

Parents' Posttraumatic Stress After Burns in Their School-Aged Child: A Prospective Study

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Objective: This prospective study examined the course and potential predictors of parents' posttraumatic stress symptoms (PTSS) after burn injury in their child (Age 8 to 18 years). **Method:** One hundred eleven mothers and 91 fathers, representing 118 children, participated in the study. Within the first month after the burn event and subsequently at 3, 12, and 18 months postburn, both parents completed the Impact of Event Scale (IES). Parental emotions related to the burn event and appraisal of threat to the child's life were assessed, which were investigated in a multilevel regression model. **Results:** Within the first month postburn, 48% of the mothers and 26% of the fathers reported clinically significant PTSS ($IES \geq 26$), which decreased to, respectively, 19% and 4% 18 months postburn. Symptoms of intrusion were mainly individually experienced, whereas parents within a couple were more similar in terms of their avoidance symptoms. The perceived life threat and feelings of guilt and anger linked to the burn event were significantly related to parental PTSS, especially in mothers. **Conclusions:** The results indicate that a burn event to a child has a severe (acute) psychological impact on parents and that clinical levels of PTSS may persist in a subgroup of parents. The findings underline the need to incorporate parent support in burn care, especially for mothers with a strong emotional response during the first months after the burn event.

Keywords: appraisal, burns, guilt, parents, posttraumatic stress symptoms

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A pediatric burn event severely disrupts the life of families involved. Witnessing the child's burn trauma or exposure to child distress and pain during hospitalization may be very distressing for parents. In the acute aftermath of a pediatric burn event, parental posttraumatic stress symptoms (PTSS) appear to be relatively

common. Research has shown that 25% to 50% of parents experience clinically relevant PTSS levels within the first months postburn (Bakker, Van der Heijden, Van Son, & Van Loey, 2013; De Young, Hendrikz, Kenardy, Cobham, & Kimble, 2014; Hall et al., 2006). Previous studies in parents of young children (0 to 4 years old) showed that initial symptoms largely decline as time goes by (Bakker et al., 2013; De Young et al., 2014). However, up to 18% of mothers and 6% of fathers still experience clinically significant PTSS 18 months after the burn event (Bakker et al., 2013). So far, no longitudinal investigations have specifically examined the course of PTSS in parents of school-aged children and adolescents. Moreover, it is unknown whether associated factors with PTSS established in parents of young children are similar in parents of older children. Establishing these factors will improve early identification of parents who are in need of professional support.

Parental appraisal of threat to the child's life seems important in explaining parental PTSS after pediatric injury, such as traffic-related injuries (Kassam-Adams, Fleisher, & Winston, 2009) or burns (Bakker et al., 2013). Within the integrative (trajectory) model of pediatric medical traumatic stress, the interpretation of medical events has been referred to as one of the most powerful predictors of parental traumatic stress (Price, Kassam-Adams, Alderfer, Christofferson, & Kazak, 2016). Moreover, people's emotions after trauma are dependent on the way they appraise the trauma (Beck, 1976). Specifically, the parental emotions of guilt

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and anger have been shown important in pediatric burns. Parents may feel responsible for their child's injury or feel they have failed in protecting their child (Mason, 1993). Consequent guilt feelings are experienced by a considerable number of parents (Mason, 1993; Rivlin & Faragher, 2007). In turn, these feelings have been associated with parental PTSS (Bakker et al., 2013; De Young et al., 2014; Fukunishi, 1998). The same holds for feelings of anger (Bakker et al., 2013), although less research has focused on this parental emotion in relation to pediatric burns.

The developmental period in which pediatric trauma takes place is considered essential to understanding the psychological consequences within the family (Kazak et al., 2006; Price et al., 2016). Although in the majority of child medical trauma studies, child age has not been shown associated with levels of parents' PTSS (e.g., Landolt, Vollrath, Ribl, Gnehm, & Sennhauser, 2003; Le Brocque, Hendrikz, & Kenardy, 2010), differences in the role of parents' appraisal and emotions after burn injury may be expected between parents of young (i.e., infants, toddlers, and preschoolers) and school-aged children and adolescents. Whereas young children typically receive scald burns in the presence of adults and at home, school-aged children have a higher risk of sustaining flame burns, which are generally more severe (Vloemans et al., 2011). Moreover, as school-aged children are less often supervised by their parents, feelings of direct responsibility and guilt are expected to be less prevalent in their parents. However, in case others are present at the burn event, parents may attribute more responsibility to these people, which could be accompanied by externalizing emotions, such as anger (Neumann, 2000). Thus, depending on the appraisal regarding one's responsibility for the burn event, feelings of guilt and anger might act differently in shaping subsequent PTSS of parents of school-aged children and adolescents versus younger children.

In addition to parents' appraisal and emotions, other factors associated with parents' PTSS identified in earlier studies comprise higher burn severity (Bakker et al., 2013; Hall et al., 2006; Rizzone, Stoddard, Murphy, & Kruger, 1994) and a greater number of invasive medical procedures (De Young et al., 2014). With regard to child gender, one previous study showed that parents of girls reported more intrusion and avoidance symptoms (Bakker et al., 2013), whereas another study found this was only the case for avoidance (McGarry et al., 2013).

