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ORIGINAL ARTICLE

Maladaptive Post-traumatic Cognitions in Interpersonally Traumatized Adolescents with Post-traumatic Stress Disorder: An Analysis of "Stuck-Points"

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Abstract
This study investigated maladaptive post-traumatic cognitions, so-called "stuck-points", from forty-three adolescent survivors of interpersonal traumatization. Thematic content and relationships between stuck-points and trauma characteristics as well as symptom severity were analyzed. Guilt, esteem and trust were the most frequently named themes. Physical abuse was related to stuck-points in the categories trust and control, sexual abuse was related to the categories safety and guilt. Penetration, female sex, an older age at trauma onset and a closer relationship to the perpetrator were related to the category guilt. Injuries through physical violence were related to the category trust. Physical violence and a longer duration of the index trauma were related to a higher number of stuck-points overall. Last, a higher number of stuck-points in the category trust was related to higher post-traumatic stress disorder symptom severity. Therapists should pay attention to these different themes in order to provide the best possible treatment for each patient individually.

Keywords Cognitive processing therapy · Cognition · Interpersonal violence · Adolescents

Introduction

Prevalence rates of post-traumatic stress disorder (PTSD) in adults are about 6.8% in the general population (Kessler et al. 2005). In adolescents (13–17 years) prevalence rates are estimated to be 2.2% for boys and 7.3% for girls (McLaughlin et al. 2013). PTSD is associated with a heightened risk for revictimization, which is especially important for the later development of adolescents with PTSD (e.g., Arata 2002).

An important finding for the adult survivor population of interpersonal trauma is the association of PTSD and distorted cognitions about the self, the world and other people (e.g., Mechanic and Resick 1993). A multitude of information processing theories of PTSD have emerged in an attempt to explain which cognitive processes may be impaired in people developing PTSD, from basal network approaches (Brewin et al. 1996; Chemtob et al. 1999; Foa et al. 1989; Litz 1989) to complex models of appraisal (Ehlers and Clark 2000).

Resick and Schnicke (1992, 1993) created a theoretical model specifically tailored for survivors of interpersonal trauma (i.e., sexual and physical abuse). The main assumption of this model is that a person who is involved in a traumatic event is confronted with new information that usually does not fit into his or her pre-existing cognitive schemata. Resick and Schnicke (1992, 1993) propose that two processes called "accommodation" and "assimilation" occur within the attempt to integrate the information of the traumatic experience. Accommodation means that an individual adjusts their pre-existing schema so that the new information can be integrated without difficulty. Accommodation usually leads to functional and healthy beliefs: e.g., "I am always in control of what is happening to me" becoming "In most situations I am in control of what is happening to me". The exceptions are situations when accommodation is exaggerated, so-called "over-accommodation", e.g., "I am in control of what is happening to me" becoming "I am never

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in control of what is happening to me". Assimilation on the other hand describes the process by which an individual alters the information provided by the trauma to make it fit into the existing schemata. This process leads to maladaptive beliefs: e.g., "I am in control of what is happening to me" remains a schema and the information of the traumatic event is altered leading to the belief "it was my fault I was raped". The resulting maladaptive cognitions of both assimilation and over-accommodation are often referred to as "stuck-points". These stuck-points prevent trauma survivors from integrating the experience and processing the traumatic events (Resick and Schnicke 1992, 1993). There is ample evidence that supports the association between maladaptive post-traumatic cognitions and PTSD symptom severity in adults (Dunmore et al. 1999; Owens and Chard 2001; Owens et al. 2008; Sobel et al. 2009; Steil and Ehlers 2000; Vaile Wright et al. 2010; Wenninger and Ehlers 1998).

Based on these theoretical assumptions, Resick and Schnicke also developed a new form of treatment for PTSD known as cognitive processing therapy (CPT). A primary goal of CPT is to modify assimilated and over-accommodated thoughts by identifying and challenging maladaptive beliefs and suggesting more adaptive thoughts. For this purpose, at the start of a CPT course of treatment, patients write so-called impact statements in which they describe the meaning of the traumatic event and how it has affected their thoughts about themselves, other people, and the world. The patients then elaborate on their beliefs in conjunction with the therapists to derive stuck-point lists from the impact statement. In CPT, a significant reduction of maladaptive cognitions from pre- to post-treatment has been demonstrated (Resick and Schnicke 1992; Resick et al. 2002, 2008). Sobel et al. (2009) examined impact statements from 37 adult female rape survivors before and after treatment. Results demonstrated that adaptive beliefs increased and over-accommodated and assimilated thoughts decreased from pre- to post-treatment. The hypothesis that higher numbers of maladaptive beliefs are related to higher PTSD symptom severity, and that an increased number of accommodated thoughts are related to lower PTSD symptom severity was partially supported by this study.

