Interpersonal trauma and associated psychopathology in girls and boys living in residential care

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A B S T R A C T

Out-of-home placement in e.g. residential care is the most common intervention for children and adolescents at risk and studies have shown that this population exhibits high prevalence rates of traumatic events. Associations with specific psychopathology need to be studied in order to sensitize caregivers to the specific needs of this population. The present study aimed to assess the relationship between interpersonal traumatic experiences and specific psychopathological symptoms in a high-risk population of girls and boys living in youth welfare institutions in residential care. 370 adolescents living in 64 different Swiss institutions and their professional caregivers filled out questionnaires on traumatic experiences and psychopathology and took part in structured clinical interviews. They were grouped in 3 different subgroups: no interpersonal trauma, single interpersonal trauma and multiple interpersonal trauma, i.e. interpersonal trauma in two or more domains. Furthermore, associations between the identity of the perpetrator (if the perpetrator was known vs. unknown to the victim) and psychopathology were examined. One third of participants reported multiple interpersonal trauma with female adolescents being more often affected. Multiple interpersonal trauma was associated with more internalizing and externalizing symptoms, but this association was only found with self-reported psychopathology. Male adolescents with multiple interpersonal trauma seemed to be more vulnerable to substance use and affective disorders, while female adolescents with multiple interpersonal trauma tended to have disorders of attention, activity and conduct disorders. Interpersonal trauma (compared to no interpersonal trauma) was not associated with higher rates of PTSD. Furthermore, associations between interpersonal trauma and psychopathology were stronger when the perpetrator was known to the victim.
Our results suggest that interpersonal trauma, especially multiple interpersonal trauma, seem to be associated with mental health problems beyond the symptoms of PTSD in this high-risk population. Concepts of residential care institutions should contain trauma-sensitive care and include psychiatric liaison services in order to take into account the specific needs of adolescents in residential care.

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1. Introduction

Exposure to potentially traumatic events during childhood seem to influence the development of children to a substantial degree as they are strongly associated with mental disorders across the whole lifespan (Briggs-Gowan et al., 2010; Carey, Walker, Rossouw, Seedat, & Stein, 2008; Chu, Williams, Harris, Bryant, & Gatt, 2013; Ford, Elhai, Connor, & Frueh, 2010; Hetzel-Riggin & Roby, 2013; Milot, Ethier, St-Laurent, & Provost, 2010; Schmid, Petermann, & Fegert, 2013). A recent meta-analysis revealed an average prevalence rate of posttraumatic stress disorder (PTSD) of 15.9% in trauma-exposed children and adolescents, with girls exposed to interpersonal trauma being most at risk (32.9%) (Alisic et al., 2014). However, various studies have shown that the potential mental health consequences of traumatic life events are much broader than PTSD-criteria, especially the sequelae for interpersonal traumatic events (Cloitre et al., 2009; Copeland, Keeler, Angold, & Costello, 2007; Greeson et al., 2013; Keyes et al., 2012; Leenarts et al., 2013; Moffitt & The Klaus-Grawe 2012 Think Tank, 2013). Moreover, a body of knowledge states that recurrence of interpersonal traumatic experiences (compared to singular traumatic experiences) affects mental health more strongly (Cloitre et al., 2009; Ford et al., 2010; Teicher & Samson, 2014). Greeson et al. (2011) examined 2,251 children and adolescents in the child welfare system (aged on average 9.5 years) who had experienced at least one recorded traumatic event. At the time of the study, 54.1% of the sample was residing in out-of-home care. It was shown that children and adolescents with multiple trauma histories (reporting traumata of at least two different domains) were more

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at risk for internalizing symptomatology, posttraumatic stress and having at least one clinical diagnosis than those without these histories. This risk was higher for girls and older youth and those currently residing in foster care (Greeson et al., 2011).