In research on pediatric medical trauma, mothers are more often the subject of investigation compared with fathers. It has been frequently demonstrated that women are more vulnerable to developing posttraumatic stress disorder (PTSD) than men after a traumatic event (Stein, Walker, & Forde, 2000). Women display higher levels of negative threat appraisal and appear to use more avoidant and emotion-focused coping (Tamres, Janicki, & Helgeson, 2002), which increase the risk of PTSD (Olf, Langeland, Draijer, & Gersons, 2007). However, the role of fathers after trauma should also be considered, and findings from mothers should not automatically be generalized to parents in general (Phares, Lopez, Fields, Kamboukos, & Duhig, 2005). Moreover, it is valuable to study parental PTSS within the parental dyad, as parents are part of the same family and thus share certain characteristics. In addition, vulnerability factors in one parent may influence the other. Therefore, dependency of parents' reactions should be taken into account when studying their psychological symptoms.

Most previous studies on parental PTSS after a pediatric burn event have not differentiated between symptoms, although distinct symptom clusters might be differentially related to its predictors (Schell, Marshall, & Jaycox, 2004). Especially when examining symptoms within couples, a distinction may be relevant. Mothers and fathers may have different intrusive images about the burn event (Bakker et al., 2013). Particularly, intrusions may be associated with high levels of emotions, such as guilt and anger (Holmes, Grey, & Young, 2005), that subsequently induce and maintain avoidance and PTSS (e.g., Creamer, Burgess, & Pattison, 1992). Symptoms of avoidance may be more identical within couples than intrusion symptoms because they include a behavioral component, such as avoiding talking about the event. Moreover, intrusion and avoidance symptoms have been shown not to develop in a unified way, with avoidance being more enduring compared with symptoms of intrusion (McFarlane, 2000). Therefore, differentiating between the symptom clusters may reveal relevant distinctions in terms of course and interdependence of symptoms as well as different relationships with predictors.

The aim of the current study was to examine the course of PTSS in parents of children aged 8 to 18 years and to identify individual and shared parent factors that were associated with this course. The first hypothesis of the current study was that parental symptoms of intrusion and avoidance would decrease over time. Second, it was expected that, throughout the entire study period, mothers would show higher symptoms of intrusion and avoidance than fathers. The third hypothesis was that parental feelings of guilt and anger, and perceived threat to the child's life within the first month postburn, would be associated with higher levels of PTSS, but that associations would be stronger for mothers. Fourth, symptoms of avoidance were hypothesized to be more similar *within* couples compared with symptoms of intrusion, which were expected to show less similarity within couples. Shared couple factors expected to be significantly related to parental PTSS were child gender (girls) and percentage total body surface area (TBSA; higher) burned. No significant associations with child age were expected.

Method

Procedure

This study is part of a large prospective study on child (Age 8 to 18 years) and parental adjustment following a pediatric burn event. Earlier articles on this cohort report on behavioral problems (Egberts et al., 2016) and health-related quality of life (Pan et al., 2015) of the child. A study with the same design was conducted earlier in a group of young children (Age 0 to 4 years) and their parents (e.g., Bakker et al., 2013). Two independent ethics committees in the Netherlands and Belgium approved the current study. From April 2007 to July 2011, families were enrolled in three Dutch and four Belgian burn centers. The current study used data collected within the first month after the burn event (Time 1 [T1]) and subsequently at 3 (Time 2 [T2]), 12 (Time 3 [T3]), and 18 (Time 4 [T4]) months postburn. Families were eligible to participate if the child had been in the hospital for more than 24 hr and the TBSA burned was more than or equal to 1%. Exclusion criteria included limited Dutch language proficiency and child cognitive impairment. During admission, researchers at the burn

centers contacted eligible families and requested to complete the first questionnaires within the first 4 weeks postburn. They explained the study purpose and offered additional written information. Written informed consent was obtained from the mother and father. Children provided written (≥ 12 years) or oral (< 12 years) assent. Following discharge from the hospital, follow-ups consisted of mail-out questionnaires. In case families did not return the questionnaires, they were contacted by telephone to remind them to return the questionnaires. Although there was no guarantee that parents completed the questionnaires separately, to prevent parents from influencing one another, parents were instructed to complete the measures separately, questionnaires were sent in separate envelopes, parents had their own return envelope, and the questionnaires were marked "mother" or "father" in conspicuously colored labels.

