure therapy, which focuses on decreasing arousal levels (i.e. habituation), is also in line with these findings.

Although empirical articles (Marhsall et al., 2006; Schell et al., 2004) have interpreted the theoretical models as inconsistent with evidence of the importance of hyperarousal, there is some recognition of the role of hyperarousal by Horowitz (2011). In discussing traumatic grief, for example, he mentions that the initial, rapid appraisal of the implications of loss results first in shock or hyperarousal (Horowitz, 2011). When read closely, Creamer and colleagues (1992) also propose that intrusive memories can cause very high aversive arousal which then motivates avoidance. The evidence about hyperarousal could also be consistent with these models if it signals the lack of success of processing trauma via re-experiencing and avoidance and if the studies done so far have not probed the temporal sequence with high enough temporal resolution. Testing the precise temporal sequence of the symptoms probably requires shorter time scales (i.e. days, hours, minutes, seconds, or milliseconds) and instruments other than the questionnaires used so far.

1.2 PTSD symptoms in the present studies

The symptom groups for PTSD in *DSM-5* are re-experiencing trauma, avoiding reminders of trauma, negative changes in thoughts and mood, and negative changes

in arousal and reactivity. The individual symptoms included in the diagnostic criteria in *DSM-5* are shown in Table 1.

Table 1. Symptoms of Posttraumatic Stress Disorder (American Psychiatric Association, 2013)

- | |
|---|
| <ol style="list-style-type: none">1. Intrusive thoughts and images of the traumatic events2. Reenactments of the traumatic event in play3. Distress and physiological reactivity to trauma-related stimuli4. Avoidance of places, thoughts and feelings associated with the event5. Inability to remember essential features of the event6. Negative beliefs and expectations about oneself and the world7. Distorted blame about the event8. Diminished interest in activities9. Feelings of alienation10. Constricted affect11. Irritable or aggressive behavior12. Self-destructive behavior13. Hypervigilance14. Exaggerated startle response15. Detachment16. Sleep disturbances17. Concentration problems |
|---|

DSM-5 includes a PTSD subtype for children who are younger than 6 years. A reason for this is that children younger than 7 years have reported significantly less avoidance compared to 12–18 year-old children, which affects the diagnosis (Scheeringa, Wright, Hunt, & Zeanah, 2006). In the present sample, children's age (10–13) was clearly above six or seven. The research group also used measures of mental health and cognitions which were developed and tested with children who were about the same age as those in the present sample.

In order to reduce the complexity of the models and let our focus be on the theoretical predictions of the role of posttraumatic cognitions, in the present studies PTS symptoms other than negative cognitions were dealt with as one latent construct. The latent PTSD variable was built with groupings of symptoms according models which fit the present data best. There were usually more subgroups of hyperarousal symptoms than in the groupings of official diagnoses.

1.3 Biological approaches to PTSD

The thesis focuses on social, psychological, and behavioral levels of analysis, but it is good to also have some background knowledge about biological approaches to PTSD. Biological studies of PTSD have mainly focused on Pavlovian fear conditioning and extinction (VanElzakker, Dahlgren, Davis, Dubois, & Shin, 2014). Simply put, people and other animals such as rats can associate neutral stimuli with fear when they experience life-threatening events. The formation of associations is thought to occur especially amygdala. Afterwards the associated neutral stimuli will cause protective reactions such as fear in anticipation of harm (LeDoux & Gorman, 2001). Although the model is powerful, it does not seem to be enough to explain PTSD by itself because usually the majority of people who have experienced life threat do not develop PTSD (Yehuda & LeDoux, 2007).

A few biological features are associated with PTSD. First, PTSD is associated with exaggerated amygdala activity and lower medial prefrontal cortex activity in line with the idea that PTSD results from fear, which is difficult to regulate or reappraise (Ochsner & Gross, 2005), and from conditioning, which is difficult to extinguish (Rauch, Shin, & Phelps, 2006). Second, PTSD is associated with a lower level of cortisol (Yehuda, 2005). Cortisol inhibits the physiological stress response and low cortisol levels can explain the high levels of physiological arousal in PTSD (Yehuda, 2005). And third, PTSD is associated with a smaller hippocampus volume (van Rooij et al., 2015). A small hippocampus predicts difficulties in putting memories in context and learning, for example, that a previously negative context later is associated with a positive outcome. This provides a possible biological basis for reexperiencing symptoms, i.e. having memories which are not put in context in the past but experienced as happening in the present (Levy-Gigi, Szabo, Richter-Levin, & Kéri, 2015).

At least low cortisol levels and small hippocampus volume reflect vulnerabilities which exist before trauma (van Rooij et al., 2015; Yehuda & LeDoux, 2007). Genetic and epigenetic factors, and previous life events can therefore explain why, in

response to the same event, some people develop PTSD whereas others do not. For example, differences in early life events such as maternal care cause differences in epigenetically heritable DNA methylation which programs the activity of genes that regulate later stress reactions that are related to PTSD (Yehuda & Ledoux, 2007).

To a great extent, this thesis will deal with appraisals and emotions. An increasing number of studies have recently studied the material basis of these psychological phenomena. For example, a meta-analysis of brain imaging studies concluded that changing the way one thinks about an event (in other words reappraising it) in order to change feelings consistently activates cognitive control regions and lateral temporal cortex and modulates the bilateral amygdala (Buhle et al., 2014). Although inferring psychological states from brain imaging data is problematic, these results are consistent with the interpretation that people can willfully change the meanings (semantic representations) of emotional stimuli which in turn changes the emotions (Buhle et al., 2014).

1.4 Study questions

As mentioned above, the majority of trauma survivors do not develop chronic symptoms of PTSD that would warrant a clinical diagnosis (Alisic et al., 2014; Santiago et al., 2013). PTSD symptoms also usually decrease over time in the absence of mental health interventions although a recent review claimed that PTSD symptoms increase on average after intentionally caused trauma such as war (Santiago et al., 2013). The review included three studies of war trauma out of which two reported an increase (Grieger et al., 2006; Roth, Ekblad, & Ågren, 2006) and one reported a decrease in prevalence (Vojvoda, Weine, McGlashan, Becker, & Southwick, 2008). In addition, Solomon and colleagues (2009), for instance, reported that posttraumatic stress symptoms decreased over time among Israeli combat veterans with a combat stress reaction (with a higher level of symptoms at baseline) but increased among those without a combat stress reaction (with a lower level of symptoms at baseline). After war, Palestinian children experience a decrease in symptoms on average (Thabet & Vostanis, 2000) but there are also subgroups of children whose symptoms do not decrease or whose symptoms increase over time as in the sample of the present study (Punamäki, Palosaari, Diab, Peltonen, & Qouta, 2015).

Why do some children develop posttraumatic stress symptoms (PTS symptoms) and other mental health problems, which become chronic or even grow worse over time, whereas others do not? The potential explanations tested in this thesis were

drawn from a number of models, which attempt to explain the effects of trauma on children's PTS symptoms (Dalgleish, 2004). Psychological traumas have been proposed to have effects on mental health through social, cognitive, emotional, and physiological processes. Mental health problems might be the result of, for example, the formation of maladaptive appraisals and disintegrated memories as well as the dysregulation of the physiological stress response system (Malta, 2012; section 1.3). This thesis focused on the role and determinants of posttraumatic cognitions (PTCs) and on intergenerational processes. Specifically, the studies tested cognitive and evolutionary models about the associations between risk factors and mental health problems after war (Articles I–III).

The first question (Article I) was: how does the way children think about themselves and the world affect their mental health after war? Cognitive models predict that thoughts (cognitions) cause PTS symptoms and are the final link in the causal chain to PTS symptoms for other factors (Ehlers & Clark, 2000; Kinderman, 2005). A central idea is that more negative posttraumatic cognitions (PTCs) will lead to more symptoms of posttraumatic stress for a longer period of time by inducing a sense of current threat. An empirically testable implication of this idea is that those with less negative PTCs should have less PTS symptoms.

The second question (Article II) was: do cognitions mediate the effects of other risk factors on PTSD? According to cognitive models, the final pathway to mental health of all risk factors, including negative parenting, is through cognitions.

The third question (Article III) was: do parents' war experiences affect their children's mental health? Evolutionary life history models predict that parents' war experiences influence their parenting behavior (Quinlan, 2007) and, through parenting, their children's mental health (Belsky, 2008). According to these predictions, children whose parents have more war exposure will experience more negative parenting and have worse mental health as a result. The evolutionary logic of these effects is proposed to be that the children's mental health problems are by-products of changes in behavior that increase the offspring's chances of survival and reproduction.

Finally, despite the acknowledged suffering and disabilities, there is a lack of affordable, large-scale interventions to improve children's mental health after war. The possibility of reducing children's mental health problems was studied by testing the effectiveness of a cognitive-behavioral intervention (Article IV).

2 Cognitions and mental health

2.1 Theoretical models of cognitions and mental health

The central idea of cognitive theories of mental health problems and of cognitive psychotherapy is that biased and dysfunctional cognitions cause and maintain psychiatric disorders such as depression (Beck, 2005) and posttraumatic stress disorder (Ehlers & Clark, 2000). Cognitions, together with other psychological processes, have been proposed to be the final common pathway through which various life events and biological and social factors have their effects on mental health (Ingram, Miranda, & Segal, 1998; Kinderman, 2005).

2.1.1 Concepts of appraisal and representation in trauma models

Appraisals are evaluations about the congruence between a representation of a situation and personal goals and, according to appraisal theories, the evaluations result in emotions (Roseman & Smith, 2001; Smith & Kirby, 2009). In the case of traumatic events such as war and deadly violence, the representation of the situation as unsafe would be appraised as threatening to the goal of maintaining one's physical and psychological integrity. Similarly, a victim who interprets his posttraumatic stress symptoms as indications that he is going crazy would appraise this as threatening to his goal of maintaining an identity as a healthy and capable person. Ehlers and Clark (2000) have hypothesized that generalized negative appraisals of trauma and stress symptoms and the overestimation of the probability of future catastrophic events result in generalized fear, which leads to hyperarousal, maladaptive and self-defeating coping strategies, and chronic PTSD. In addition, appraisals about trauma can also result in other kinds of emotions. For example, appraisals of unfairness and of threat can lead to anger, appraisals of oneself as uncontrollably negative lead to shame (Tracy & Robins, 2006), and appraisals of loss lead to sadness (Ehlers & Clark, 2000).

Various concepts regarding thoughts about trauma and its sequelae are used in the literature and negative posttraumatic cognitions (PTCs) is an umbrella term for these mental representations and processes. Appraisals are processes which use

mental representations that can exist on three interconnected levels of abstraction according to the analogical, propositional, schematic, and associative representational systems model (SPAARS; Power & Dalgleish, 2008). Analogical representations are the most concrete and concern sensory information such as body states and smells, sounds, and sights of the traumatic scene. Propositional representations are language-like beliefs and descriptions. Schematic representations organize analogical and propositional representations into abstract and general models and categories which are more than the sum of their individual representations. The schematic representations help people process experiences quickly but with biases. For example, a trauma survivor can develop general schemas about the world as an unsafe place, about other people as threatening, and about himself as helpless. These schemas will then bias information processing in such a way that the schemas will be maintained: perceptions and interpretations will be biased toward threats. Finally, associative representations connect the various analogical, propositional, and schematic representations in networks so that the activation of one representation increases the likelihood of the activation of other connected representations.

The thoughts one might have about the world and about oneself can simultaneously be different on different representation levels and even in conflict with one another. Janoff-Bulman (1992) describes how one may on a superficial level know that the world is not safe (propositional representations in the SPAARS model) while simultaneously not believing it on a deep level (schematic representations) until the experiential reality of trauma (analogical representations) forces one to reconsider the deeply held basic assumptions of the world (schematic representations).

Schematic representations have been proposed to be part of a long-term memory system, which learns slowly and incrementally and consists of averages and typical experiences (Smith & DeCoster, 2000). A second long-term memory system forms representations of new, unique events quickly. The slowly learning memory retrieves information quickly and effortlessly whereas the quickly learning memory usually requires conscious and effortful retrieval.

Horowitz (2011) considers a form of short-term memory to be important for his theory of PTSD. Drawing on Broadbent (1971), he claims that trauma-related information is retained in an active memory bank slot until it is replaced with some other, more pressing information. Horowitz (2011) claims that this active trauma memory makes the intrusive symptoms possible.

Analogically to two long-term memory systems, there are two types of information processing: automatic and controlled (Kahneman, 2011). Kahneman (2011) proposed that cognitively more available representations (such as first-person experiences, media reports) inflate the probability estimates of the automatic system (for example, the likelihood that one will be killed in a bombing) even when the controlled system may “know” that the probability is low. Although automatic and effortless processing is associated with general and abstract schemas, automatic processing can also use representations and memories of unique, one-time events.

To give an example in the context of the sample in the presents study, children in Gaza can hear and see a bomb destroy a nearby building. The sights, smells, and sounds of bombing are analogical representations, which are first stored in active short-term memory, from where they can be quickly retrieved. The children can appraise the bombing as a threat to their goal for survival, which causes fear and anger together with the associated bodily readiness to flee or fight (e.g. heart beating faster and “a lump in the throat” in order to provide oxygen to the limbs). The children may have heard and discussed with their parents about the bombings and what they mean, and the propositional representations can be activated when children attempt to make sense of their experience. Some of the children may have experienced similar threats many times before and these experiences have become stored in long-term memory as non-specific typical experiences, i.e. categories or schemas. Exposure to the bombing instantly brings back these earlier patterns including emotions, thoughts, and actions, which can be different for children with different developmental histories.

2.1.2 Biases in appraisals

According to the cognitive perspective, depression, for example, can be viewed as the result of taking negatively biased interpretations and predictions about oneself and the world as certainties, which leads to giving up and shutting down. There is no possibility of escaping (by fleeing) or winning (by fighting). Instead, in anxiety the negative state of the world is considered as a possibility, which leads to a readiness for the danger and fight or flight (fear or anger) responses (Beck, 2002).

Although PTSD is not considered to be an anxiety disorder in *DSM-5* (Gotlib & LeMoult, 2014), it is still useful to consider trauma responses in terms of threat. Ehlers and Clark (2000) propose that global, generalized negative appraisals of a life-threatening event and related stress reactions lead to chronic PTSD symptoms by

inducing a sense of current threat. The appraised threat can be from the outside (“nowhere is safe”) and / or from the inside (“I can’t control or cope with what happens to me”; Benight & Bandura, 2004; Cieslak, Benight, & Caden Lehman, 2008; LeDoux & Gorman, 2001). The threat appraisal will lead to fear and fear leads to high vigilance and physiological arousal. In the Ehlers and Clark’s (2000) model, negative appraisals can also lead to self-defeating coping strategies that prolong the stress reactions. The belief that one is unable to cope with the strong emotions related to the event and subsequent avoidance of those emotions may at first help in calming down but it prevents recovery in the long term by disabling the processing of trauma memories.

2.1.3 Fear structures

Foa and Kozak (1986) proposed that fear structures account for the symptoms of anxiety disorders and also PTSD (Foa & Rothbaum, 2001). The fear structures include associated networks of representations of feared stimuli, meanings, and physiological responses. The hypothesized fear structures are therefore not the result of only simple reinforcement learning but also of evaluations and meanings. In PTSD, a large number of neutral representations are associated with the fear structures which can therefore be activated easily and lead to perceptions of the world as dangerous and the self as incompetent. Similarly to Ehlers and Clark’s (2000) model, the result is fear.

According to Foa and Kozak’s (1986) model, people with chronic PTSD do not recover because they do not process the traumatic memory, which would lead to disconfirmation of the thoughts that the world is unsafe and that they are incompetent, and to the disassociation between stimuli, meanings, and responses in the fear structure. The model requires that the fear structure or memory should be activated in order to change it and the activation of fear structures in exposure therapy means exposure to the memories, feelings, and objects associated with the trauma. The experience of reduced physiological arousal in relation to the fear memory (i.e. habituation) is an especially potent source of corrective information, but experiences of reduced arousal within sessions in therapy (short-term habituation) can be independent of reduced arousal outside therapy sessions (long-term habituation). Foa and Kozak (1986) hypothesized that habituation outside therapy sessions is the result of changes in general representations of threat. They further proposed that trauma processing is enhanced if there are supportive others

with whom one can talk emotionally and activate, correct, and organize the fear structures.

2.1.4 Discrepant schemas

The schema-based theories of PTSD by Horowitz (2011), Janoff-Bulman (1989, 1992), and Power and Dalgleish (2008) consider the discrepancy between the positive pretraumatic and the negative posttraumatic schemas about the self, others, and the world as the main factor leading to PTSS. For example, one might have a general model of other people as non-violent based on repeated experiences of being treated kindly, and the first-hand experience of war, which includes people killing and maiming other people, is not consistent with the schematic model.

According to these schema theories, PTS symptoms and especially intrusive symptoms result from the uneven process of integrating new, discrepant information from the trauma with the existing positive schemas. The intrusive re-experiencing continues to occur until the model or schema of oneself, others, or the world is updated to include the new experiences. Negative pretraumatic cognitions may be a risk factor for anxiety and depression, for instance, but not for PTS symptoms because the intrusive symptoms of PTS symptoms are thought to require the discrepancy between the old positive pretraumatic schemas and the new negative trauma representations (Power & Dalgleish, 2008). However, because empirical studies have shown that past traumas and a history of psychological problems form a risk for PTSD (Brewin, Andrews, & Valentine, 2000), Janoff-Bulman (1992) and Foa and Rothbaum (2001) have allowed for the possibility of negative pretraumatic schemas in PTS symptoms. They suggest that it is the extremity and rigidity of beliefs, whether negative or positive, which is crucial.

Janoff-Bulman (1992) states that the lack of stable, nonthreatening schemas is likely to keep persons hyperreactive to stress and vulnerable to disintegration when faced with future trauma. In contrast, the acknowledgement of some personal vulnerability as a result of prior minor traumatic experience with otherwise benign core schemas could serve as an inoculation against future psychological distress. Janoff-Bulman (1992) particularly brings up survivors of severe child abuse who would be primed to perceive new trauma as intensely threatening and respond to it with physiological hyperarousal and cognitive-emotional disintegration. Also, others have suggested that the strengthening of previous negative schemas by trauma is a source of psychological problems (McCann & Pearlman, 1990). The SPAARS

model (Power & Dalgleish, 2008) does not deny that PTS symptoms can develop in the presence of negative pretraumatic cognitions but the authors write that this cannot occur through appraisals and schemas. Instead, the authors predict that PTS symptoms will then appear through environmental, sensory cueing of associations related to trauma (Dalgleish, 2004). That is, rather than more or less conscious evaluations of the meanings of trauma, sensory stimuli such as sights, sounds or smells associated with trauma should activate earlier stress reactions and the related emotions directly. This is because the authors subscribe to the view that schema-related intrusions can only be the result of discrepancy between positive pretrauma schemas and the trauma.

Empirical studies do not support the idea of positive pretrauma schemas as risk factors on average (see section 2.2 below). There might nevertheless be some types of positive pretrauma schemas that are risk factors. For example, people with protected lives could have valid positive and inflexible schemas and people with trauma could have illusory positive and inflexible schemas maintained by inhibition of processing of negative experiences (Power & Dalgleish, 2008). These subgroups of people could develop PTSD after trauma because of their positive but inflexible schemas. The hypothesis has not yet been put to an empirical test.

2.1.5 Memory quality

Many models invoke the nature and structure of memory to explain the intrusive symptoms in PTSD. Brewin, Gregory, Lipton, and Burgess (2010) propose the existence of sensory and context bound memories and representations, S-memory and C-memory, respectively, which are associated with different brain structures and networks (Brewin, 2014).

Intrusions are driven by the activation of sensory-bound S-memories and representations which are not coded with context and can therefore lead to reliving of the traumatic event as if it was happening in the present. The intrusive memories can be triggered in three ways: First, by selective attention to the reminders that can be the paradoxical result of avoidance which requires monitoring of the environment. Second, by negative appraisals leading to the negative mood associated with the memories. And third, by overgeneralization in reasoning that leads to the association of traumatic memories with multiple neutral representations (Brewin et al., 2010).

Poorly or incompletely integrated memories with strong stimulus-stimulus and stimulus-response associations activated by cues are a cause of intrusive symptoms also according to Ehlers and Clark (2000) and the SPAARS models (Dalgleish, 2004). Ehlers and Clark (2000) propose that there is a reciprocal relationship between trauma memory and trauma appraisals: appraisals bias trauma recall towards aspects consistent with the appraisals and the problematic qualities of the memories can lead to appraisals maintaining a sense of current threat. For instance, problems with memory can be interpreted as signs that one is incompetent and unworthy, that there might be something worse that happened which one cannot remember, that one is responsible for the event, and that one still lives in the traumatic environment (Ehlers & Clark, 2000).

2.2 Empirical studies on cognitions and mental health

Concerning depression, on which literature is more plentiful than on PTS symptoms, research mostly supports the hypotheses that negative cognitions cause depression and changes in cognitions mediate the beneficial effects of cognitive therapy (Garratt, Ingram, Rand, & Sawalani, 2007; Gotlib & Joormann, 2010; Kaufman, Rohde, Seeley, Clarke, & Stice, 2005). However, the negative cognitions could also be caused by depression or some third factor underlying both depression and cognitions. Experimental evidence confirms that cognitions are influenced by affective and biochemical factors related to depression (Longmore & Worrell, 2007; Segal, Kennedy, Gemar, Hood, Pedersen, & Buis, 2006) and pharmacotherapy of depression decreases negative cognitions in a similar way to cognitive therapy (Quilty et al., 2014) although cognitive therapy alone bolsters more positive self-representations than when it is combined with pharmacotherapy (Dozois et al., 2014). Furthermore, longitudinal studies find that the association between depression and negative representations is bidirectional (LaGrange et al., 2011; Timbremont & Braet, 2006). Negative cognitions and depressive symptoms also predict a larger number of stressors over time among adolescents (Calvete, Orue, & Hankin, 2013). The role of cognitions in psychopathology is therefore more complex than originally hypothesized and depression can cause cognitive scars which lead to further depressive symptoms.

Positive changes in cognitions mediate treatment effectiveness for anxiety disorders and PTSD among adolescents (Kendall & Treadwell, 2007; McLean, Yeh, Rosenfield, & Foa, 2015). A positive association between posttraumatic cognitions and posttraumatic stress symptoms has also been found in all published studies that

I am aware of (e.g. Bryant, Salmon, Sinclair, & Davidson, 2007; Meiser-Stedman, Dalgleish, Glucksman, Yule, & Smith, 2009; Nixon, Nehmy, Ellis, Ball, Menne, & McKinnon, 2010). Even in studies where statistically significant longitudinal association is not found (Field et al., 2008; Kangas, Henry, & Bryant, 2005), a statistically significant association in the cross-section is observed.

The lack of statistically significant longitudinal associations in the two studies cited above could be the result of the different effects of different trauma types. The patients had life threatening medical conditions: stroke (Field et al., 2008) and cancer (Kangas, Henry, & Bryant, 2005). A statistically significant longitudinal association is observed among patients with traumatic injury (Bryant, Salmon, Sinclair, & Davidson, 2007), motor vehicle accident survivors (Ehlers, Mayou, & Bryant, 1998; Ehrling, Ehlers, & Glucksman, 2008), and assault survivors (Dunmore, Clark, and Ehlers, 2001; Halligan, Michael, Clark, Ehlers, 2003). All of these seem to be experiences of sudden threat external to one's own body in contrast to stroke and cancer but this difference is not necessarily the correct explanation.

If cognitions are an important determinant of PTS symptoms (especially after sudden threats of external harm as speculated above) we should also observe the association among war-exposed children. Cognitive factors such as lack of optimism and negative appraisal of trauma were associated with increased PTS symptoms among war-exposed adolescents in Sarajevo (Duraković-Belko, Kulenović, & Dapić, 2003) and studies of adult combat veterans found that negative posttraumatic cognitions are associated with higher PTS symptoms (Dekel, Solomon, Elklit, & Ginzburg, 2004; Renaud, 2008).

Against the predictions of most cognitive theories of PTSD, Duraković-Belko and colleagues (2003) observed that it was the appraisal of trauma as a loss rather than as a threat which was associated with more PTS symptoms. This result is compatible with the definition of stress as resource loss (Hobfoll, 1989). Hobfoll (1989) proposed that one overarching human goal is to build, protect, and retain valued resources (object, condition, and personal characteristics, and energy), losses tend to be disproportionally more salient and impactful than gains (Kahneman & Tversky, 1974), and losses or threats of loss determine stress reactions. The model has been extended also to traumatic stress (Hobfoll, 1991) and it has found support in studies done among Palestinians (Hobfoll, Mancini, Hall, Canetti, & Bonanno, 2011). Hobfoll (1989, 2001) emphasizes the objective nature of resource loss. Hobfoll (2001) does not deny that appraisals play a role but especially individual differences in appraisal should have little predictive power after accounting for objective losses and culturally normative evaluations. Hobfoll's (1989) conservation

of resources model can have problems accounting for the effectiveness of individual therapy which changes PTS symptoms and appraisals (McLean et al., 2015). One potential test of the model would be to measure both resources and appraisals during therapy and see whether there are changes in material, social, and psychological resources which predict changes in appraisals.

Empirical studies have not supported the (qualified) predictions that PTSS will not appear among persons with negative pretraumatic schemas. Among children who witnessed the 9/11 attacks in the US indirectly, prospectively measured pretraumatic threat appraisal and positive appraisal styles (measured by their appraisals of the three biggest problems during the previous month) were associated with the posttraumatic appraisals (Lengua, Long, & Meltzoff, 2006). On average, children who reported high levels of threat appraisals before the terrorist attack were likely to have high levels of trauma-specific threat appraisals after the trauma. Furthermore, trauma-specific threat appraisals mediated the effects of pretrauma threat appraisal style on PTS symptoms (Lengua et al., 2006). Similarly in a prospective study of trainee firefighters, negative self-appraisals measured before exposure to motor vehicle accidents, fires, and scenes of suicide predicted high levels of severe PTS symptoms after the trauma (Bryant & Guthrie, 2007). In one study, college students were asked directly about the discrepancy between pre- and posttraumatic beliefs and personal goals. The results show that there was a positive association between the cognitive discrepancies and PTS symptoms (i.e. if the difference between earlier positive beliefs and later negative beliefs was larger there were more posttraumatic stress symptoms). However, the association was fully mediated by the level of negative cognitions about self and the world (Park, Mills, & Edmondson, 2010). If discrepancy is the crucial factor in the development of PTS symptoms, the level of negative cognitions should not have accounted fully for its association with PTS symptoms.

If negative posttraumatic cognitions underlie PTS symptoms, psychological interventions should decrease PTS symptoms by decreasing negative posttraumatic cognitions. Accordingly, changes in PTCs have been found to mediate the effect of interventions on changes in PTS symptoms among children and adolescents (Smith et al., 2007) as well as among adults (Foa & Rauch, 2004; Karl et al., 2009). The few studies which have used several measurement times during therapy have also found that PTCs predict PTS symptoms over time during both cognitive and exposure therapies (Kleim et al., 2013; McLean et al., 2015; Zalta et al., 2014).

Meiser-Stedman and colleagues (2009) interpreted Ehlers and Clark's (2000) appraisal and memory model of PTSD as implying that high levels of PTS symptoms

lead to high levels of negative posttraumatic cognitions shortly after trauma and high levels of negative posttraumatic cognitions in turn lead to chronic PTS symptoms. In other words, posttraumatic cognitions mediate the association between acute and chronic posttraumatic stress symptoms. Meiser-Stedman et al. (2009) tested the hypothesis among children exposed to a motor vehicle accident and found that early PTSS predict chronic PTSS via posttraumatic cognitions. The study by Meiser-Stedman et al. (2009) consisted of two time points and was thus partly cross-sectional: posttraumatic cognitions and chronic PTSS were measured at the same time. Fully longitudinal study setting would have provided a better test. Because the associations between symptoms and cognitions have in general been weaker and less consistent in longitudinal studies, it is possible that the result does not hold in such a setting. Sharar, Noyman, Schnidel-Allon, and Gilboa-Schechtman (2013) measured PTCs and PTS symptoms 2, 4, and 12 weeks after the traumatic events and found that early PTS symptoms and PTCs predicted each other. My reanalysis of their data showed that one way early PTS symptoms affected later PTS symptoms was indeed through PTCs. The results support Ehlers and Clark's (2000) model and the hypothesis that early stress symptoms increase the negativity of appraisals which lead to chronic posttraumatic stress symptoms.

To summarize, the empirical evidence about the relationship between posttraumatic cognitions and PTS symptoms is more supportive of the hypothesis that negative appraisals lead to PTS symptoms (Ehlers and Clark, 2000) than of the models emphasizing the discrepancy of schemas. I therefore focused on further testing of Ehlers and Clark's (2000) cognitive model of PTSD which claims that the amount and intensity of negative appraisals after trauma lead to more chronic posttraumatic stress symptoms.

3 Cognitions as a pathway of the effects of risk factors

Studies have shown that pretrauma appraisal styles influence both PTCs and PTS symptoms (Bryant & Guthrie, 2005; Lengua et al., 2006), which raises the question about factors other than trauma and acute stress reactions influencing trauma-related cognitions. Pre-trauma negative experiences are one likely cause of PTCs. This has been implicitly assumed in the argument (e.g. in Elwood, Hahn, Olatunji, & Williams, 2009) that the influence of prior stressful experiences on PTSD shows that negative schemas before traumatic events are a risk rather than a protective factor.

3.1 The development of negative appraisals before trauma

Schore (2002) hypothesized that the roots of PTSD are in negative interactions during infancy. This is plausible for example if negative schemas, learned through repeated experiences, contribute to the development of PTSD, or if the negative interactions lead to a lack of ability to regulate bodily arousal. Attachment theory in particular posits that repeated early negative interactions lead to persistent negative cognitive models or internal working models of oneself and others (Bowlby, 1988). Similarly in cognitive models of depression, early negative experiences embed negative schemas or attitudes which later stress can activate (Beck, 1967; Ingram, 2003). In line with these models, environmental but not genetic variation has been found to be associated with negative cognitions and depression among twins (Lau, Belli, Gregory, Napolitano, & Eley, 2012).¹

To explain the observed connection between negative cognitive styles and early aversive experiences such as authoritarian parenting, lack of acceptance, sexual and emotional abuse (Alloy, Abramson, Smith, Gibb, & Neeren, 2006; Gibb, Abramson, & Alloy, 2004; Vélez et al., in press), Rose and Abramson (1992) hypothesized that people try to make sense of the stressful events so that they could avoid the events

¹ However, there seems to be genetic influences in depression in general as well as gene–environment interactions (Dobson & Dozois, 2011; Franić, Middeldorp, Dolan, Ligthart, & Boomsma, 2010), which twin studies in behavioral genetics have problems accounting for (Duncan, 2014). Experimental studies (such as randomized controlled trials of psychosocial interventions) provide a better test of the effects of environment.

in the future. At first this search can lead to hopeful inferences (“Mommy got mad because my room was a mess”, i.e. children think they can avoid the anger by changing their own behavior) but after repeated experiences that disconfirm the hopeful inferences, hopeless, depressive cognitions take their place (“My mother will continue to beat me no matter how I behave”; “I am bad and can’t do anything right”; Rose & Abramson, 1992). Children’s need hierarchy, cognitive immaturity, lack of experience and knowledge, and belief in adults’ explanations influence the explanations children come up with (Rose & Abramson, 1992). Children’s conflicting needs are shown for example in the behavior of maltreated children with disorganized attachment styles who simultaneously try to remain close to their caregivers as sources of protection and avoid them as sources of harm (Cyr, Euser, Bakermans-Kranenburg, & Van Ijzendoorn, 2010). The lack of experience and knowledge of the world, cognitive immaturity favoring intentional explanations (Rossett & Rottman, 2014), and dependence on adults lead children to explanations which make the child uniquely responsible for the harm inflicted on them. The end result is that especially young children can become passively accepting of the abuse and develop negative self-concepts deserving negative outcomes (Rose & Abramson, 1992). The development of negative cognitions related to PTS symptoms may have similar origins in early negative interactions with parents. There is evidence that children’s internal attributions of abuse are positively associated with mental health problems, and that feelings of shame mediate the internal attributions’ association to PTSD (Feiring, Taska, & Chen, 2002). Negative interactions with and abuse by parents can therefore be especially influential in the development depression as well as PTSD through negative cognitions and the present thesis tested the idea.