Because placement in foster or residential care is the most common intervention for children and adolescents at risk, it is not surprising that this population exhibits high prevalence rates of traumatic events (Ford et al., 2010; Greeson et al., 2011; Leenarts et al., 2013). In a recent study in children and adolescents in residential care in Switzerland, as many as 80% of study participants were reported to have had at least one traumatic experience, and 65% were reported to have had two or more traumatic experiences (Schmid et al., 2013). It has been shown that the trauma sequelae in this population lead to instability in care since emotional and behavioral problems in adolescents in residential care provoke a more frequent change of the institution when compared to adolescents without these problems (Aarons et al., 2010). The report by the German Ministry of Family Affairs therefore stressed the need for trauma-sensitive care and trauma-specific pedagogic interventions for traumatized children and their specific needs in the foster and residential care setting (Fegert & Besier, 2009, 2010; Schmid et al., 2013). Accordingly, studies that describe specific trauma sequelae in these patients are clearly needed in order to sensitize caregivers. Since many institutions work gender-specifically, specific trauma sequelae should be studied in boys and girls separately. This may help to increase care stability in residential care settings.

This study therefore aims to evaluate the specific trauma sequelae in a population of girls and boys in residential care in youth welfare institutions.

Apart from the fact that the population of children and adolescents living in residential care is not well studied yet, there is another limitation of recent research: the identity of perpetrators responsible for interpersonal trauma has only rarely been assessed. Freyd's (1996) 'betrayal trauma theory' is based on post-traumatic outcomes if the perpetrator was a caregiver. Such forms of trauma are particularly detrimental because they involve the loss of confidence in a person of trust. Freyd (1996) concluded that the outcomes of betrayal trauma are more severe than those of non-betrayal trauma, which has also been demonstrated in a previous study with college students (Kelley, Weathers, Mason, & Pruneau, 2012). Freyd's theory is further supported by the occurrence of insecure attachment in abused and neglected children (Muller, Sicoli, & Lemieux, 2000). It can be assumed that adolescents in youth welfare institutions exhibit not only high prevalence rates of traumatic experiences in general, but more specifically also high prevalence rates of betrayal trauma, since out-of-home placement often occurs due to abuse or neglect by caregivers (Schmid et al., 2013). Accordingly, the influence of perpetrator identity on posttraumatic outcomes in this population needs to be studied.

The present study aimed to assess the prevalence of different interpersonal trauma experiences (single vs. multiple) and the specific associated psychopathological symptoms in adolescents living in residential care in youth welfare institutions. To our knowledge, this is the first study which evaluates different trauma types and their associations with psychopathology in this high-risk population and further in girls and boys separately. We analyzed the relationship between different interpersonal traumatic experiences (i.e. no interpersonal trauma vs. single trauma vs. multiple trauma, such as trauma experiences in two or more domains according to Kisiel, Fehrenbach, Small, & Lyons, 2009), and psychopathological symptoms. We focused on professional caregiver-reported and self-reported psychopathology as well as clinician-rated diagnoses in order to further take into account psychopathology with clinical distress and impairment. The following questions were of interest:

- How do adolescents with or without a history of interpersonal trauma differ in terms of professional caregiver-reported and self-reported internalizing and externalizing psychopathology? And how do these groups differ in boys and girls separately?

- Within the group of adolescents with a history of interpersonal trauma, how do adolescents who had experienced multiple trauma differ from those who had experienced single trauma in terms of caregiver-reported and self-reported internalizing and externalizing psychopathology? And how do these groups differ in boys and girls separately?
- How do the groups (with vs. without a history of interpersonal trauma and with multiple trauma experience vs. single trauma experience) differ in terms of frequency of diagnoses according to DSM-IV-TR and corresponding comorbidity? How do these groups differ regarding diagnoses in girls and boys separately?

In sum, we expect adolescents with a history of interpersonal trauma to exhibit more internalizing as well as externalizing psychopathology compared to adolescents without a history of interpersonal trauma. Within the group of adolescents affected by interpersonal trauma, we expect those with a history of multiple interpersonal trauma to be more affected by internalizing and externalizing psychopathology compared to adolescents with a history of a single interpersonal trauma. Specific associations within gender are analyzed in exploratory analyses.

Another study aim of interest was to determine the influence of the identity of the perpetrator on psychopathological symptoms, since this association has not yet been examined in recent research in the population of adolescents in youth welfare institutions. We examined the prevalence of interpersonal trauma inflicted by a familiar person (i.e. a person well known to the adolescent), compared to interpersonal trauma caused by an unknown person, and the corresponding associations with internalizing and externalizing psychopathology, and the frequency of diagnoses.