Of the 202 eligible families, data from 118 families, from which at least one parent per family completed the PTSS measure on at least one study occasion, were used. Twenty-two families declined to participate in the study, 28 families gave their informed consent to participate but did not complete a measure on parental PTSS, 15 children were already discharged before the family could be approached, and 19 families were not invited because their participation was deemed inappropriate (e.g., psychiatric background, severely ill family members, or families with prolonged socioeconomic and psychosocial problems). The 118 participating families did not differ from the other 84 eligible families in terms of child gender ($p = .59$), length of stay in the hospital ($p = .26$), percentage TBSA burned ($p = .32$), number of surgeries ($p = .40$), and percentage of deep burns ($p = .51$). However, children from nonparticipating families were older than children from participating families ($M = 12.9$, $SD = 3.0$ vs. $M = 13.9$, $SD = 3.1$), $t(197) = 2.2$, $p = .03$.

Participants

Data from 111 mothers and 91 fathers, including 84 couples representing 118 children, were included in descriptive analyses. Mothers had a mean age of 42.1 years ($SD = 5.9$, range = 28 to 55 years). The mean age of fathers was 44.7 years ($SD = 6.4$, range = 30 to 64 years). The majority of the parents, 93% of mothers and 86% of fathers, were born in the Netherlands or Belgium. The education level of the mothers and fathers was categorized as low (primary education, technical and vocational training until the age of 16; 37% of mothers, 30% of fathers), middle (technical and vocational training until the age of 18; 35% of mothers, 29% of fathers), or high (technical or vocational training for ages 18 and older or university; 28% of mothers, 41% of fathers). The majority of the parents were employed (70% of mothers and 93% of fathers) and had a partner (82% of mothers and 91% of fathers).

Of the children, 70% were boys. Children were, on average, 12.9 years old ($SD = 3.0$, range = 7.9 to 17.8 years). Fifty-six percent of the burn injuries were flame burns (e.g., resulting from a barbecue or firework accident), 33% were scald burns, and 11% were other types of burns (e.g., electrical, chemical, or contact). Most burn accidents occurred at home (62%), either inside or outside. The average TBSA affected was 9.6% ($SD = 11.8\%$), with a range of 1% to 72%. The mean length of hospital stay was 20.1 days ($SD = 32.5$, range = 1 to 218 days). Fifty-four percent

of the children required at least one skin grafting procedure during the initial hospitalization ($M = 1.1$, $SD = 2.5$, range = 0 to 16).

For the final multilevel analysis, only parents that provided information on the predictors in the model could be included. The availability of data for this sample is described in the missing data analyses of the Results section.

Measures

Parental PTSS. The Impact of Event Scale (IES; Horowitz, Wilner, & Alvarez, 1979; Sundin & Horowitz, 2002) was used to assess parental PTSS. This questionnaire assesses two dimensions of traumatic stress, namely, symptoms of intrusion and avoidance. Both parents completed the Dutch version of the IES (Brom & Kleber, 1985) at all four time points. The IES consists of 15 items. Parents were asked to rate the frequency of symptoms they had experienced specifically in relation to their child's burn event on a 4-point Likert scale (0 = *not at all*, 1 = *rarely*, 3 = *sometimes*, 5 = *often*). The total possible score ranged from 0 to 75, with higher scores representing higher levels of stress. Based on Dutch (Van der Velden, Van der Burg, Steinmetz, & Van den Bout, 1992) and Australian (Le Brocque et al., 2010) research, scores ≥ 26 on the Total scale were considered "clinically significant stress symptoms." In the present study, the subscales Intrusion (range 0 to 35) and Avoidance (range 0 to 40) were used as the dependent variables. In our sample, Cronbach's alpha for the Total scale, Intrusion subscale, and Avoidance subscale of the IES ranged from, respectively, .85 to .90, .78 to .89, and .75 to .86 for mothers and fathers at the four time points.

Parental appraisal and emotions related to the burn event. Within the first month postburn, both parents reported their subjective appraisal of the life-threatening nature of the injury (yes/no) through a single item: "At any time, did you think your child would not survive the burn event?" Psychometric properties of this item were not assessed, but previous studies have supported the validity of the measure (e.g., Kassam-Adams et al., 2009). Items assessing parents' emotions were developed for the purpose of the present study. In contrast to measuring trait emotions, emotions directly related to the burn event were assessed with the question, "To what extent do the following emotions apply when you think about the accident that caused the burn?" The emotions of guilt and anger were evaluated in the present study. Answers were rated on a 5-point Likert scale ranging from 0 (*not at all*) to 4 (*a lot*). The choice for the use of single items was driven by the demanding nature of the hospitalization phase for parents, hereby minimizing the burden of the study.

Child and burn characteristics. Characteristics of the child (i.e., gender and age) and the burn (i.e., percentage TBSA burned, number of skin grafting procedures during initial hospitalization and length of stay in the hospital) were derived from the medical file. Percentage TBSA burned is the estimated percentage body surface area affected by partial- or full-thickness burns. Within the first month postburn, parents provided information on the place of the burn event (i.e., inside or outside the home) and the cause of the burn (e.g., hot fluid, flame, or contact with hot object).