3.2 Influences on negative appraisals during and after trauma

The idea that traumatic event itself makes cognitions or appraisals more negative has empirical support (Prager & Solomon, 1995; Solomon, Iancu, & Tyano, 1997) but there are also some contradicting results. For example, Ginzburg (2004) found that exposure to myocardial infarction was not related to world assumptions although the negative world assumptions were related to PTSD.

Social support after the trauma can also help with the processing of the traumatic event (Cahill & Foa, 2010; Ehlers & Clark, 2000). Social support is sought after trauma as a way to manage stress which is why others’ perspectives—through their

verbal and non-verbal communication—can become especially influential in appraising trauma and its causes and consequences. I.e., people seek support and pay close attention to others after trauma (Guay, Billette, & Marchand, 2006; Joseph, Williams, & Yule, 1997). The responses of others can help make sense of the trauma and stress reactions and reduce the sense of isolation, shame, and guilt (Ehlers & Clark, 2000). Talking about the trauma makes it possible to remember and re-experience the event, change negative interpretations, and habituate or reduce the physiological arousal with the help of supportive others instead of using thought suppression which paradoxically increases intrusive thoughts (Ehlers & Clark, 2000; Guay et al., 2006). The quality of social support is appraised as well, which influences emotions and coping strategies (Ehlers & Clark, 2000; Guay et al., 2006; Joseph et al., 1997). There is a possibility that trauma survivors will interpret even receiving positive support negatively as a sign that they cannot cope alone and are therefore not as autonomous and capable as they want to be (Ehlers & Clark, 2000). Despite these many hypothesized pathways, Guay and colleagues (2006) note that there is not much empirical research testing the links from social support to PTCs.

More distant factors such as socioeconomic status may also affect PTCs. The effects may be indirect. For example, economic stress can cause conflicts within the family leading eventually to negative views of oneself and others. The effects may also be direct, as negative views of a social group tend to become internalized in order to justify the existing social order (Cox, Abramson, Devine, & Hollon, 2012; Jost, Banaji, & Nosek, 2004). Not much is known about these possible influences on negative representations and cognitions in war-prone environments.

Because of the large number of theoretically plausible influences and the close connection between PTCs and PTS symptoms, PTCs can even be hypothesized to be a final pathway to PTS symptoms for *all* risk factors similarly to cognitions' role in depression (Ingram et al., 1998). There are a large number of risk factors of PTSD among children with the largest effects belonging to social relationships and cognitive factors (Trickey, Siddaway, Meiser-Stedman, Serpell, & Field, 2012). On the basis of their strong association, Trickey and colleagues (2012) speculated that cognitive factors are probably among the mechanisms through which robust risk factors influence PTS symptoms.

PTCs have been found to mediate the effects of prior interpersonal trauma on acute trauma symptoms (Nixon & Nishith, 2005), as well as the effects of mental illness before trauma (Constans et al., 2012) and attachment insecurity (Lim, Adams, & Lilly, 2012) on PTS symptoms among adults. A re-analysis of the data of Leeson and Nixon (2011) showed that PTCs also mediated the effects of maltreatment on

depression and PTS symptoms. Belsher and colleagues (2012) found that PTCs partially mediated the negative association between social constraints and PTS symptoms. Hitchcock and colleagues (2015) affirmed that PTCs mediated the longitudinal association between social support and PTSD among children (mean age = 12 years) with a single incident trauma.

Together with my co-authors I tested a variety of risk factors as potential predictors of PTCs and PTS symptoms at the same time. This made it possible to compare the strength of the association of different predictors as well as reduce (although not eliminate) omitted variable bias which might have distorted earlier studies. In addition to familial risk of PTS symptoms and socioeconomic status, we included measures of interactions in relationships important for preadolescents, i.e. parents, siblings, and peers (Steinberg & Morris, 2001). A similar study by Kinderman, Schwannauer, Pontin, and Tai (2013) found support for the hypothesis that cognitive factors mediate the effects of risk factors on depression and anxiety (Kinderman, 2005).

4 Psychological maltreatment as a pathway of intergenerational effects of war trauma

Palosaari, Punamäki, Qouta, and Diab (2013) found that psychological maltreatment was a major risk factor of PTS symptoms. Psychological maltreatment has also been proposed to be a mechanism through which parents' exposure to war and political violence affects children's mental health (Belsky, 2008; Yehuda, Halligan, & Grossman, 2001). Belsky (2008) speculated that psychological maltreatment could have the function of influencing children's development in a way that makes survival and reproduction more likely in a dangerous environment with a low life expectancy. The idea is drawn from life history theory which explains variation in organisms' growth and reproduction (Hill & Kaplan, 1999; Pianka, 1970).

4.1 Models based on Life History Theory

Belsky (2008; Belsky, Steinberg, & Draper, 1991) proposes that harsh, rejecting, and insensitive parenting, which are criteria of psychological maltreatment (Glaser, 2002), prepares the offspring to a dangerous extra-familial environment. Psychological maltreatment increases attachment insecurity (Riggs & Kaminski, 2010) and symptoms of anxiety (Spertus, Yehuda, Wong, Halligan, & Seremetis, 2003), depression (Allen, 2008; Ferguson & Dacey, 1997; Wright, Crawford, & Del Castillo, 2009), and aggression (Allen, 2011).

Psychological maltreatment can benefit offspring's reproductive success through insecure attachment. The hypothesis is that insecure attachment leads to having many children at an early age which is beneficial if children as well as adults tend to die early (Belsky, 2008; Chisholm, Quinlivan, Petersen, & Coall, 2005; Del Giudice, 2009; Schmitt, 2005).

Anxiety, depression, and aggression have functions beneficial for survival in a dangerous environment. Attentional biases and vigilance to threats associated with PTSD can help recognize and avoid danger quickly (Dalgleish, Moradi, Taghavi, Neshat-Doost, & Yule, 2001; El Khoury-Malhame et al., 2011; Fani et al., 2012; Masten et al., 2008; Pergamin-Hight, Naim, Bakermans-Kranenburg, van

IJzendoorn, & Bar-Haim, 2015; Scrimin, Moscardino, Capello, Altoè, & Axia, 2009; Swartz, Graham-Bermann, Mogg, Bradley, & Monk, 2011).

Depressive symptoms caused by psychological maltreatment can serve as signals of submission and inhibit enemy's hostility (Irons & Gilbert, 2005). Belsky (2008) predicts that especially women who are depressed and passive would be likely to survive war and ethnic cleansing. The reasons are that they signal submission by their depression and—from an evolutionary perspective—there are few resources which are more valuable than reproductively mature women.

Finally, aggressiveness can also help people in surviving a war because it aids in deterring, wounding, or killing others before being killed by them (Belsky, 2008). Belsky (2008) predicts that war increases aggressiveness especially among males because deadly enemies are not likely to value them for their reproductive potential and would therefore be more likely to kill them rather than girls and women.

A different interpretation of life history theory hypothesizes that warfare leads to a decrease in sensitive and close parental care because such care does not increase fitness enough when the expected lifespan is short (Quinlan, 2007). Quinlan (2007) assumes that war is independent of parental care, and parental investment in a war-prone environment is less productive in evolutionary terms than in a peaceful environment. One reason is that the offspring would be more likely to die before the parental investments would pay off in evolutionary terms. Having only a couple of children and investing time, resources, and care in them but having all of them die before they reproduce would not be evolutionarily as worthwhile as investing less in each child but having more children. Having more offspring increases the chances that some of them will reach the reproductive age even if some of them die before.

4.2 Empirical studies on the intergenerational effects of war

Empirical studies have provided some support for the hypothesis that psychological maltreatment mediates intergenerational effects of war trauma (i.e. that psychological maltreatment is the link between or the pathway via which war trauma affects the next generation). The association between being the child of Holocaust survivors' offspring (i.e. being the third generation) and insecure attachment style was mediated by parents' rejection and overprotection (Scharf, 2007), that is, people who had grandparents who survived the Holocaust were more likely to have insecure attachment style than those whose grandparents were not Holocaust survivors and

this higher likelihood appeared to be explained by the Holocaust survivors' offsprings' higher likelihood of rejecting or overprotecting their children. Relatedly, intergenerational transmission of PTSD among Holocaust survivors was mediated by psychological maltreatment (Yehuda et al., 2001).

Furthermore, there is evidence that parents' exposure to war and torture is directly associated with the individual outcomes predicted by Belsky (2008): insecure parent-child attachment (Han, 2005), children's PTSD and depression (Daud, Skoglund, & Rydelius, 2005; Montgomery, 1998), aggressive behavior (Rosenheck and Fontana, 1998) and increased attentional biases toward threat (Motta, Joseph, Rose, Suozzia, & Leiderman, 1997; Suozzia & Motta, 2004).

Among Holocaust survivor families, the findings suggest that the intergenerational effects are observed when the offspring is under stress: Epidemiological studies show no direct intergenerational effects of Holocaust on mental health (van IJzendoorn, Bakermans-Kranenburg, & Sagi-Schwartz, 2003; Sagi-Schwartz, van IJzendoorn, & Bakermans-Kranenburg, 2008), but the survivors' offspring are more vulnerable than others to PTSD in stressful situations (Solomon, Kotler, & Mikulincer, 1988; Baider, Peretz, Hadani, Perry, Avramov, & De-Nour, 2000).

War and political violence is associated with harsh, rejecting, and insensitive parenting or psychological maltreatment (Haj-Yahia & Abdo-Kaloti, 2003) especially among fathers (Vogt et al., 2004). One study found that whereas paternal Holocaust trauma increased negative and decreased positive parenting by both parents, maternal Holocaust trauma had the opposite effect (Last & Klein, 1984). However, warfare has been also found to be associated with decreased maternal care (sleeping proximity, response to crying, bodily contact) but not decreased paternal involvement (sleeping proximity, closeness in infancy and childhood) in a sample of 186 societies (Quinlan, 2007).

5 Psychosocial interventions among war-affected children

Intervention studies can help both in finding effective ways to improve mental health as well as in uncovering causal relations. Many interventions for war-affected children share common elements such as psychoeducation, relaxation techniques, and positive reframing (Gelkopf & Berger, 2009; Smith, Dyregrov, & Yule, 2000). In addition to these, the intervention Teaching Recovery Techniques (TRT), on which the intervention I studied with my research group was based, teaches children, for example, how to control mental imagery to reduce intrusive symptoms and how to deal with fears and avoidant symptoms via gradual exposure (Smith, Dyregrov, & Yule, 2000). Does teaching these activities or techniques in class-room help children?

There are few randomized controlled trials showing effectiveness of group psychosocial interventions for war-affected children and the effects have been modest. Jordans, Tol, Komproe, & De Jong (2009) reviewed mental health care treatments for children in war and found two randomized controlled trials. The studies found small to medium-sized effects (Bolton, Bass, Betancourt, & et al, 2007; Dybdahl, 2001). The first study, by Bolton and colleagues (2007), compared group interpersonal therapy and creative workshops to a control group and observed a medium-sized effect ($d = 0.53$) on depression among Ugandan adolescent girls in interpersonal therapy. The second study, by Dybdahl (2001), observed small positive effects on mothers' mental health, and on 5–6 –year old children's weight and psychological functioning in an intervention targeting parent-child interaction in Bosnia.

Peltonen and Punamäki (2010) pooled two randomized (Berger, Pat-Horenczyk, & Gelkopf, 2007; Layne et al., 2008) and two nonrandomized studies (Ehnholt, Smith, & Yule, 2005; Thabet, Vostanis, & Karim, 2005) and found a combined medium-sized effect estimate on PTSD ($d = 0.56$). Berger and colleagues (2007) studied a preventive intervention in school-classes which included psychoeducation, coping skills training, body and emotional awareness exercises, support system enhancement, reframing experiences, and future planning. They found a decrease in PTSD, somatic complaints, generalized anxiety, and separation anxiety. Layne

and colleagues (2008) studied classroom-based psychoeducation, relaxation, reprocessing of trauma experience, reframing, grief processing, problem-solving, and thought and emotion regulation. Results showed a decrease in PTSD and depression after intervention and in a 4-month follow-up. Ehnholt and colleagues (2005) studied TRT among war-affected refugee and asylum-seeking children in the UK. They found a decrease in PTSD and behavioral difficulties but the effects were not maintained at 2-month follow-up. There was no significant effect on depression. Thabet and colleagues (2005) studied Critical Incident Stress Management (CISM) among war-affected Palestinian children in Gaza and found no effect on PTSD or depression symptoms.

Betancourt, Meyers-Ohki, Charrow, and Tol (2013) observed that although the number of studies is increasing there are few using control groups and testing long-term effects. They suggested that a promising approach for intervention studies among war-affected children in low- and middle-income countries is stepped care where universal, class-room based preventive interventions are supplemented with treatments for those children who have more difficult symptoms.

Little is known about the mechanisms through which psychosocial interventions operate (Kazdin, 2007) but changes in cognitions are a probable pathway. Tol and colleagues (2008) tested the efficacy of a school-based intervention for conflict-exposed children in Indonesia and found that it improved both hope and posttraumatic stress symptoms (but not depression, anxiety, functioning, or stress-related physical symptoms). The result suggests that appraisals could be important for the effectiveness of interventions for PTSD among war-affected children. That posttraumatic cognitions mediate the effectiveness of trauma interventions has received support in the few studies of best quality in both cognitive and in exposure therapy (Kleim et al., 2013; McLean et al., 2015; Zalta et al., 2014). Although the studied cognitive therapy also included exposure and the effective element can be habituation through exposure (Kleim et al., 2013), the results reinforce the view that different types of interventions can work through similar mechanisms. In cognitive therapy, talking and the interaction with the therapist can challenge negative appraisals, whereas in exposure therapy cognitions can be changed, for example, by experiences about the reduced physiological arousal to previously anxiety-inducing stimuli.

We know something about who benefit from the trauma treatments because the effects of interventions on war-affected children have often been reported to be gender-specific, and it is girls who tend to benefit from them. For example, Interpersonal Therapy in Uganda decreased depression (Bolton et al., 2007) and

Classroom Based Intervention Program in Indonesia reduced PTS symptoms (Tol et al., 2008) only among girls and not among boys.

In addition to gender, dissociation or detachment from physical and emotional experience can potentially moderate intervention effects, for example, by preventing learning from exposure (habituation). No one had tested this possibility among traumatized children before our study but it had been found that dissociation decreases the effectiveness of therapy among adults with an anxiety disorder (Michelson, June, Vives, Testa, & Marchione, 1998).

6 Study context

6.1 Historical background of political violence in Gaza

The context of the study was the aftermath of a major war in the long-standing Israeli–Palestinian conflict. The Israeli army launched intensive attacks on the Gaza Strip in December 2008 using warplanes, tanks, and sea vessels. The 22-day war claimed 1,166–1,444 Palestinian lives, including 313–348 children, and injured about 1,600 children (PCHR, 2009; UNHRC, 2009). Satellite-based assessment estimated that the offensive resulted in the destruction or severe damage to about 2,600 buildings (UNITAR, 2009).

The Gaza Strip has been under a blockade by Egypt and Israel since 2007 (Erlanger, 2007) when the Islamic organization Hamas took control of the Gaza Strip from the Palestinian Authority and from the rival Fatah organization which fled from the area to the West Bank (Urquart, Black, & Tran, 2007). The takeover by Hamas followed a military conflict between Hamas and Fatah after Hamas had won the legislative elections in 2006 (Urquart, Black, & Tran, 2007).

Many Israeli restrictions and sanctions on Gaza had been in place before 2007. Forty years before, in the 1967 Six-Day War, Israel took the Gaza Strip from Egypt and Gaza became an Occupied Territory, a closed military area (B’Tselem, 2015a). Israel allowed residents of the Occupied Territories to move within and between Israel, the Gaza Strip, and the West Bank from 1972 until 1989. After 1989, only persons with restricted identity cards were allowed to cross borders and the restrictions have become stricter over time (B’Tselem, 2015a). The new restrictions coincided with the first Palestinian mass uprising or intifada from 1987 to 1993. The Israelis killed about thousand Palestinians during the uprising and Palestinians were also killed in Palestinian infighting (B’Tselem, 2015b).

In 1993, the Palestine Liberation Organization (PLO) signed the Oslo Accords with the government of Israel which created the Palestinian Authority and ended the first intifada. A second, more violent Palestinian mass uprising erupted after the failure of peace negotiations between PLO and Israel at Camp David in 2000. By 2005 Israel had withdrawn its military and civilians from Gaza and over 4000 people had been killed, the majority Palestinians (BBC, 2005).

The Israeli withdrawal from Gaza did not end the restrictions put on the Gazans by Israel nor did it end the violence. The State of Israel and Palestinian military organizations have continued to fight with each other and to also kill civilians with ceasefires and major escalations of violence occurring now and then. Palestinian organizations have fired rockets into Israel and carried out cross-border raids from the Gaza Strip. Israel has used its airpower to attack Gaza and has also carried out cross-border raids and conventional ground attacks on Gaza Strip.

Major Israeli military offensives in Gaza have been operations Summer Rains and Autumn Clouds in 2006, operation Hot Winter in February 2008 (more than 100 people dead; BBC, 2008), operation Cast Lead in 2008-2009 (after which the data for the present study was collected), operation Returning Echo in March 2012 (23 Palestinians killed; Al-Mughrabi, 2012), operation Pillar of Defense in 2012, and operation Protective Edge in 2014 (2205 Palestinians killed; United Nations Office for Coordination of Humanitarian Affairs, 2014). In addition, smaller scale military violence is continuous. For example, on 26 May 2015 Palestinians fired at least one rocket into Israel and on 27 May 2015 Israeli air forces fired missiles into the Gaza Strip (United Nations Office for Coordination of Humanitarian Affairs, 2015).

Some of the inhabitants of Gaza have experienced military violence also before the uprisings and the present siege. There was a violent conflict between the Arabs and the increasing number of Jews in the British Mandate over Palestine already before the second World War and the establishment of Israel. In 1948, the State of Israel was established, which led to a war between Israel and a coalition of Arab countries: Egypt, Lebanon, Syria, Jordan, and Iraq. After the war, Egypt gained control of the Gaza Strip and Jordan controlled the West Bank. Palestinians who had fled or were on the other side of the border could not return to Israel after the end of the war.

Egypt and Israel waged many wars in the following decades. In 1956, Israel invaded and occupied the Sinai Peninsula and the Gaza Strip until Egypt allowed Israeli ships to sail again in the Suez Canal. In 1967, Israel fought against Egypt, Jordan, Syria, and Iraq, and occupied the Gaza Strip and the Sinai Peninsula again. Israel and Egypt fought over the Sinai Peninsula from 1969 to 1970, and in 1973 there was yet another war between Egypt, Syria, and Israel. In 1979, Egypt and Israel signed a peace treaty: the Sinai Peninsula returned to Egypt and the Gaza Strip was to be under Israel's control until the establishment of a Palestinian state.

6.2 Socioeconomic and demographic background

Measures of the quality of life before the war in 2008 showed that the Palestinians fared worse than the neighboring Israelis and Egyptians. In 2008, the average yearly income or Gross Domestic Product per capita based on purchasing power parity was 3423 USD in the West Bank and Gaza, 9159 USD in Egypt, and 27156 USD in Israel (World Bank, 2015). On a scale from 0 (worst) to 10 (best), the Palestinians evaluated their lives to be closer to the worst possible life (4.15) than the Israelis (6.84) according to Gallup poll in 2007 (Crabtree, 2008). The majority of Palestinians in 2007 also said that their standard of living was getting worse (Crabtree, 2008).

The blockade by Egypt and Israel has affected the living standards in Gaza. There is limited movement of people and goods across both borders. The movement is closely controlled and depends on the military and political situation in the region. The economy in Gaza suffers for example from shortages of building materials and fuel (BBC, 2014). Electricity outages are common and many homes have their own small generators fuelled by gasoline (BBC, 2014). The economy and the Hamas government receive supplies from smuggling tunnels across the Egyptian border (BBC, 2014).

The population in Gaza was estimated to be about 1.5 million in 2006 (Palestinian Central Bureau of Statistics, 2006). In 2007, about 3000 were Christian and Muslims were the overwhelming majority (Associated Press, 2007). 49% of the population in the Gaza Strip was under 15 years and the population has been growing rapidly (Palestinian Central Bureau of Statistics, 2006). In 2006, the estimated population growth rate in the Gaza Strip was 3.8% (Palestinian Central Bureau of Statistics, 2006). The growing population puts pressure on infrastructures in electricity, water and sanitation, education, housing, health, and social services (United Nations, 2012).

The United Nations and the Hamas government run most of the schools in Gaza. Almost half a million children attended about 700 primary and secondary schools most of which run on double shifts (BBC, 2014). The large classes can have between 40 to 50 pupils. Nevertheless, the official literacy rates are high: 93 % for women and 98 % for men (BBC, 2014).

AIMS OF THE STUDY

The thesis on the causes of war-affected children's chronic posttraumatic stress symptoms (PTS symptoms) focused on the role of trauma-related cognitions and parents' experiences. The theoretical and empirical literature suggested that posttraumatic cognitions (PTCs) mediate the effects of various risk factors and the evolution of posttraumatic stress symptoms (PTS symptoms) from initial to chronic ones. The study setting enabled the testing of intergenerational effects of war trauma on psychological maltreatment which is a risk factor for PTS symptoms among other problems. Finally, the possibility of improving the mental health of war-affected children was tested. The hypothesized links between variables are shown in Figure 1.

The specific aims of the thesis were to:

- 1) test whether PTCs are driving or mediating the evolution of PTS symptoms from initial (T1) to chronic (T3) ones among war-affected children (Article I),
- 2) test how PTCs and PTS symptoms predict each other over time (Article I),
- 3) test whether the risk factors of PTS symptoms also predict PTCs (Article II) and
- 4) whether PTCs mediate the influence of risk factors on PTS symptoms (Article II),
- 5) test whether parental war trauma before the child's birth is a risk factor for children's PTS symptoms, insecure attachment, depression, and aggressiveness (Article III) and
- 6) whether psychological maltreatment mediates the effects of the parent's war trauma on children's PTS symptoms, insecure attachment, depression, and aggressiveness (Article III),
- 7) and test whether a cognitive-behavioral group intervention is able to decrease PTS symptoms and other mental health problems among children after a war (Article IV).

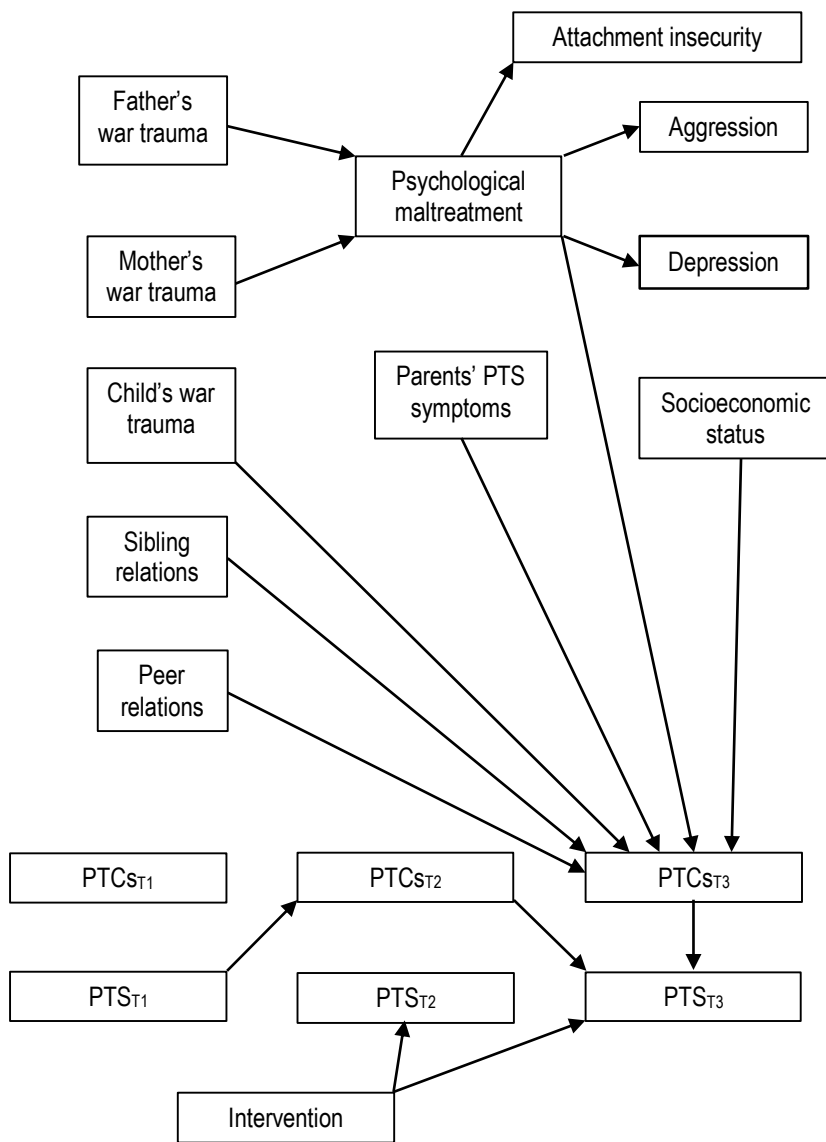


Figure 1. The hypothesized associations between study variables. PTS = posttraumatic stress symptoms, PTCs = posttraumatic cognitions

MATERIALS AND METHODS

7 Participants and procedure

The participants were Palestinian children and their parents from the North Gaza and Gaza city. The participants in studies about the mediating role of posttraumatic cognitions and psychological maltreatment (Articles I, II, and III) were the control group of the intervention study (Article IV). The participants were selected in a two-stage cluster sampling in which schools were sampled first and then classes from those schools. The school classes were a natural unit for the group intervention and having many school classes in a few schools was financially and logistically economical. Four schools were sampled from two areas assessed to be the most severely bombed and shelled regions during the Gaza War 2008–2009 (the North Gaza and Gaza City) because it was judged that the intervention should be implemented in areas where the population most needed it. Two girls' and two boys' classes were randomly sampled in each of the four schools, resulting in 16 classes of fifth and sixth level students. In each of the four schools, there were thus two boys' and two girls' classes chosen. Finally, one of both genders' classes was chosen to the intervention group and the other to the waiting-list control group by lottery. The time line of the randomization, measurement waves, and the intervention is shown in Figure 2.

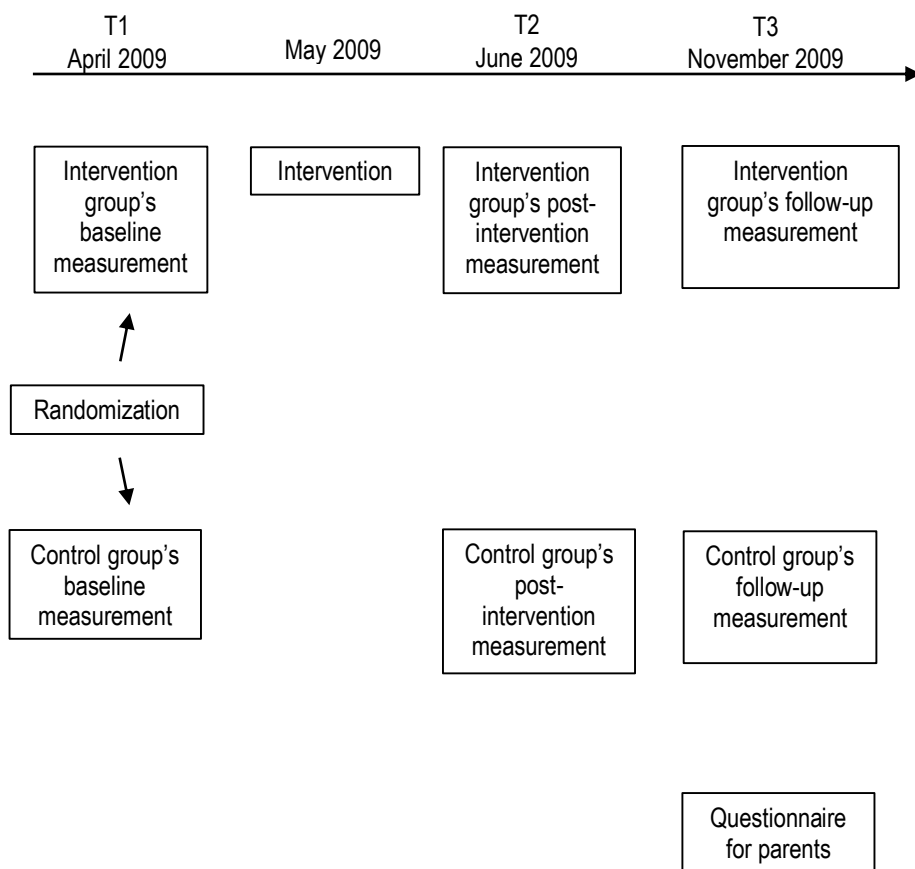


Figure 2. The timeline of the measurement waves and the intervention.

7.1 Participants in studies about mediation by cognitions and maltreatment (Articles I, II, and III)

Participants were 240 children and their parents. Children answered to questionnaires three months (T1), five months (T2), and eleven months (T3) after the war. The parents answered to questionnaires eleven months after the war.

The children were 10–12 ($M = 11.4$, $SD = 0.57$) years old and half were boys. Mothers were on average 37.6 ($SD = 6.92$) and fathers 42.4 ($SD = 7.75$) years old. Parents had elementary (18% of mothers, 19% of fathers), preparatory (31% of mothers, 32% of fathers), secondary (42% of mothers, 24% of fathers) or university (8% of mothers, 25% of fathers) level education. Family income was less than 1000 Israeli shekels (about 260 USD) a month for 60% of the families, between 1000 and 2000 shekels for 16% of the families and more than 2000 shekels for 24% of the families. Twelve percent of the sample was refugees and 88% had a citizenship.