2. Methods

2.1. Study population

Our study sample stems from 592 adolescents living in Swiss youth welfare institutions in residential care, who participated in a longitudinal study. From the whole sample, $n = 100$ had to be excluded because they did not fulfill inclusion criteria (see study design) and $n = 122$ had further to be excluded due to missing data in the ETI-KJ, the questionnaire which was indispensable for the allocation of the different trauma-groups (for description see below). This resulted in a final sample of 370 adolescents. The sample consisted of 65.9% ($n = 244$) males and had a mean age of 15.72 years (range between 11 and 18 years, $SD = 1.79$). Institutionalization of children and adolescents in residential care occurs for three possible reasons in Switzerland: child protection (by civil law), delinquency (by penal law) or due to other reasons (e.g. by their own choice). Overall, 62.8.% ($n = 218$) of adolescents were institutionalized by civil law and 18.7% ($n = 65$) after conviction/by penal law, while 18.4% ($n = 64$) were in residential care for other reasons (e.g. their own choice). Most (78.9%; $n = 292$) adolescents were born in Switzerland. Before their institutionalization, 59.5% ($n = 217$) of participants had lived at home with their parents, 20% ($n = 73$) had lived in another institution, 6% ($n = 22$) had been in psychiatric hospitals, and 6.8% ($n = 25$) had lived in foster care. The remaining participants had lived with relatives/acquaintances or in their own flat, while some had been placed in investigative custody. Most adolescents grew up with both parents (43.3%; $n = 158$) or with their mother (38.1%; $n = 139$). Only few grew up with their father (4.7%; $n = 17$), with relatives/acquaintances (4.9%; $n = 18$), or in foster families (2.7%; $n = 10$). Regarding these variables, we had missing data up to $n = 23$ adolescents (reasons for institutionalization).

2.2. Measures

We obtained the data by structured clinical interviews and standardized questionnaires. Questionnaires were computer-based, except the *Essen Trauma-Inventory* (ETI-KJ, Tagay et al., 2007, for description see

below). The original content of the questionnaires was not altered during the converting procedure, and the computerized versions were comparable with the paper-pencil versions with respect to their validity (Carlbring et al., 2007). The data analyzed in the present study originated from the first assessment point of a longitudinal study (see study design).

2.2.1. Traumatic experiences

Traumatic experiences and PTSD symptoms were assessed with the ETI-KJ (Tagay et al., 2007). Participants were presented with a list of potentially traumatic experiences (e.g. natural disasters, severe accidents, severe illness, assault, death of significant others, sexual abuse, or neglect) and were asked if they ever experienced any of these situations personally, as a witness, or both. With respect to interpersonal trauma, participants were asked if they knew the offender (e.g. family members) or not. PTSD symptoms following the worst experience as perceived by the participant were rated on a 4-point Likert scale ranging from 0 (not at all) to 3 (very often). However, in this study only the first part of the ETI-KJ was analyzed (traumatic experiences). The ETI-KJ has been shown to possess good psychometric properties for the symptom scales (Tagay et al., 2011).

Subgroups of trauma types were created according to the ETI-KJ. These were 'no interpersonal trauma', 'single interpersonal trauma', and 'multiple interpersonal trauma'. Multiple interpersonal trauma was defined as interpersonal trauma experienced in two or more domains (sexual abuse, physical abuse, emotional abuse, neglect, or domestic violence; Kisiel et al., 2009). Single interpersonal trauma was defined as interpersonal trauma experienced in one domain only. No interpersonal trauma was defined as having no experience with interpersonal trauma (experiences in other domains cannot be ruled out, e.g. disease, natural disaster, accident).