In taking a closer look at the association between maladaptive post-traumatic cognitions and PTSD, an area of concern emerges, namely the thematic content of these cognitions and possible differences in the importance of certain themes. The body of research dealing with these issues is mostly influenced by Janoff-Bulman (1992) and McCann et al. (1988). Janoff-Bulman (1992) proposed that people hold three fundamental assumptions about the self and the world: (1) The world is benevolent (other people are trustworthy and misfortunes occur infrequently), (2) The world is meaningful (people get what they deserve and the distribution of outcomes follows justice), and (3) The self is worthy (the self is seen as competent and lovable). A traumatic event shatters these positive assumptions and consequently the individual experiences post-traumatic distress.

McCann et al. (1988) identified five major themes of basic beliefs through clinical experience and theoretical work that comprise safety, trust, control, esteem and intimacy. These authors assume that all basic beliefs a person holds—whether positive or negative—occur within these thematic categories. The theory posits that a traumatic event influences individuals differently depending on how positive or negative their basic beliefs are. If a person who grew up in a very safe neighborhood created the belief "The world is a safe place" is then involved in a crime, this person will likely experience a greater degree of suffering than a person with a more realistic belief such as "The world is a safe place, though there are also places that are not safe.".

A handful of studies have examined the link between PTSD symptom severity and the thematic content of maladaptive post-traumatic cognitions in adult samples. These studies used the World Assumptions Scale (WAS) designed by Janoff-Bulmann (1989) and the Personal Beliefs and Reactions Scale (PBRS), which measures cognitions in the five areas proposed by McCann et al. (Mechanic and Resick 1993). Results suggested that the number of maladaptive post-traumatic cognitions was associated with PTSD symptom severity (Mechanic and Resick 1993; Owens and Chard 2001; Wenninger and Ehlers 1998), and that especially the themes trust, power, esteem and intimacy displayed strong correlations with PTSD symptoms (Wenninger and Ehlers 1998). Additionally, the "worthiness of the self" scale correlated significantly with PTSD symptom severity, and the WAS subscales "beliefs", "safety", and "power" predicted PTSD symptom severity (Owens and Chard 2001).

An additional question, yet to be explored, would be whether trauma characteristics such as the nature or frequency of the abuse are related to the amount of maladaptive cognitions in specific thematic categories. It has already been shown that trauma- and person-characteristics of the survivor influence PTSD symptom severity, especially frequency of the abuse (Wenninger and Ehlers 1998), the number of assailants, perceived life threat, injury threat, and perceived lack of control (Dunmore et al. 1999). Owens and Chard (2001) examined the predictability of pre-treatment cognitive distortions by trauma event characteristics in their sample of adult female childhood sexual abuse (CSA) survivors. Results suggested that out of a number of event characteristics only penetration predicted cognitive distortions in the areas of trust and power.

In the field of childhood and adolescent PTSD, research on these relationships and content of maladaptive post-traumatic cognitions is sparse to non-existent. Tyler (2002) examined the relationship between trauma characteristics and PTSD symptom severity in children and adolescents.

Female sex, age at trauma onset, frequency of the abuse, duration of the abuse, and type of the abuse—sexual versus physical—as well as severity of the abuse and the relationship to the perpetrator were identified to influence both the emergence and the severity of PTSD symptoms. One longitudinal study (Palosaari et al. 2013) examined the relationship between post-traumatic cognitions and post-traumatic stress symptoms in a sample of 240 ten- to twelve-year-old children from Gaza, who experienced shelling during the 2008–2009 war between Israel and Palestine. Data were collected 3, 5, and 11 months following the end of the war. Results indicated that the number of post-traumatic cognitions predicted the level of post-traumatic stress symptoms over time, but the level of post-traumatic stress symptoms did not predict the amount of post-traumatic cognitions. These results are consistent with the assumption that post-traumatic cognitions play a central role in the development and retention of post-traumatic stress symptoms.