There were no dropouts among children between T1 and T2 but 43 (17.9 %) children were lost between T2 and T3 due to their absence or change of schools. Dropout was unrelated to psychological measures at earlier waves, the age of the children, their citizenship status, parents' employment, education level and age, and family income. Boys ($\chi^2(1) = 8.188$, $p = .004$) were more likely drop out than girls.

7.2 Participants in the study about intervention effectiveness (Article IV)

The participants were 482 girls (49.4%) and boys (50.6%) who were 10–13 years old ($M = 11.29$, $SD = 0.68$). About a half ($n = 242$) participated in the intervention and the remainder in a control waiting list group ($n = 240$). There were 78 (16.2%) dropouts between T2 and T3. The attrition was independent of group status, child age, father/mother's education and work, refugee/citizen status and school region. Boys were more likely to drop out (22.5%) compared to girls (9.2%), $\chi^2(1,482) = 15.69$, $p < .001$. Dropout was not associated with the baseline mental health (PTSS, depressive and psychological distress symptoms), but high peritraumatic dissociation was marginally associated with dropout, $t = 1.76$, $p = .08$.

8 Measures

The measures used were mostly established questionnaires. Some were already available in Arabic but some had to be translated and back-translated by the bilingual research group.

8.1 War trauma

Parents' war traumas. The research group wrote the parents' war trauma questionnaire and it covered their experiences of violence during the Israeli–Palestinian conflict from 1948 Arab–Israeli War and Palestinian exodus, 1967 Six-Day War and Israeli occupation of Gaza, 1987–1993 Intifada, and the 2008–2009 war. Both mothers and fathers reported about their war traumas separately. The 14 event types for each conflict time period included experiences of life threat such as “Have you been shot at?” “Has a member of your family been killed?” and “Has your house ever been demolished by the occupation when you were stuck inside?” A yes–no response was given for each question, and positively endorsed items were summed to construct four variables: mothers' and fathers' war experiences before the child's birth until 1993, and mothers' and fathers' experiences during the Gaza War.

Children's war traumas. The measure of children's war trauma was modified from a previous questionnaire used in Gaza and it consisted of 14 traumatic events that correspond to the stressor criterion (A1) of the diagnosis of PTSD in the *DSM-IV* (APA, 2000). They include experiencing and witnessing actual or threatened serious injury or death. The measure did not assess subjective emotional response criterion of intense fear, helplessness, or horror (A2) which is excluded from the diagnosis of PTSD in *DSM-V*. The children reported whether they had had the experience during the war (*yes* = 1; *no* = 0). A sum variable was constructed by counting the positive answers.

8.2 Mental health

Children's posttraumatic stress symptoms. Posttraumatic stress symptoms (PTSS) were assessed by the 13-item Children's Impact Event Scale, CRIES (Perrin, Meiser-Stedman, & Smith, 2005). The scale is designed to cover three dimensions of PTSD: re-experiencing (4 items), avoidance (4 items) and hyperarousal (5 items) symptoms. CRIES was available as an Arabic version which has had a good internal consistency (Barron, Abdallah, & Smith, 2012). The children reported on a 4-point scale how often they had had each symptom during the last two weeks (*not at all* = 0, *rarely* = 1, *sometimes* = 3, *often* = 5). The total sum ranges from 0 to 65, and the score of 30 has been established as a cutoff for a probable PTSD diagnosis (Perrin, Meiser-Stedman, & Smith, 2005).

Depression. The Depression Self-Rating Scale for Children by Birmaher et al. (1987) is an established 18-item self-report instrument that assesses the cognitive, affective, and behavioral dimensions of depression. The children estimated on a 3-point scale whether they had had each symptom during the last two weeks (0 = *not at all*, 1 = *sometimes*, 2 = *all the time*). The total sum ranges from 0 to 36.

Aggression. Conduct problem scale of Strengths and Difficulties Questionnaire (SDQ; Goodman, 2001) was used to measure aggressive conduct problems. The instrument consists of five items and children indicated on a 3-point scale how well the statements described them for the last six months (0 = *not true*, 1 = *somewhat true*, or 2 = *certainly true*). A latent factor was formed from two parcels of averages of the items. The first parcel consisted of aggression ("I fight a lot. I can make other people do what I want" and "I get very angry and often lose my temper") and the second parcel consisted of items concerning disobedience, lying, and stealing.

Peritraumatic dissociation. A modified 8-item version of the Peritraumatic Dissociative Experiences Questionnaire (RAND PDEQ; Marshall, Orlando, Jaycox, Foy, & Belzberg, 2002) was used. The modified version has been reported to have good psychometric properties (Marshall et al., 2002) and it has been successfully used with war-traumatized children (Klasen et al., 2010). Children were asked to recall the war and retrospectively to report their experiences of dissociation. Two (*yes* = 1; *no* = 0) instead of five response categories were used because using fewer categories has not significantly affected the psychometric properties of the instrument (Marshall et al., 2002). The measure was translated into Arabic. A sum variable was constructed. Cronbach's $\alpha = .67$ for the control group and $\alpha = .77$ in the total sample.

Psychological distress. The Strengths and Difficulties Scale (SDQ) by Goodman (1997) was used to assess emotional and behavioral problems and hyperactivity. Each dimension consists of five items, and participants evaluated on a 3-point scale how well the description fitted them (0 = *not at all*, 1 = *somewhat*, 2 = *yes, fit well*). A sum score of psychological distress was constructed, ranging from 0 to 30. The normal range for the total difficulties score is 0 – 15, which has included about 90% of children in various normative samples (Bourdon, Goodman, Rae, Simpson, & Koretz, 2005; Smedje, Broman, Hetta, & von Knorring, 1999; Woerner et al., 2002). Because we excluded the peer problems scale from our score, we also subtracted the score for the highest amount of normal peer problems (3; Bourdon et al., 2005) and used the cutoff score of 12 to indicate significant psychological distress. The values of α were .69 for T1, .72 for T2, and .67 for T3.

Parents' PTS symptoms. The Impact of Event Scale – Revised (IES-R; Weiss & Marmar, 1997) is a 22-item self-report questionnaire measuring current posttraumatic stress symptoms. The items are evaluated on a 5-point Likert scale (0 = *not at all*, 4 = *extremely*). An Arabic translation of IES-R has shown good internal consistency in a Palestinian sample (Alhajjar, 2014).

8.3 Cognitions

Posttraumatic cognitions. Posttraumatic cognitions (PTC) were measured by the 25-item Children's Posttraumatic Cognitions Inventory (CPTCI; Meiser-Stedman, Smith et al., 2009). CPTCI was translated to Arabic and back-translated to English by the bilingual research group. The items in CPTCI represent negative posttraumatic cognitions such as "My reactions since the frightening event show that I must be going crazy", "The frightening event has changed me forever" and "Bad things always happen". Children reported on a 4-point scale how much they agreed with each statement (*Don't agree at all* = 1, *Don't agree a bit* = 2, *Agree a bit* = 3, *Agree a lot* = 4).

8.4 Social relations

Psychological maltreatment. The children responded to a 20-item Child Psychological Maltreatment questionnaire (Khamis, 2000) that assesses the children's experiences of emotional abuse, neglect, and corrupting by their parents in the context of Palestinian culture. The basis for the selection of the items was the

description of psychological maltreatment by the American Professional Society on the Abuse of Children (1995). Examples of items are “My parents despise me in front of people”, “My parents ignore my attempts to interact with them”, and “My parents tell me that it is important that one should cheat sometimes in order to get what s/he wants.” All the items were in present tense but otherwise the measure did not specify the time period when the behavior occurred. The children rated the items on a Likert-scale ranging from 1 (*Strongly disagree*) to 5 (*Strongly agree*). In a sample of 1000 Palestinian children from the West Bank, Khamis (2000) found three underlying factors, which were used in the present study as indicator variables: emotional abuse (sum of 11 items), emotional neglect (sum of 7 items), and corrupting (sum of 2 items). Khamis (2000) also reported good internal reliability for the total scale (Cronbach’s alpha: .92) as well as discriminant validity.

Children’s attachment security. Security scale (Kerns, Klepac, & Cole, 1996) was used to measure attachment security in the child’s relationship with the mother. The instrument consisted of eight items such as “Some kids are sure that their mom would never leave them”, “Some kids find it easy to trust their mom”, and “Some kids worry that their mom does not really love them.” The children indicated on a 4-point scale whether the sentence or its opposite was either sort of true or very true for them. The measure was translated into Arabic. Security scale has shown adequate internal and test–retest reliability as well as validity in non-Arab samples (Kerns et al., 1996; Verschueren & Marcoen, 2002).

Sibling relations. Relations between siblings were measured by an 11-item scale by Dunn, Slomkowski, and Beardsall (1994) that describes positive (warmth and intimacy) and negative (conflict and rivalry) interactions. Children marked how often the described events happen in their relations with an older (11 items) and a younger (11 items) sibling using a 5-point scale (ranging from 1 = *never* to 5 = *always*). All items of older and younger sibling relationships correlated significantly, and averaged variables were calculated by combining the items of both siblings: (1) warmth in siblingship, such as “We usually laugh and joke together” or “I miss him/her when he/she is out of the home”, (2) intimacy, such as “I usually tell him/her about my secrets” or “I play and share games with him/her”, (3) conflict, such as, “He/she annoys and teases me” or “In times, he/she beats me and pushes me”, and (4) rivalry, such as, “I feel jealous of him/her when he/she takes all my mother’s attention” or “I feel unhappy or jealous when other children play with him/her ignoring me”. The reliability and validity of the siblingship quality questionnaire has been established by Diab (2011) and Peltonen et al. (2010).

Parents’ socioeconomic status. Parents’ socioeconomic status was measured by their employment status (0 = *unemployed*, 1 = *employed*), education (1 = *elementary*, 60

2 = *preparatory*, 3 = *secondary*, 4 = *university*), and monthly family income (1 = *less than 1000 shekels*, 2 = *1000 – 2000 shekels*, 3 = *more than 2000 shekels*; 1000 Israeli shekels were about 180 USD in 2009).

Peer relations. The quality of peer relations was measured by a questionnaire which included seven items of the children's loneliness (Asher, Hymel, & Renshaw, 1984) and eight items of friendship qualities scales (Bukowski, Hoza, & Boivin, 1994). Children were asked to mark on a 5-point scale how well the descriptions fit their experiences with peers and schoolmates (ranging from 0 = *not at all* to 4 = *very well*). Two averaged sum variables were constructed: friendship quality (i.e., "I can easily find new friends", "I have good friends that I can share my secrets with") and loneliness in peer relations (i.e., "I feel alone and rejected by my peers", "I don't have anyone to talk to during the school breaks"). The same peer questionnaire has been found to be valid and reliable among Palestinian children in two earlier studies (Diab, 2011; Peltonen et al., 2010).

9 Statistical analyses

All analyses were run in Mplus 5.2 (Muthén & Muthén, 1998–2007) with Full Information Maximum Likelihood (FIML) estimation with robust standard errors to take into account missing data and non-normality of the variables. Therefore no cases were excluded from the analyses because of some missing values (unlike stated in the flowchart in in Figure 1 in Article IV). The Kish correction to standard errors was calculated in Microsoft Excel (2007). All analyses were two-tailed with alpha set at .05. Good model fit was indicated by a non-significant χ^2 –value at 95 % confidence level, Root Mean Square Error of Approximation (RMSEA) value below .06, Standardized Root Mean Squared Residual (SRMR) value below .08, and Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI) values above .95 (Hu & Bentler, 1999).

Cluster sampling can result in a smaller sample variation than if the same number of participants were sampled individually through simple random sampling. This affects standard statistical tests by inflating type I error rate (i.e. making statistical tests erroneously lenient) and the design effect should be taken into account in statistical analysis if it exceeds 2 (Muthén & Satorra, 1995). All the associations in the mediation analyses (Articles I, II, and III) had design effects close to one and we therefore did not adjust our analyses. In the intervention effectiveness study (Article IV), the cluster sampling procedure resulted in non-independence of observations. A form of Kish correction was used to adjust the confidence intervals to achieve a more correct type I error rate (Kish, 1965; Musca et al., 2011). The correction consisted of multiplication of the standard errors of regression weights by the design effect $[1 + ICC_y * ICC_x * (n - 1)]^{0.5}$, where ICC_y and ICC_x are intraclass correlation coefficients of the mental health variables, y , and of the covariate or factor, x , respectively, and n is the average number of children in a school class (Ukoumunne, et al., 1999).

9.1 Crosslagged analysis of cognitions and stress symptoms (Article I)

We used cross-lagged analysis of levels and of latent change scores (McArdle, 2009) to test how posttraumatic cognitions and posttraumatic stress symptoms predict each other longitudinally. Cross-lagged analysis of levels was done with latent variables of PTSS and PTC but observed variables had to be used to construct latent change scores in order for the models to converge.

9.2 Mediation by cognitions and psychological maltreatment (Articles II and III)

To determine the statistical significance of the indirect effects (from PTS symptoms at T1 to PTS symptoms at T3 via PTCs at T2; from various risk factors to PTS symptoms via PTCs; and from parents' war trauma to children's mental health and development via psychological maltreatment), joint significance tests of the paths from the independent variable to the mediator and from the mediator to the outcome were used (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). The method assumes that there can be indirect effects from the independent variable to the outcome variable even if no statistically significant direct association between the two variables is observed. The pattern of non-significant direct and significant indirect effects can be the result of multiple mediators cancelling out each other's effects on the independent variable.

9.3 Intervention effectiveness (Article IV)

Two criteria were used to indicate intervention effectiveness. Compared to the control group and controlling for the baseline level, the intervention group should have statistically significantly (a) less PTSS, depressive, and psychological distress symptoms, and (b) more cases below the cutoffs at T2 and T3.

Regression analysis was used to estimate the effect of the intervention on the levels of mental health symptoms after controlling for the centered baseline values of the mental health variables. This method accounts for regression to the mean (Barnett, van der Pols, & Dobson, 2005), which was a problem in this sample because the intervention group had a higher baseline level of PTS symptoms than the control group. Each indication of mental health problems (PTSS, depressive and

psychological distress symptoms) was regressed on the intervention as a dummy variable (0 = no intervention; 1 = intervention) and on the corresponding centered mental health variable at the baseline.

Poisson regression with robust standard errors was used to estimate the effect of the intervention on the proportion of children having non-clinical symptom levels (Zou, 2004). The dichotomy was regressed on the intervention as a dummy variable and the corresponding clinical cutoff dummy variables at baseline. Poisson regression produces estimates of relative risk which are easier to interpret correctly than odds ratios produced by logistic regression (Knol, Duijnhoven, Grobbee, Moons, & Groenwold, 2011). The method also estimates clinical significance at the group level, and therefore produces more precise estimates than the aggregation of individual level clinically and statistically significant changes (Hageman & Willem, 1999). Additionally we applied the Reliable Change Indices (RCI) to check that there was not individual level mental health deterioration in the intervention group (Hsu, 1989).

The roles of gender and peritraumatic dissociation in moderating the intervention effectiveness were examined by the χ^2 difference test (Satorra & Bentler, 1999). Peritraumatic dissociation was treated as three classes: Low = the lowest 25% of the sample; Medium = from the lower to the upper quartile; High = the highest 25% of the sample. The regression parameters were either constrained to be the same across groups (2 in gender and 3 in peritraumatic dissociation) or were estimated freely. The groups were judged to have different parameter estimates if the improvement in the fit from the constrained to the freely estimated model was statistically significant.

After Article IV was published I re-run the analyses with Bonferroni corrections to take into account the multiple comparisons and the inflated type I error (false positives). The correction consists of dividing the significance level by the number of comparisons and it resulted in the significance level of .05 for the whole study. In other words, assuming the intervention had no effect, there would be similar or larger differences in 5% of studies that would be due to sampling error. Without the correction, the percentage of studies with a similar difference due to sampling error was much higher. Because the Bonferroni correction is very conservative and assumes that the tests are independent, I also used other correction methods for multiple comparisons (Benjamini & Hochberg, 1995; Benjamini & Yekutieli, 2001; Holm, 1979; Hommel, 1988; Hochberg, 1988).

10 Ethical considerations

The research group complied with the ethical standards of the American Psychological Association (APA, 2009). The research protocol received approval from the government in Gaza and the participants gave their informed verbal consent. The participants who needed more psychiatric help were directed to specialized services. The authors had no conflicting interests.

RESULTS

11 Posttraumatic cognitions (PTCs) and posttraumatic stress symptoms (PTS symptoms) (Article I)

The first research task was to analyze the relationship between PTCs and PTS symptoms over time. The research questions were whether PTCs mediated the development of PTS symptoms from acute (T1) to chronic (T3) ones and whether PTS symptoms predicted PTCs and PTCs predicted PTS symptoms over time. The results showed that there was a decreasing trend in PTCs in a growth model, and that the sample mean of PTCs decreased (T2–T1) before the sample mean of PTS symptoms decreased (T3–T2) (Article I).

As hypothesized, the level and change in posttraumatic cognitions predicted subsequent level (the standardized estimate of the association from PTCs at T2 to PTS symptoms at T3 was .45) and change in posttraumatic stress symptoms (the standardized estimate of the association of the latent change in PTCs from T1 to T2 to latent change in PTS symptoms from T2 to T3 was .17). Against the hypothesis, the level and change in PTS symptoms did not predict subsequent level and change in PTCs (Article I). There was no significant relationship between the level of PTCs at T1 and the level of PTS symptoms at T2 when using a factor structure of PTS symptoms which included a non-significantly associated avoidance parcel as an indicator. When the avoidance parcel was excluded, also the relationship between PTCs at T1 and PTS symptoms at T2 became statistically significant.

Contrary to our hypothesis, there was no statistically significant indirect effect from PTS symptoms at T1 to PTS symptoms at T3 via PTCs at T2 (Article I). There was therefore no support for the hypothesis that negative cognitions mediate the evolution of acute PTS symptoms to chronic PTS symptoms.

There was a statistically significant mediated effect if the same statistical model was used as Meiser-Stedman and colleagues (2009) had to use because they had only two measurement points and no control of PTCs at T1. This pattern of results was consistent with the interpretation that Meiser-Stedman and colleagues (2009) had earlier found significant results because their research setting was inadequate, and when the setting was completely longitudinal negative cognitions no longer mediated the development of posttraumatic stress symptoms.

The first measurement point was quite late, about three months after the trauma, and the results might have been statistically non-significant because the hypothesized processes had already occurred by that time. I reanalyzed data from Shahar and colleagues (2013) and found support for this interpretation: in their data PTCs did indeed mediate the association between PTS symptoms at 2 weeks after trauma and 12 weeks after trauma ($B^* = .06$, 95% CI [.02, .11], $p = .009$) (Article II).

12 Risk factors and PTCs (Article II)

The relative strength of various risk factors of PTS symptoms in predicting PTCs and the mediating role of PTCs between risk factors and PTS symptoms was analyzed (Article II). Children's war trauma, parental psychological maltreatment, sibling conflict, and loneliness among peers predicted PTCs, whereas socioeconomic status, parental PTS symptoms, or other aspects of peer and sibling relationships did not predict PTCs statistically significantly.

As hypothesized, all risk factors which predicted PTCs had indirect effects via PTCs on PTS symptoms. *Id est*, posttraumatic cognitions mediated the effects of children's war trauma, parental psychological maltreatment, sibling conflict, and loneliness (unpopularity) among peers on PTS symptoms. The effects of psychological maltreatment on PTS symptoms via PTCs were the largest (standardized indirect effect = .29) and war trauma's effect size was comparable to those of sibling conflict and loneliness or unpopularity among peers (standardized indirect effects = .10). The effects of loneliness specifically on PTS symptoms were almost statistically significant. Intimacy among siblings and good friendship quality were directly associated with lower levels of depressive symptoms.

13 Intergenerational effects of war (Article III)

The third major research task was to test whether parental war exposure predicts children's attachment insecurity, PTS symptoms, depression and aggression directly and via psychological maltreatment (Article III).

Parental war trauma did not directly predict child outcomes statistically significantly except for mothers' current war trauma which was *negatively* related to their children's aggressive conduct problems ($b^* = -.36$, 95% CI $[-.67, -.04]$, $t = -2.23$, $p = .02$). Parental war trauma predicted psychological maltreatment but against our hypotheses, mothers' war trauma was negatively associated with psychological maltreatment reported by the child and indirectly with aggressive conduct problems (current war trauma: $b^* = -.17$) and depressive symptoms (current war trauma: $b^* = -.11$; war trauma before the child's birth: $b^* = -.11$). Fathers' war trauma was positively associated with psychological maltreatment and, through it, fathers' war trauma before the children's birth was positively associated with children's attachment insecurity ($b^* = .09$), depression ($b^* = .12$), and aggression ($b^* = .19$). The indirect effect on PTS symptoms was almost statistically significant ($b^* = .07$, 95% CI $[-.003, .15]$, $t = 1.89$, $p = .06$).

14 Intervention effectiveness (Article IV)

The effectiveness of a modified version of Teaching Recovery Techniques to decrease PTS symptoms, depression, and psychological distress right after the intervention (T2) and in a six-month follow-up (T3) was tested (Article IV). The moderating effects of gender and peritraumatic dissociation was analyzed. Additional analyses (after Article IV was published) reported here controlled for the number of comparisons and tested the role of cognitions in intervention effectiveness.

Without corrections to the number of comparisons, the estimates showed that the intervention reduced the proportion of severe PTS symptoms among boys at T2 (relative risk = 1.81, 95% CI [1.10, 2.97]) and both the symptom level ($b = -8.78$, 95% CI [-16.80, -0.75]) and the proportion of severe PTS symptoms (RR = 5.96, 95% CI [1.55, 22.86]) at T2 among girls with low peritraumatic dissociation. There was no statistically significant effect at T3 and no effect on depressive symptoms nor on psychological distress.

Because multiple comparisons lead to a high risk of incorrectly rejecting the null hypothesis, I used a Bonferroni correction for the significance level in the additional analyses reported for the first time in Table 1 and Table 2. I used the correction for the 40 tests, which produced confidence intervals of 99.88%. The results are reported below and they show no statistically significant effects. Using the Bonferroni correction to reduce the probability of finding false positive results also reduces the probability of finding a true positive result. The large confidence intervals tell us that the intervention might reduce the posttraumatic stress symptoms in the population by almost 10 points on the CRIES scale, but it might just as likely increase them by a couple of points.

Because the Bonferroni correction leads to lowest power and assumes that the tests are independent, I also used a number of other correction methods without these problems (Benjamini & Hochberg, 1995; Benjamini & Yekutieli, 2001; Holm, 1979; Hommel, 1988; Hochberg, 1988). No statistically significant results were found with any of the six adjustment methods.

The intervention did not have any statistically significant effects on posttraumatic cognitions at T2 ($b^* = 0.05$; 95% CI [-0.05, 0.16]) nor at T3 ($b^* = 0.01$; 95% CI [-

0.18, 019]) (Kangaslampi, Palosaari, Peltonen, Qouta, Punamäki, & Diab unpublished manuscript). Therefore, if the intervention had an effect on mental health, PTCs did not mediate it.

A schematic, approximate summary of all the results is presented in Figure 3.

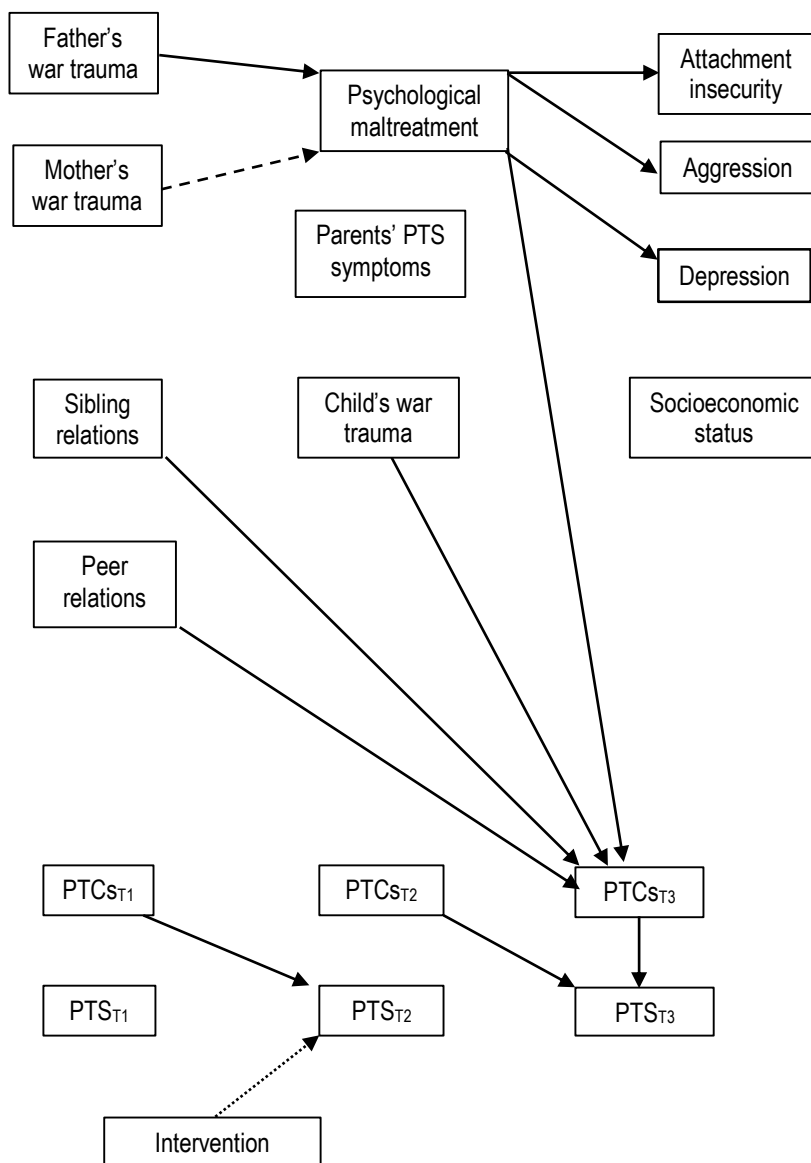


Figure 3. Approximate observed associations between the studied concepts. Please find the detailed results in the original articles. PTS = posttraumatic stress symptoms, PTCs = posttraumatic cognitions, solid line = positive association, dashed line = negative association, dotted line = one significant association for one subgroup if multiple testing is not taken into account.

Table 2. Regression Analysis Results of Intervention Effects on Outcome Variables with Bonferroni Corrections

Dependent variables	Regression weights				<i>R</i> ²	Intervention effect on the clinical cutoff ^a	
	Intervention		(Mental health) _{T1}			<i>RR</i>	99.88% CI
	<i>b</i>	99.88% CI	<i>b</i>	99.88% CI			
PTSS _{T2}							
Girls	-3.47	[-10.88, 3.93]	0.39	[0.14, 0.64]	.10	1.38	[0.75, 2.52]
Boys	-2.81	[-9.01, 3.40]	0.23	[-0.01, 0.46]	.06	1.81	[0.84, 3.89]
PTSS _{T3}							
Girls	-1.53	[-7.82, 4.75]	0.25	[0.02, 0.48]	.06	0.99	[0.50, 1.96]
Boys	-3.62	[-9.75, 2.50]	0.05	[-0.12, 0.22]	.04	1.20	[0.37, 3.86]
Depression _{T2}	0.19	[-1.90, 2.28]	0.44	[0.29, 0.59]	.15	1.01	[0.60, 1.68]
Depression _{T3}	0.34	[-1.87, 2.55]	0.32	[0.16, 0.48]	.09	1.06	[0.89, 1.27]
Distress _{T2}	1.18	[-0.90, 3.26]	0.35	[0.20, 0.51]	.15	0.53	[0.26, 1.06]
Distress _{T3}	0.23	[-2.01, 2.46]	0.36	[0.20, 0.51]	.15	0.88	[0.44, 1.78]

Note. CI = confidence interval; PTSS = posttraumatic stress symptoms; T₁ = baseline; T₂ = post-intervention; T₃ = six month follow-up; (Mental health) T₁ = outcome variable's baseline covariate; RR = relative risk. ^aThe relative risks were calculated from Poisson regression and they indicate the likelihood of the participants in the intervention group to have the symptom level below the clinical cutoff relative to the participants in the control group after controlling for the baseline categorization by cutoff levels.

* $p < .00125$ (Bonferroni-corrected for 40 tests)

Table 3. Regression Analysis Results of Intervention Effects on PTSS Moderated by Gender and Peritraumatic Dissociation (PD) with Bonferroni Corrections

Dependent variables	Regression weights				R^2	Intervention effect on the clinical cutoff (relative risk) ^a	
	Intervention		PTSS _{T1}			RR	99.88% CI
	<i>b</i>	99.88% CI	<i>b</i>	99.88% CI			
Girls							
Low PD							
PTSS _{T2}	-8.78	[-21.16, 3.60]	0.53	[0.15, 0.90]	.24	5.96	[0.75, 47.41]
PTSS _{T3}	-4.51	[-16.06, 7.05]	0.43	[0.07, 0.79]	.19	0.98	[0.16, 6.12]
Medium PD							
PTSS _{T2}	-1.99	[-12.98, 9.01]	0.23	[-0.13, 0.59]	.03	1.19	[0.18, 7.72]
PTSS _{T3}	0.05	[-16.07, 7.05]	0.03	[-0.33, 0.38]	.00	0.82	[0.26, 2.53]
High PD							
PTSS _{T2}	-2.88	[-15.87, 10.12]	0.17	[-0.34, 0.67]	.03	1.21	[0.55, 2.65]
PTSS _{T3}	-2.40	[-13.37, 8.57]	0.15	[-0.32, 0.62]	.03	1.24	[0.51, 3.01]
Boys							
Low PD							
PTSS _{T2}	0.95	[-12.04, 13.94]	0.27	[-0.14, 0.67]	.09	0.37	[0.06, 2.40]
PTSS _{T3}	-3.15	[-17.93, 11.70]	0.24	[-0.25, 0.62]	.07	1.35	[0.14, 13.03]
Medium PD							
PTSS _{T2}	-2.52	[-11.64, 6.60]	0.23	[-0.13, 0.59]	.06	2.10	[0.58, 7.63]
PTSS _{T3}	-3.07	[-11.73, 5.58]	0.05	[-0.15, 0.24]	.04	0.50	[0.05, 4.89]
High PD							
PTSS _{T2}	-5.58	[-16.43, 5.27]	0.10	[-0.21, 0.41]	.07	2.06	[0.63, 6.78]
PTSS _{T3}	-6.44	[-16.78, 3.90]	-0.13	[-0.40, 0.14]	.18	2.66	[0.42, 16.68]

Note. CI = confidence interval; PTSS = posttraumatic stress symptoms; T1 = baseline; T2 = post-intervention; T3 = six month follow-up; RR = relative risk. ^a The relative risks were calculated from Poisson regression and they indicate the likelihood of the participants in the intervention group to have the symptom level below the clinical cutoff relative to the participants in the control group after controlling for the baseline categorization by cutoff levels.