2.2.2. Internalizing and externalizing psychopathology and diagnoses

Psychopathological symptoms as reported by the responsible professional caregiver (residential staff) were assessed with the Child Behavior Checklist (age range 4–18 years). For the symptoms reported by the adolescents themselves, we used the Youth Self Report (age range 11–18 years; CBCL/YSR; Arbeitsgruppe Deutsche Child Behavior Checklist, 1998). This well-established, 118-item screening instrument evaluates behavioral, emotional, and social problems experienced within the last six months. In the present study, questions referred to the last three months. Answers were coded on a 3-point scale ranging from 0 (not true) to 2 (true very often). The cutoff of $T \geq 60$ is generally accepted as suitable for differentiating between clinically relevant symptoms and subclinical/non-clinical symptoms (Schmeck et al., 2001). The German version of the CBCL has shown acceptable or good internal consistency for most of the scales with Cronbach's alpha ranging from 0.53 to 0.94 in a clinical sample (four separate analyses for 4–11 and 12–18 year old girls and boys; Döpfner, Schmeck, Berner, Lehmkuhl, & Poustka, 1994). The German version of the YSR has also shown acceptable to good internal consistency for most of the scales with Cronbach's alpha ranging from 0.56 to 0.92 in a clinical sample (two separate analyses for girls and boys; Döpfner, Berner, & Lehmkuhl, 1995). Internal consistency in our study sample ranged between 0.65 and 0.90 for the CBCL subscales (withdrawn/depressed, somatic complaints, anxious/depressed, social problems, attention problems, rule-breaking behavior, aggressive behavior), between 0.87 and 0.94 for the CBCL broadband scales (internalizing vs. externalizing), between 0.65 and 0.87 for the YSR subscales and between 0.88 and 0.94 for the YSR broadband scales.

To diagnose mental disorders, we used the Kiddie Schedule for Affective Disorders and Schizophrenia (K-SADS PL; German version by Delmo, Delmo, Weiffenbach, Gabriel, & Poustka, 2000), a structured clinical interview conducted by trained psychologists. Both the responsible professional caregiver and the child/adolescent were interviewed. The K-SADS captures past and present affective disorders, anxiety disorders, psychotic disorders, behavioral disorders, and substance abuse or other disorders (e.g. eating disorders) according to the corresponding

DSM-IV diagnostic criteria (APA - American Psychiatric Association, 2013). Analyses of psychometric properties of the original version of the K-SADS revealed good convergent validity (Lauth et al., 2010).

2.3. Study design

In this descriptive, cross-sectional study, we analyzed a subset of adolescents living in 64 different residential care institutions in Switzerland, who had participated in a longitudinal study. Inclusion criteria were age between 11 and 18 years and complete data on traumatic events (ETI-KJ), since this was indispensable for the allocation to the different trauma types. The study was funded by the Swiss Federal Office of Justice and took place between 2007 and 2011. The primary study aim was to describe the population of adolescents living in residential care (epidemiological study) and to evaluate treatment strategies in Swiss residential care facilities. In the first step, residential care institutions were recruited, and in the second step, within the institution, the study participants were recruited. Participants as well as their parents (when aged <18 years) provided written consent. Participants and their professional caregivers filled out computer-based questionnaires on psychopathological symptoms, psychopathic traits, delinquency, substance use, traumatic life events, personality, quality of life, and attainment of goals at two different assessment points. Furthermore, structured clinical interviews to diagnose mental disorders were conducted. The Ethical Committees of Basel and Ulm reviewed the study design.

2.4. Statistical analyses

Correlates (gender, age, biographical characteristics) of traumatic experiences across subgroups (no interpersonal trauma, single trauma, multiple interpersonal trauma) and potential differences were assessed by means of Pearson's chi-square tests for categorical data and analysis of variance (ANOVA) followed by Scheffé tests for dimensional data.