Statistical Analyses

First, descriptive statistics for parental PTSS, and emotions and appraisal related to the burn event, were calculated, as well as

correlations between the constructs. For these statistics, all available data from the complete sample of 118 families were used. To examine the course and predictors of parental PTSS, multilevel regression analysis was used. In the data, there was a three-level hierarchy. The lowest level comprises the four measurement moments, time (first level), which are nested within an individual parent (second level), with parents nested in a couple (third level). Predictors included varied only at one of the levels. On the individual parent level (second level), predictors comprised parental gender and appraisal and emotions related to the burn event. Predictors that varied on the couple level (third level) were child and burn characteristics, such as child age and percentage TBSA burned. Separate multilevel regression analyses were performed for the symptom clusters Intrusion and Avoidance. Analyses were conducted in Mplus 7.4 (Muthén & Muthén, 2012). As some of the variables were non-normally distributed, a robust maximum likelihood (MLR) estimator was used.

In multilevel analysis, missing data on the outcome level is allowed for, by using a missing conditionally at random assumption. This assumption allows the probability of missing data to depend on observed data (Enders, 2010; Hox, 2010). To assess the reasonableness of this assumption, missing data analyses were performed. Next, in the multilevel analyses, a full information maximum likelihood (FIML) estimator was used to estimate missing data, with the use of all available data. With the inclusion of the observed variables related to the probability of missingness in the multilevel model, FIML leads to unbiased parameter estimates for cases with and without missing data (Hox, 2010).

In the first step of the multilevel analyses, for both symptom clusters separately, the course of symptoms in mothers and fathers was examined in a model with time (coded as 0, 3, 12, and 18 months). Moreover, to test for a possible nonlinear course of symptoms, a quadratic term was added to the model. Based on these models, intraclass correlations were calculated to define the proportion of the variance at each level. Next, predictors at the individual parent level were entered into the model (i.e., parent characteristics), followed by the predictors at the couple level (i.e., child characteristics). To examine whether mothers and fathers varied in their course of symptoms, random slopes for the time variable were added at the individual parent and the couple level, respectively. In case a decrease in model deviance provided evidence for random slopes, it was examined whether predictors at the specified level could explain this variation, by including interactions between time and these predictors. In a last step, interactions between parental gender and appraisal/emotions were tested exploratory to examine whether associations between appraisal/emotions and parental PTSS would be different for mothers and fathers.

In multilevel models, predictor variables are assumed to be random variables. However, in the present analyses, this assumption was violated for the variable parental gender. This variable cannot be regarded a random variable, because when a father is included in the analyses, corresponding to a value of 0, the other value is automatically 1 (a mother). After adding the variable parental gender to the intrusion model, the variance of intrusion symptoms increased, instead of decreased, which is a known feature (Snijders & Bosker, 1994). Therefore, no explained variance estimates could be derived for the third level of the Intrusion model.

Results

Prevalence of Parental PTSS

Means and standard deviations of parental PTSS and the percentage of mothers and fathers with clinically significant PTSS (IES Total ≥ 26) at the four measurement moments are displayed in Table 1. Prevalence of clinically significant PTSS was especially high within the first month postburn. The correlations between mothers' and fathers' symptoms of intrusion were small to moderate, namely, .14, .37, .26, and .14 at the four subsequent measurement moments, respectively. For symptoms of avoidance, correlations were small to large, namely, .26, .51, .53, and .55.

Parental Emotions, Appraisal, and PTSS

Within the first month postburn, the majority of parents (57% of the mothers and 59% of the fathers) reported at least some level of anger (a minimum score of 1 on a 0-to 4 scale). For feelings of guilt, this was 45% of the mothers and 46% of the fathers. Within couples, mean guilt feelings within the first month postburn were not significantly different for mothers ($M = .8$, $SD = 1.2$) compared with fathers ($M = .8$, $SD = 1.2$). Likewise, feelings of anger did not differ between mothers ($M = 1.1$, $SD = 1.3$) and fathers ($M = 1.2$, $SD = 1.3$). Of the mothers, 13% had perceived their child's life to be in danger. For fathers, this was 8%. This difference was not statistically significant, $\chi^2(1) = 1.33$, $p = .25$. In Table 2, associations between parental feelings of guilt and anger, perceived life threat, and parental PTSS at the four measurement moments are displayed. Correlations between parental PTSS and emotions and appraisal appear to be higher in mothers than in fathers.

Missing Data Analyses

The selection of parents that completed at least one IES and provided complete information on the predictors included in the

Table 1
Means, Standard Deviations, and Percentage of Mothers and Fathers With Clinically Significant Posttraumatic Stress Symptoms

Parental PTSS	First month	3 months	12 months	18 months
Mothers	($n = 108$)	($n = 89$)	($n = 69$)	($n = 69$)
IES—Total	26.0 (14.0)	18.5 (14.1)	15.7 (11.7)	13.6 (11.4)
IES—Intrusion	15.9 (8.6)	10.9 (7.9)	9.7 (7.0)	8.1 (6.3)
IES—Avoidance	10.1 (7.8)	7.6 (7.7)	5.9 (5.9)	5.5 (6.6)
% of mothers with IES ≥ 26	48%	29%	25%	19%
Fathers	($n = 84$)	($n = 73$)	($n = 48$)	($n = 51$)
IES—Total	16.0 (11.9)	11.2 (11.3)	8.9 (10.3)	6.9 (8.5)
IES—Intrusion	9.8 (7.7)	6.5 (6.6)	5.5 (5.8)	4.4 (5.0)
IES—Avoidance	6.2 (6.3)	4.6 (6.1)	3.4 (5.7)	2.5 (4.5)
% of fathers with IES ≥ 26	26%	14%	6%	4%

Note. Total $n = 111$ mothers and 91 fathers, from 118 families. The sample size (n) refers to participating mothers and fathers at each time point separately. PTSS = Posttraumatic Stress Symptoms; IES = Impact of Event Scale.