The aim of the present study was to provide a first insight into maladaptive post-traumatic cognitions of adolescents with a history of interpersonal traumatization. First, we examined the thematic content and the dispersal of the cognitions amongst thematic categories. Second, we investigated the relationship between trauma characteristics such as the nature of the trauma and the number of maladaptive cognitions overall, and the number of maladaptive cognitions within categories. Third, we determined whether adolescent survivors of physical and sexual traumatization with more cognitive distortions overall and more cognitive distortions in certain thematic categories also displayed a greater PTSD symptom severity, as shown in former studies with adult samples (e.g., Owens and Chard 2001; Wenninger and Ehlers 1998).

Because of the lack of studies in this area, our study was exploratory in nature. Our research questions were as follows: (1) What is the thematic content and how are the cognitions dispersed in thematic categories? (2) What is the relationship between trauma characteristics, the number of maladaptive cognitions overall and the number of maladaptive cognitions within categories? Regarding the latter question, only Owens and Chard (2001) examined this type of relationship, but with an adult sample. All other researchers investigated PTSD symptom severity instead of cognitive distortions. (3) What is the relationship between PTSD symptom severity and the number of maladaptive cognitions overall and the number of maladaptive cognitions within categories? This type of analysis has been conducted before in adult samples (Owens and Chard 2001; Wenninger and Ehlers 1998). Despite these two studies with adults, we explored this relationship by an exploratory approach, because we assumed that cognitions may differ between adults and adolescents. However, there is little empirical evidence examining the difference between adolescents' and adults' cognitions. Thus, our study provides the opportunity to examine possible differences in relevance to specific schemata between adolescents and adults. Adolescence is seen as a period of life with heightened vulnerability (Steinberg 2005). Compared to adulthood, adolescence is a particularly sensitive period for the effects of stress on mental health (Fuhrmann et al. 2015). In this period of life, the brain is still developing, and behavioral and cognitive systems mature at different rates, especially in brain regions that are key to regulation of emotions and behavior and to the perception of risk (Steinberg 2005). Additionally, the evaluation of the self continues to change and becomes further differentiated with time (Harter 1990). These factors may influence vulnerability to the development of PTSD and the subjective importance of specific schemata.

In contrast to most former studies addressing maladaptive post-traumatic cognitions, we used qualitative material in place of questionnaire data. We would like to highlight this fact, as it allowed us to examine the content of the maladaptive cognitions from the individuals in our sample in a less-restrictive manner. We would further like to highlight the fact that the current paper presents results from a secondary analysis of data, which were collected for a multicenter randomized controlled trial (RCT) of CPT for PTSD in adolescents (REF Rosner et al. 2014).

Method

Participants

The sample consisted of patients from the pilot study and first patients from a multicenter RCT in which a developmentally adapted form of CPT (D-CPT; Matulis et al. 2014) was compared to treatment as usual. We included all patients, who already completed treatment and whose stuck-point lists were available. At the time of our data collection, 44 patients had completed treatment. The data from 5 out of 44 patients could not be included in the current sample due to missing stuck-point lists. Treatment took place at three outpatient centers in Germany, namely in Berlin, Eichstätt-Ingolstadt and Frankfurt am Main (Rosner et al. 2014). Eligible for the treatment study were adolescent subjects between 14 and 21 years, who were diagnosed with PTSD after CSA or childhood physical abuse (CPA). CSA was defined as the coercion of sexual activity onto a minor person by an older person (American Psychological Association 2001). CPA was defined as intentional injury of a child by a parent or caretaker by any action that leads to physical injury like striking, kicking, beating or biting (American Psychiatric Association 2013). Exclusion criteria were: a pervasive developmental disorder (e.g., autism), diagnosed intellectual disability (defined as IQ < 75), abuse only before

the age of three, withdrawal of the informed consent before randomization, inability to be fluent in German, unstable housing conditions, a lifetime diagnosis of schizophrenia, a schizo-affective disorder or bipolar disorder, a current diagnosis of substance dependence (full remission < 6 months), a suicidal attempt or life-threatening self-harming behavior within 6 months prior to admission to the study, or other current psychotherapy. Patients were recruited via flyers, newspapers, referrals from hospitals, private practitioners, and advertisement on several websites including the project's homepage. Data for the current study were collected from 43 patients who had reached a therapy phase, in which stuck-point lists could be derived from analyzing the written impact statements. The sample consisted of 88% ($n = 38$) female and 12% ($n = 5$) male patients. Mean age was 17.3 years (range 14–21 years). The study protocol was approved by the ethic committees of all three participating Universities.