* $p < .00125$ (Bonferroni-corrected for 40 tests)

DISCUSSION

The thesis is about the effects of war and political violence on Palestinian children's development and mental health. It tested hypotheses derived from psychological theories about the role of cognitions (appraisals, beliefs, interpretations) and psychological maltreatment in the development of chronic mental health problems. The hypotheses were mostly supported by the empirical results. The effectiveness of a psychosocial intervention in school classes in alleviating mental health problems was also analyzed.

Before discussing the results in more detail I will first write about the wider politically contested context of mental health studies among war-affected populations. The thesis attempts to not be political despite the political nature of the subject matter. However, in addition to words such as "Israel" or "Palestine", using the term "posttraumatic stress disorder" (PTSD) and conducting mental health interventions in Gaza have been criticized as controversial or political and unethical (Summerfield, 1999). I will therefore give some ethical justification and motivation for the general approach and research tasks beyond their possible scientific merit.

Emotional suffering—horror, grief, and anger—caused by violence and losses in war is not in itself a sickness which would justify medical or psychotherapeutic attention (Summerfield, 1999). The answer to the question about the best response to suffering and loss depends on each individual's personal, political, ethical, cultural, philosophical, and religious views (Giacaman et al., 2011) on which there is not ever likely to be an agreement. Many will nevertheless agree that it would be good if people would be able to decide on their own views, values or goals and work towards achieving them—whatever those goals might be. To the extent that neurobiological, behavioral, social, and psychological phenomena beyond people's control prevent them from leading the lives they value or prevent them from deciding or justifying their goals and values, this minimal ethical criterion would justify the study of the phenomena and the search for possibilities to change them.

Depressive and posttraumatic stress symptoms can be unimportant for some people and the symptoms might even aid in surviving threats in a war-prone environment (Belsky, 2008), but they can also prevent people from achieving goals that are important to them. For example, concentration and sleeping difficulties can

harm children's ability to learn and develop the skills they need to construct and achieve their goals in life. In Gaza, children who have more PTS symptoms fare worse in school relative to other children with similar intelligence or IQ level (Diab, 2010). War-related posttraumatic stress symptoms (avoidance, hyperarousal, numbing, and re-experiencing) predict outcomes in employment, family relationships, violent behavior, and substance abuse (Maguen, Stalnaker, McCaslin, & Litz, 2009), which many people would usually prefer not to have. Many people also pay money out of their own pockets and voluntarily seek help in reducing trauma-related symptoms.

Exposure to life threat does not automatically lead to functional impairments. For example, school children in Nairobi had minimal self-reported functional impairment after exposure to the 1998 bombing of the American Embassy in Nairobi (Pfefferbaum et al., 2003). Similarly, exposure to life threat does not automatically lead to PTSD, depression or other mental health problems. Furthermore, some war-affected children's posttraumatic stress symptoms decrease over time without the aid of psychosocial interventions (Punamäki et al., 2015). What explains the differences in children's responses? Is the variation in responses explained by objective socioeconomic and political realities (Hobfoll, 1989) or does the way children interpret and appraise themselves and those realities affect their mental health outcomes (Ehlers & Clark, 2000)? If children's cognitions are crucial, how do the cognitions themselves develop and what affects them?

Even if cognitions do play a role, it may not be ethical or feasible to change evaluations of negative external realities in a war-prone area. Negative evaluations of oneself may be a more legitimate target for interventions there (in addition to preventing wars). Although I am not aware of research about children's negative posttraumatic cognitions about the self, there are grounds for suspecting the cognitions about the self play a major role in the development of posttraumatic stress symptoms. Among adults, negative cognitions about the self are usually most strongly related to posttraumatic stress symptoms (Bryant & Guthrie, 2005; Carek, Norman, & Barton, 2010). The effects of negative cognitions about the self related to self-blame do not seem to be important among adults (Bryant & Guthrie, 2005; Carek et al., 2010). Negative cognitions about the self appear to have their effects on posttraumatic stress via perceptions of self-efficacy (Benight & Bandura, 2004) consistent with more general appraisal theories of stress (Lazarus & Folkman, 1984).

Figure 3 summarizes the results of the individual studies in the thesis. Children's posttraumatic cognitions (PTCs; interpretations, appraisals) predicted posttraumatic

stress symptoms (PTS symptoms) over time whereas PTS symptoms did not predict PTCs (Article I).

The PTCs were predicted by war trauma and negative aspects of relationships important for the children aged 10–13 years: parental psychological maltreatment, conflict with siblings, and loneliness or unpopularity among peers. These factors also had their effect on PTS symptoms through PTCs. Parents' PTS symptoms or socioeconomic status did not have a statistically significant effect on PTCs or PTS symptoms after controlling for other variables. Psychological maltreatment had the largest effect on PTCs (Article II).

Psychological maltreatment was predicted by parents' war trauma: mother's war trauma decreased psychological maltreatment and father's war trauma increased psychological maltreatment. Psychological maltreatment also predicted children's attachment security, depression, and aggressiveness (Article III).

Finally, the psychosocial trauma intervention was not effective in decreasing mental health problems. At most, it has a temporary effect on PTS symptoms among girls with a low level of peritraumatic dissociation and the statistical significance of the effect vanishes in the follow-up or if the number of statistical tests is controlled. There is no statistically significant effect on depression, psychological distress, or cognitions (Article IV).

15 The role of cognitions in the development of chronic posttraumatic stress symptoms

Cognitive models of PTSD assume that changes in cognitions predict changes in PTS symptoms over time (Ehlers & Clark, 2000; Foa & Kozak, 1986). This assumption might not hold empirically. PTCs could be the result of the objective reality of PTS symptoms or they could be caused by some other factors which affect the development of both PTCs and PTS symptoms. If PTCs would not influence PTS symptoms, there would be no reason to attempt to change PTS symptoms through cognitions.

The study found that the level and changes in PTCs predicted the level and changes in PTS symptoms, whereas PTS symptoms did not predict PTCs (Article I). The findings confirm the general importance of PTCs in the development of PTS symptoms and does not falsify the hypothesis that PTCs cause PTS symptoms. The findings are also in line with the findings from recent randomized, controlled trials which measured PTS symptoms and depressive symptoms together with PTCs during exposure and cognitive therapies. PTCs predict symptoms over time but symptoms do not predict PTCs statistically significantly (Kleim et al., 2013; McLean et al., 2015; Zalta et al., 2014).

The present study did not find support for the interpretation of Ehlers and Clark's (2000) model that PTCs mediate the evolution of acute PTS symptoms to chronic PTS symptoms (Meiser-Stedman et al., 2009). The reason for this is probably that the PTS symptoms had already had their effects on PTCs by the three months after trauma when the first measurements in the present study were taken. My reanalysis of the data from Shahar and colleagues (2013), whose first measurement was 2 weeks after trauma, showed that early PTS symptoms did have an effect on later PTS symptoms via PTCs in the first three months after trauma.

Intervention studies did not find an effect from PTS symptoms to PTCs either (Kleim et al., 2013; McLean et al., 2015; Zalta et al., 2014). The difference compared to Shahar and colleagues' (2013) study could be the result of later measurements and the impact of interventions on the associations.

16 Trauma-related cognitions as a mediator of risk factors among war-affected children

Appraisals predict PTS symptoms from the start and from even before trauma (Bryant & Guthrie, 2005; Lengua, Long, & Meltzoff, 2006) and many models (Ehlers & Clark, 2000; Guay, Billette, & Marchand, 2006; Janoff-Bulman, 1992) include also the severity of trauma and other people's reactions after trauma as factors affecting appraisals and PTS symptoms. We tested the effects of these and other PTS symptoms' risk factors on PTCs. We found that PTCs were predicted by war trauma, sibling conflict, loneliness or unpopularity among peers, and psychological maltreatment by parents. PTCs also mediated their effects on PTS symptoms and depression.

Psychological maltreatment had the largest effects on PTCs. Other aspects of sibling and peer relations, parents' socioeconomic status, and parents' PTS symptoms did not have statistically significant effects on children's PTS symptoms via PTCs.

The relationships predicting PTCs are very age-salient in middle childhood: parents, peers, and siblings (Steinberg & Morris, 2001). All of the significant predictors were also negative interactions (e.g. parental maltreatment) instead of positive (e.g. sibling warmth), which has also been found in other studies (Andrews, Brewin, & Rose, 2003; Guay et al., 2006; Zoellner, Foa, & Brigidi, 1999). This may reflect a general human tendency to be more sensitive to negative events and losses than to positive events and gains (Ernst et al., 2014; Hobfoll, 2001; Tversky & Kahneman, 1974).

The results are in line with literature suggesting that some of the origins of negative cognitions related to mental health problems are in negative parent-child interaction and specifically in psychological maltreatment (Beck, 2008; Gibb, 2002; Hankin 2009). This is understandable as the negative cognitions are given directly to the victim (Haefel & Grigorenko, 2007). Verbal abuse is also associated with white matter tract abnormalities in brain regions that are correlated with verbal IQ and comprehension and with depression, dissociation, somatization and anxiety (Choi et al., 2009). Our results suggest that the negative appraisals and

representations behind chronic PTS symptoms have a similar origin in negative interactions with parents and to a smaller extent also with peers and siblings.

17 Parental trauma and parental psychological maltreatment

Belsky (2008) hypothesized that war leads to psychological maltreatment or harsh, rejecting, and insensitive parenting because it prepares children for a dangerous environment where fear, anxiety, submissiveness, insecure attachment, and anger (with their associated mental health problems) can help in survival and reproduction. Parents' war trauma predicted psychological maltreatment which mediated the effects of trauma on children's attachment and mental health. However, the direction of the effects was different among fathers and mothers. The results supported our hypothesis only among fathers whose war trauma predicted children's less secure attachment, marginally more PTS symptoms, and more depression and aggression via psychological maltreatment. Among mothers, the results were completely opposite to our hypotheses as more war trauma reported by mother predicted less psychological maltreatment and less child depression and aggression.

Despite the partial support, psychological maltreatment's role in the intergenerational transmission of trauma can also be explained without invoking the concept of evolutionary adaptation (Andrews, Gangestad, & Matthews, 2002) and the effect sizes of indirect effects were small which could speak against adaptationist explanations (Hönekopp, 2009). The intergenerational associations could be side effects of war trauma without evolutionary significance.

Quantitative studies do not present a clear and consistent picture about the effects of parents' gender on intergenerational transmission of trauma. Our findings are in line with the results by Last and Klein (1984) who found that mothers' Holocaust trauma led to less insensitive parenting in the family, with Kellermann (2001) who found that punishment of children was more common among male than among female survivors of Holocaust, and with Vogt et al. (2004) who found that among Vietnam veterans war reduced parenting satisfaction among males but not among females. Speaking against these results are studies that found that female but not male Holocaust survivors' PTSD is related to the risk of offspring's PTSD (Yehuda, Bell, Bierer, & Schmeidler, 2008) and that warfare in general is associated with decreased maternal care but not decreased paternal involvement in a sample of 186 societies (Quinlan, 2007).

Last and Klein (1984) speculated that traumatized mothers refrain from negative interactions because they do not like to be involved in socialization conflicts as a result of their overall sense of fragility caused by trauma. It is not immediately clear why fragility should apply only to mothers and not to fathers. Belsky (2008) predicted that, for evolutionary reasons, females would be more likely to respond to war with depressive symptoms whereas males would become more aggressive. These tendencies could explain why mothers would withdraw from socialization conflicts (Last & Klein, 1984) as well as from positive interaction (Quinlan, 2007) whereas fathers would become harsher and less sensitive in their parenting.

Although there is no clear empirical evidence, Taylor and colleagues (2000) provide one possible explanation for gender differences: they speculated that males are more likely to “fight or flee” and females are more likely to “tend and befriend” in the face of stress. Different ways of interpreting and appraising the same events can lead to different behaviors (aggression, flight, or care) whatever the origin of the differences in appraisals is – cultural, developmental, genetic, or their interaction. Studying gender differences in parents’ interpretations and appraisals could therefore prove to be fruitful.

18 Interventions and cognitions

The cognitive-behavioral intervention based on Teaching Recovery Techniques (TRT) consisted of sessions in school classes and homework. In a few weeks, children were taught techniques they could use to control symptoms of hyperarousal, avoidance, and re-experiencing if they had a need for the techniques. The skills included for example breathing and relaxation techniques and manipulation of mental images.

The intervention possibly had gender and risk specific effects. Only girls with low levels of peritraumatic dissociation experienced statistically significant reductions in symptom levels and in the proportion of severe PTS symptoms. However, the results were fairly modest and did not last to the six-month follow-up. Furthermore, when the number of statistical tests was controlled for in any way, the significance also of also these effects disappeared. It is still possible that the intervention has effects in the population but the statistical power of our study does not detect them.

Gender-specific effects of psychosocial interventions have been observed before (Bolton et al., 2007; Tol et al., 2008). Girls are also more vulnerable to developing PTS symptoms (Qouta, Punamäki, & Sarraj, 2003). The large effects of trauma and of intervention on girls' PTS symptoms might therefore be an expression of a more general sensitivity of PTS symptoms to environmental effects among girls. The influence of low peritraumatic dissociation could be the result of a better capacity to process memories and learn from new experiences, because dissociation in general prevents learning.

The results suggest that dissociation and gender have do not have separate effects on the effectiveness of the intervention. That is, peritraumatic dissociation's effects can depend on the sensitivity of girls to the environmental effects. However, this was not our original hypothesis. Gender as a moderator was included in the tests of the moderating effects of peritraumatic dissociation only after it was found out that the gender seemed to moderate the effects of the intervention. The inclusion of gender was done on the basis of earlier tests on the same data and the tests were therefore not independent which led to a higher likelihood of false positive results (Kriegeskorte et al., 2009). These results should be considered to be very tentative and in need of replication.

Studies of TRT have found similar modest and temporary effects (Ehnholt, Smith, & Yule, 2005). Barron, Abdallah, and Smith (2012) reported that TRT decreased PTS symptoms, grief, and depression in the West Bank, but they did not have a follow-up measurement. One possible explanation for the modest or non-significant results is that the intervention implemented in Gaza did not follow the intervention manual for example in the time order of the sessions (safe place sessions were not held first as in the manual).

Other published articles of the same study have reported changes in peer relations and psychosocial wellbeing, and posttraumatic stress, distress, and depressive symptoms (Diab, Punamäki, Palosaari, & Qouta, 2014). There was no effect on emotion regulation (Punamäki, Peltonen, Diab, & Qouta, 2014). The latent difference variable of mental health used in these studies did not take into account regression to the mean and the handling of cluster sampling was different from the present study (i.e. clusters were used as covariates rather than adjusting the standard errors according to design effects) which accounts for differences in results. In addition, the intervention did not have effects on psychosocial wellbeing and the intervention was actually associated with a decrease in the proportion of prosocial children (Diab, Peltonen, Qouta, Palosaari, & Punamäki, 2015). These results suggest that at least the modified TRT intervention was not very effective.

It is also possible that the continuing conflict made intervention effectiveness less potent and it would be unethical to spend resources on psychosocial interventions rather than on larger-scale political and military projects in the region (Summerfield, 1999). However, the conflict should not make mental health interventions completely impossible because the PTS symptoms did decrease among the majority of children in both the intervention and the control group during the study. The intervention did not have a statistically significant effect on negative cognitions, which might explain the lack of other effects. Negative cognitions have mediated established intervention effectiveness on PTS symptoms in all published studies where it has been tested so far (e.g. Kleim et al., 2013; McLean et al., 2015; Zalta et al., 2014).

The intervention might be developed to be lengthier and more intensive to make it more effective. Based on the results of the present study, improving the modules dealing with beliefs and self-efficacy could be a fruitful path. Addressing loneliness and unpopularity in the school is also a potential avenue for improving children's mental health after war. Including reminders or mini-habits which require very little exercise of willpower for practicing the techniques thought in the intervention as well as follow-up reviews in school classes could make the effects longer-lasting. If

the Teaching Recovery Techniques cannot be improved there are also other universal preventive interventions such as ERASE-Stress (Gelkopf & Berger, 2009) used in school classes in the neighboring area which have shown more promise and their effectiveness should be tested in other settings.

19 Strengths and limitations of the study

The study has a number of strengths and limitations. The study setting was longitudinal which allowed for disentangling some relationships over time such as between PTCs and PTS symptoms. However, in many analyses this was not possible. For example, parents' reports of war trauma before 2009 were retrospective and might be biased and we have no information about the psychological maltreatment over time or before the war. Studies of trauma measures have shown that about one third of all the items might change during one week (Carlson et al., 2011). Although the data was based on self-reports and questionnaires, there were multiple informants which alleviates some biases.

The sample was comparatively large but it was not designed to be representative of the population of Gaza. It could be that the results would have been different among people from the southern part of Gaza. Nevertheless, the results are very similar to those obtained in other countries among populations with different ages and different traumas. It even seems likely that the processes related to PTCs and PTS symptoms are similar among adults and children, because the literature on cognitions related to anxiety in general (Chorpita, Albano, & Barlow, 1996) and on PTC in particular shows similar patterns among adults and children who are of the same age as in this study (Meiser-Stedman, Smith et al., 2009). In addition, the measure of children's PTC was based on the measure for adults, the best-fitting factor structure was similar to adults', and associations of the self-blame scale missing from the children's PTCs measure often do not reach statistical significance in studies among adults (Nixon & Bryant, 2005).

Most of the measures in our studies are commonly used by other researchers and have a proven validity. Many were already in Arabic and had been used before while others were translated in Arabic for the first time. Reliabilities of the measures were often not good to the point that one PTS symptoms symptom cluster, avoidance, should have been left out of the analysis on psychometric grounds but was kept only because of its conceptual importance. It is noteworthy that the reason for a separate PTSD diagnosis for children under 7 years was the finding that they report significantly less avoidance than older children and adults (Scheeringa et al. 2006).

Only the study about intervention effectiveness was a randomized and controlled trial. Other associations should therefore be considered as potentially causal rather than as established causalities. However, the randomization of the intervention study did not succeed completely either. The intervention group reported at baseline a significantly higher level of posttraumatic stress symptoms than the control group. This difference appears to be caused by chance. For example, the means of PTS symptoms were not systematically higher in all intervention classes compared to control group classes. The difference caused problems with regression to the mean. The decrease in the reported stress symptoms in the intervention group can be because of the random variation and non-causal regression to the mean and not because of the intervention. I took this phenomenon into account by using regression analysis and controlling the baseline levels of posttraumatic stress symptoms.

Another problem with the studies, especially the intervention study, is that they were not registered beforehand. Pre-registration would have reduced the risk that only statistically significant results will be published and that outcome and moderator variables and analysis methods will be chosen only after knowing the data and after trying out which ones produce statistically significant results.

The closest thing to pre-registration I have is my original research plan, where PTS symptoms were the primary outcome variable and depression and anxiety were more or less secondary outcome variables. I had hypothesized that the intervention effects might be moderated by co-morbid disorders, by complex PTSD, or by problems with habituation to fear. I haven't yet analysed the potential moderation by co-morbidity. The analysis could be statistically complex because of the problems with PTS symptoms' regression to the mean. Moderation by peri-traumatic dissociation could be interpreted as a test which is related to the two latter hypotheses: the roles of complex PTSD and problems with fear habituation. However, better tests of these hypotheses could have been done with post-traumatic or state dissociation. The moderation could also be the result of peritraumatic dissociation functioning as a proxy of trauma severity. Gender was included in the analysis by default but I had not mentioned it in my plans. There were grounds for including it, however, because previous studies had found moderation by gender.

Many outcome variables and two categorical moderator variables in the intervention study produced a large number of statistical tests. The large number of tests increased the risk that statistically significant results are in fact false. Correcting for multiple testing in turn made it harder to detect true effects, but no significant effects were found even with the most lenient p-value adjustments.

More generally, the non-significant findings do not mean that there are no real effects. For example, in Article II the analysis about multiple risk factors for PTS symptoms may have produced many non-significant results because the study did not have enough power to detect the true effects. One major reason for this is the sample size which was small ($n = 160\text{--}240$) compared to another similar study which produced more significant findings ($N = 32\,827$). Lower power caused by smaller sample size or by corrections to multiple testing leads to wider confidence intervals which means that also larger effect sizes remain undetected.

20 Conclusions and implications for clinical practice and future research

The results imply that negative cognitions are important from the early stages in the recovery from trauma. Other studies have found effects even from before trauma (Bryant & Guthrie, 2005; Lengua, Long, & Meltzoff, 2006). This suggests that resilience against the negative mental health effects of trauma can be strengthened right after and also before trauma which has significance in war-prone areas. In contrast to those schema theories which imply that positive pretrauma schemas can be a risk factor for PTS symptoms (Janoff-Bulman, 1992; Power & Dalgleish, 2008), negative cognitions are more worrisome and their reduction also reduces PTS symptoms. However, the results are based on group averages which might hide effects of extremely positive cognitions, for example.

The results suggest that conflict and psychological maltreatment in the family together with unpopularity among peers are contributing causes of PTCs and PTS symptoms also in war-torn environments. Supporting families, preventing psychological maltreatment, and increasing social skills also before trauma can potentially support the prevention and recovery from PTS symptoms through less negative PTCs. Reducing negative social interactions could be especially effective but this hypothesis is yet to be tested. It is also quite possible that the association between negative social interaction and PTCs and PTS symptoms results from the effects of the burden of PTS symptoms on social relationships (Kaniasty & Norris, 2008) or from some third factor. The causal effects would become more established in a randomized controlled trial that would improve children's social relationships.

The hypothesis that cognitions in general, and, in this case, PTCs in particular, are the final common pathway of risk factors to mental health problems, received support from this study. The various risk factors had their effects on PTS symptoms through PTCs. This suggests that even if changing other risk factors is out of reach, patients, clients and children in general and Gaza in particular can benefit from changing negative cognitions and strengthening positive cognitions. In the daily practice with patients or clients suffering from the effects of war trauma, short questionnaires about PTCs can be helpful in finding out the specific negative cognitions of the individual patient as well as in monitoring treatment's progress or

the lack of it even if the treatment modality is something other than cognitive psychotherapy (McLean et al., 2015; Zalta et al., 2014). The lack of significant effects of the intervention we studied could be accounted for by its lack of effects on children's appraisals.

The intergenerational effects of war and organized violence were different among fathers and mothers. One possible reason for this is differences in the way stressful and violent events are appraised by the genders (whether because of biological or cultural reasons). This hypothesis could be tested in the future. Addressing parents' and especially fathers' war trauma can be useful when dealing with problems in children's development and mental health and with psychological maltreatment in the family.

Universal preventive interventions for war-affected children could still prove to be useful although we did not find strong support for the modified Teaching Recovery Techniques intervention. For example, ERASE-Stress (Gelkopf & Berger, 2009) has shown more promise.

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ORIGINAL PUBLICATIONS

Negative Social Relationships Predict Posttraumatic Stress Symptoms Among War-Affected Children Via Posttraumatic Cognitions

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Abstract Post traumatic cognitions (PTCs) are important determinants of post traumatic stress symptoms (PTS symptoms). We tested whether risk factors of PTS symptoms (trauma, demographics, social and family-related factors) predict PTCs and whether PTCs mediate the association between risk factors and PTS symptoms among war-affected children. The participants were 240 Palestinian children 10–12 years old, half boys and half girls, and their parents. Children reported about psychological maltreatment, sibling and peer relations, war trauma, PTCs, PTS symptoms, and depression. Parents reported about their socioeconomic status and their own PTS symptoms. The associations between the variables were estimated in structural equation models. In models which included all the variables, PTCs were predicted by and mediated the effects of psychological maltreatment, war trauma, sibling conflict, and peer unpopularity on PTS symptoms. Other predictors had statistically non-significant effects. Psychological maltreatment had the largest indirect effect ($b^*=0.29$, $p=0.002$) and the indirect effects of war trauma ($b^*=0.10$, $p=0.045$),

sibling conflict ($b^*=0.10$, $p=0.045$), and peer unpopularity ($b^*=0.10$, $p=0.094$) were lower and about the same size. Age-salient social relationships are potentially important in the development of both PTCs and PTS symptoms among preadolescents. Furthermore, PTCs mediate the effects of the risk factors of PTS symptoms. The causality of the associations among the variables is not established but it could be studied in the future with interventions which improve the negative aspects of traumatized children's important social relationships.

Keywords War · Children · Posttraumatic stress symptoms · Posttraumatic cognitions · Risk factors

Current *DSM-5* criteria of posttraumatic stress disorder (PTSD) include persistent negative thoughts and expectations about oneself and the world (American Psychiatric Association 2013) which are called post traumatic cognitions (PTCs) in the literature (Foa et al. 1999). Theoretical models have considered PTCs to be a central cause of posttraumatic stress symptoms (PTS symptoms; Brewin and Holmes 2003; Dalgleish 2004; Ehlers and Clark 2000) and empirical studies confirm that PTCs predict other PTS symptoms and mental health problems both among adult (Ehring et al. 2008) and child (Shahar et al. 2013) trauma survivors. Reductions in negative PTCs are also a path through which exposure therapy (Zalta et al. 2014) and cognitive therapy (Kleim et al. 2013) reduce PTS symptoms. Because of PTCs' importance for PTS symptoms, it may be beneficial to study the correlates of PTCs. Furthermore, if PTCs are as central to PTS symptoms as theoretical models claim and empirical studies suggest, PTCs might serve as a final pathway for all other risk factors of PTS symptoms as cognitions do in depression (Ingram et al. 1998). We tested this hypothesis among war-affected children with risk factors related to trauma, social relations, demographics, and parental mental health problems.

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There are conflicting results about the determinants of PTCs and their role as mediators of the effects of PTS symptoms risk factors. First, starting from the PTS symptoms themselves, the hypothesis (Ehlers and Clark 2000) that initial PTS symptoms lead to later negative PTCs and, through them, to chronic PTS symptoms has received both disconfirmation (Palosaari et al. 2013b) and confirmation (standardized indirect effect = 0.06, 95 % CI [0.02, 0.11], $p=0.009$; reanalysis of data from Shahar et al. 2013). The discrepancy in the results probably arises from the differences in the timing of the measurements. The impact of PTS symptoms on PTCs might occur within the first few months after trauma. Second, trauma has been suggested to be the cause of negative assumptions about the world (Janoff-Bulman 1992). There is empirical support for this view (Prager and Solomon 1995; Solomon et al. 1997) but there are also contradicting results such as those by Ginzburg (2004) who found that exposure to myocardial infarction was not related to world assumptions, but the negative world assumptions were more common among those with PTSD. Whatever the case may be, PTSD and PTCs are not completely determined by trauma because the majority of people do not develop PTSD after trauma, and PTCs measured before trauma influence later PTCs and PTS symptoms (Bryant and Guthrie 2007).

Social Determinants of Cognitions Before and After Trauma

It is plausible that a variety of pre-, peri-, and posttraumatic factors (in addition to PTS symptoms and trauma) make negative schemas and appraisals more likely. Negative experiences in infancy might predispose to PTS symptoms later (Schore 2002) via PTCs. In depression research, Beck (1967) proposed that early traumatic situations embed or reinforce negative attitudes which can be activated by later stress. Rose and Abramson (1992) suggested that one reason for this is that children tend to make internal attributions for all events and therefore traumatic or recurring negative experiences lead to a negative self-image. Similarly, attachment theory proposes that early relationships are cognitively represented as internal working models and recurring negative experiences can lead to persistent negative models of oneself and others (Bowlby 1988). These propositions have also received empirical support (Catlin and Epstein 1992; Ingram 2003).

Theorists have proposed that social support and others' interpretations during and after trauma can affect the likelihood of PTS symptoms via appraisals. Individuals may try to manage stress after trauma by seeking social support and others' points of view can become influential in appraisal and reappraisals of the event and its consequences (Guay et al. 2006; Joseph et al. 1997). The behavior of significant others is also appraised and affects the emotional states and coping

strategies after trauma (Ehlers and Clark 2000; Guay et al. 2006; Joseph et al. 1997). Others' empathy may help make reactions understandable. Talking about the event can show the victim that others care as well as reduce the possibility that the victim assumes culpability for the event (Ehlers and Clark 2000). Discussing the trauma with empathic others may also make it possible to relive the event therapeutically and to change negative interpretations. Lack of the possibility to talk about the trauma can lead to thought suppression and therefore to intrusive thoughts and lack of habituation (Ehlers and Clark 2000; Guay et al. 2006). However, positive support may also be interpreted negatively as a sign that one is too helpless and weak to cope (Ehlers and Clark 2000). Guay et al. (2006) have called for empirical studies testing these links.

Meta-Analyses of Risk Factors of PTS Symptoms

Theoretical literature therefore suggests that PTCs can be influenced by and mediate the effects of many types of risk factors. The literature on children's risks for PTSD is increasing but there are still few studies about their relative importance. Meta-analyses, analyzing partly the same original articles, have found large effects from comorbid psychiatric problems (Alisic et al. 2011; Kahana et al. 2006; Trickey et al. 2012), social relations (social support, poor family functioning, social withdrawal; Trickey et al. 2012), and cognitive strategies (thought suppression, distraction; Trickey et al. 2012).

The role of socioeconomic status and age have produced discrepant results: non-significant (Alisic et al. 2011) and small to medium effects (Kahana et al. 2006; Trickey et al. 2012). Demographic factors such as socioeconomic status may affect the development of PTS symptoms through their impacts on cognitions. For example, negative appraisals of oneself as a member of a social group tend to become internalized in order to justify the existing social order (Cox et al. 2012; Jost et al. 2004).

Small to moderate effects have been found for gender (Alisic et al. 2011; Cox et al. 2008; Kahana et al. 2006; Trickey et al. 2012), heart rate (Alisic et al. 2011), pre-trauma psychological factors (low self-esteem, low intelligence, mental health problems; Cox et al. 2008; Trickey et al. 2012), and pre- and post-trauma life events (Trickey et al. 2012). The relative effect sizes of risk factors identified in meta-analyses among adults are similar (Brewin et al. 2000; Ozer et al. 2008).

Trickey et al. (2012) state that cognitive factors are likely to be among the mechanisms by which robust risk factors such as poor family functioning influence PTS symptoms. Their argument is based on their finding that the strongest predictors of PTSD are cognitive in nature (thought suppression, distraction, and perception of life threat). Similarly, Ehling et al.

(2008) report that cognitive variables predict PTSD and depression severities among motor vehicle accident survivors better than initial symptom levels and better than established predictors from meta-analyses.

PTCs as Mediators Between Risk Factors and PTS Symptoms

There is empirical evidence of PTCs functioning as mediators between risk factors and PTS symptoms. Nixon and Nishith (2005) discovered that PTCs mediated the relationship between prior interpersonal trauma and acute trauma symptoms among college students after the September 11 attacks. They also found that symptoms of depression acted as mediators in the association between prior interpersonal trauma and PTCs. Others have found that PTCs mediate the relationship between mental illness before trauma (Constans et al. 2012), attachment insecurity (Lim et al. 2012), and, among victims of sexual assault, mental pollution (feelings of dirtiness without physical contact; Olatunji et al. 2008) and PTS symptoms among adults.