Table 2
Associations Between Parental Guilt Feelings, Anger, and Perceived Threat as Assessed Within the First Month Postburn and Posttraumatic Stress Symptoms of Intrusion and Avoidance at All Four Time Points

Variables	First month	3 months	12 months	18 months
Mothers	(<i>n</i> = 105–106)	(<i>n</i> = 87)	(<i>n</i> = 68)	(<i>n</i> = 68)
Intrusion—guilt feelings	.31**	.26*	.22	.33*
Intrusion—anger	.32**	.24*	.25*	.18
Intrusion—perceived threat	.24*	.27*	.27*	.24
Avoidance—guilt feelings	.30**	.35**	.13	.31*
Avoidance—anger	.35**	.25*	.27*	.10
Avoidance—perceived threat	.35**	.31**	.26*	.29*
Fathers	(<i>n</i> = 79)	(<i>n</i> = 67)	(<i>n</i> = 45)	(<i>n</i> = 47)
Intrusion—guilt feelings	.26*	.07	.10	.02
Intrusion—anger	.04	-.04	.08	-.02
Intrusion—perceived threat	.23*	.26*	.21	.08
Avoidance—guilt feelings	.17	.01	.03	.06
Avoidance—anger	-.03	.02	.18	.03
Avoidance—perceived threat	-.04	.18	.23	.02

Note. Total *n* = 111 mothers and 91 fathers, from 118 families. The (range of the) sample sizes (*n*) refer to the number of participating mothers and fathers at each time point separately. Sample sizes differ from those reported in Table 1, due to missing data on parental guilt feelings, anger, and perceived threat.

p* < .05. *p* < .01.

multilevel model resulted in a sample of 104 mothers and 76 fathers, from 108 families. Table 3 displays the proportion of parents that completed the IES at each time point, as well as the proportion of couples in which both parents completed the measure per time point. By the use of FIML, available information from all 108 families could be used in the analyses.

To assess the reasonableness of the missing conditionally at random assumption, analyses of variance and chi-square difference tests were conducted to examine possible differences between couples in which both parents completed questionnaires at all time points (*n* = 34 families), couples in which both parents participated but both parents dropped out during the study (*n* = 30), and couples in which only one parent participated from the start or in which one of the parents dropped out (*n* = 44). No differences between these families were found in terms of child age (*p* = .85), child gender (*p* = .83), percentage TBSA burned (*p* = .98), number of surgeries (*p* = .86), or location of the accident (*p* = .59). Moreover, a comparison between the three groups revealed

no differences regarding a combined mean PTSS score of mothers and fathers at T1 (*p* = .33).

To assess possible differences within the group of mothers and the group of fathers as a function of missing data, parents with partially missing data were compared with parents who completed all measures in terms of self-reported measures at T1. Mothers with complete data did not differ from mothers with partially missing data in terms of intrusion and avoidance at T1 and anger. However, mothers with partially missing data reported significantly higher feelings of guilt at T1 compared with mothers with complete data ($M_{\text{complete}} = .6, SD = .9; M_{\text{missing}} = 1.2, SD = 1.5$), $t(70) = 2.27, p = .03$. For fathers, no differences were found regarding intrusion and avoidance at T1 and feelings of anger or guilt. However, more fathers with complete data had perceived their child's life to be in danger compared with fathers with partially missing data, $\chi^2(1) = 6.87, p = .009$. By including the variables that were related to the missingness in the multilevel model, the use of FIML resulted in unbiased parameter estimates.

Table 3
Number of Parents That Completed the Impact of Event Scale (IES) per Time Point

Time point	Mothers (<i>n</i> = 104)	Fathers (<i>n</i> = 76)	Couples ^a (<i>n</i> = 72)
Within first month	102 (98%)	74 (97%)	70 (97%)
3 months	85 (82%)	62 (82%)	57 (79%)
12 months	66 (64%)	42 (55%)	39 (54%)
18 months	66 (64%)	44 (58%)	41 (57%)
All time points ^b	59 (57%)	37 (49%)	34 (47%)

Note. Total *n* = 108 families, for which complete information regarding predictors included in the multilevel model was available.

^aNumber and percentage of couples of whom both the mother and the father completed the IES. ^bNumber and percentage of mothers, fathers, and couples that completed the IES at all time points.