Measures

Basic Documentation of Trauma Characteristics

One part of pre-therapy assessment was a study specific standardized questionnaire called "Basic Documentation of Trauma" in which diagnosticians documented characteristics of the traumatic events. Variables assessed were (separately for physical and sexual traumata): number of trauma clusters, number of perpetrators, age at the beginning of the trauma, duration of the trauma, number of assaults, time passed since the last assault, relationship to the perpetrator as well as injuries through physical violence and specific type of sexual assault (e.g., penetration).

Clinician Administered PTSD Scale, Children and Adolescent Version (CAPS-CA, IBS-KJ in German)

The German Version of the CAPS, the IBS-KJ, can be used to asses PTSD symptomatology and symptom severity according to the fourth edition of the Diagnostic and Statistical Manual of Mental Disorder (DSM-IV, American Psychiatric Association 2000). Both frequency and intensity scores of each symptom are obtained, resulting in a sum score for PTSD severity. The reliability and validity of the IBS-KJ diagnoses and severity scores are good (Steil and Füchsel 2006).

University of California Los Angeles PTSD Reaction Index (UCLA, German Version)

The UCLA PTSD Reaction Index is an instrument to assess post-traumatic stress symptoms and trauma exposure among children and adolescents. It contains three sections of which the first one is a screening for trauma exposure (section I), the second one is an evaluation of the A criterion for PTSD according to DSM-IV criteria (section II), and the third one is a 22-item assessment of symptom severity by frequency of individual symptoms (section III). The validity and reliability of the UCLA are well-documented (e.g., Elhai et al. 2013).

Beck Depression Inventory (BDI-II, German Version)

The BDI-II is a 21-item self-assessment instrument for the rating of current depressive symptoms (Beck et al. 1996). The BDI-II psychometric properties can be considered as good (Kühner et al. 2007).

Stuck-Point Logs

Stuck-point logs contain the patients' maladaptive beliefs that were identified within the therapeutic process. At the beginning of treatment, patients wrote an impact statement about the assumed reasons for the traumatic event and its impact on their life today in the thematic categories safety, trust, control, esteem and intimacy. In a next step, patients and therapists analyzed this impact statement and created a stuck-point log with the specific basic maladaptive beliefs of the patient (see Table 1 for examples).

Procedures

Copies of all stuck-point logs of the patients were obtained from the three study centers. A category system for the contents of the beliefs was developed and two independent evaluators, who were trained to a minimum of 80% agreement, assigned the stuck-points to the relevant categories using a detailed coding manual by Rabenau (2014). For additional guidance in the rating process, the procedure described by Sobel et al. (2009) was taken into account. A number of decision rules were established before and during the rater training. For example, if a sentence contained two different statements which clearly represented different stuck-points, these statements were separated and counted

Table 1 Examples of stuck-points

Category	Example
Safety	"The world is a cruel place."
Trust	"I can´t rely on anyone."
Control	"I have no influence over what is happening to me."
Esteem	"I am a bad person."
Intimacy	"If someone comes close, something bad will happen."
Guilt	"The rape wouldn´t have happened if I had behaved differently."

as two stuck-points. In accordance with Sobel et al. (2009) sentences that expressed feelings rather than thoughts were still counted as stuck-points, in case a belief could be derived from the statement (e.g., "I don´t feel safe." (feeling) was counted as "I believe I am not safe." (thought)).

The coding followed the general definition of stuck-points by Resick et al. (2008). Stuck-points are distorted cognitions, which often take the form of extreme statements like "The world is a bad place". Based on the CPT manual by Resick et al. (2014) specific thematic categories of stuck-points were analyzed; namely: safety, trust, control, esteem, intimacy, guilt, denial, and one category, which was named "irrelevant content" and served as a residual category for statements that did not contain any profound content (e.g., "Only Micky Mouse is my friend.").