At least two additional studies have examined PTCs with designs that could be used to test its mediating role. Robinaugh et al. (2011) study among motor vehicle accident (MVA) survivors had measurements at 4 and 16 weeks post-MVA. Their results were consistent with a potentially mediating role of PTCs in the relationship between social support and PTS symptoms. However, they did not test mediation statistically, because they claimed that the concurrent assessment of social support and PTCs precluded it. Leeson and Nixon (2011) found that maltreated children had more PTCs than non-maltreated children. Furthermore, PTCs explained additional variance of symptoms of depression and PTS symptoms after accounting for the direct effects of maltreatment. Leeson and Nixon (2011) used hierarchical regression and did not test mediation. We reanalyzed their data and found that PTCs mediated the effect of emotional abuse on the severity of PTS symptoms (standardized indirect effect = 0.33, 95 % CI [0.08, 0.58]) after controlling for the mediated effects of emotional neglect (0.08, 95 % CI [-0.10, 0.26]), sexual abuse (0.26, 95 % CI [0.07, 0.44]), and physical abuse (0.22, 95 % CI [-0.03, 0.48]) and neglect (0.02, 95 % CI [-0.17, 0.20]). The mediated effect of emotional abuse on the severity of depressive symptoms was on the border of being statistically significant (standardized indirect effect = 0.17, 95 % CI [0.00, 0.34]).

Hypotheses and the Setting of the Present Study

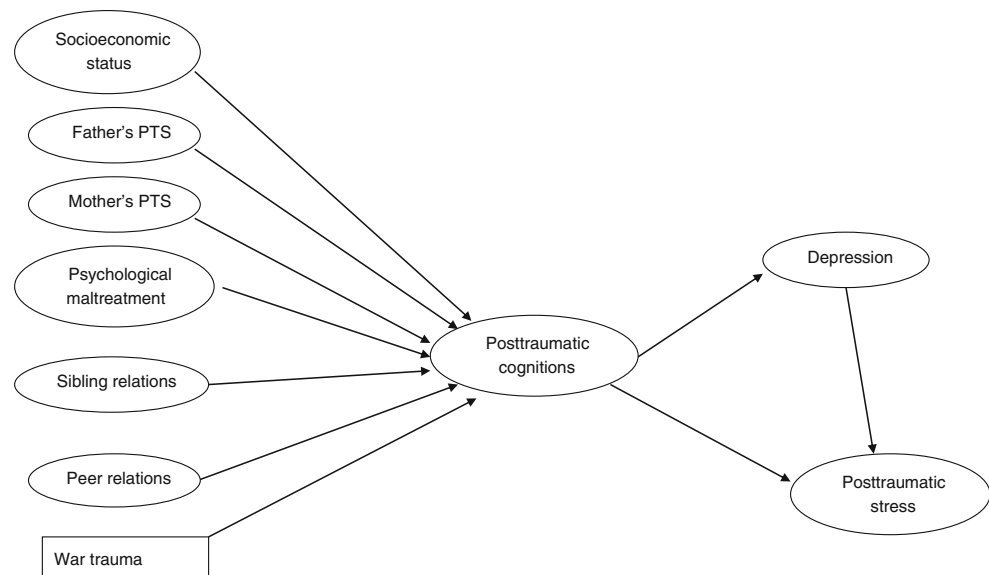
The studies reviewed above concerning prior trauma, mental illness, attachment insecurity, and social support are consistent

with the idea that risk factors of PTS symptoms predict PTCs which act as their final pathway to PTS symptoms. To our knowledge, the studies so far have not included many potential predictors of PTCs simultaneously. The associations observed with only one risk factor, for example lack of social support, might be the result of some variable left out of the analysis. Simultaneous testing of multiple risk factors will allow for the reduction of omitted-variable bias and for the comparison of the relative strengths of the predictors of PTCs. It would also be a test of the hypothesis that PTCs are the common pathway through which the various risk factors have their effects on PTS symptoms. One previous study found support for the more general hypothesis (Kinderman 2005) that cognitive factors mediate the effects of multiple risk factors on mental health although measuring symptoms of depression and anxiety rather than PTSD (Kinderman et al. 2013). We included several risk factors of PTS symptoms from multiple domains identified in the literature: trauma severity, depression (co-morbid mental health problem), relations with peers and siblings (negative and positive age-salient social support), parental psychological maltreatment (negative family relations), parents' PTS symptoms (familial or genetic factor), and socioeconomic status (demographic factor).

The present study was conducted after the escalation of military conflict in 2008–2009 when Israeli forces invaded the Gaza Strip and Palestinians fired rockets into Israel. The escalation led to the death of about 1400 Palestinians and 13 Israelis (UNHRC 2009). Earlier studies in the context of Israeli-Palestinian conflict have found that social factors are significant in the development of mental health problems. For instance, studies confirm the hypothesis that social support protects mental health from the effects of war trauma among Palestinian adults (Punamäki et al. 2005) as does the support by parents and siblings among children (Thabet et al. 2009). Furthermore, poor friendship quality and rivalry among siblings mediate the association between war trauma and children's mental health problems (Peltonen et al. 2010). Among Israeli students, low levels of perceived social support mediate the association between attachment anxiety and PTS symptoms (Besser and Neria 2010, 2012).

The present study tested the hypothesis that PTCs are predicted by risk factors of PTS symptoms and mediate the association between risk factors and PTS symptoms among war-affected children in Gaza. The life-threatening events, negative social relations and parental mental health problems were hypothesized to increase children's PTS symptoms via more negative PTCs whereas positive social relations and higher socioeconomic status were hypothesized to decrease PTS symptoms via less negative PTCs (Fig. 1). Given that depression is a risk factor of PTS symptoms and PTCs also predict depressive symptoms over time (Zalta et al. 2014), we first

Fig. 1 Hypothesized model of the predictors of posttraumatic cognitions (PTCs) and the mediation of risk factors of posttraumatic stress symptoms (PTSSs) via PTCs



tested the relationships between depression, PTS symptoms, and PTCs over time in a cross-lagged setting to help disentangle a temporal order among these factors. The rest of the design was cross-sectional.

Method

Sample

The participants were 240 Palestinian children and their parents. The children were recruited from school classes in government schools in 2009 after the Gaza War (known as the Gaza Massacre or the Battle of al-Furqan in Gaza and as Operation Cast Lead in Israel). The children were 10–12 ($M=11.4$, $SD=0.57$) years old and an equal number were girls and boys. Mothers were on average 37.6 ($SD=6.92$) and fathers 42.4 ($SD=7.75$) years old. Parents had elementary (18 % of mothers, 19 % of fathers), preparatory (31 % of mothers, 32 % of fathers), secondary (42 % of mothers, 24 % of fathers) or university (8 % of mothers, 25 % of fathers) level education. Family income was less than 1,000 Israeli shekels (about 260 USD) a month for 60 % of the families, between 1,000 and 2,000 shekels for 16 % of the families and more than 2,000 shekels for 24 % of the families. Twelve percent of the sample was refugees and 88 % had a citizenship.

The present sample of children belonged to the control group of a randomized controlled trial of a psychosocial trauma intervention. The effects of the intervention on children's mental health are published elsewhere (Qouta et al. 2012). Two-stage cluster sampling was chosen because the school classes were a natural unit for the group intervention and having many school classes in a few schools was financially and logistically economical. The schools were sampled from two

areas assessed to be the most severely bombed and shelled regions during the Gaza War 2008–2009 (the North Gaza and Gaza City) because it was judged that the intervention should be implemented in areas where the population most needed it. Two schools for girls and two schools for boys were picked by simple random sampling from a list of schools provided by the Ministry of Education. The random sampling of classes from each school resulted in 8 classes of fifth and sixth grade students.

Questionnaires not available in Arabic were translated and back-translated from and to English by the research group. The measures were adjusted to the socio-cultural context in Gaza by the research group. The Board of Directors of the Gaza Community Mental Health Programme reviewed and the Ministry of Education in Gaza approved the research. Parents were sent questionnaires as well as information sheets explaining the purpose of the study, and verbal consent for the target child's participation was obtained from parents and from children because families in Gaza were afraid of the consequences of giving a written consent. Children completed questionnaires at school where research assistants gave them instructions and answered their questions. In order to first test the relationships between depression, PTS symptoms, and PTCs over time, the data from three different time points were used. The children were unaware of their intervention status at the first data collection wave, which was 3 months after the war (T1). The following data collection waves were at 5 months after the war (T2) and at 11 months after the war (T3). Children reported about their war traumas at T1 and they reported about their psychological maltreatment and peer and sibling relations at T3. Children reported about their PTCs, PTS symptoms and symptoms of depression at T1, T2, and T3. Parents reported about their work status, education, income, and PTS symptoms at T3.

Attrition

There were no dropouts between T1 and T2 because the children were reached in their school classes during the same semester. Instead, 43 (17.9 %) children were lost between T2 and T3 because of their absence or change of schools. Dropout was unrelated to PTCs and PTS symptoms at earlier waves; the age of the children; their citizenship status; parents' employment, education level, and age; and family income. Boys, $\chi^2(1)=8.188$, $p=0.004$, were more likely to drop out than girls.

Measures

Parents' Socioeconomic Status Parents' socioeconomic status was measured by their education (1 = *elementary*, 2 = *preparatory*, 3 = *secondary*, 4 = *university*), and monthly family income (1 = *less than 1000 shekels*, 2 = *1000–2000 shekels*, 3 = *more than 2000 shekels*).

Parents' PTS Symptoms The Impact of Event Scale – Revised (IES-R; Weiss and Marmar 1997) is a 22-item self-report questionnaire measuring current posttraumatic stress symptoms. The items are evaluated on a five-point Likert scale (0 = *not at all*, 4 = *extremely*). An Arabic translation of IES-R has shown good internal consistency in a Palestinian sample with Cronbach's alphas ranging from 0.81 to 0.86 (Alhajjar 2014).

Psychological Maltreatment The children responded to a 20-item Child Psychological Maltreatment questionnaire that assesses the children's experiences of emotional abuse, neglect, and corrupting (i.e., encouraging the breaking of social norms such as lying and cheating) by their parents in the context of Palestinian culture (Khamis 2000). The basis for the selection of the items was the description of psychological maltreatment by the American Professional Society on the Abuse of Children (APSAC 1995). Examples of items are “My parents despise me in front of people”, “My parents ignore my attempts to interact with them”, and “My parents tell me that it is important that one should cheat sometimes in order to get what s/he wants.” All the items were in present tense and the time period asked was the first 12 years. The children rated the items on a Likert-scale ranging from one (*Strongly disagree*) to five (*Strongly agree*). In a sample of 1,000 Palestinian children from the West Bank, Khamis (2000) found three underlying factors, which were used in the present study as indicator variables: emotional abuse (sum of 11 items), emotional neglect (sum of seven items), and corrupting (sum of two items). Khamis (2000) also reported good reliability for the total scale (Cronbach's alpha 0.92) as well as discriminant validity.

Sibling Relations Relations between siblings were measured by an 11-item scale by Dunn et al. (1994) that describes positive (warmth and intimacy) and negative (conflict and rivalry) interactions. Children marked how often the described events happen in their relations with an older (11 items) and a younger (11 items) sibling using a five-point scale (ranging from 0 = *never* to 4 = *always*). All items of older and younger sibling relationships correlated significantly, and averaged composite variables were calculated by combining the items of both siblings: (1) warmth in siblingship, such as “We usually laugh and joke together” or “I miss him/her when he/she is out of the home”, (2) intimacy, such as “I usually tell him/her about my secrets” or “I play and share games with him/her”, (3) conflict, such as, “He/she annoys and teases me” or “At times, he/she beats me and pushes me”, and (4) rivalry, such as, “I feel jealous of him/her when he/she takes all my mother's attention” or “I feel unhappy or jealous when other children play with him/her ignoring me”. The reliability and validity of the siblingship quality questionnaire has been established by Diab (2011) and Peltonen et al. (2010) with Cronbach's alphas ranging from 0.66 to 0.81.

Peer Relations The quality of peer relations was measured by a questionnaire which included seven items of the children's loneliness (Asher et al. 1984) and eight items of friendship qualities (Bukowski 2004) scales. Children were asked to mark on a five-point scale how well the descriptions fit their experiences with peers and schoolmates (ranging from 0 = *not at all* to 4 = *very well*). Two averaged sum variables were constructed: friendship quality (i.e., “I can easily find new friends”, “I have good friends that I can share my secrets with”) and loneliness or unpopularity among peers (i.e., “I feel alone and rejected by my peers”, “I don't have anyone to talk to during the school breaks”). The same peer questionnaire has been found to be valid and reliable among Palestinian children in earlier studies (Diab 2011; Peltonen et al. 2010) with Cronbach's alphas of 0.70 for friendship quality and 0.72 for unpopularity.

War Trauma The measure consisted of 14 traumatic events that correspond to Criterion A of the diagnosis of PTSD in *DSM-5* (American Psychiatric Association 2013). They include experiencing and witnessing actual or threatened serious injury or death. The children reported whether they had had the experience during the war (0 = *no*, 1 = *yes*). A sum variable was constructed by counting the positive answers.

Children's PTCs Children's PTCs were measured by the 25-item Children's Post-traumatic Cognitions Inventory (CPTCI; Meiser-Stedman et al. 2009). The CPTCI was translated to Arabic and back-translated to English by the bilingual research group. The items in CPTCI represent negative PTCs such as “My reactions since the frightening event show that I

must be going crazy,” “The frightening event has changed me forever,” and “Bad things always happen.” Children reported on a four-point scale how much they agreed with each statement (1 = *don't agree at all*, 2 = *don't agree a bit*, 3 = *agree a bit*, 4 = *agree a lot*). Meiser-Stedman et al. (2009) reported that Cronbach's alphas were larger than 0.75 and that test-retest reliabilities were 0.70 or larger.

Children's PTS Symptoms The 13-item Children's Revised Impact Event Scale (CRIES; Perrin et al. 2005) is designed to cover three dimensions of PTSD: re-experiencing (four items), avoidance (four items), and hyperarousal (five items) symptoms. CRIES is available as an Arabic version, which has a good reliability (Cronbach's alpha 0.93; Barron et al. 2012). The children reported on a four-point scale how often they had had each symptom during the past 2 weeks (0 = *not at all*, 1 = *rarely*, 3 = *sometimes*, 5 = *often*). The total sum ranges from zero to 65, and the score of 30 has been established as a cutoff for a probable PTSD diagnosis (Perrin et al. 2005).

Depression The Depression Self-Rating Scale for Children by Birlisson et al. (1987) is an 18-item self-report instrument that assesses the cognitive, affective, and behavioral dimensions of depression. The children estimated on a 3-point scale whether they had had each symptom during the last 2 weeks (0 = *not at all*, 1 = *sometimes*, 2 = *all the time*). The total sum ranges from zero to 36. The instrument has shown moderate reliability in a Palestinian sample (Cronbach's alpha 0.79; Kolltveit et al. 2012) and has been found to have a multi-factor structure in an Iranian sample (Taghavi 2006).

Statistical Methods

Structural equation models were estimated for the measurement models, cross-lagged models, and mediation models with Mplus 5.2 (Muthén and Muthén 1998–2007). In the measurement models and cross-lagged analysis, missing data were handled with full information maximum likelihood (FIML) estimation and non-normality was allowed by maximum likelihood estimation with robust standard errors (MLR). Good fit was indicated by a non-significant χ^2 -value at 95 % confidence level, Root Mean Square Error of Approximation (RMSEA) value below 0.06, Standardized Root Mean Squared Residual (SRMR) value below 0.08, and Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI) values above 0.95 (Hu and Bentler 1999).

To estimate the instruments' reliability (the ratio of true scores to the total score variability), we used omega instead of Cronbach's alpha to measure internal consistency reported in Table 2 (Raykov and Marcoulides 2010). Alpha is biased when its strict assumptions do not hold whereas omega

performs better with less unrealistic assumptions and it can be interpreted in the same manner (Dunn et al. 2014).

We used Tobit or censored regression methods in Mplus with emotional abuse variables in the mediation model, because the variables had a floor effect. We had to use Monte Carlo integration in Mplus to estimate the model and we therefore had no indices of model fit.

To determine the statistical significance of the indirect effects of risk factors on children's PTS symptoms via PTCs, joint significance tests of the paths from the independent variable to the mediator and from the mediator to the outcome were used (MacKinnon et al. 2002). The method has a good balance of Type I error and statistical power.

Cluster sampling can affect standard statistical tests by inflating type I error rate and the design effect should be taken into account in statistical analysis if it exceeds two (Muthén and Satorra 1995). All the associations in the current analysis had design effects close to one and we therefore did not adjust our analyses.

Results

Descriptive Statistics

Descriptive statistics of the study variables are shown in Table 1. The mode of mothers' education was secondary education and the mode of fathers' education was primary education. The mode of family income was less than 1000 shekels a month. On average, both mothers and fathers were in the middle of the scale assessing the frequency of PTS symptoms. The mode of psychological maltreatment reported by the children was no maltreatment at all, but otherwise the values were approximately normally distributed. The averages of negative aspects of sibling relations were on the low side of the scale and positive aspects on the high side. Similarly, children judged the quality of friendships to be on the high side of the scale and peer unpopularity or loneliness on the low side on average. On average, children reported more than five types of war trauma and didn't agree with the negative statements measuring PTCs and the agreement decreased over time. The average of children's PTS symptoms also decreased over time and was below the cutoff of probable PTSD diagnosis of 30. Averages of depression scores were below the middle of the scale.

Measurement Models

Most of the measurement models are reported in Palosaari et al. (2013a). In Table 2, we report measurement models for children's PTS symptoms at T1, T2, and T3 for three different factor structures, children's peer and sibling relations, and parents' PTS symptoms and socioeconomic status.

Table 1 Descriptive statistics of the observed study variables

Variable	<i>n</i>	Miss.	Miss. %	Pot. range	Range	<i>M</i>	<i>SD</i>	Skew.	Kurt.
Mothers' education	166	74	31 %	1–4	1–4	2.41	0.88	−0.15	−0.78
Fathers' education	166	74	31 %	1–4	1–4	2.55	1.07	0.02	−1.25
Family income	166	74	31 %	1–3	1–3	1.63	0.84	0.78	−1.13
Mothers' PTS symptoms	167	73	30 %	0–4	0.09–3.68	2.16	0.65	−0.14	0.22
Fathers' PTS symptoms	158	82	34 %	0–4	0.14–3.68	2.07	0.74	−0.19	0.30
Maltreatment	197	43	18 %	20–100	20–96	42.83	19.41	0.30	−1.08
Sibling conflict	190	50	21 %	0–4	0–4	1.30	0.89	0.33	−0.39
Sibling intimacy	192	48	20 %	0–4	0.17–4	2.09	0.93	0.19	−0.62
Sibling rivalry	191	49	20 %	0–4	0–2.67	0.75	0.70	0.74	−0.32
Sibling warmth	189	51	21 %	0–4	0.17–4	2.43	0.93	−0.14	−0.56
Friendship quality	197	43	18 %	0–4	0.44–4	2.82	0.75	−0.86	0.73
Peer unpopularity	197	43	18 %	0–4	0–4	0.99	0.87	0.81	0.19
Child's war trauma	218	22	9 %	0–14	0–12	5.28	2.55	0.09	−0.33
Children's PTCs T1	240	0	0 %	25–100	25–88	55.15	11.49	−0.50	0.28
Children's PTCs T2	240	0	0 %	25–100	25–79	50.75	11.76	−0.29	−0.16
Children's PTCs T3	197	43	18 %	25–100	25–96	51.32	12.81	−0.12	−0.08
Children's PTS symptoms T1	240	0	0 %	0–65	1–65	27.79	10.63	0.19	0.79
Children's PTS symptoms T2	240	0	0 %	0–65	0–65	27.41	11.61	0.47	0.43
Children's PTS symptoms T3	197	43	18 %	0–65	0–53	25.83	9.24	0.23	0.51
Depression T1	240	0	0 %	0–36	3–26	12.34	4.69	0.36	−0.09
Depression T2	240	0	0 %	0–36	1–34	13.39	5.13	0.40	1.08
Depression T3	197	43	18 %	0–36	2–26	13.42	4.96	0.08	−0.53

All variables are observed sum variables

Miss. missing, *Pot. Range* potential range, *Skew.* skewness, *Kurt.* kurtosis, *PTS* posttraumatic stress, *PTCs* posttraumatic cognitions

We also added the omega reliability estimates, that were not in Palosaari et al. (2013a, b), for models of PTCs. The measurement models for PTCs were based on the original Posttraumatic Cognitions Inventory (PTCI; Foa et al. 1999) and on the factor structure suggested by Meiser-Stedman et al. (2009). The factor structure of the original PTCI (cognitions about the self and cognitions about the world) was used in our analyses because of the better fit and temporal equivalence of the factor loadings although it had a lower estimate of reliability.

We tested the factor structures of PTS symptoms suggested by Perrin et al. (2005), Simms et al. (2002), and by Shevlin et al. (2009). The measurement models differ from those reported in Palosaari et al. (2013a, b) because in the present study we allowed all the error variances of indicator variables to correlate over time. All the models had temporally equivalent factor loadings only for subscales other than the Avoidance subscale. The Avoidance subscale also had nonsignificant loadings at T2 in all models but because of the importance of avoidance symptoms for the PTSD construct, we kept the Avoidance subscale in the models and estimated its parameters as noninvariant in the subsequent analyses (Byrne et al. 1989). As in our previous study, we chose to use the model

based on Simms et al. (2002) because it had the best fit although not the best reliability.

For our depression measure we used the factor structure suggested by Taghavi (2006) because of its fit (Palosaari et al. 2013b). We tested four factor structures for parents' PTS symptoms: the scales of the questionnaire IES-R (Weiss and Marmar 1997), and the factor structures suggested by Shevlin et al. (2009), and Simms et al. (2002). In subsequent analyses we used Shevlin et al. (2009) factor structure because it had the best combined fit and reliability. The measurement models for peer and sibling relations did not fit well nor did they have good enough reliability and therefore we used only the observed scales. The model for socioeconomic status had a good enough fit.

Cross-Lagged Model of PTCs, Depression, and PTS Symptoms

We first tested whether PTCs would predict rather than be predicted by depressive symptoms over time and what the relationship is between PTS symptoms and depressive symptoms. We analyzed the relative strength of the associations between PTCs, PTS symptoms, and depressive symptoms

Table 2 Measurement Models

Model	$p(\chi^2)^a$	CFI	TLI	RMSEA	SRMR	$p(S-B \chi^2)^a$	Loadings	Reliability ^c
CRIES _{Perrin}	0.01	0.95	0.89	0.06	0.05	0.26	0.25–0.75	0.58–0.65
CRIES _{Shevlin} ^d	<0.001	0.96	0.94	0.07	0.07	0.16	0.07–0.98	0.70–0.77
CRIES _{Simms} ^d	0.01	0.98	0.95	0.06	0.04	0.16	0.20–0.74	0.50–0.67
CPTCI _{M-S}	<0.01	0.98	0.95	0.09	0.03	<0.01	0.69–0.96	0.84
CPTCI _{PTCI}	0.35	0.99	0.99	0.02	0.04	0.06	0.56–0.90	0.70
IES-R _{Fa, Weiss} ^e	—	—	—	—	—	—	0.66–0.69	0.84
IES-R _{Mo, Weiss} ^e	—	—	—	—	—	—	0.50–0.61	0.76
IES-R _{Mo, Simms}	0.03	0.97	0.92	0.12	0.03	—	0.52–0.63	0.78
IES-R _{Fa, Simms}	0.99	1	1	0	0	—	0.65–0.73	0.83
IES-R _{Mo, Shevlin}	0.22	1	0.99	0.06	0.02	—	0.45–0.71	0.87
IES-R _{Fa, Shevlin}	0.08	0.99	0.98	0.10	0.02	—	0.59–0.79	0.90
Peer relations	0.001	0.83	0.82	0.10	0.07	—	0.57–0.81	0.43
Sibling _{All}	<0.001–0.05	0.39–0.79	0.30–0.36	0.11–0.16	0.04–0.29	—	0.19–0.68	0.38–0.42
Sibling _{Positive}	0.02	0.84	0.74	0.09	0.07	—	0.36–0.44	0.17
Sibling _{Negative}	<0.001	0.47	–0.13	0.27	0.13	—	—	—
SES	0.03	0.94	0.89	0.08	0.04	—	0.11–0.88	0.71

The fit indices and loadings are from the constrained model when the loadings are time invariant

CFI comparative fit index, *TLI* Tucker-Lewis index, *RMSEA* root mean square error of approximation, *SRMR* standardized root mean squared residual, *CRIES* children's posttraumatic stress (PTS) symptoms, (Children's Revised Impact of Event Scale), *IES-R* parents' PTS symptoms, *Perrin and Weiss* PTS symptoms in three 3 parcels (Perrin et al. 2005; Weiss and Marmar 1997), *Simms* PTSS in 4 parcels (Simms et al. 2002), *Shevlin* PTSS in 4 overlapping parcels (Shevlin et al. 2009), *Fa* father, *Mo* mother, *Sibling All, Positive, Negative* all, positive, and negative sibling scales as parcels, respectively, *SES* socioeconomic status

^a p -value of the model χ^2 –test

^b p -value of χ^2 –test for time invariance

^c Reliability, omega coefficient is calculated according to Raykov and Marcoulides (2010)

^d The loading of Avoidance subscale is allowed to vary over time

^e Models are saturated

over time in a cross-lagged design. As shown in Fig. 2, mental health problems did not predict PTCs statistically significantly. Depressive symptoms (T1) and PTCs (T2) predicted later PTS symptoms. Although there was no significant association over time between PTCs and depression in the model, the cross-sectional associations were very significant and in a model with Shevlin et al. (2009) factor structure for PTS symptoms we found that PTCs (T2) also predicted later depressive symptoms ($b^*=0.34$, 95 % CI [0.087, 0.587], $p=0.008$). We built on these results in the next model.

Risk Factor Predicting PTCs and Their Indirect Effects on Depressive and PTS Symptoms

The effects of risk factors on PTCs and on depressive and PTS symptoms are shown in Fig. 3. The design of the models was cross-sectional, i.e., measurements were at the same time. War trauma, parental psychological maltreatment, sibling conflict, and loneliness among peers predicted PTCs which mediated their effects on PTS symptoms. PTCs mediated the effect of loneliness among peers on PTS symptoms statistically

significantly only when the effect via depression was included (standardized total effect = 0.14, 95 % CI [0.01, 0.28], $p=0.04$). Psychological maltreatment had the largest indirect effect on PTS symptoms. Intimacy among siblings and the quality of friendships predicted depression directly. Other estimates were statistically non-significant.

Discussion

We tested whether risk factors of posttraumatic stress symptoms (PTS symptoms) predict posttraumatic cognitions (PTCs) and whether PTCs mediate the effects of risk factors on posttraumatic stress symptoms (PTS symptoms). PTCs were predicted by and mediated the effects of war trauma, sibling conflict, unpopularity among peers, and psychological maltreatment on PTS symptoms. Sibling intimacy and friendship quality had direct effects on depressive symptoms that were not mediated by PTCs. The results confirmed that PTCs were predicted by a variety of risk factors as suggested by the previous literature (Constans et al. 2012; Leeson and Nixon

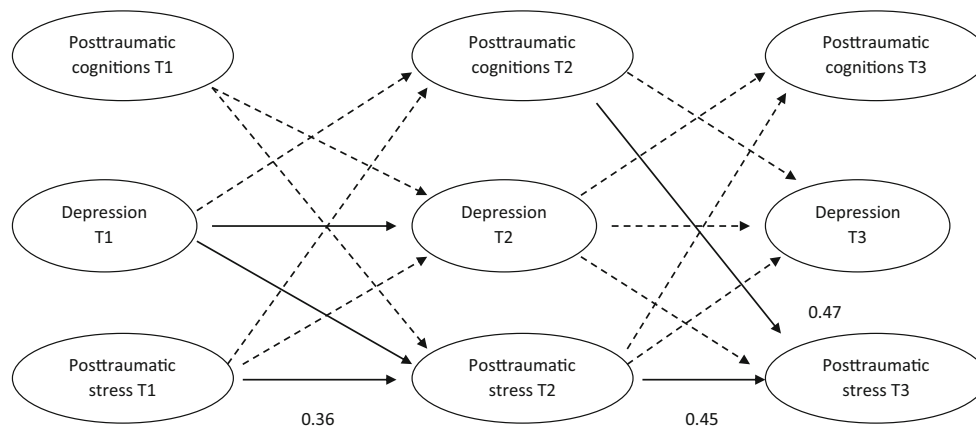


Fig. 2 Cross-lagged structural equation model of posttraumatic cognitions, depressive and posttraumatic stress symptoms. Standardized regression weights are shown. *Dashed arrows* indicate statistically non-significant

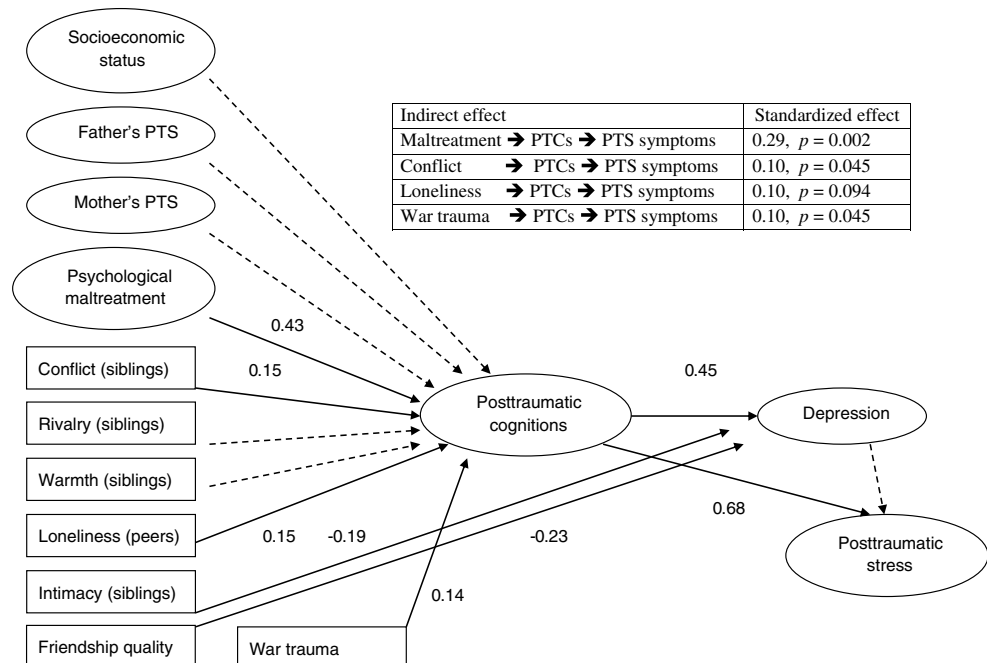
regression weights. $\chi^2(382)=544.05, p<0.001$; CFI = 0.90, TLI = 0.88, RMSEA = 0.04, SRMR = 0.07. The model had 30 observed variables ($30*(30+1)/2=465$ unique elements in the covariance matrix) and 113 free

2011), and that PTCs mediated the effects of risk factors on PTS symptoms as hypothesized by Trickey et al. (2012). The results are consistent with the interpretation that negative events such as war trauma and negative relationships lead children to appraise themselves as changed for the worse and unable to escape from a threatening situation. These negative appraisals in turn make children vulnerable to mental health problems (Ehlers and Clark 2000).