For the main analysis, one-way analysis of variance (ANOVA) for dimensional data was conducted with the trauma-type subgroup as a factor and all subscales of CBCL and YSR as dependent variables. In the first step, the data were checked for distribution (e.g. homoscedasticity) and outliers (Tabachnick & Fidell, 2007). Two dependent variables (the YSR subscales 'withdrawn/depressed' and 'somatic complaint') had to be transformed (square-root), and outliers disappeared subsequently. In order to assess differences between the trauma subgroups, specific contrasts were conducted. Participants with no history of interpersonal trauma were compared with participants with any history of interpersonal trauma (single or multiple), and in the second step, participants with a history of single interpersonal trauma were compared with participants with a history of multiple interpersonal trauma. The set of contrasts met the conditions of orthogonality. Since we conducted multiple analyses for all subscales of CBCL and YSR, we adjusted p-values according to the procedure of Holm within assessments by caregivers as well as within self-report questionnaires to avoid inflated type I errors (Holm, 1979). We conducted separate analyses for girls and boys, again with adjusted p-values, since our study aim is to outline the specific psychopathological symptoms in girls and boys. Effect sizes were calculated according to Cohen's d. Furthermore, the frequency of diagnoses across different trauma types assessed by psychologists was analyzed with Pearson's chi-square test for categorical data. Corresponding effect sizes were calculated with Cramer's V. Since the prevalences of some mental disorders (e.g. schizophrenia) were rather low, and to avoid inflated alpha levels, we classified different mental disorders into six groups, i.e. substance use disorders, psychotic disorders, affective disorders, anxiety disorders, eating disorders, disorders of attention and activity, and conduct disorders. PTSD was tested separately because of its etiological association with traumatic events. However, we did not calculate adjusted alpha levels due to the rather low subgroups

(resulting in a power problem). Analyses were conducted for female and male adolescents separately.

Further, we examined the differences in scores of the CBCL and YSR between adolescents traumatized by a known perpetrator and those traumatized by an unknown perpetrator (single trauma as well as multiple trauma) by means of t-tests and Cohen's d. The frequency of diagnoses across the two groups was assessed by means of Pearson's chi-square test. Alpha levels were not adjusted due to the rather small subgroups (resulting in a power problem). We conducted analyses only for boys since the sample sizes for girls were too small (below 10).

Individuals with missing data were compared to individuals who completed the questionnaires of dependent variables (CBCL, YSR) in terms of sociodemographic data and traumatic experiences by means of Pearson's chi-square tests for categorical data and the Mann-Whitney-U Test for metric data, because of small sample size in one subgroup (below 20). Further, we analyzed the subsample of $n = 122$ we had to exclude before running analyses due to missing data in the ETI-KJ. We compared them to adolescents who filled out the ETI-KJ regarding sociodemographic data, reasons for institutionalization and psychopathology by means of t-test and Pearson's chi-square tests for categorical data.

Statistical analyses were conducted using IBM SPSS Statistics version 19.0 (IBM Corp, 2010), and all alpha levels (if not adjusted) were set at 0.05.

3. Results

3.1. Missing data

Overall, 68 participants had missing data regarding caregiver report (CBCL) and 68 participants had missing data regarding the self-report (YSR). However, $n = 54$ in the subsample of adolescents with missing data in the CBCL and $n = 55$ in the subsample of adolescents with missing data in the YSR fulfilled the adult versions of the Achenbach scales since they had turned 18 years during the follow-up of the study. They are subsequently suspended from the following missing data analyses, since they are missing due to methodolocial reasons. This resulted in a total of $n = 14$ adolescents with missing data in the CBCL and $n = 13$ adolescents with missing data in the YSR.

Adolescents with missing data in the CBCL and YSR (each $M = 16.75$) were significantly older than adolescents with complete data (each $M = 15.42$; CBCL: $U = 1369.50$, $z = -2.23$, $p = 0.026$; YSR: $U = 1076.00$, $z = -2.76$, $p = 0.006$), but other sociodemographic data or biographical characteristics were similar. Regarding trauma types, no significant differences were seen. Regarding the subsample we had to exclude before running analyses due to missing data in the ETI-KJ ($n = 122$) we found several significant differences: adolescents with missing data in the ETI-KJ were significantly older ($t[490] = 2.28$, $p = 0.023$), were more likely to be institutionalized for penalty reasons ($\chi^2[2] = 7.5$, $p = 0.024$) and had significantly higher values on the externalizing subscale of the CBCL ($t[387] = 2.54$, $p = 0.011$) and YSR ($t[378] = 2.97$, $p = 0.003$) compared to adolescents without missing data in the ETI-KJ.

3.2. Prevalence of traumatic experiences

Of the whole sample, 80.3% reported different traumatic experiences ($n = 297$) (see Table 1). Regarding interpersonal trauma, 55.7% ($n = 206$) reported at least one interpersonal traumatic experience (29.2%[$n = 108$] reported multiple interpersonal trauma; 26.5% [$n = 98$] reported single interpersonal trauma), and only 43.4% [$n = 164$] reported no interpersonal trauma.