If the two raters disagreed, a short discussion took place and a decision on the category was made. If discrepancies could not be resolved, the statement was coded "irrelevant". In both cases, the statement was counted as "no agreement" in the calculation of Cohen's Kappa. After the described training, the two coders reached a very good interrater agreement of 87% and a Cohen's Kappa of .84.

Statistical Analysis

Frequencies of stuck-points were determined for each thematic category and a mean value over all categories. Relationships between numbers of stuck-points overall and in specific categories and demographic and trauma-relevant measures, as well as relationships between stuck-point numbers overall and in specific categories and symptom severity were evaluated using Pearson correlations. We computed partial correlations to control for a confounding effect of PTSD symptom severity on stuck-point frequencies. Mean values of different subsamples were compared using non-paired t-tests and one-way analysis of variance (ANOVA). If the data did not meet the criteria of normality, non-parametric alternatives, i.e., Mann–Whitney-U Test and Kruskal–Wallis Test, were used. Despite multiple testing, we resigned to adjust the alpha level (5%), as our results are based on a small sample size and our study provides preliminary insights into a new topic.

Results

Sample Characteristics

The total sample comprised 43 patients. Further information on more detailed sample characteristics can be obtained from Table 2.

Stuck-Points

Participants' stuck-point lists contained on average $M = 11.8$ (SD 5.5) stuck-points. The most frequently named were in the categories esteem (18.6%), guilt (18.6%) and trust (12.5%). Denial occurred only twice (0.4%) and was therefore excluded from further analysis. Table 3 shows information about frequencies and means for stuck-points in the other categories.

Relationships Between Stuck-Points and Demographic and Trauma-Relevant Variables

Correlations between stuck-points and demographics as well as trauma-relevant variables controlled for the effect of PTSD symptom severity are presented in Table 4. We found a higher number of stuck-points overall to be significantly related to a longer duration of the index trauma ($r(41) = 0.364^*$, $p < .05$). Furthermore, the older the patients at trauma onset, the more guilt stuck-points they displayed ($r(41) = 0.390^*$, $p < .05$).

Patients with a history of physical abuse displayed significantly more stuck-points overall ($U = 50.5$, $p = .046$) and more stuck-points in the categories trust ($U = 25.0$, $p = .003$) and control ($U = 50.0$, $p = .046$) than patients without a history of physical abuse. Patients who experienced sexual abuse displayed more stuck-points in the categories safety ($U = 92.0$, $p = .005$) and guilt ($U = 114.0$, $p = .026$) compared to patients who did not experience sexual abuse. Female patients showed more stuck-points in the categories safety ($U = 46.4$, $p = .033$) and guilt ($U = 46.5$, $p = .033$) compared to male patients. Patients with sexual abuse, who experienced penetration, showed more stuck-points in the category guilt ($U = 110.0$, $p = .003$) than patients who did not experience penetration.

Furthermore, the average number of guilt stuck-points was significantly elevated for patients who had experienced the abuse with a perpetrator from their family in comparison to patients whose perpetrators were part of the social environment or complete strangers ($H(2) = 6.93$, $p = .03$).

The average number of trust stuck-points was significantly elevated for patients who had a severe injury in comparison to patients who had a slight injury or no injury at all from physical violence ($H(2) = 6.59$, $p = .04$).

Relationship Between Number of Stuck-Points and Psychopathology

Pearson correlations were conducted to examine the relationships between stuck-points and measures of psychopathology (see Table 5). Results show that patients with a higher number of stuck-points in the category trust displayed a higher PTSD symptom severity (IBS-KJ).