Psychological maltreatment had the largest indirect effect on PTS symptoms, and its standardized point estimate (Fig. 3) was about two times larger than that of war trauma and other variables. The indirect effects on PTS symptoms of psychological maltreatment and war trauma were not statistically significantly different from each other but psychological maltreatment's direct effect on PTCs was significantly larger.

There are at least two potential explanations why psychological maltreatment has a larger effect than war trauma: First, children trust and depend on their parents (unlike enemy soldiers) which tends to make children select explanations that are favorable to the continuation of the relationship and that lead to negative self-concepts deserving of negative outcomes. This explanation fits with the converging theoretical (Beck 2008; Bowlby 1988; Rose and Abramson 1992; Young and Lindemann 2002) and empirical literature (for reviews, see Gibb 2002; Hankin et al. 2009) about the origins of negative cognitions formed on the basis of negative early interactions with significant others. Second, psychological maltreatment can be an especially potent influence on negative cognitions because the cognitions are given directly to the victim unlike when being under a military attack (Haefel and Grigorenko

Fig. 3 Structural equation model of post traumatic cognitions (PTCs) mediating the effects of risk factors of posttraumatic stress (PTS) at T3. The Monte Carlo estimation method did not produce fit indices. 19 observed variables (190 unique elements in covariance matrix) and 82 free parameters



2007; Rose and Abramson 1992). Verbal abuse is also linked to white matter tract abnormalities in brain regions that are correlated with verbal IQ and comprehension and with depression, dissociation, somatization, and anxiety (Choi et al. 2009).

Negative cognitions mediate the effects of abuse on mental health as our reanalysis of the data by Leeson and Nixon (2011) showed. Leeson and Nixon (2011) reported that psychological maltreatment did not explain additional variance of PTSD symptoms after accounting for total maltreatment. However, our reanalysis of their data showed that emotional abuse had the highest indirect effect on PTS symptoms via cognitions after controlling for other types of maltreatment. Furthermore, the mediation via cognitions was complete: no form of maltreatment directly predicted PTS symptoms significantly after accounting for cognitions in their data. This suggests that our results would hold even if other types of maltreatment are taken into account.

War trauma could activate earlier negative schemas because dangers of war lead children to search for security, i.e., to the activation of attachment system and working models related to attachment relationships (Bowlby 1988; Riggs 2010). Emotional maltreatment would then moderate the effects of the severity of war trauma on PTCs. Our preliminary analyses did not find significant moderation but this hypothesis could be tested in the future.

We hypothesized that parents' PTS symptoms and socioeconomic status (SES) would predict PTCs and children's PTS symptoms. The estimates were small and not significantly different from zero. Meta-analyses have found parents' PTS symptoms to have small (Cox et al. 2008) to large (Alisic et al. 2011) effects on children. Saile et al. (2014) found that in the context of organized violence fathers with PTSD were more likely to maltreat their children. It is therefore possible that we did not observe a significant association between parents' PTS symptoms and children's PTCs and PTS symptoms because the association was fully mediated by psychological maltreatment. Our lack of findings about SES's effects are not surprising given the previous non-significant (Alisic et al. 2011) and small to medium sized effects (Trickey et al. 2012). The effects of SES could also have been fully mediated via psychological maltreatment.

The earlier literature was not clear about the temporal relationship between depression, PTCs, and PTS symptoms. We therefore ran a cross-lagged analysis of their associations (Fig. 2). Cross-lagged analysis does not reveal causal associations (Rogosa 1980) but it aided us in ordering the variables in the mediation model (Fig. 3). We found that depression and PTCs predicted PTS symptoms but not the other way around. In the mediation model, PTCs predicted depressive symptoms but depression did not predict PTS symptoms statistically significantly. The association between mood and PTS could be due to their connection to PTCs.

The association between social relations and depression and PTS symptoms among Palestinian war-affected children has been observed before (Peltonen et al. 2010). Against our initial hypotheses, friendship quality and sibling intimacy predicted depression directly instead of being mediated by PTCs. These aspects of social relations could have their influence on depression via more specifically depression-related cognitions which were not measured in the present study.

The effects of negative instead of positive social interactions on PTS symptoms have been observed in other studies as well (Andrews et al. 2003; Guay et al. 2006; Zoellner et al. 1999). Anxious, angry, or fearful cognitions may in general be more sensitive to the presence of negative social relationships than to the lack of positive relationships in the same way people are more sensitive to negative events than they are to positive events (Ernst et al. 2014). The lack of positive social interactions in turn could lead to depressive cognitions.

The study design has several limitations. The results are not experimental and do not necessarily reflect causal relations. It is possible that the associations partly reflect an underlying genetic vulnerability which could account for psychological maltreatment among parents, sibling conflict, and negative cognitions among children. However, we did not observe a link between parents' and children's PTS symptoms which could have been expected if the associations were genetic. This study does not answer the question whether children's PTS symptoms and PTCs also caused psychological maltreatment by the parents, conflict among siblings, and unpopularity among peers. The data in the present analysis was collected after a war and in particular the mediation models were cross-sectional. The origin of negative PTCs could have been investigated more thoroughly by measuring all of the social relations longitudinally and also before the war. There is evidence that during the first year after trauma, poor social support increases PTS symptoms, whereas during the second year, PTS symptoms contribute to the decrease of social support (Kaniasty and Norris 2008). In other words, mental health problems can harm social relations. A longitudinal design for the mediation models could have allowed us to take this into account. Nevertheless, social influences other than trauma can have a role in the formation of PTCs and PTS symptoms, which is shown by the fact that psychotherapy changes negative cognitions and thereby alleviates mental health problems (Kleim et al. 2013; Zalta et al. 2014).

Conclusions

The present results highlight the importance of negative social relations such as maltreating parenthood, sibling conflict, and unpopularity among peers together with war trauma, for the development of negative cognitions. The results point to the importance of age-salient relationships in the development of

negative cognitions among preadolescents for whom parents and siblings remain important while the influence of peers has increased (Steinberg and Morris 2001). Challenging preadolescents' negative cognitions may protect their mental health if the prevention of psychological maltreatment, improving poor peer and sibling relations, and peace building fails. Randomized controlled trials of interventions which train social and parenting skills could test the causal associations suggested by the present study.

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Conflict of Interest The authors declare that they have no conflict of interest

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Intergenerational effects of war trauma among Palestinian families mediated via psychological maltreatment[☆]



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ABSTRACT

We tested the hypothesis that intergenerational effects of parents' war trauma on offspring's attachment and mental health are mediated by psychological maltreatment. Two hundred and forty children and their parents were sampled from a war-prone area, Gaza, Palestine. The parents reported the number and type of traumatic experiences of war they had had during their lifetime before the child's birth and during a current war when the child was 10–12 years old. The children reported their war traumas, experiences of psychological maltreatment, attachment security, and symptoms of posttraumatic stress (PTSS), depression, and aggression. The direct and indirect intergenerational effects of war trauma were tested in structural equation models. The hypotheses were confirmed for father's past war exposure, and disconfirmed for mother's war exposure. The father's past war trauma had a negative association with attachment security and positive association with the child's mental health problems mediated by increased psychological maltreatment. In contrast, the mother's past war trauma had a negative association with the child's depression via decreased psychological maltreatment. The mother's current war trauma had a negative association with the child's depression and aggression via decreased psychological maltreatment. Among fathers, past war exposure should be considered as a risk factor for psychological maltreatment of children and the associated attachment insecurity and mental health problems. Among mothers, war exposure as such could be given less clinical attention than PTSS in the prevention of psychological maltreatment of children.

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Survivors of war and political violence can suffer from long-lasting effects, which can reach their offspring by making them more vulnerable to developmental and mental health problems (Han, 2005). The effects can be transmitted through various biological, psychological, familial, and societal pathways (Weingarten, 2004), of which negative parental behavior in the form of psychological maltreatment plays a central role in an evolutionary framework proposed by Belsky (2008). Yet, few studies have tested whether psychological maltreatment is a pathway through which war trauma affects survivors' offspring.

Belsky (2008) argues that intergenerational effects of war can, at the same time, be negative for the offspring's psychosocial wellbeing but positive in terms of survival and reproduction. Belsky draws this argument from life history theory which aims to explain variation in organisms' investments in growth and reproduction (Hill & Kaplan, 1999; Pianka, 1970). Belsky's (2008) hypothesis is somewhat different from Quinlan's (2007) who argues, also based on life history theory, that war is

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independent of parental care and that parental efforts in war-prone environments quickly reach the point where offspring's fitness is not improved anymore. [Quinlan \(2007\)](#) therefore hypothesizes that warfare leads to a decrease in sensitive and close parental care because the care does not benefit fitness in a risky environment, whereas [Belsky \(2008; Belsky, Steinberg, & Draper, 1991\)](#) argues that warfare leads to an increase in harsh, rejecting, and insensitive parenting because it benefits the offspring's fitness in such an environment ([Frankenhuis & Del Giudice, 2012](#)).

Harsh, rejecting, and insensitive parenting can be considered to be part of psychological maltreatment. Psychological maltreatment includes rejecting in the form of unavailability and denying emotional responsiveness; harshness in the form of terrorizing, hostile degrading, and negative attributions to the child; and insensitiveness in the form of developmentally inappropriate or inconsistent interactions with the child, failures to recognize and acknowledge the child's individuality, and using the child for the fulfillment of the parent's psychological needs ([APSAC, 1995; Glaser, 2002](#)).

[Belsky \(2008; Belsky et al., 1991\)](#) assumes that the harsh, rejecting, and insensitive parenting prepares the offspring to a dangerous extra-familial environment by increasing attachment insecurity ([Riggs & Kaminski, 2010](#)) and symptoms of anxiety ([Spertus, Yehuda, Wong, Halligan, & Seremetis, 2003](#)), depression ([Allen, 2008; Ferguson & Dacey, 1997; Wright, Crawford, & Del Castillo, 2009](#)), and aggression ([Allen, 2011](#)). Psychological maltreatment can benefit offspring's reproduction via insecure attachment by shifting reproductive strategy toward having many children at an early age ([Belsky, 2008; Chisholm, Quinlivan, Petersen, & Coall, 2005; Del Giudice, 2009b; Schmitt, 2005](#)). This strategy makes it more likely that some offspring is born before the potential parents' death and that some of the offspring survive to reproduce themselves.

Anxiety, depression, and aggression can be beneficial for survival in a dangerous environment. Attentional biases and vigilance to threats associated with anxiety disorders such as posttraumatic stress disorder (PTSD) can help the offspring recognize and avoid danger quickly ([Dalgleish, Moradi, Taghavi, Neshat-Doost, & Yule, 2001](#)). Depressive symptoms caused by psychological maltreatment can serve as signals of submission and therefore inhibit enemy's hostility ([Irons & Gilbert, 2005](#)). Finally, aggressiveness and a "war zone mentality" favoring preemptive violence ([Garbarino, 2011](#)) can also help in surviving a war ([Belsky, 2008](#)).

The hypothesis that psychological maltreatment mediates the intergenerational effects of war trauma finds some support from studies of families of torture victims, refugees, war veterans, and Holocaust survivors. Most studies have not explicitly measured psychological maltreatment but related negative parental behavior, some of which could also be conceptualized as psychological maltreatment.

We found two studies that tested the role of harsh, rejecting, or insensitive parenting in mediating the relationship between parents' traumatic experiences and children's attachment, behavior, and mental health. [Scharf \(2007\)](#) discovered that adolescents whose both parents were Holocaust survivors' offspring (HSO) were more likely to have an insecure anxious attachment style than if one or neither parent was HSO. The association between having HSO as parents and an insecure anxious attachment style was mediated by parent's rejection and overprotection ([Scharf, 2007](#)). In contrast, [Rosenheck and Fontana \(1998\)](#) found that Vietnam veterans' participation in abusive violence (e.g. torturing people, killing civilians) during the war predicted their children's behavioral disturbances but physical family violence did not mediate the association. Further supporting evidence of the mediating role of psychological maltreatment comes from the study of intergenerational transmission of PTSD, which however is not the same thing as the transmission of the effects of events themselves. [Yehuda, Halligan, and Grossman \(2001\)](#) found that the intergenerational transmission of PTSD was mediated by psychological maltreatment among Holocaust survivors.

The empirical literature on the separate associations in the hypothesized causal pathway is more abundant. There is evidence that parents' war trauma is associated with children's insecure attachment styles and mental health problems. A study of South East Asian refugee families found that the severity of parents' experiences of war and political violence was associated with insecure parent–child attachment ([Han, 2005](#)). Wiseman (as cited in [Sagi-Schwartz, van Ijzendoorn, & Bakermans-Kranenburg, 2008](#)) found that HSO had a more anxious attachment style than comparisons during a period of bombing attacks ([Sagi-Schwartz et al., 2008](#)). [Sagi-Schwartz et al. \(2003\)](#) did not find HSO to show more unresolved attachment and studies by Goldberg and Wiseman and by Wiseman (as cited in [Sagi-Schwartz et al., 2008](#)) did not find HSO to show more avoidant attachment.

Children of torture victims have more symptoms of PTSD and depression compared to children whose parents were not tortured ([Daud, Skoglund, & Rydelius, 2005; Montgomery, 1998](#)). The severity of veterans' war experiences is positively associated with their children's increased attentional biases toward threat ([Motta, Joseph, Rose, Suozzia, & Leiderman, 1997; Suozzia & Motta, 2004](#)).

Epidemiological studies of mental health problems among HSO indicate that there are no direct negative intergenerational effects of parental trauma on depressive and anxiety disorders ([Sagi-Schwartz et al., 2008; van Ijzendoorn, Bakermans-Kranenburg, & Sagi-Schwartz, 2003](#)). However, the HSO are found to be more vulnerable to PTSD in stressful situations such as combat ([Solomon, Kotler, & Mikulincer, 1988](#)) and cancer ([Baider et al., 2000](#)). Consistent with these results of heightened vulnerability, low levels of cortisol have been measured in the offspring of Holocaust survivors indicating a heightened risk for PTSD ([Yehuda et al., 2000, 2007](#)).

The evidence suggests that experiencing war and political violence is associated with harsh, rejecting, and insensitive parenting especially among fathers but the association could be different among mothers. Political stressors (e.g. curfews, arrests of family members, tangible losses) have predicted increased rates of physical and psychological maltreatment within the family as reported by Palestinian youth in the West Bank ([Haj-Yahia & Abdo-Kaloti, 2003](#)). Male war veterans in the

USA have lower parenting satisfaction than civilians (Vogt, King, King, Savarese, & Suvak, 2004), and the occurrence of child maltreatment is higher in military families during departures to and returns from deployment (Rentz et al., 2007).

Studies of the parental behavior of Holocaust survivors have produced mixed result and the associations seem to be gender specific. Kellermann (2001) found that survivors' parenting included more perceived role-reversal by both mothers and fathers and more hitting, shouting, and punishing by fathers. Last and Klein (1984) discovered that paternal trauma increased fathers' controlling, intrusive, and inconsistent socializing of girls and decreased both fathers' and mothers' nurturance of boys. In contrast, maternal trauma decreased mothers' hostile control, enforcement, and intrusiveness as well as fathers' rejecting, controlling, and anxiety-instilling behavior (Last & Klein, 1984). Lichtman (1984) found that parents' severity of Holocaust trauma was positively associated with their guilt inducing communication, which was also positively associated with anxiety among daughters. Others have not found associations between parents' Holocaust trauma and harsh, avoidant or intrusive parenting styles (Gross, 1988; Weiss, 1988; Zlotogorski, 1983).

The participants of this study are Palestinian families, and the context for intergenerational transmission of trauma is the Israeli–Palestinian conflict. The establishment of the state of Israel and the 1948 war resulted in the loss of land and the start of refugeedom for most Palestinians. In the 1967 war, Palestinians living in West Bank and Gaza became under Israeli military rule, characterized by extensive land confiscation, house destruction, imprisonments, and restriction of movement. The Palestinian resistance to the military occupation culminated in the First Uprising (Intifada) in 1987–1993, followed by the Second Uprising (Al Aqsa Intifada) in 2000–2006. The current war trauma assessed in this study refers to the Gaza War 2008–2009, a wide-ranging military offensive resulting in extensive human and material losses. The participating children were 10–13 year-old, thus born in 1996–1999, the time of Oslo agreement and Palestinian Authority rule, signifying a lull in hostilities and prospects for peace.

It is known that parental behavior in the context of military violence in Gaza is associated with children's mental health. Mothers' punitive disciplining style is negatively associated with children's resilient attitudes (Qouta, Punamäki, Montgomery, & El-Sarraj, 2007). A study conducted at the height of military violence during the First Intifada in Gaza showed that high exposure to war trauma formed a risk for punitive and neglecting parenting, which in turn was associated with children's poor mental health (Punamäki, Qouta, & El Sarraj, 1997). Punitive parenting practices were found to associate with children's aggression in a multisample study reflecting levels of political violence in Gaza, but also revealed that non-punitive parenting could moderate the trauma-related increase in aggressive behavior (Qouta, Punamäki, Miller, & El-Sarraj, 2008; Qouta, Punamäki, & Sarraj, 2008). Similarly, Thabet, Ibraheem, Shivrām, Winter, and Vostanis (2009) found in a sample of children aged 12–16 years that traumatic events such as witnessing killing and destruction increased the risk of PTSD, while emotionally supportive parenting was associated with a low symptom level. Among adults, an epidemiological study in Gaza strip revealed that retrospectively reported parental maltreatment was associated with low and inadequate social support, whereas exposure to military violence was associated with high social support, including emotional sharing (Punamäki, Komprou, Qouta, El-Masri, & de Jong, 2005). To our knowledge, however, there have been no quantitative studies done among Palestinians on the effects of parents' past war trauma on children's attachment and mental health and whether these possible effects are mediated by psychological maltreatment.

In summary, the scant evidence supports the hypothesis that harsh, rejecting, and insensitive parenting or psychological maltreatment mediates the intergenerational effects of war exposure. Nevertheless, previous research has tested the hypothesis only partially. The two mediation studies done previously did not explicitly measure psychological maltreatment nor PTSS or depressive symptoms. Furthermore, they did not measure war victims' trauma, but either veterans' perpetration of atrocities (Rosenheck & Fontana, 1998) or the effects of being a victim's offspring (Scharf, 2007).

Based on life history theory (Belsky, 2008) and previous research, we tested, first, the hypothesis that parents' traumatic experiences of war and political violence decrease children's attachment security and increase symptoms of posttraumatic stress (PTSS), depression, and aggression. The experiences involve both past (before the child was born) and current war trauma. Second, we tested the hypothesis that psychological maltreatment mediates the association between parents' war trauma and children's attachment security, PTSS, depression, and aggression. We took the possibility of gender-specificity into account by analyzing the separate associations of mothers' and fathers' war trauma.

Method

Sample

Participants were 240 Palestinian children and their parents. The children were recruited from school classes in government schools in 2009 after the Gaza War (known as the Gaza Massacre or the Battle of al-Furqan in Gaza and as Operation Cast Lead in Israel). The children were 10–12 ($M = 11.4$, $SD = 0.57$) years old and half were boys. Mothers were on average 37.6 ($SD = 6.92$) and fathers 42.4 ($SD = 7.75$) years old. Parents had elementary (18% of mothers, 19% of fathers), preparatory (31% of mothers, 32% of fathers), secondary (42% of mothers, 24% of fathers) or university (8% of mothers, 25% of fathers) level education. Family income was less than 1,000 Israeli shekels (about 260 USD) a month for 60% of the families, between 1,000 and 2,000 shekels for 16% of the families and more than 2,000 shekels for 24% of the families. Twelve percent of the sample was refugees and 88% had a citizenship.

The present sample of children belonged to the control group of a randomized controlled trial of a psychosocial trauma intervention. The effects of the intervention on children's mental health are published elsewhere (Qouta, Palosaari, Diab,

& Punamäki, 2012). Two-stage cluster sampling was chosen because the school classes were a natural unit for the group intervention and having many school classes in a few schools was financially and logistically economical. The schools were sampled from two areas assessed to be the most severely bombed and shelled regions during the Gaza War 2008–2009 (the North Gaza and Gaza City) because it was judged that the intervention should be implemented in areas where the population most needed it. Two schools for girls and two schools for boys were picked by simple random sampling from a list of schools provided by the Ministry of Education, because no permission was granted for conducting the study in UNRWA schools and there are no mixed governmental schools in Gaza. The random sampling of classes from each school resulted in 8 classes of fifth and sixth grade students. The classes were numbered and written on pieces of paper, and the head master picked the pieces of paper randomly.

Questionnaires not available in Arabic were translated and back-translated from and to English by the research group. Palestinian members of the research group adjusted the measures to the socio-cultural context in Gaza.

Parents were sent questionnaires as well as information sheets explaining the purpose of the study, and verbal consent for the target child's participation was inquired because families in Gaza were afraid of the consequences of giving a written consent. Children completed questionnaires at school where six research assistants gave them instructions and answered their questions. Children reported about their war traumas and attachment security 3 months after the war, and they reported about their maltreatment, PTSS, depression, and aggression 11 months after the war. The parents reported about their war traumas 11 months after the war.

Measures

Parents' war traumas. Parents' war trauma measure was based on the Gaza Traumatic Event Checklist (Thabet & Vostanis, 1999) and it covered their experiences of violence during the Israeli–Palestinian conflict from 1948 Arab–Israeli War and Palestinian exodus, 1967 Six-Day War and Israeli occupation of Gaza, 1987–1993 Intifada, and 2008–2009 Gaza War. Both mothers and fathers reported about their war traumas separately. The 14 event types for each conflict time period included experiences of violence and life threat such as “Have you been shot at?” “Has a member of your family been killed?” and “Has your house ever been demolished by the occupation when you were stuck inside it?” The items are shown in Table 1. A yes–no response was given for each question, and positively endorsed items were summed to construct four variables: mothers' and fathers' war experiences before the child's birth until 1993, and mothers' and fathers' experiences during the Gaza War.

Children's war traumas. Children's war traumas during the Gaza War were measured with a 14-item questionnaire similar to the parents' questionnaire. The items are shown in Table 2. Sum variables were constructed from the positively endorsed items.

Psychological maltreatment. The children responded to a 20-item Child Psychological Maltreatment questionnaire that assesses the children's experiences of emotional abuse, neglect, and corrupting by their parents in the context of Palestinian culture (Khamis, 2000). The basis for the selection of the items was the description of psychological maltreatment by the American Professional Society on the Abuse of Children (1995). Examples of items are “My parents despise me in front of people”, “My parents ignore my attempts to interact with them”, and “My parents tell me that it is important that one should cheat sometimes in order to get what s/he wants.” All the items were in present tense and the time period asked was the first 12 years. The children rated the items on a Likert-scale ranging from 1 (*Strongly disagree*) to 5 (*Strongly agree*). In a sample of 1,000 Palestinian children from the West Bank, Khamis (2000) found three underlying factors, which were used in the present study as indicator variables: emotional abuse (sum of 11 items), emotional neglect (sum of 7 items), and corrupting (sum of 2 items). Khamis (2000) also reported good internal reliability for the total scale (Cronbach's alpha: .92) as well as discriminant validity.

Children's attachment security. Security scale was used to measure attachment security in the child's relationship with the mother (Kerns, Klepac, & Cole, 1996). The instrument consisted of eight items such as “Some kids are sure that their mom would never leave them”, “Some kids find it easy to trust their mom”, and “Some kids worry that their mom does not really love them.” The children indicated on a 4-point scale whether the sentence or its opposite was either sort of true or very true for them. Security scale has shown adequate internal and test–retest reliability as well as validity in non-Arab samples (Kerns et al., 1996; Verschuere & Marcoen, 2002).

Posttraumatic stress symptoms. The 13-item Children's Impact Event Scale, CRIES (Smith, Perrin, Dyregrov, & Yule, 2003), covers three core dimensions of PTSS: re-experiencing (4 items), avoidance (4 items), and hyperarousal (5 items) symptoms. Children indicated on a 4-point scale how often they had had each symptom during the previous two weeks (0 = *not at all*, 1 = *rarely*, 3 = *sometimes*, 5 = *often*). The total sum ranges from 0 to 65. CRIES has shown moderate to adequate reliability and validity in European (Giannopoulou et al., 2006; Smith et al., 2003) and Palestinian samples (Koltveit et al., 2012).

Depression. The Depression Self-Rating Scale for Children by Birlleson, Hudson, Buchanan, and Wolff (1987) is an 18-item self-report instrument that assesses the cognitive, affective, and behavioral dimensions of depression. The children estimated on a 3-point scale whether they had had each symptom during the last two weeks (0 = *not at all*, 1 = *sometimes*, 2 = *all the*

Table 1

Mothers' and fathers' war trauma, percentages and (sums).

Item	1948		1967		Intifada I		Gaza 2009	
	Mothers	Fathers	Mothers	Fathers	Mothers	Fathers	Mothers	Fathers
1. Have you ever been shot at?	0%	0%	0%	1.7% (4)	1.2% (2)	0.8% (2)	1.8% (3)	27.7% (39)
2. Has your house been bombed by tanks?	0.6% (1)	0%	1.2% (2)	0.4% (1)	0.6% (1)	0.4% (1)	9% (15)	7.5% (18)
3. Has your house been bombed by air jets or drones?	1.2% (2)	0.4% (1)	0.6% (1)	1.3% (3)	0.6% (1)	0.8% (2)	9% (15)	6.7% (16)
4. Has your house been demolished by the occupation when you were outside it?	0.6% (1)	0.4% (1)	0%	0.8% (2)	0%	0.4% (1)	6% (10)	4.2% (10)
5. Has your house been demolished by the occupation when you were stuck inside it?	0.6% (1)	0.4% (1)	0%	0%	1.8% (3)	0.8% (2)	2.4% (4)	2.5% (6)
6. Has your land been leveled by the occupation?	0%	0%	0%	0%	3% (5)	1.3% (3)	10.2% (17)	6.7% (16)
7. Has any member of your family died as a martyr?	0%	1.3% (3)	1.2% (2)	2.5% (6)	2.4% (4)	2.5% (6)	8.4% (14)	7.1% (17)
8. Has any member of your family been injured?	0%	0%	1.2% (2)	0%	5.4% (9)	4.2% (10)	7.2% (12)	6.7% (16)
9. Have you ever seen one of your family members subjected to beating or torture?	0.6% (1)	0%	0%	0.4% (1)	13.8% (23)	11.7% (28)	3.6% (6)	0.8% (2)
10. Have you ever seen one of your family members exposed to humiliation?	0.6% (1)	0%	0%	0.8% (2)	15.6% (26)	10.8% (26)	6% (10)	4.6% (11)
11. Have you ever seen a friend or friends killed as martyrs?	0.6% (1)	0%	0.6% (1)	0.8% (2)	10.2% (17)	11.3% (27)	34.7% (58)	24.6% (59)
12. Have you ever seen a friend or friends injured?	0.6% (1)	0%	0.6% (1)	0.4% (1)	10.8% (18)	11.3% (27)	32.9% (55)	26.3% (63)
13. Have you ever seen strangers killed as martyrs?	2.4% (4)	0%	1.8% (3)	1.7% (4)	15.6% (26)	12.5% (30)	44.2% (74)	30.4% (73)
14. Have you ever seen body parts?	0%	0%	0.6% (1)	0.4% (1)	6% (10)	3.3% (8)	40.7% (68)	32.1% (77)

Table 2

Children's war trauma in 2008–2009.

Item	Sum	Percentage
1. Were you surrounded by shelling from everywhere?	180	75.6%
2. Were you injured or hurt during the war?	59	24.9%
3. Do you have any fears of death as a result of continuous shelling?	168	74.0%
4. Was the shelling close to you and you were about to be injured?	178	77.4%
5. Did you see people dying during the shelling?	131	58.0%
6. Were you subjected to gunshots?	28	11.7%
7. Were you burnt by grenades or phosphorous bombs?	46	19.2%
8. Did one of your family members die as a martyr?	27	11.3%
9. Did you see a friend or friends die as a martyr?	62	25.8%
10. Was one of your family members injured?	28	11.7%
11. Did you see a friend or friends injured?	71	29.6%
12. Did you see strangers die as a martyr?	147	61.3%
13. Did you see strangers injured?	139	57.9%
14. Did you see body parts of martyrs or dead people?	151	62.9%

Table 3

Descriptive statistics of the observed study variables.

Variable	n	Miss.	Miss. %	Potential range	Range	Mean	SD	Skew.	Kurt.
Mother's war trauma 1948–1993	167	73	30%	0–18	0–9	1.02	1.89	2.10	3.91
Mother's war trauma 2008/2009	167	73	30%	0–18	0–9	2.16	2.41	0.84	–0.34
Father's war trauma 1948–1993	158	82	34%	0–18	0–11	1.29	2.25	1.76	2.39
Father's war trauma 2008/2009	158	82	34%	0–18	0–11	2.46	2.59	0.85	0.03
Child's war trauma 2008/2009	218	22	9%	0–18	0–12	5.28	2.55	0.09	–0.33
Psychological maltreatment	197	43	18%	20–100	20–96	42.83	19.41	0.30	–1.08
Attachment security	230	10	4%	4–16	4–16	13.66	2.51	–1.21	1.12
Posttraumatic stress symptoms	197	43	18%	0–65	0–53	25.83	9.24	0.23	0.51
Depressive symptoms	197	43	18%	0–36	2–26	13.42	4.96	0.08	–0.53
Aggressive symptoms	197	43	18%	0–10	0–9	2.15	1.75	1.12	1.85

Miss.: missing; Skew.: skewness; Kurt.: kurtosis.

time). The total sum ranges from 0 to 36. The instrument has shown moderate internal consistency in a Palestinian sample (Kolltveit et al., 2012) and has been found to have a multi-factor structure in an Iranian sample (Taghavi, 2006).

Aggression. Conduct problem scale of the Strengths and Difficulties Questionnaire was used to measure aggressive conduct problems (Goodman, 2001). The instrument consists of five items and children indicated on a 3-point scale how well the statements described them for the last 6 months (0 = *not true*, 1 = *somewhat true*, or 2 = *certainly true*). A study done in Gaza has shown that SDQ might not work for Arab parents' assessment of pre-school children (Thabet, Stretch, & Vostanis, 2000) but good validity of the instrument has been shown for the self-report version in a sample of 12- to 17-year-old children and adolescents in Yemen (Alyahri & Goodman, 2006).