Table 1
Traumatic experiences (ETI-KJ, $N = 370$).

	n	%
Death of an important attachment figure ($N = 370$)	160	43.2
Violent assault by a family member or a person from the circle of acquaintances ($N = 370$)[b]	111	30.0
Violent assault by a strange person ($N = 369$[a])[b]	109	29.5
Serious disease ($N = 370$)	105	28.4
Serious accident, fire or explosion ($N = 370$)	101	27.3
Neglect ($N = 370$)[b]	84	22.7
Natural disaster ($N = 368$[a])	67	18.2
Captivity ($N = 370$)	59	15.9
Sexual abuse by a strange person during childhood/youth ($N = 369$[a])[b]	38	10.3
Sexual abuse by a family member or a person from the circle of acquaintances during childhood/youth ($N = 370$)[b]	27	7.3
Combat mission or stay in a war zone ($N = 307$[a])	8	2.6
Torture ($N = 369$[a])	8	2.2
Sexual abuse by a strange person during adulthood ($N = 308$[a])[b]	5	1.6
Sexual abuse by a family member or a person from the circle of acquaintances during adulthood ($N = 308$[a])[b]	3	1.0
Other ($N = 370$)	99	26.8
Any ($N = 370$)	297	80.3

[a] Missing data in this item.
[b] Interpersonal traumatic experiences.

3.3. Correlates of interpersonal trauma

Adolescents affected by multiple interpersonal trauma were more likely to be female ($\chi^2[2] = 17.54$, $p < 0.001$) and were significantly older than adolescents who did not report multiple interpersonal trauma ($F[2] = 8.74$, $p < 0.001$). Furthermore, adolescents affected by multiple interpersonal trauma were less likely to have lived with their parents or relatives/acquaintances and were thus more likely to have lived in another welfare institution before their current institutionalization ($\chi^2 = 27.95$, $p = 0.032$). Adolescents with or without a history of single or multiple interpersonal trauma did not differ with respect to the reason for their institutionalization ($\chi^2[4] = 6.32$, $p = 0.176$).

3.4. Interpersonal trauma and associated internalizing and externalizing psychopathology

As shown in Table 2, T-values of the CBCL or the YSR were often above the clinically relevant cutoff of $T = 60$, especially in the group of adolescents affected by interpersonal trauma. Table 2 further presents the differences in psychopathology between adolescents with the various histories of interpersonal trauma and no interpersonal trauma. After the Holms procedure, only a few differences remained significant. Adolescents with multiple interpersonal trauma reached higher values in the caregiver report (CBCL) on the subscale 'thought problems' compared to adolescents with single interpersonal trauma. Moreover, adolescents with any interpersonal trauma (single or multiple) achieved higher values on the CBCL subscale 'rule-breaking behavior' compared to adolescents with no interpersonal trauma. Furthermore, adolescents with any interpersonal trauma achieved higher values on the YSR subscales 'somatic complaints', 'rule-breaking', and 'aggressive behavior' compared to adolescents without any interpersonal trauma. Among the traumatized adolescents, those with multiple trauma reached higher values on the YSR subscales 'somatic complaints', 'anxious-depressed', 'thought problems', 'rule-breaking', and 'aggressive behavior' than those with single trauma.

3.5. Interpersonal trauma and associated internalizing and externalizing psychopathology in girls and boys

When analyzing male and female adolescents separately, male adolescents with a history of any interpersonal trauma had higher self-reported (YSR) values on the subscales 'somatic complaints' as well as

Table 2
Psychopathological profiles across different trauma types in adolescents.