Table 2 Sample characteristics

Demographic variables	Mean	SD	Range
Age	17.3	2.3	14–21
Sex			
Male % (n)	12% (5)		
Female	88% (38)		
Age at trauma onset	10.1	5.09	1–18
Duration (index trauma)[a]	34.7	49.6	0–168
Frequency (index trauma)	135.8	258.4	0–1100
Number of trauma clusters[b]	4.7	3.4	1–15
	N		%
Physical abuse[c]	38		88,4
Sexual abuse[c]	31		72,1
Penetration	17		39.5
Injuries from physical abuse			
None	9		20.9
Light[d]	15		34.9
Severe[e]	19		44.2
Relationship with perpetrator			
Family[f]	18		41.9
Social environment	17		39.5
Stranger	6		14.0

SD standard deviation, *n* number of cases

[a]Duration in months

[b]Trauma clusters = sexual/physical abuse, natural disaster, war, medical treatment, accident, death of a relative, neglect

[c]Number of patients who experienced physical abuse/sexual abuse exclusively or in combination with other types of trauma

[d]Light = e.g., blue spots, scratch marks

[e]Severe = e.g., fracture, burns, contusion

[f]Family = also including extended family like uncles or step-parents

Table 3 Stuck-points in thematic categories

Stuck-point categories	N	%	M	SD
Safety	37	7.3	0.9	0.8
Trust	63	12.5	1.5	0.9
Control	40	7.9	0.9	1.1
Esteem	94	18.6	2.2	1.8
Intimacy	44	8.7	1.0	1.3
Guilt	94	18.6	2.2	1.6
Denial	2	0.4	0.1	0.2
Irrelevant content	132	26.1	3.7	2.7
Total	506	100	11.8	5.5

Discussion

The purpose of the current study was to offer first insights into the nature of maladaptive post-traumatic cognitions of adolescents who experienced interpersonal traumatization. To our knowledge, this is the first study examining the thematic content of maladaptive cognitions of adolescent survivors of interpersonal trauma. We explored the differences between the impact of sexual versus physical abuse on post-traumatic cognitions of adolescents.

The most crucial themes of the stuck-points were trust, esteem and guilt. The five themes proposed by McCann et al. (1988) and the themes guilt and denial (König 2012) covered the thematic content of stuck-points. There were no other statements in the residual category that indicated another significant theme. Stuck-points in the category of denial occurred only twice (e.g., "I am exaggerating, this was not a traumatic event."). This result may seem surprising in the first place. However, trauma survivors who deny the traumatic event usually don´t seek treatment and hence are not included in the sample.

Our results also indicated a relationship between the nature of the trauma and the importance of specific thematic categories. Physical abuse was related to a significantly higher number of stuck-points in the categories

Table 4 Partial pearson correlations between stuck-points and demographic and trauma-relevant variables controlled for PTSD symptom severity

Demographic/trauma-relevant variables	Total number of stuck-points	Safety	Trust	Control	Esteem	Intimacy	Guilt
Age at trauma onset	−0.035	0.245	−0.057	−0.029	−0.064	−0.202	0.390*
Duration	0.364*	−0.114	0.084	0.201	−0.077	0.205	−0.116
Frequency	−0.074	−0.261	−0.081	−0.067	−0.252	−0.132	−0.186
Number of trauma clusters	−0.048	0.081	−0.127	−0.093	0.347	−0.048	−0.073

* $p < .05$

Table 5 Pearson correlations between measures of psychopathology and number of stuck-points

Demographic/trauma-relevant variables	Total stuck-point number	Safety	Trust	Control	Esteem	Intimacy	Guilt
IBS-KJ	0.176	0.095	0.307*	0.043	0.074	0.130	0.160
UCLA	0.161	0.184	0.205	0.256	−0.023	0.183	0.183
BDI	0.198	0.171	0.107	0.268	0.271	0.149	0.172

* $p < .05$

of trust and control. It is not surprising that victims of physical abuse display difficulties related to trust and an increased need for control. Trust is defined as "a psychological state comprising the intention to accept vulnerability based on positive expectations of the intentions or behavior of another" (Rousseau et al. 1998). This positive expectation is shattered in victims of physical abuse. As the propensity to trust is influenced by learning (e.g., Simpson 2007) this negative experience will most likely lead towards difficulties to trust in the future. Furthermore, it seems likely that difficulties related to trust and relying on others can result in a heightened need for control. Physical abuse in children often happens within the context of a disciplinary interaction in which parents try to control their children's behavior using physical forms of punishment (e.g., Ateah and Durrant 2005; Kadushin et al. 1981). It seems likely that this extreme method to gain control over another person can lead to resistance in this person and a need to regain control.