Statistical analysis

Separate structural equation models were estimated for the measurement models and for the outcomes using Mplus 5.2 (Muthén & Muthén, 1998). As shown in Table 3, data were missing from 4 to 82 cases in different variables. Missing data were handled with full information maximum likelihood (FIML) estimation. We used maximum likelihood estimation with robust standard errors (MLR), which does not require the assumption that variables are normally distributed. Good fit was indicated by a non-significant χ^2 -value at 95% confidence level, Root Mean Square Error of Approximation (RMSEA) value below .06, Standardized Root Mean Squared Residual (SRMR) value below .08, and Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI) values above .95 (Hu & Bentler, 1999).

To determine the statistical significance of the indirect effects of parents' war trauma on children's mental health via emotional maltreatment, joint significance tests of the paths from the independent variable to the mediator and from the mediator to the outcome were used (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). The method has a good balance of Type I error and statistical power. In particular, it has better statistical power than the method proposed by Baron and Kenny (1986; MacKinnon et al., 2002). Furthermore, the method assumes that there can be indirect effects from the independent variable to the outcome variable even if no statistically significant direct association between the two variables is observed. The pattern of non-significant direct and significant indirect effects can be the result of total mediation or multiple mediators canceling out each other's effects on the independent variable, which is problematic for the Baron and Kenny (1986) approach.

Cluster sampling can affect standard statistical tests by inflating type I error rate and the design effect should be taken into account in statistical analysis if it exceeds 2 (Muthén & Satorra, 1995). All the associations in the current analysis had design effects close to one and we therefore did not adjust our analyses.

Results

Descriptive statistics

Table 3 presents information regarding the observed study variables including the total sums of the observed outcome variables. On average, mothers and fathers had one type of past war trauma before the child's birth and two types of current war trauma during the Gaza War 2008–2009, when children had on average five types of war trauma. The reported psychological maltreatment ranged from nonexistent to severe. The most common answer that children gave to questions about the attachment relationship to their mothers was that descriptions of secure attachment were very true for them. The amount of posttraumatic stress and depressive symptoms were on average less than the cutoff for probable clinical diagnosis of PTSD (30; Perrin, Meiser-Stedman, & Smith, 2005) and depression (15; Birmleson et al., 1987). The reported aggression was on average on the low end of the scale.

The bivariate correlations, covariances, and variances of the study variables are presented in Table 4. Some of the hypothesized associations, that will be tested in the structural equation models below, have statistically significant bivariate

Table 4

Pearson correlations, variances, and covariances of the observed total sum variables.

Variable	1	2	3	4	5	6	7	8	9	10
1. Mother's trauma-1993	3.58	1.30	2.42	0.59	0.38	−1.98	−0.04	−1.18	0.50	0.20
2. Mother's trauma 2009	.29***	5.79	1.18	3.96	0.46	−6.31	1.18	0.28	0.35	−0.44
3. Father's trauma-1993	.56***	.22**	5.05	1.68	0.78	6.94	0.03	−1.81	−1.99	0.53
4. Father's trauma 2009	.12	.63***	.29***	6.72	0.52	2.03	1.27	−0.66	1.90	0.16
5. Child's trauma 2009	.08	.08	.14	.08	6.50	4.93	0.36	4.91	2.76	0.32
6. Maltreatment	−.06	−.14	.17*	.04	.10	376.85	−11.42	8.56	35.72	15.28
7. Attachment security	−.01	.18*	.01	.18*	.06	−.24**	6.31	1.23	−2.10	−0.27
8. PTSS	−.07	.01	−.08	−.03	.20**	.05	.05	85.36	11.38	1.57
9. Depression	.06	.03	.18*	.15	.22**	.37***	−.17*	.25***	24.62	3.81
10. Aggression	.06	−.11	−.11	.04	.07	.45***	−.06	.10	.44***	3.06

Note. Correlations are on the lower triangular, variances on the diagonal, and covariances on the upper triangular.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 5

Measurement models.

Model	$p(\chi^2)^a$	CFI	TLI	RMSEA	SRMR	Loadings ^b	Reliability ^c
Maltreatment	Sat. ^d	Sat.	Sat.	Sat.	Sat.	.83–.96	.95
Attachment _{All}	<.001	.58	.42	.09	.07	−.09 to .67	.33
Attachment _{Positive}	.40	1	1	.000	.01	.39–.65	.58
PTSS _{Perrin}	.29	1	1	.000	.01	.21–.97	.54
PTSS _{Simms}	.004	.81	.44	.15	.03	.21–.69	.50
PTSS _{Shevlin}	.01	.98	.93	.13	.05	.05–.94	.70
Depression _{All}	<.001	.76	.73	.06	.07	−.10 to .57	.70
Depression _{Taghavi}	.16	.98	.94	.06	.03	.36–.70	.64
Aggression _{Items}	.18	.92	.83	.05	.03	.19–.56	.43

Note. CFI: Comparative Fit Index; TLI: Tucker-Lewis Index; RMSEA: Root Mean Square Error of Approximation; SRMR: Standardized Root Mean Squared Residual. Attachment_{All}: all items in security scale (Kerns et al., 1996). Attachment_{Positive}: Only items in security scale indicating attachment security, no reversed items. PTSS_{Perrin}: CRIES in three 3 parcels (Perrin et al., 2005). PTSS_{Simms}: CRIES in 4 parcels (Simms, Watson, & Doebbeling, 2002). PTSS_{Shevlin}: CRIES in 4 overlapping parcels (Shevlin, McBride, Armour, & Adamson, 2009). Depression_{All}: all individual items in Birlleson et al. (1987). Depression_{Taghavi}: 4 parcels according to Taghavi (2006).

^a p -Value of χ^2 test of model fit.

^b Range of standardized factor loadings.

^c Factor-analysis-based estimate of reliability (Raykov & Marcoulides, 2011, pp. 160–165).

^d Saturated or just-identified model.

correlations in observed sum variables. Specifically, father's war trauma before the child's birth is positively correlated with the severity of psychological maltreatment and child's depressive symptoms. Psychological maltreatment, in turn, is negatively correlated with child's attachment security, and positively correlated with symptoms of depression and aggression.

Measurement models

We tested various measurement models based on previous literature and the models with the best fit were chosen for further analysis (Table 5). Accordingly, the chosen models included the security scale with only items describing secure attachment as indicators for attachment, CRIES in three parcels according to the scales proposed by Perrin et al. (2005) for PTSS, and the Depression Self-Rating Scale for Children with four parcels according to the factor-structure found by Taghavi (2006). The fits of the chosen models were good and the factor-analysis-based estimates of reliability ranged from .43 to .95 (Raykov & Marcoulides, 2010).

Direct association between parents' war traumas and children's attachment security and mental health problems

We tested the hypothesis that parental war trauma would decrease children's attachment security and increase mental health problems by regressing the PTSS, depressiveness and aggression on war trauma before the child was born and the current war trauma, and controlling for children's current war trauma. The results are reported in Tables 6 and 7. Contrary to our hypotheses, we observed that the more the mothers had current war trauma the less their children had aggressive conduct problems. The unstandardized effect was negative and statistically almost significant and the standardized effect was significant ($\beta = -.36$, 95% CI $[-.67, -.04]$, $t = -2.23$, $p = .02$). All other hypothesized direct effects of parental war trauma were statistically non-significant.

Table 6

Regression weights predicting children's attachment security directly.

Predictor	Attachment security		
	<i>b</i>	SE <i>b</i>	<i>b</i> *
Father's war trauma 1948–1993	–0.02	0.03	–.07
Father's war trauma 2008/2009	0.03	0.03	.15
Mother's war trauma 1948–1993	–0.01	0.04	–.03
Mother's war trauma 2008/2009	0.03	0.03	.14
Child's war trauma 2008/2009	0.01	0.02	.05
<i>R</i> ²	.06		
χ^2 (df)	14.01 (19)		
CFI	.99		
TLI	.99		
RMSEA	.00		
SRMR	.04		

Note. PTSS: posttraumatic stress symptoms, *b**: standardized regression weight, RMSEA: Root Mean Square Error of Approximation; SRMR: Standardized Root Mean Square Residual.

Table 7

Regression weights predicting children's mental health symptoms directly.

Predictor	Symptoms								
	Depressive			PTSS			Aggressive		
	<i>b</i>	SE <i>b</i>	<i>b</i> *	<i>b</i>	SE <i>b</i>	<i>b</i> *	<i>b</i>	SE <i>b</i>	<i>b</i> *
Father's war trauma-1993	0.04	0.02	.22	–0.04	0.14	–.03	0.02	0.02	.18
Father's war trauma 2009	0.03	0.02	.23	–0.01	0.15	–.01	0.02	0.02	.23
Mother's war trauma-1993	–0.02	0.03	–.08	–0.04	0.31	–.03	0.01	0.02	.06
Mother's war trauma 2009	–0.02	0.02	–.14	–0.03	0.17	–.03	–0.04*	0.02	–.40
Child's war trauma 2009	0.03	0.02	.22	0.32**	0.10	.30	0.01	0.01	.09
<i>R</i> ²	.15			.09			.14		
χ^2 (df)	35.30 (25)			23.38 (10)**			1.43 (4)		
CFI	.89			.72			.99		
TLI	.85			.49			.99		
RMSEA	.04			.08			.00		
SRMR	.04			.04			.02		

Note. PTSS: posttraumatic stress symptoms; *b**: standardized regression weight; RMSEA: Root Mean Square Error of Approximation; SRMR: Standardized Root Mean Square Residual.

* $p < .05$.

** $p < .01$.

Does emotional maltreatment mediate between parents' war traumas and children's attachment and mental health problems?

We hypothesized that parents' war traumas would increase the emotional maltreatment of children, which would in turn decrease children's attachment security and increase posttraumatic stress, depressive, and aggressive symptoms. The results of the path model analyses are presented in Figs. 1–4. The fathers' and mothers' war traumas are observed variables whereas psychological maltreatment, attachment insecurity, posttraumatic stress, depression, and aggression are latent factors. Model fit was good in all cases.

As hypothesized, Fig. 1 shows that high levels of fathers' war traumas before the child's birth were associated with children's lower attachment security via more severe psychological maltreatment (standardized indirect effect = $-.09$, 95% CI $[-.16, -.01]$, $t = -2.25$, $p = .02$). There was a nearly significant indirect effect from fathers' war trauma before the child's birth on PTSS via more severe psychological maltreatment (standardized indirect effect = $.07$, 95% CI $[-.003, .15]$, $t = 1.89$, $p = .06$) as shown in Fig. 2. Similarly, as hypothesized, results in Fig. 3 show that father's war traumas before the child's birth were associated with high level of the child's depressive symptoms via increased psychological maltreatment (standardized indirect effect = $.12$, 95% CI $[.03, .22]$, $t = 2.58$, $p = .01$). Finally, as shown in Fig. 4, the father's war trauma before the child's birth was positively associated with child's aggressive conduct problems via increased psychological maltreatment (standardized indirect effect = $.19$, 95% CI $[.04, .34]$, $t = 2.44$, $p = .014$).

In contrast, both mothers' war trauma before the child's birth (standardized indirect effect = $-.09$, 95% CI $[-.16, -.01]$, $t = -2.25$, $p = .02$) and current war trauma (standardized indirect effect = $-.11$, 95% CI $[-.20, -.01]$, $t = -2.15$, $p = .03$) were associated with low level of child's depressive symptoms via decreased psychological maltreatment. Similarly, mother's current war trauma (standardized indirect effect = $-.17$, 95% CI $[-.33, -.01]$, $t = -2.12$, $p = .03$) was negatively associated with aggressive conduct problems via decreased psychological maltreatment.

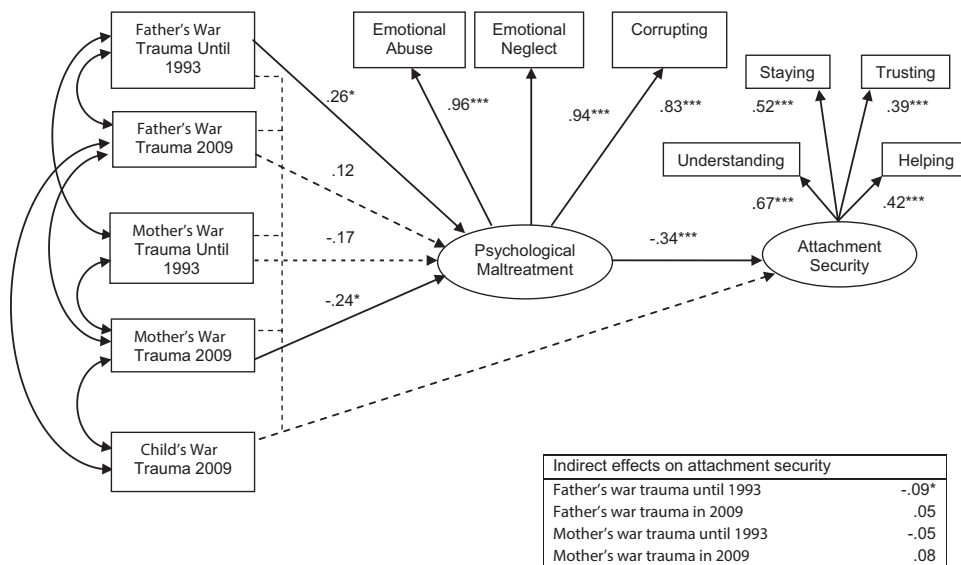


Fig. 1. Structural equation model of the hypothesized indirect effects of mothers' and fathers' war trauma on the children's felt attachment security. Standardized regression coefficients are shown. The dashed line indicates statistically nonsignificant associations. $\chi^2(40) = 27.310$, $p = .94$; CFI = .99; TLI = .99; RMSEA = .00; SRMR = .03. Note. * $p < .05$; ** $p < .01$; *** $p < .001$.

Discussion

The current study examined the mediating role of psychological maltreatment in the intergenerational transmission of war trauma in Palestinian families. Based on Belsky's (2008) interpretation of life history theory, we hypothesized that the more the parents were exposed to war traumas the more they would maltreat their children psychologically, which would in turn lead to children's insecure attachment, and more symptoms of posttraumatic stress, depression, and aggression. The hypotheses were supported in part among fathers but disconfirmed among mothers. The difference was specifically that father's past war trauma lead to more psychological maltreatment whereas mother's past and current war trauma lead to less psychological maltreatment experienced by the child. In addition, our hypotheses about the direct association between parental war trauma and children's insecure attachment and mental health problems was not confirmed. We observed that children whose mothers had more current war traumas reported lower levels of aggression and conduct problems.

Our results were dependent on the gender of the parent which has also been found in earlier studies, although the literature does not present a clear picture. Specifically, our findings are congruent with the results of Last and Klein (1984)

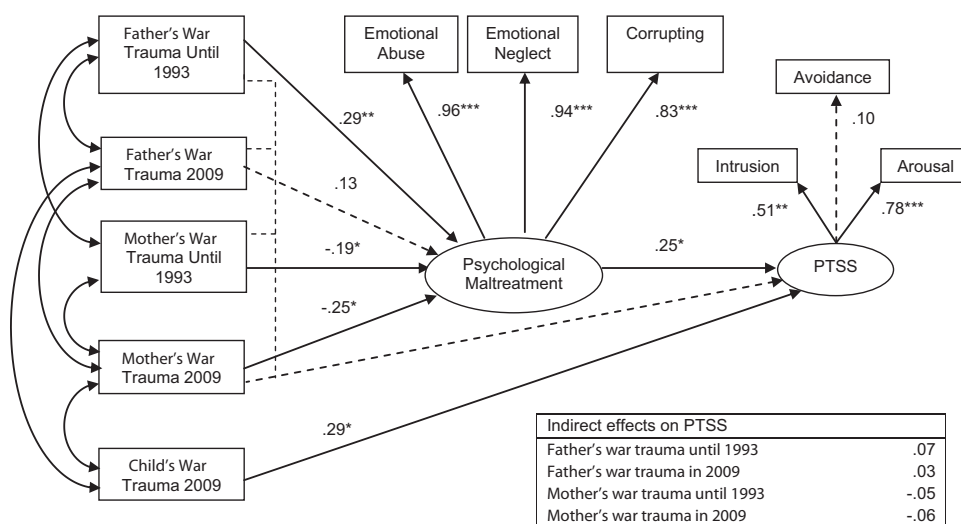


Fig. 2. Structural equation model of the hypothesized indirect effects of mothers' and fathers' war trauma on the children's posttraumatic stress symptoms (PTSS). Standardized regression coefficients are shown. The dashed line indicates statistically nonsignificant associations. $\chi^2(29) = 37.846$, $p = .12$; CFI = .99; TLI = .98; RMSEA = .04; SRMR = .05. Note. * $p < .05$; ** $p < .01$; *** $p < .001$.

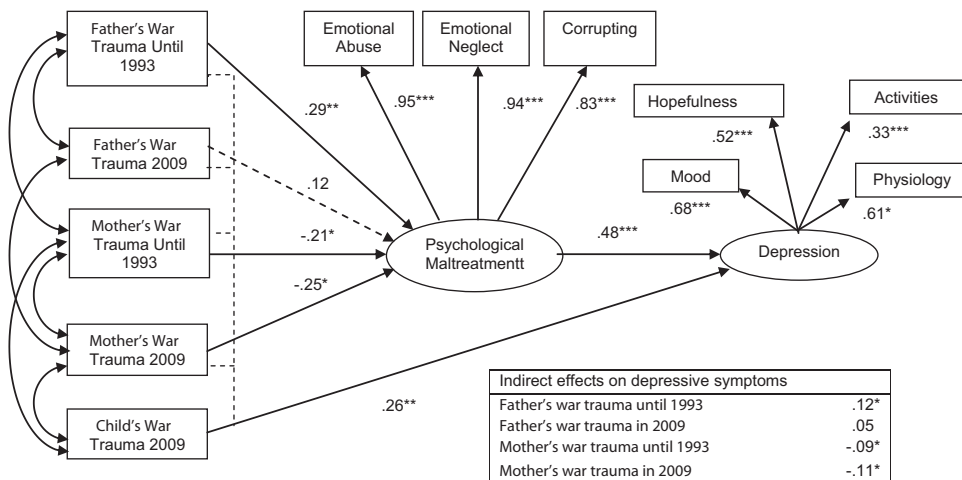


Fig. 3. Structural equation model of the hypothesized indirect effects of mothers' and fathers' war trauma on the children's depressive symptoms. Standardized regression coefficients are shown. The dashed line indicates statistically nonsignificant associations. $\chi^2(40) = 47.154$, $p = .20$; CFI = .99; TLI = .98; RMSEA = .03; SRMR = .04. Note. * $p < .05$; ** $p < .01$; *** $p < .001$.

according to which father's Holocaust trauma led to harsher and more insensitive behavior toward the child whereas mother's trauma led to less insensitive parenting in the family. Similarly, Kellermann (2001) found that punishment of children was more common among male than among female survivors of Holocaust. Among Vietnam veterans, parenting satisfaction was reduced among males but not among females (Vogt et al., 2004). In contrast, female but not male Holocaust survivors' PTSD has been found to be related to the risk of offspring's PTSD (Yehuda, Bell, Bierer, & Schmeidler, 2008), and more problematically, warfare in general is associated with decreased maternal care (sleeping proximity, response to crying, bodily contact) but not with decreased paternal involvement (sleeping proximity, closeness in infancy and childhood) in a sample of 186 societies (Quinlan, 2007).

The interpretation most consistent with the evidence is that exposure to warfare – but not traumatization in the form of PTSD – results in a decrease in positive (Quinlan, 2007) as well as negative parental behavior among mothers (Last & Klein, 1984). This interpretation is also given by Last and Klein (1984) to their results. They speculate that mothers might feel more fragile than fathers as a result of trauma exposure and they would therefore refrain from interactions involving conflict and this would also be shown in the behavior of the fathers. This explanation needs to be tested in future studies by measuring overall parental involvement, amount of parent–child interaction, and sense of fragility among war-exposed parents.

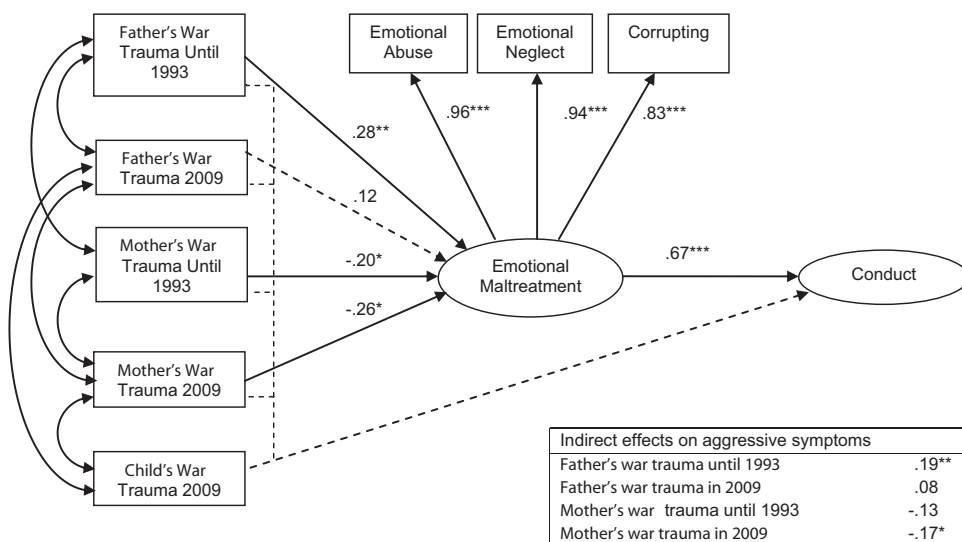


Fig. 4. Structural equation model of the hypothesized indirect effects of mothers' and fathers' war trauma on the children's aggressive conduct problems. Standardized regression coefficients are shown. The dashed line indicates statistically nonsignificant associations. $\chi^2(51) = 76.496$, $p = .01$; CFI = .96; TLI = .94; RMSEA = .05; SRMR = .05. Note. * $p < .05$; ** $p < .01$; *** $p < .001$.

Another explanation is that war-exposed mothers behave more positively toward their children. Taylor et al. (2000) have hypothesized that males are more likely to “fight or flee” and females more likely to “tend and befriend” as a response to stress. This can be reinforced through cultural attitudes assigning a high value for mothering among females. In support of this, for example, some Palestinian women explicitly say that their role is to be caretakers of their fellow group members in conflicts (Palonen, 2012). As a result of war, therefore, fathers may in general become more aggressive and withdrawn than mothers who may become more sensitive toward their children. However, we did not find published evidence that mothers’ stressful experiences or war-exposure would be related to positive parenting toward their children. The hypothesis is incongruent by Quinlan’s (2007) cross-cultural finding of a decrease in positive maternal care in war, but it is possible that there are other types of positive parental behavior where an increase would be observed. Future studies could put this hypothesis to further test.

The hypothesis that women who are exposed to war would receive more social support than men and would therefore cope better and behave in a less negative manner toward their children is not supported by the evidence among the Palestinians. In fact, the opposite is the case: exposure to military violence is associated with higher satisfaction with social support among men (Punamäki et al., 2005).

In addition to the gender of the parent, the intergenerational effects of war trauma may also depend on the child’s gender (Last & Klein, 1984). We were unable to test whether fathers’ and mothers’ war traumas had different kinds of effects on girls and boys because the sample size of the present study was too small and the baseline model, on which group invariance constraints are to be placed, did not converge. However, if we assumed factor loading invariance, we did not find statistically significant intergenerational indirect effects on girls or boys.

In addition to gender, many different processes are likely to be involved simultaneously in the intergenerational transmission of the effects of war trauma. Although psychological maltreatment mediated several associations, the only direct effect was the decrease of children’s aggression as a result of mothers’ war trauma. In all other cases, among both fathers and mothers, it is possible that the indirect intergenerational effects via psychological maltreatment were neutralized by some unknown processes so that we were unable to reject the hypothesis that the total intergenerational effects are nil.

The intergenerational effects may depend on the nature of trauma and traumatization. It is known that the association between anger and PTSD is different among civilians and veterans (Orth & Wieland, 2006), and the role of gender in PTSD transmission could also be different in these two groups. The cultural context (different roles assigned to men and women), study design (variation within a society may show a different pattern than variation between societies) and the aspect of parental behavior in question (war may decrease women’s psychological maltreatment as well as bodily contact) can also affect the results. Regarding these possible moderating factors, we did not distinguish, for example, parents by participation in the perpetration of political violence (comparable to the distinction made in the literature between civilians and veterans) nor by the type of trauma (e.g. injury vs. loss of family members) nor did we take parents’ PTSD into account.

The results about past trauma among fathers support Belsky’s (2008) hypotheses that parents prepare their children to a war-prone environment through psychological maltreatment. However, psychological maltreatment also can play a mediating role in the intergenerational transmission of war trauma without being an evolutionary adaptation shaped by natural selection (Andrews, Gangestad, & Matthews, 2002). Possible intergenerational effects may instead be, for instance, accidental consequences of the psychological damage caused by war and other political violence without ultimate evolutionary significance. The effect sizes of the indirect effects were not large in this study (range of standardized estimates: .07–.19) and small effect sizes have been cited as evidence against the view that the proposed mechanism of information transmission about the extra-familial environment to the children via parental behavior is an evolutionary adaptation (Hönekopp, 2009). However, small effect sizes are not conclusive evidence against the hypothesis (Del Giudice, 2009a).

A limitation of the study is that the sample was not designed to be representative of the population of Gaza and the sample did not include as large a share of refugees as there is in the general population in Gaza. Furthermore, South Gaza was left out of the sample altogether. The results cannot therefore be generalized to the whole population of Gaza and it is possible that the results would be different if the sample would be more representative of Palestinian refugees and of South Gaza.

Another limitation is the poor psychometric quality of most of the instruments. We do not have information of the test–retest reliability of our trauma measures. Especially the parents’ reports of war trauma before 2009 were retrospective and might be biased and the biases could be related to their behavior reported by the children. Therefore, the associations might not be telling about the effects of real events as much as the effects of the style of remembering and interpreting experiences. In that case the reports of past traumas would be informative as a risk factor for children’s reports of psychological maltreatment, but not in the way the theories we tested posited. In general, all data is based on self-report and not validated with other methods.

The internal consistency reliabilities were all below .80 except for the measure of psychological maltreatment. The low reliabilities concerned children’s own reports about their attachment security and mental health problems and it is likely that the observed associations between psychological maltreatment and these measures also hold with more reliable instruments.

To conclude, an implication of the results is that father’s war-exposure could become a focus of clinical attention when dealing with children’s mental health problems and psychological maltreatment. Children’s psychological maltreatment could also be inquired when a father reports exposure to war and political violence, but it should be remembered that these associations are not large and there is much individual variation. Furthermore, the result may not generalize to all

Palestinians. The negative association between mother's war exposure and children's psychological maltreatment and its consequences could be a basis for directing help and efforts in preventing child maltreatment less to mothers who have been exposed to war than to mothers who also have PTSD.

Future studies should investigate the reason for the unexpected negative association between mothers' war exposure and the psychological maltreatment of children: is the association as measured here also found in other cultures and societies? Is the association related to a decrease in the quantity of interaction overall or with an increase in positive interaction? If the negative association is culture-specific, both theories such as life history theory and the tend-and-befriend hypothesis as well as recommendations on clinical practice may need to be revised to accommodate cultural diversity. If the negative association is related to a decrease in the interaction overall, it would support Quinlan's (2007) interpretation of life history theory and point to a possible need for help in other areas than psychological maltreatment. Finally, if future studies show that the negative association is related to an increase in positive interaction, it would be a disconfirmation of life history theory and a confirmation of the tend-and-befriend hypothesis. Clinically it would mean that war exposure as such would not be a reason for interventions for the prevention of psychological maltreatment among mothers.

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Intervention Effectiveness Among War-Affected Children: A Cluster Randomized Controlled Trial on Improving Mental Health

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We examined the effectiveness of a psychosocial intervention in reducing mental health symptoms among war-affected children, and the role of peritraumatic dissociation in moderating the intervention impact on posttraumatic stress symptoms (PTSS). School classes were randomized into intervention ($n = 242$) and waitlist control ($n = 240$) conditions in Gaza, Palestine. The intervention group participated in 16 extracurriculum sessions of teaching recovery techniques (TRT) and the controls received normal school-provided support. Participants were 10- to 13-year-old Palestinian girls (49.4%) and boys (50.6%). Data on PTSS, depressive symptoms, and psychological distress were collected at baseline (T1), postintervention (T2), and 6-month follow-up (T3). Peritraumatic dissociation was assessed only at baseline. Regression analyses that took regression to the mean and cluster sampling into account were applied. The results on intervention effectiveness were specific to gender and peritraumatic dissociation. At T2, the intervention significantly reduced the proportion of clinical PTSS among boys, and both the symptom level ($R^2 = .24$), and proportion of clinical PTSS among girls who had a low level of peritraumatic dissociation. The results have implications for risk-specific tailoring of psychosocial interventions in war conditions.

War means threat to life and deep insecurity for children, and can seriously harm their mental health and development if help is not provided. Guidelines advocate creating a sense of safety, and enhancing natural healing processes and supportive networks among war-affected children (Inter-Agency Standing Committee, 2007; National Child Traumatic Stress Network, 2005), and researchers emphasize the right of suffering children to receive evidence-based psychosocial treatments (Ehnholt & Yule, 2006; Jordans, Tol, Komproe, & de Jong, 2009). More research is required on the effectiveness of the different ways of helping children, whether through universal community-based resilience building programs or targeted therapeutic interventions.

Reviews on the intervention effectiveness of psychosocial programs among war-affected children show modest reduc-

tions in symptoms of posttraumatic stress disorder (PTSD), depression, and anxiety, and the beneficial impacts are to a great extent gender-specific (Jordans et al., 2009; Peltonen & Punamäki, 2010; Persson & Rousseau, 2009). The results are increasingly based on randomized controlled trials (RCTs) among children exposed to war and terrorism. A 15-session manualized classroom-based intervention was implemented among Indonesian (Tol et al., 2008) and Nepalese (Jordans et al., 2010) children, who were first screened for trauma exposure, symptoms, and functional impairments. The intervention reduced posttraumatic stress symptoms (PTSS) for girls and helped maintain hope for boys, but did not reduce depressive and anxiety symptoms in the whole Indonesian sample ($n = 495$). Moderate reduction was found in psychological problems and aggression among boys, as was an increase in prosocial behavior among girls in the Nepalese sample ($n = 325$). A Ugandan study ($n = 314$) showed that a 15-session interpersonal therapy (IPT) was effective in reducing depression among girls (Bolton et al., 2007). Further, a trauma and grief component therapy, involving 17–20 sessions, was generally effective in reducing PTSD, depression, and pathological grief among Bosnian adolescents ($n = 127$; Layne et al., 2008). Israeli studies have also confirmed generally beneficial intervention impacts. A resilience-focused school-based, teacher-mediated prevention program (ERASE-Stress) intervention was found significantly to decrease PTSS, functional problems, and depressive and somatic symptoms among

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war-affected children ($n = 114$; Gelkopf & Berger, 2009); another study ($n = 142$) showed that a trauma-focused, school-based intervention reduced PTSD, somatic complaints, and anxiety (Berger, Pat-Herencyk, & Gelkopf, 2007). Finally, one study ($n = 983$) showed that an intervention, based on a manualized coping-enhancement protocol, significantly decreased children's trauma-related symptoms soon after a major war (Wolmer, Hamiel, Barchas, Slone, & Laor, 2011).