	No interpersonal trauma ($nCBCL = 136$, $nYSR = 139$)			Single interpersonal trauma ($nCBCL = 79$, $nYSR = 78$)			Multiple interpersonal trauma ($nCBCL = 87$, $nYSR = 85$)
	M (SD)	p^a	d	M (SD)	p^b	d	M (SD)
CBCL Withdrawn/Depressed	60.51 (8.22)	0.124	0.14	60.59 (8.54)	0.056	0.24	62.69 (8.78)
Somatic complaints	57.06 (7.95)	0.005*	0.30	59.04 (9.06)	0.218	0.12	60.05 (8.21)
Anxious/Depressed	61.72 (8.74)	0.034*	0.22	62.82 (8.90)	0.120	0.18	64.48 (9.77)
Social problems	62.29 (9.29)	0.455	0.02	61.76 (8.51)	0.179	0.15	63.07 (9.45)
Thought problems	63.80 (9.66)	0.308	0.07	62.06 (10.22)	0.001***	0.47	66.68 (9.61)
Attention problems	62.46 (7.40)	0.243	0.08	62.46 (7.78)	0.170	0.15	63.75 (9.60)
Rule-breaking behavior	62.29 (8.78)	<0.001***	0.40	64.08 (8.78)	0.008*	0.38	67.40 (8.77)
Aggressive behavior	62.12 (10.08)	0.021*	0.24	63.61 (10.19)	0.111	0.18	65.61 (11.46)
YSR Withdrawn/Depressed	58.60 (7.94)	0.072	0.18	58.62 (9.67)	0.012*	0.32	61.61 (9.19)
Somatic complaints	56.88 (7.00)	<0.001***	0.54	59.51 (9.73)	0.002***	0.40	63.28 (9.15)
Anxious/Depressed	58.05 (7.70)	0.004*	0.31	58.51 (8.40)	0.002***	0.46	62.96 (10.59)
Social problems	58.55 (8.49)	0.315	0.05	57.23 (7.25)	0.090	0.22	58.96 (8.57)
Thought problems	63.57 (8.99)	0.022*	0.24	63.45 (8.62)	<0.001***	0.48	68.02 (10.27)
Attention problems	58.92 (8.09)	0.035*	0.21	59.14 (8.77)	0.015*	0.34	62.36 (10.08)
Rule-breaking behavior	60.69 (8.76)	<0.001***	0.56	63.59 (10.00)	<0.001***	0.48	68.35 (9.89)
Aggressive behavior	58.62 (8.23)	0.003***	0.32	59.10 (8.54)	<0.001***	0.51	63.53 (8.87)

* $p < 0.05$.
*** $p <$ adjusted Alpha-level according to the procedure of Holm.
a Differences between adolescents with no interpersonal trauma and adolescents with interpersonal trauma (single and multiple).
b Differences between adolescents with single interpersonal trauma and adolescents with multiple trauma.

'rule-breaking behavior', compared to male adolescents without any history of interpersonal trauma. Traumatized male adolescents with multiple interpersonal trauma had higher caregiver reported (CBCL) values on the subscale 'thought problems'. Female adolescents with a history of any interpersonal trauma had higher YSR values for rule-breaking behavior compared to female adolescents without any history of interpersonal trauma. Traumatized girls with multiple interpersonal trauma reported higher somatic complaints. Results are displayed in Tables 3 and 4 for male and female adolescents separately.

3.6. Interpersonal trauma and frequency of diagnoses

Of the whole sample, the majority fulfilled diagnostic criteria for any mental disorder (73.1%). Adolescents with a history of multiple interpersonal trauma were more likely to suffer from a mental disorder ($\chi^2[2] = 7.71$, $p = 0.021$, Cramer's $V = 0.145$) especially comorbid conditions (three to five different mental disorders) ($\chi^2[8] = 20.77$; $p = 0.008$, Cramer's $V = 0.196$) compared to adolescents with no interpersonal trauma or single interpersonal trauma. Further, they seemed to be more prone to substance use disorders ($\chi^2[2] = 16.92$; $p < 0.001$, Cramer's $V = 0.215$) compared to adolescents without or with single interpersonal trauma. However, only boys with multiple interpersonal trauma seemed to be more vulnerable to substance use disorders ($\chi^2[2] = 15.66$; $p < 0.001$, Cramer's $V = 0.255$) compared to adolescents without or with single interpersonal trauma, whereas no significant differences were seen in girls across the different subgroups (multiple interpersonal trauma vs. single interpersonal trauma vs. no interpersonal trauma) ($\chi^2[2] = 4.69$; $p = 0.096$, Cramer's $V = 0.195$). Moreover, adolescents with a history of multiple interpersonal trauma seemed to be more prone to affective disorders ($\chi^2[2] = 10.69$; $p = 0.005$, Cramer's $V = 0.171$) compared to adolescents without or with single interpersonal trauma, especially in the male sample ($\chi^2[2] = 13.32$; $p = 0.001$, Cramer's $V = 0.265$). No significant differences regarding affective disorders in female adolescents were found across the different subgroups ($\chi^2[2] = 0.22$; $p = 0.898$, Cramer's $V = 0.042$). Additionally, disorders of attention and activity as well as conduct disorders were more frequent in adolescents with multiple trauma than those without trauma ($\chi^2[2] = 8.05$; $p = 0.018$, Cramer's $V = 0.149$), especially in girls ($\chi^2[2] = 6.85$; $p = 0.033$, Cramer's $V = 0.235$). No significant differences across the trauma types were found in boys ($\chi^2[2] = 4.47$; $p = 0.107$, Cramer's $V = 0.136$).