Sexual abuse was related to significantly more stuck-points in the categories of guilt and safety. These results in the category of guilt are in line with previous studies on adult samples that found sexual abuse to be linked to feelings of guilt (i.e., Briere and Runtz 1988; Resick et al. 2002; Vaile Wright et al. 2010; Wenninger and Ehlers 1998), and safety (Vaile Wright et al. 2010; Wenninger and Ehlers 1998). One explanation for the emergence of feelings of guilt after sexual abuse could be the often held prejudice that victims of sexual abuse partly carry responsibility. Consequently, some victims of sexual abuse do not receive needed support while some even experience victim blaming (e.g., Ullmann and Peter-Hagene 2014). Furthermore, it seems likely that one would not feel safe in the absence of understanding and support. Those findings suggest that there is a differential cognitive impact of sexual abuse compared to physical abuse in adolescent survivors of interpersonal trauma.

Furthermore, injuries through physical violence and penetration in the case of sexual violence displayed significant relationships with stuck-points in the categories of trust and guilt, two categories that are most relevant to the specific type of abuse. This finding suggests that injuries and penetration are markers for the severity of the violence. The heightened number of guilt stuck-points matches other research results, i.e., penetration is associated with a heightened risk for dissociation and PTSD (Collin-Vézina and Hébert 2005; Owens and Chard 2001). In contrast to Owens and Chard (2001), we did not find penetration to be associated to trust and power. Possible reasons for this discrepancy could be that Owens and Chard (2001) used questionnaire data and examined an adult sample. In addition, their sample size was larger than that of the current study. However, penetration seems to play a crucial role, as it was related to more post-traumatic cognitive distortions in general.

Female patients reported more "guilt" stuck-points than did male patients. However, the finding about the sex difference should be interpreted cautiously, as our sample included only five male patients. Nevertheless, it should be mentioned, since it is in line with several other studies and thus seems to be a robust effect (e.g., Tolin and Foa 2006). Furthermore, the older the patients were at trauma onset and the closer the perpetrator was, the more guilt stuck-points they displayed. These findings partly agree with former research. Wenninger and Ehlers (1998) found a significant relationship between depression symptoms and a closer relationship to the perpetrator. Tyler (2002) reported mixed findings on that relationship in her review. The relationship between age at trauma onset and the number of guilt cognitions seems partly surprising, as most former studies

reported no significant relationship between age at trauma onset and any trauma outcome (Hagenaars et al. 2011; Tyler 2002). Only Ackerman et al. (1998) found a significant negative relationship between age at onset and number of diagnoses in a sample of children who experienced sexual and physical abuse, indicating that the younger the children were when the assault began the higher the subsequent psychological distress they displayed. Our present result suggests that older children display more distorted cognitions about guilt. One possible explanation for those mixed results may be that age at trauma onset was examined in combination with different outcome variables. Furthermore, we know from clinical experience that adolescents who experienced abuse at an older age, feel guilty for not having defended themselves, whereas adolescents who experienced abuse as young children usually understand that they could not have defended themselves.

The number of stuck-points overall was related to a longer duration of the index trauma and physical abuse. Former studies presented mixed results concerning the relationship between duration of the abuse and PTSD symptom severity. Tyler (2002) for example reported no significant association in children with a history of sexual abuse, whereas Wolfe et al. (1994) did find a significant relationship in a sample of children who experienced sexual abuse. The association between the number of stuck-points and physical abuse compared to sexual abuse seems somewhat surprising, as two other studies found that sexual violence compared to other trauma was associated with a higher risk for mental health issues (Kelley et al. 2009; Vaile-Wright et al. 2010). However, Kelley et al. (2009) did not include victims of physical abuse in their comparison and Vaile-Wright et al. (2010) compared mixed sexual- and non-sexual trauma groups. Based on these findings, one cannot conclude that sexual trauma is associated with a higher risk for psychopathology. More in line with the present result is a study by Ackerman et al. (1998) who found combined sexual and physical abuse and physical abuse only to involve a higher risk for PTSD compared to sexual abuse only.