Multilevel Analyses

Unexplained variance. Intraclass correlations were calculated in a model with time and the quadratic term as predictors. In the model with intrusion symptoms, 32% of the variance was located at the time level, 61% at the individual parent level, and 7% at the couple level. This indicates that intrusions are mainly individually experienced symptoms that show little overlap within a parent couple. For avoidance, 44% of the variance was located at the time level, and the amount of variance located at the individual parent and couple levels was similar to each other (both 28%), indicating that symptoms of avoidance are experienced individually and show resemblance within a couple. Thus, there was a larger overlap in avoidance symptoms than intrusion symptoms between two parents within one couple.

Course of parental PTSS. Over time, parental symptoms of intrusion and avoidance decreased. There was a significant positive quadratic term for both types of symptoms, indicating a nonlinear effect of time. Figure 1 displays the course of intrusion and avoidance symptoms for mothers and fathers (estimated means). The existence of random slopes in intrusion and avoidance indicates that parents from the same couple did not have the same course of symptoms over time. However, between couples, the course of symptoms for mother–father dyads did not consistently differ.

Explanatory variables. Results of the final models for symptoms of intrusion and avoidance are displayed in Table 4. For intrusion, gender of the parent had a significant effect: Mothers reported higher levels of symptoms throughout the study period compared with fathers. Guilt feelings within the first month postburn were related to higher intrusion across both parents. The effect of anger was only present for mothers and not for fathers (interaction effect $B = 1.12$). Parents who had perceived their child's life to be in danger reported more symptoms of intrusion over the four time points. At the couple level, more severe burns were related to more symptoms of intrusion. The effects of child gender and location of the accident were not significant. The only significant variable explaining differences in intrusion within couples was gender of the parent; mothers decreased more than fathers, indicating that the difference between mothers and fathers became smaller over time.

Similar to symptoms of intrusion, mothers reported higher levels of avoidance symptoms than fathers. More feelings of guilt were associated with higher avoidance across mothers and fathers. The effects of anger and perceived threat on avoidance symptoms were present in mothers but not in fathers (interaction effects: $B_{\text{anger}} = .92$, $B_{\text{threat}} = 3.31$). Mothers with higher anger levels and mothers who had perceived their child's life to be in danger experienced more avoidance. At the couple level, parents of girls reported more symptoms of avoidance. Moreover, when the accident had oc-

curred within the home, more avoidance was reported by parents. The individual differences in the course of avoidance symptoms (i.e., the random slope) could be partially explained by feelings of anger; there was an initial effect of anger that diminished as time passed.

Discussion

The present study examined the course and predictors of PTSS in parents after a burn event to their school-aged child. This is the first study to investigate this in a cohort of 8- to 18-year-old children. Results show that a substantial amount of parents experience serious traumatic stress symptoms in the first 18 months after their child's burn injury, with higher prevalence briefly after the incident and in mothers. Initial feelings of guilt and anger, as well as appraisal of threat to the child's life, were shown to be related to a higher level of parental PTSS over time, especially in mothers. Moreover, although symptoms of intrusion were mainly individually experienced, parents within a couple were more similar in terms of their avoidance symptoms.

In the first month after the burn event, 48% of the mothers and 26% of the fathers experienced clinically significant PTSS. After 18 months, 19% of the mothers and 4% of the fathers experienced clinically relevant symptoms. On average, symptoms decreased over time. Prevalence rates were comparable with prospective studies in parents of preschool children (Bakker et al., 2013; De Young et al., 2014) and school-aged children and adolescents (Hall et al., 2006). It seems that most parents recover from initial symptoms or can be regarded resilient, which is in line with the conceptual model for pediatric medical traumatic stress (Kazak et al., 2006; Price et al., 2016). In congruence with a previous study in a younger cohort (Bakker et al., 2013), there was a higher prevalence of clinically relevant stress symptoms in mothers compared with fathers. However, in both cohorts, the acute impact of the child's burn injury appears to be large in both parents, with high levels of PTSS in the first month postburn for mothers as well as fathers, whereas only mothers are indicated to be more at risk of persistent PTSS up to 18 months postburn.

In line with the cognitive model of PTSD (Ehlers & Clark, 2000), results of this study emphasize the relevance of parental appraisal and emotions after a pediatric burn event. Overall, whether the parent had perceived their child's life to be at risk during the acute phase was identified as a risk factor for later PTSS. This finding is supported by previous research (e.g., Bakker et al., 2013; Kassam-Adams et al., 2009) and fits within the conceptual model for pediatric medical traumatic stress (Kazak et al., 2006; Price et al., 2016). Although parents of older children appear to experience lower guilt feelings compared with parents of younger children (Bakker et al., 2013), higher initial guilt feelings were related to higher levels of PTSS, which was in line with previous studies (Bakker et al., 2013; De Young et al., 2014; Fukunishi, 1998). Negative self-blame coping strategies that may be part of guilt might increase the risk of PTSS in parents (Frank et al., 2015). Anger was related to higher PTSS in mothers, and not in fathers, which was an unexpected finding, as it is well established that anger is related to later PTSS (e.g., Mayou, Ehlers, & Bryant, 2002). Although feelings of guilt and anger may be part of the posttraumatic stress response, previous studies have found that these emotions do not merely reflect overlap with the posttrau-