All these RCT studies tested impacts of different psychosocial intervention programs, except two implementing the same classroom-based intervention (Macy et al., 2003) among Indonesian (Tol et al., 2008) and Nepalese (Jordans et al., 2010) children. The intervention programs typically aimed at improving children's coping with traumatic experiences and building their resilience, shared similar cognitive-behavioral therapeutic (CBT) tools and narrative, integrative and creative elements, and provided psychoeducation in a playful manner. For instance, the classroom-based intervention involves (a) cooperative play, (b) expressive exercises of drama, dance, and music, and (c) building of safety; the trauma and grief component therapy (Layne et al., 2008) involves (d) coping skills training, (e) emotion regulation, and (f) narrative reconstruction of trauma. The aim of the ERASE-Stress intervention is to enhance empowerment and strength by incorporating skills training, meditative practices, and narrative techniques (Gelkopf & Berger, 2009).

Except for Tol et al. (2010) and Wolmer et al. (2011), research has not considered the moderating role of vulnerability or protective factors that possibly can impact intervention effectiveness in war conditions. Peritraumatic dissociation means losing the sense of time and space and experiencing depersonalization, disorientation, and derealization at the time of the traumatic event. Peritraumatic dissociation is a risk factor for PTSD both among adults (Boos, Ehlers, Maercker, & Schützwohl, 1998; Breh & Seidler, 2007) and children (Schafer, Barkmann, Riedesser, & Schulte-Markwort, 2006). We did not find intervention studies considering peritraumatic dissociation among traumatized children, but dissociation is found to interfere with successful therapy outcomes among adults with anxiety disorders (Michelson, June, Vives, Testa, & Marchione, 1998).

The teaching recovery techniques intervention (TRT; Smith, Dyregrov, & Yule, 2000) aims at creating safety and feelings of mastery, and incorporates trauma-related psychoeducation, CBT methods, coping skills training, and creative-expressive elements such as dream work and drawing. Families are involved in children's recovery through their homework such as training sleep hygiene and writing dream and emotion diaries. The TRT has been found effective in reducing PTSS and depressive symptoms among children traumatized in war (Ehnholt, Smith, & Yule, 2005) and natural disasters (Giannopoulou, Dikaiakou, & Yule, 2006). Ehnholt et al. ($n = 26$) found among refugee children statistically significant, but clinically modest reduction in PTSS and depressive symptoms postintervention, but the beneficial intervention impact was not sustained at follow-up.

The current study analyzes the effectiveness of the TRT intervention aiming to improve child mental health after a major war in the Middle East, and contributes to our knowledge about the role of peritraumatic dissociation in the intervention. Our aims were to examine intervention effects on children's mental health and their staying power at follow-up, and to analyze the role of peritraumatic dissociation in moderating the intervention effect on PTSS. To indicate intervention effectiveness we applied two criteria. There should be a significantly greater reduction in PTSS, depressive, and psychological distress symptoms in the intervention than in the control group from baseline (T1) to postintervention (T2) and 6-month follow-up (T3). Also, children in the intervention group should have a significantly greater likelihood of showing nonclinical levels of PTSS, depression, and distress at T2 and T3 than the control children. Concerning the moderating role of peritraumatic dissociation, we hypothesized that the intervention would be effective in reducing symptoms and resulting in nonclinical scores among children who showed low levels of peritraumatic dissociation. Previous studies among war-affected children have found inconsistent gender differences in intervention outcomes (for reviews, Jordans et al., 2009, and Peltonen & Punamäki, 2010), and we thus analyzed the intervention effectiveness by gender, but did not have an expectation about the results.

Our choice of TRT was due to theoretical and practical considerations. The intervention elements are evidence-based CBT tools, including culturally appropriate creative and symbolic methods. Due to the international boycott, Palestinian mental health professionals had to provide interventions that were available in the aftermath of the 2008/2009 war in Gaza.

Method

Participants

The participants were 482 Palestinian girls (49.4%) and boys (50.6%) who were 10–13 years old ($M = 11.29$, $SD = 0.68$). About a half ($n = 242$) participated in the intervention and the remainder in a control waiting list group ($n = 240$). After a 6-month follow-up, the control group was provided the same intervention for 1 month.

The sampling involved three phases. First, two regions (the North Gaza and Gaza City) were selected, both having been shelled during the 2008/2009 war in Gaza. In both regions, two schools were randomly sampled from a list of schools provided by the Ministry of Education. In the second phase, two girls' and two boys' classes were randomly sampled in each of the four schools, resulting together in 16 classes of fifth- and sixth-grade level students. In each of the four schools, there were thus two boys' and two girls' classes chosen. In the third phase, through cast lots, one of both genders' classes was assigned to the intervention group and the other to the waiting-list control group.

Study Procedure and Intervention

The baseline assessment (T1) of all participating children was conducted in the last week of April 2009 by the first author and six research assistants, who were master's-level psychology students. The Board of Directors of the Gaza Community Mental Health program (GCMHP) approved the research. Information sheets were sent to the parents explaining the purpose of the study, and verbal consent for the target child's participation was obtained. Children, families, teachers, and research assistants were not aware of the intervention status of children at the baseline.

The intervention was based on TRT with modifications to suit a war situation, and usage of an Arabic-language manual (Smith et al., 2000). In May, four psychologists ran the sessions parallel in four groups of 15 children as an extracurricular activity on school premises. In both the intervention and the control groups, children continued their normal school attendance. The intervention lasted for 4 weeks, consisting of two weekly 2-hour sessions. Treatment fidelity was safeguarded by weekly preparatory and supervisory meetings with the first author, who also trained the counselors.

Measures

Peritraumatic dissociation. A modified eight (not 10) item version of the Peritraumatic Dissociative Experiences Questionnaire (Marmar, Weiss, Metzler, & Delucchi, 1996) was used. The wording of the eight items were checked to suit children; one item ("difficulty in making sense of what was happening") was added. Children were asked to recall the war situation and to report their dissociation retrospectively (yes = 1; no = 0). A sum variable was constructed for T1; the value of α was .77.

Posttraumatic stress symptoms. The 13-item Children's Revised Impact of Event Scale, CRIES (Smith, Perrin, Dyregrov, & Yule, 2003), based on the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., text rev.; *DSM-IV-TR*; (American Psychiatric Association [APA], 2000), covers symptoms of reexperiencing (four items), avoidance (five items), and hyperarousal (five items). Children indicated on a 4-point scale how often they had had each symptom during the last 2 weeks (0 = *not at all*, 1 = *rarely*, 3 = *sometimes*, 5 = *often*). The total sum ranges from 0 to 65. The cutoff score of 30 has been found to identify children with PTSD in two samples of 7- to 18-year-old children and adolescents recruited from a child traumatic stress clinic and an accident and emergency department in London (Perrin, Meiser-Stedman, & Smith, 2005). The α values were .61 for T1, .72 for T2, and .63 for T3.

Depressive symptoms. The Depression Self-Rating Scale for Children by (Birleson, Hudson, Grey-Buchanan, & Wolff, 1987) is an 18-item self-report instrument assessing the cognitive, affective, and behavioral dimensions of depression. Chil-

dren estimated on a 3-point scale whether they had had each symptom during the last 2 weeks (0 = *not at all*, 1 = *sometimes*, 2 = *all the time*). Total scores range from 0 to 36. The cutoff score of 15 has best distinguished those with and without clinical depression in a sample of 8- to 14-year-old children referred to a child psychiatry outpatient clinic in Edinburgh (Birleson et al., 1987). The α values were .69 for T1, .72 for T2, and .68 for T3.

Psychological distress. The Strengths and Difficulties Scale (SDQ) by Goodman (1997) was used to assess emotional and behavioral problems and hyperactivity. Each dimension consists of five items, and participants evaluated on a 3-point scale how well the description fitted them (0 = *not at all*, 1 = *somewhat*, 2 = *yes, fit well*). A sum score of psychological distress was constructed, ranging from 0 to 30. The normal range for the three dimensions plus a peer problems (total difficulties) score is 0–15, which has included about 90% of children in various normative samples (Bourdon, Goodman, Rae, Simpson, & Koretz, 2005; Smedje, Broman, Hetta, & von Knorring, 1999; Woerner et al., 2002). Because we excluded the peer problems scale from our score, we also subtracted the score for the highest amount of normal peer problems (3; Bourdon et al., 2005) and used the cutoff score of 12 to indicate significant psychological distress. The α values were .69 for T1, .72 for T2, and .67 for T3.

Translation. All scales were available in Arabic: peritraumatic dissociation (Punamäki, Qouta, de Jong, Komproe, & El-Masri, 2005), psychological distress (Thabet, Stretch, & Wostanis, 2000), and both PTSS and depressive symptoms (see Children and War Foundation, <http://www.childrenandwar.org/measures>).

Data Analysis

Two criteria were used to indicate intervention effectiveness. Compared to the control group and controlling for the baseline level, the intervention group should have statistically significantly less PTSS, depressive, and psychological distress symptoms; and more cases below the cutoffs at T2 and T3. A 95% confidence level was used as the criterion of statistical significance in all analyses.

Regression analysis was used to estimate the effect of the intervention on the levels of mental health symptoms after controlling for the centered baseline values of the mental health variables. This method accounts for regression to the mean (Barnett, van der Pols, & Dobson, 2005). Each indication of mental health problems (PTSS, depressive and psychological distress symptoms) was regressed on the intervention as a dummy variable (0 = *no intervention*, 1 = *intervention*) and on the corresponding centered mental health variable at baseline.

Poisson regression with robust standard errors was used to estimate the effect of the intervention on the proportion of children having nonclinical symptom levels (Zou, 2004). The dichotomy was regressed on the intervention as a dummy

variable and the corresponding clinical cutoff dummy variables at baseline. Poisson regression produces estimates of relative risk that are easier to interpret correctly than odds ratios produced by logistic regression (Knol, Duijnhoven, Grobbee, Moons, & Groenwold, 2011). The method also estimates clinical significance at the group level, and therefore produces more precise estimates than the aggregation of individual-level clinically and statistically significant changes (Hageman & Willem, 1999). Additionally, we applied the reliable change index (RCI) to check that there was not any individual-level mental health deterioration in the intervention group (Hsu, 1989).

The roles of gender and peritraumatic dissociation in moderating the intervention effectiveness were examined by the χ^2 difference test (Satorra & Bentler, 1999). Peritraumatic dissociation was treated as three classes: low = the lowest 25% of the sample; medium = from the lower to the upper quartile; high = the highest 25% of the sample. The regression parameters were either constrained to be the same across groups (2 in gender and 3 in peritraumatic dissociation) or were estimated freely. The groups were judged to have different parameter estimates if the improvement in the fit from the constrained to the freely estimated model was statistically significant.

The cluster sampling procedure resulted in nonindependence of observations. Sample variation was smaller than if the same number of participants were sampled individually through simple random sampling, which makes standard statistical tests erroneously lenient. A form of Kish correction was used to adjust the confidence intervals to achieve a more correct type I error rate (Kish, 1965; Musca et al., 2011). The correction consisted of multiplication of the standard errors of regression weights by the design effect, $[1 + ICC_y \times ICC_x \times (n-1)]^{0.5}$, where ICC_y and ICC_x are intraclass correlation coefficients of the mental health variables, y , and of the covariate or factor, x , respectively, and n is the average number of children in a school class (Ukounmunne et al., 1999). In our study, the average number of children in the 16 classes was about 30.

The regression models and the χ^2 difference tests for the moderation hypotheses were run on Mplus 5.2 using full information maximum likelihood estimation with robust standard errors (Múthen & Múthen, 2007). The estimation method handled missing data without excluding dropouts and adjusted the standard errors for nonnormality in the variables. The fit of the models was evaluated with a scaling-corrected χ^2 test (non-significant at the 95% confidence level), comparative fit index (CFI) > .90, and Root mean square error of approximation < .06 (RMSEA: Múthen & Múthen, 2007). The Kish correction to standard errors was calculated in Microsoft Excel (2007).

Results

Descriptive Statistics

The flowchart (Figure 1) illustrates that the planned eligible sample was 500, but 18 children were lost due to absences from school. There were no refusals or dropouts between T1

and T2 because the assessments took place during the same semester. There were 78 (16.2%) dropouts between T2 and T3 due to children's absence or change of schools. The attrition was independent of group status, child age, father/mother's education and work, refugee/citizen status, and school region. Yet, boys were overrepresented among dropouts (22.5%) compared to girls (9.2%), $\chi^2(1, N = 482) = 15.69, p < .001$. Dropout was not associated with the baseline mental health (PTSS, depressive and psychological distress symptoms), but high peritraumatic dissociation was marginally associated with dropout, $t(480) = 1.76, p = .08$.

Due to randomization, there were no significant differences between the intervention and control groups in demographic variables (father's and mother's profession and education, place of residence). Almost a half (47% and 49%) of fathers were unemployed, which corresponds with general statistics in the Gaza Strip during the international siege and economic blockade (United Nations Office for the Coordination of Humanitarian Affairs Occupied Palestinian Territory, 2009). The proportion of mothers working at home was high (92% and 94%), which is slightly higher than in general statistics. Fathers' university education was high (24% and 25%), and substantially higher than their wives' (8%), which corresponds with general statistics (World Bank, 2006).

Baseline group comparison revealed that despite randomization, the mean PTSS was significantly higher in the intervention ($M = 32.78, SD = 9.59$) than in the control ($M = 27.79, SD = 10.63$) group, $t(482) = 3.99, p = .03$. The rate of clinically significant PTSS was 64% in the intervention and 43% in the control group. The groups did not differ in depressive and psychological distress symptoms or in peritraumatic dissociation at baseline.

Intervention Effects on Children's Mental Health

The χ^2 difference test showed that boys and girls had different regression parameter estimates in PTSS at T2 ($p = .03$) and T3 ($p = .001$), but not in other mental health outcomes. Table 1 summarizes the means, standard deviations, and clinical cutoffs of PTSS, depressive, and psychological distress symptoms for girls and boys. Table 2 presents the results from regression analyses separately for girls and boys for PTSS and together for depressive and psychological distress symptoms. All regression models had a good fit (the χ^2 tests were nonsignificant at the 5% level, CFI ranged from .95 to 1.00, and the RMSEA from .00 to .06).

A significant intervention effect was found for boys in the PTSS clinical cutoff score, indicating that the intervention increased the proportion of nonclinical PTSS scores at T2 only among boys, as indicated by the significant relative risk (RR). The intervention was not effective for boys, however, if considering simultaneously both criteria, i.e., an intervention group having significantly less symptoms and higher proportion of nonclinical symptom scores than controls. Unexpectedly, the intervention decreased the portion of children with a

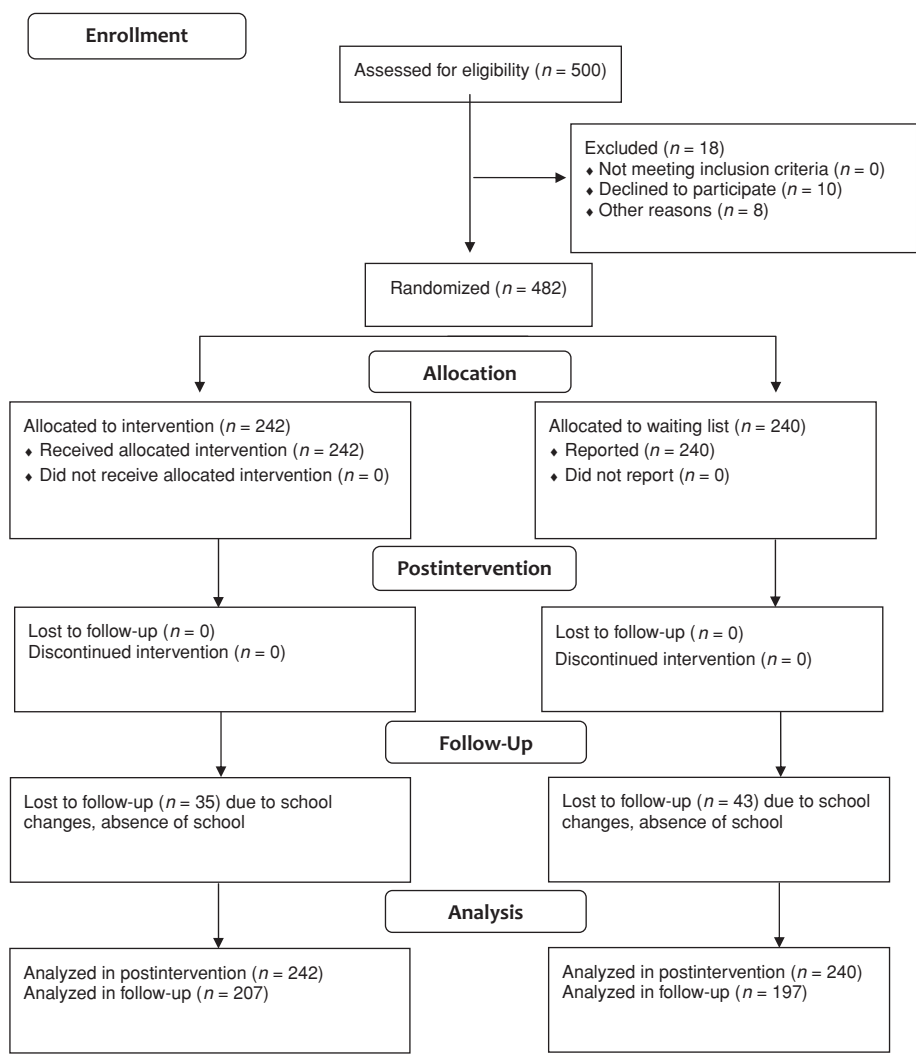


Figure 1. Flowchart of the sample.

nonclinical level of psychological distress at T2. According to reliable change index analyses, 2% of the the control group deteriorated in PTSS from T1 to T2, whereas there was no deterioration in the intervention group.

The χ^2 difference test showed that the low, medium, and high classes of peritraumatic dissociation had different parameter estimates of the intervention effects on PTSS at T2 and T3 among girls and boys (p values $\leq .001$). Table 3 presents the group means at all assessment points in the three peritraumatic dissociation classes and according to gender. Table 4 presents the estimates of the two intervention effectiveness criteria. Based on the first criterion, the intervention had a significant effect on PTSS among girls in the low peritraumatic dissociation group. As illustrated in Figure 2, girls with a low level of peritraumatic dissociation showed significantly less PTSS at T2 in the intervention than in the control group, whereas no intervention effect was found among girls with a medium or high level of peritraumatic dissociation. Similarly, the results based on the second effectiveness criterion revealed

that the intervention increased the proportion of nonclinical PTSS at T2 among girls with a low level of peritraumatic dissociation. Thus, the intervention met both effectiveness criteria concerning PTSS at T2 in a subgroup of girls with a low level of peritraumatic dissociation.

Discussion

The intervention given to children after a major war showed gender- and risk-specific effectiveness. The intervention reduced the proportion of clinically significant PTSS only among boys at postintervention. Girls, in turn, benefited from the intervention if they showed low peritraumatic dissociation, the effectiveness indicated by significant reductions in both symptoms and in the proportion of clinically significant PTSS. Limitations of the study include single-source and subjective reporting of children’s mental health.

Table 2
Regression Analysis Results of Intervention Effects on Outcome Variables

Variable	Intervention		Mental health T1		Intervention effect on the clinical cutoff ^a		
	B	95% CI	B	95% CI	R ²	RR	95% CI
PTSS T2							
Girls	-3.47	[-8.27, 1.33]	0.39	[0.23, 0.55]	.10	1.38	[0.93, 2.04]
Boys	-2.81	[-6.83, 1.22]	0.23	[0.07, 0.38]	.06	1.81	[1.10, 2.97]*
PTSS T3							
Girls	-1.53	[-5.61, 2.54]	0.25	[0.10, 0.40]	.06	0.98	[0.63, 1.54]
Boys	-3.62	[-7.60, 0.35]	0.05	[-0.06, 0.16]	.04	1.20	[0.56, 2.56]
Depression T2	0.19	[-1.16, 1.54]	0.44	[0.34, 0.54]	.15	1.01	[0.72, 1.40]
Depression T3	0.34	[-1.10, 1.77]	0.32	[0.22, 0.42]	.09	1.06	[0.95, 1.18]
Distress T2	1.18	[-0.17, 2.52]	0.35	[0.25, 0.45]	.15	0.53	[0.33, 0.83]*
Distress T3	0.23	[-1.22, 1.68]	0.36	[0.26, 0.46]	.15	0.88	[0.56, 1.39]

Note. CI = confidence interval; PTSS = posttraumatic stress symptoms; T1 = baseline; T2 = postintervention; T3 = 6-month follow-up; mental health T1 = variable's baseline covariate; RR = relative risk.

^aThe relative risks were calculated from Poisson regression and they indicate the likelihood of the participants in the intervention group to have the symptom level below the clinical cutoff relative to the participants in the control group after controlling for the baseline categorization by cutoff levels.

* $p < .05$

Generalization of the results should be limited to the aftermath of major war and military violence.

Palestinian boys benefited from the TRT intervention when considering the proportion of nonclinical PTSS. Similarly, an Israeli study found that boys differentially benefited from a psychosocial intervention after a war (Wolmer et al., 2011). Girls are generally considered more vulnerable to trauma, as they suffer from more PTSD and depression than boys (Attanayake et al., 2009; Ehntholt & Yule, 2006), and, partly in contrast to our results, Bolton et al. (2007) documented intervention effectiveness only among Ugandan girls after the war. In our study, both girls and boys showed high PTSS at baseline, but clinically significant reduction due to intervention was substantial among boys. The result contradicts the belief that psychological and social help matches better with girls' interests, whereas more practical and functional activities please boys.

Our results confirmed earlier findings concerning adults' dissociation, as the TRT was effective in reducing general and clinically significant PTSS among girls who showed low peritraumatic dissociation. In other words, the intervention worked well among low-risk children, which concurs with Wolmer et al. (2011) who found similar dynamics concerning socioeconomic risks. The result emphasizes the potential importance of screening and tailoring psychosocial interventions to fit the needs of vulnerable groups. Children who suffer from dissociation in addition to PTSS should be provided treatments that enhance their cohesive sense of self and the integration of affects, cognitions, and behavior (Schafer et al., 2006). Our intervention could apparently not take into account specific needs of children with dissociative experiences. Based on the recommendations of the International Society to Study Dissociation Task Force on Children and Adolescents (2004), it might have been advisable to screen children before, and to refer those with high peritraumatic dissociation to an intervention that involves dissociation-focused therapeutic elements.

The deterioration of children's mental health is of great concern when applying universal interventions after war trauma. In addition to positive effects of reduced PTSS, our intervention first increased clinically significant psychological distress although it then decreased. It can also be possible that the intervention had negative impacts on individual children, not visible in our group-level analyses. We examined the reliable change index (RCI) to check this possibility, and found no deterioration in the intervention group, but found 2% in the control group.

The effectiveness of TRT in reducing mental health symptoms was modest in our data, as compared especially to Israeli studies among war-affected children (e.g., Gelkopf & Berger, 2009). The reasons may lie in the severity of losses and destruction and in the fact that the imminence of war was still in children's minds. Parents and school personnel attempted to achieve physical and mental safety in the aftermath; yet many children were still very afraid and apprehensive during the intervention sessions. The war had resulted in 1,440 deaths and 5,380

Table 3
PTSS Means, Standard Deviations, and Frequencies and Proportions Above Cutoff by Level of Peritraumatic Dissociation

Variable	Girls						Boys					
	T1			T2			T3			T1		
	<i>n</i>	<i>M</i> or Freq	<i>SD</i> or %	<i>n</i>	<i>M</i> or Freq	<i>SD</i> or %	<i>n</i>	<i>M</i> or Freq	<i>SD</i> or %	<i>n</i>	<i>M</i> or Freq	<i>SD</i> or %
Intervention group												
Low PD	32	31.6	8.6	32	20.4	9.5	30	23.5	7	23	30.5	11.3
Med PD	39	32.9	6.4	39	27.6	9.7	35	27.6	10.2	45	32.0	9.4
High PD	49	35.1	9.6	49	31.4	12.4	46	28.8	10.8	49	33.1	11.2
PTSS +												
Low PD	32	20	63	32	3	9	30	7	23	28	14	50
Med PD	39	26	67	39	14	36	35	16	46	45	26	58
High PD	49	37	76	49	26	53	46	22	78	49	31	63
Control group												
Low PD	36	20.9	10.4	36	23.6	11.7	34	23.8	9.8	27	22.9	9.6
Med PD	58	28.2	9.3	58	28.5	12.4	48	27.0	9.2	52	28.8	9.6
High PD	26	32.5	9.0	26	33.9	10.3	25	30.9	8.5	41	31.2	11.6
PTSS +												
Low PD	36	9	25	36	14	39	34	8	24	27	5	19
Med PD	58	24	41	58	20	34	48	15	31	52	24	46
High PD	26	16	62	26	16	62	25	14	56	41	26	63

Note. Freq = Frequency; PD = peritraumatic distress; PTSS = posttraumatic stress symptoms; Dep = depression. Clinical cutoff for PTSS = ≥ 30 . Low PD = children $< 25^{\text{th}}$ percentile of peritraumatic dissociation symptoms, medium = $\geq 25^{\text{th}}$ and $\leq 75^{\text{th}}$ percentile, and high = $> 75^{\text{th}}$ percentile.

Table 4
Regression Analysis Results of Intervention Effects on PTSS Moderated by Gender and Peritraumatic Dissociation

Variable	Intervention		PTSS T1		Intervention effect on the clinical cutoff ^a	
	B	95% CI	B	95% CI	RR	95% CI
Girls						
Low PD						
PTSS T2	-8.78	[-16.80, -0.75]*	0.53	[0.28, 0.77]	5.96	[1.55, 22.86]*
PTSS T3	-4.51	[-12.00, 2.98]	0.43	[0.20, 0.67]	0.98	[0.30, 3.21]
Med PD						
PTSS T2	-1.99	[-9.12, 5.14]	0.23	[-0.01, 0.46]	1.19	[0.35, 4.00]
PTSS T3	0.05	[-0.15, 0.24]	0.03	[-0.21, 0.26]	0.82	[0.39, 1.70]
High PD						
PTSS T2	-2.88	[-11.30, 5.55]	0.17	[-0.16, 0.50]	1.21	[0.73, 2.01]
PTSS T3	-2.40	[-9.51, 4.71]	0.15	[-0.15, 0.45]	1.24	[0.70, 2.21]
Boys						
Low PD						
PTSS T2	0.95	[-7.47, 9.37]	0.27	[0.01, 0.53]	0.37	[0.11, 1.24]
PTSS T3	-3.15	[-12.72, 6.49]	0.24	[-0.08, 0.56]	1.35	[0.31, 5.88]
Med PD						
PTSS T2	-2.52	[-8.44, 3.39]	0.23	[-0.01, 0.46]	2.10	[0.91, 4.85]
PTSS T3	-3.07	[-8.68, 2.54]	0.05	[-0.08, 0.17]	0.50	[0.11, 2.19]
High PD						
PTSS T2	-5.58	[-12.61, 1.45]	0.10	[-0.10, 0.31]	2.06	[0.95, 4.46]
PTSS T3	-6.44	[-13.15, 0.26]	-0.13	[-0.30, 0.04]	2.66	[0.81, 8.74]

Note. PTSS = Posttraumatic stress symptoms; CI = confidence interval; T1 = baseline; T2 = postintervention; T3 = 6-month follow-up; RR = relative risk; Med = medium.

^aThe relative risks (RR) were calculated from Poisson regression and they indicate the likelihood of the participants in the intervention group to have the symptom level below the clinical cutoff relative to the participants in the control group after controlling for the baseline categorization by cutoff levels.

* $p < .05$

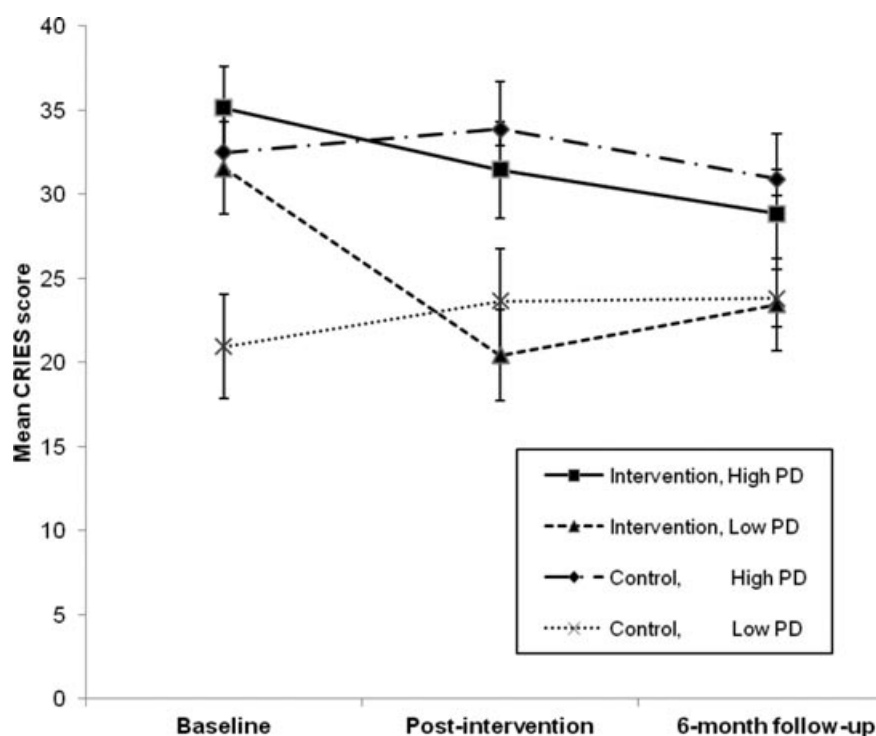


Figure 2. Intervention effect on posttraumatic stress symptoms (PTSS) measured by Children's Revised Impact of Event Scale (CRIES) among girls according to high and low quartiles of peritraumatic dissociation (PD). Error bars represent standard errors of the mean adjusted for design effects.

wounded in 23 days; the destruction of neighborhoods, schools, and infrastructure was comprehensive (Palestinian Centre for Human Rights, 2009; United Nations, 2009). Our results reveal that the psychosocial intervention was not able to combat the losses and adversities in all children. Similarly, a CBT-based intervention was unable to decrease PTSD and depression in the midst of military violence in Gaza (Thabet, Vostanis, & Karim, 2005), although interventions enhancing cultural activities reduced children's symptoms during relatively calmer times (Loughry et al., 2006). Thus, there are still unresolved questions concerning the best ways to help children in the extreme dangers of war.

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