One last important finding is that a higher number of trust stuck-points was related to higher PTSD symptom severity. Wenninger and Ehlers (1998) reported a significant relationship between trust, power, esteem and intimacy and PTSD symptom severity in adults. In addition, Owens and Chard (2001) found all subscales from the PBRS and the worthiness of the self-scale from the WAS to be related to symptom severity, and trust displayed the second strongest correlation. The results of our study are not completely identical with these results. However, one has to bear in mind that we examined an adolescent sample and we used qualitative data instead of questionnaire data. Furthermore, cognitions were categorized differently compared to the studies of Owens and Chard (2001) and Wenninger and Ehlers (1998). Still, trust stuck-points seem to play a crucial role in association to PTSD symptom severity.

In contrast to former studies, we did not find a significant relationship between the number of stuck-points overall and PTSD symptom severity (Dunmore et al. 1999; Owens and Chard 2001; Owens et al. 2008; Sobel et al. 2009; Vaile Wright et al. 2010; Wenninger and Ehlers 1998). This could be due to the different assessment of cognitive distortions as well as a set of limitations that are discussed below.

Our study is the first to provide an insight into maladaptive post-traumatic cognitions of adolescents with a history of interpersonal traumatization. Our findings provide preliminary evidence for the importance of the stuck-point categories of esteem, guilt and trust. We found associations between the nature of the trauma, a number of objective trauma characteristics, and specific thematic categories of stuck-points. Current findings are useful for future individual treatment planning as therapists can anticipate specific cognitive distortions and address them directly in therapy. Furthermore, our findings on trust may be relevant to the mindful creation of a stable therapeutic relationship.

Nevertheless, we would like to address a set of limitations. First, as we used original therapy material, stuck-point numbers may have been influenced by distracting variables. For example, the number of stuck-points could vary depending on the individual therapeutic styles, the patients' cognitive abilities, and verbal fluency. This fact, along with a lack of statistical power due to a limited sample size, could explain why we did not replicate the relationship between PTSD symptom severity and cognitive distortions in general. Furthermore, the application of qualitative material restricted the quantitative analyses we could conduct. In addition, it should be mentioned that only two results in our correlational analysis were significant, which could be due to chance. Thus, all findings presented in this article should be understood as preliminary. Yet, they present an encouraging first step to a better understanding of maladaptive post-traumatic cognitions in adolescents, the central factor in the development of PTSD. Another limitation involves the presetting of the development of the stuck-point lists. The themes proposed by McCann et al. (1988) and the theme of guilt were addressed directly in the instructions on how to write the impact statements. Patients may have felt restricted to write down thoughts that fell into these themes. However, sentences with content other than maladaptive beliefs indicated that patients may have written down other cognitions, too. Referring to the generalizability of our results, we are aware that all studies mentioned were conducted in Western societies and results cannot be generalized to other societies.

Future studies that address maladaptive post-traumatic beliefs of adolescents with interpersonal traumatization should use a combination of qualitative and quantitative data to broaden the possibilities of data analysis and subsequent

interpretation. For example, a standardized measure like the Personal Beliefs and Reactions Scale (PBRS) that measures cognitions in the five areas proposed by McCann et al. (Mechanic and Resick 1993) or the World Assumptions Scale (WAS) designed by Janoff-Bulmann (1989), along with the stuck-point logs to assess possible discrepancies between the different methods. Furthermore, it would be useful to examine the different stuck-point categories and their relation to outcome measures and symptom reduction after the completion of treatment. It is possible that certain highly relevant thematic categories have a stronger relationship to symptom reduction than others. Experimental paradigms like the Stroop task could be used to assess the cognitive interference through stuck-points. It would be interesting to investigate whether the cognitive distortions concerning the typical stuck-point themes are also reflected in an attentional bias.

Taken together, our study is the first to provide insight into the nature of maladaptive post-traumatic cognitions in a sample of interpersonally traumatized adolescents—a population that has been largely neglected in PTSD research. Our findings contribute to a better understanding of this population and encourage a focus on typical stuck-point themes in individual treatment planning.

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Data Availability The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

Compliance with Ethical Standards

Conflict of interest Janina Botsford, Maja Steinbrink, Eline Rimane, Rita Rosner, Regina Steil and Babette Renneberg declare that they have no conflict of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. For this type of study formal consent is not required.

Informed Consent Informed consent was obtained from all individual participants included in the study.

Animal Rights This article does not contain any studies with animals performed by any of the authors.

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