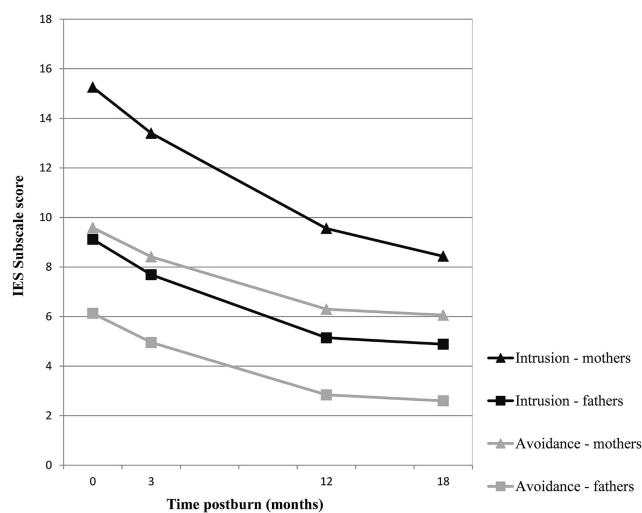


Figure 1. Longitudinal course of intrusion and avoidance symptoms of mothers and fathers, as assessed with the Impact of Event Scale (IES). Estimated means are based on a model with time, time squared, and parent gender.

Table 4
 Multilevel Regression Analyses: Predictors of Parental Intrusion and Avoidance Symptoms

Predictors	Intrusion		Avoidance	
	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>
Time level				
Intercept	9.42 [‡]	2.35	3.48 [†]	2.41
Time ^a	-.54 [‡]	.12	-.36 [‡]	.13
Time squared	.02 [‡]	.01	.01 ^{††}	.01
Individual parent level				
Parent gender (male = 0, female = 1)	4.80 [‡]	1.20	1.98 [‡]	.78
Feelings of guilt	1.36 [‡]	.39	.58 ^{††}	.34
Feelings of anger	.08	.47	.31	.46
Perceived threat (no = 0, yes = 1)	2.12 [†]	1.47	1.24	1.34
Parent Gender × Feelings of Guilt	—	—	—	—
Parent Gender × Feelings of Anger	1.12 ^{††}	.53	.92 ^{††}	.46
Parent Gender × Perceived Threat	—	—	3.31 ^{††}	1.88
Couple level				
Child gender (boy = 0, girl = 1)	.99	.92	1.92 ^{††}	1.01
Child age	-.22 [†]	.16	-.03	.16
% TBSA burned	.12 [‡]	.03	.01	.04
Accident at home (no = 0, yes = 1)	-.50	1.00	1.95 [‡]	.83
Time interaction variables				
Time × Parent Gender	-.13 ^{††}	.06	—	—
Time × Feelings of Anger	—	—	-.04 [†]	.02
Explained variance				
At individual parent level	25% (of initial 61%)		19% (of initial 28%)	
At couple level	n.a. ^b		20% (of initial 28%)	
Of random slopes at parent level	14%		14%	

Note. Total *n* = 104 mothers and 76 fathers, from 108 families. Sample sizes differ from those reported in Table 1 and 2, due to parents from 10 families having incomplete information on predictors. *SE* = standard error; TBSA = total body surface area; n.a. = not applicable.

^a Random at individual parent level. ^b Explained variance could not be calculated, as explained in text.

[†] *p* < .10. ^{††} *p* < .05. [‡] *p* < .01 (all tested one-sided).

matic symptom clusters. For example, after removal of the anger item from a PTSD instrument, the association between anger and PTSD did not considerably decrease (Novaco & Chemtob, 2002). Also, a recent review suggested that guilt may be trauma-specific, rather than a feature of low mood, which is also a common symptom after trauma (Pugh, Taylor, & Berry, 2015). In sum, parents' early subjective appraisal and emotional responses were related to PTSS. Although parents' feelings of anger and guilt might, to some degree, be regarded normal or rational reactions to the child's burn injury, the relevance of these emotions is reflected by their associations with PTSS. This indicates that attention should be paid to the occurrence of initial guilt and anger responses in identifying parents at risk. However, more research is warranted to study the course of these emotions in order to unravel the dynamics important for effective prevention or intervention.

The differentiation between symptoms of intrusion and avoidance was indicated to be informative in the present study, as results suggested a different nature of symptoms, as well as unique relationships with parent and child factors. Intrusions were indicated to be more individually experienced symptoms that decreased with time, whereas avoidance appeared more similar within a couple of parents and more stable across the studied time interval, in agreement with findings in parents of younger children (Bakker et al., 2013). Parents may avoid talking about the trauma or may hide emotions from their partner. This active avoidant pattern has been described in couples after a traumatic event in one of the partners (Goff et al., 2006), or after the loss of a child, with

parents avoiding to confront the other partner with his or her own grief to not upset the other parent (Stroebe et al., 2013). In the present study, the overlap in avoidance symptoms in parents could be partially explained by factors that were shared within a couple. In case the burn accident occurred at home, parents reported more avoidance. This might be explained by parents more often being confronted with reminders of the event at home, which cause distress and avoidance strategies. Moreover, parents of girls experienced more avoidance, which has been reported previously (Bakker et al., 2013; McGarry et al., 2013). This finding might be tentatively explained by parents' perceptions of the impact of burn scars being different for girls and boys or by preburn or postburn gender-specific modeling and reinforcement processes (i.e., socialization theory). In a qualitative study, parents of girls described being concerned regarding the long-term meaning of their daughters' scar, whereas parents of boys described their sons as being "proud of their scar" (McGarry et al., 2015). Although avoidance was unrelated to burn severity, higher burn severity was related to more parental symptoms of intrusion, which is in line with previous studies finding an (indirect) association with parental PTSS (Bakker et al., 2013; Bakker, Van Loey, Van Son, & Van der Heijden, 2010; Hall et al., 2006; Rizzone et al., 1994). Results may have clinical implications, in that the more interdependent nature of symptoms of avoidance call for interventions and family support at the couple or family level, whereas treatment of intrusions should be more individually focused.

Prevalence rates of parental PTSS were comparable with a previous study in younger children (Bakker et al., 2013), although in the present study, less variance was explained by the total model (see the Appendix in the online supplemental materials for a more detailed comparison with the study of Bakker and colleagues, 2013). This suggests that additional predictors must be considered to explain the similar severity of symptoms in parents of older children, which is an area of further study. Furthermore, in addition to taking into account other vulnerability factors, such as parents' trauma history (McGarry et al., 2013) and preburn parent or child psychological problems (Le Brocque et al., 2010), in explaining parent PTSS, future research could aim to specifically examine the factors that explain why the majority of parents do not develop clinically significant PTSS in the long term. As resilience appears to be the most common response pattern after potential trauma, followed by recovery (Bonanno, 2004), research might focus on factors that determine resilience and recovery pathways in parents after child burn injury. For example, parental emotional expression and cognitive reappraisal may help to mitigate the initial posttraumatic stress response. Also, interpersonal processes within the parental dyad should be taken into account (e.g., Compas et al., 2015).

Strengths of the present study include the prospective design, the inclusion of fathers, and, in the analysis, taking account of couples that, as a dyad, share and evoke similar experiences. However, some limitations of this study need to be addressed. First, although the sample size was large compared with other child burn studies, a larger sample size would have allowed stronger conclusions. This could, however, not be obtained within a reasonable study period of 5 years, as the incidence of burns in the age group under study is low (D'Souza, Nelson, & McKenzie, 2009) and the refusal rate to participate was rather high. Although the 84 eligible families that declined participation did not differ from the 118 included families regarding burn characteristics, older teenagers more often refused to participate, which may limit generalizability of the results to the older teenagers. Moreover, families that did not participate may differ from participating families on variables that were not measured, such as psychosocial functioning. Thus, a selection bias may still be present. Second, although analyses using FIML corrected for observed differences in mothers' feelings of guilt and fathers' perceived life threat between parents with and without missing data, other unmeasured variables may be associated with the probability of missing data. Third, PTSS were assessed with a self-report questionnaire, which prevents drawing inferences regarding the proportion of parents that meet diagnostic criteria for PTSD. Moreover, the instrument used in the current study only covers two symptom clusters of the updated diagnosis of PTSD in the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; American Psychiatric Association, 2013). For example, no data were collected on parental hyperarousal, although these symptoms have been indicated to be important in predicting subsequent severity in other PTSS clusters (Schell et al., 2004). Moreover, assessment of the current two symptoms did not allow differentiation of PTSS within the first month postburn from symptoms of acute stress disorder, as dissociative symptoms were not assessed. Last, although this study acknowledged the interdependency of parental reactions, psychological reactions of the child itself were not included in the present model. Studies on so-called relational PTSD (Scheeringa &

Zeanah, 2001) have, however, emphasized the mutual influence of symptoms in parents and children.

The results of this study highlight the role of parents' initial emotional response in adjustment after pediatric burn injury and underscore the importance of attending to the needs of parents in pediatric burn care. In pediatric psychology studies, parents' specific emotional responses have not often been the subject of investigation, although the present study showed they are prospectively associated with parents' traumatic stress. Whether targeting the initial emotional response and appraisal already in an early phase can reduce the risk of long-term parental PTSS should be examined in future studies. Interventions such as imagery exposure and imagery rescripting might be promising, as they have been shown to be able to change feelings of guilt, followed by a decrease in symptoms of posttraumatic stress (Øktedalen, Hoffart, & Langkaas, 2015). In sum, the integration of parents in psychosocial aftercare of pediatric burn injury is recommended, even in the treatment of school-aged children and adolescents, who generally become more independent of their parents as they grow older.

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