Regarding PTSD, 4.9% ($n = 18$) fulfilled diagnostic criteria. PTSD-diagnosis was not more frequently found in adolescents with single or multiple interpersonal trauma ($\chi^2[2] = 1.04$; $p = 0.596$, Cramer's $V = 0.053$), in boys ($\chi^2[2] = 0.08$; $p = 0.961$, Cramer's $V = 0.018$) or in girls ($\chi^2[2] = 1.56$; $p = 0.458$, Cramer's $V = 0.112$).

Table 3
Psychopathological profiles across different trauma types in male adolescents (only subscales with significant differences displayed).

	No interpersonal trauma ($nCBCL = 95$, $nYSR = 96$)			Single interpersonal trauma ($nCBCL = 57$, $nYSR = 56$)			Multiple interpersonal trauma ($nCBCL = 38$, $nYSR = 38$)
	M (SD)	p^a	d	M (SD)	p^b	d	M (SD)
CBCL Somatic complaints	55.45 (7.22)	0.007*	0.36	58.25 (9.17)	0.467	0.02	58.39 (7.99)
CBCL Thought problems	63.24 (10.16)	0.329	0.07	60.84 (9.63)	0.002***	0.63	66.92 (9.17)
YSR Withdrawn/Depressed	58.43 (7.84)	0.041*	0.24	58.84 (9.06)	0.022*	0.39	62.58 (10.31)
YSR Somatic complaints	56.65 (6.69)	<0.001***	0.57	60.32 (10.75)	0.059	0.27	63.16 (10.67)
YSR Anxious/Depressed	57.57 (7.03)	0.026*	0.30	58.38 (8.40)	0.056	0.36	61.82 (11.17)
YSR Thought problems	63.86 (8.91)	0.049*	0.24	64.04 (9.13)	0.017*	0.44	68.21 (10.27)
YSR Rule-breaking behavior	60.79 (8.96)	<0.001***	0.51	63.39 (10.34)	0.012*	0.45	68.08 (10.93)
YSR Aggressive behavior	58.91 (8.54)	0.035*	0.27	58.98 (9.08)	0.008*	0.50	63.66 (10.17)

* $p < 0.05$.
*** $p <$ adjusted Alpha-level according to the procedure of Holm.
a Differences between adolescents with no interpersonal trauma and adolescents with interpersonal trauma (single and multiple).
b Differences between adolescents with single interpersonal trauma and adolescents with multiple trauma.

Table 4
Psychopathological profiles across different trauma types in female adolescents (only subscales with significant differences displayed).

	No interpersonal trauma ($nCBCL = 41$, $nYSR = 43$)			Single interpersonal trauma ($nCBCL = 22$, $nYSR = 22$)			Multiple interpersonal trauma ($nCBCL = 49$, $nYSR = 47$)
	M (SD)	p^a	d	M (SD)	p^b	d	M (SD)
CBCL Attention problems	61.76 (6.88)	0.034[*]	0.39	64.41 (7.79)	0.318	0.11	65.45 (9.91)
CBCL Rule-breaking behavior	63.32 (9.28)	0.003[*]	0.57	67.95 (9.77)	0.288	0.15	69.31 (9.33)
CBCL Aggressive behavior	61.29 (8.92)	0.018[*]	0.44	65.73 (10.76)	0.478	0.01	65.88 (11.54)
YSR Somatic complaints	57.40 (7.70)	0.021[*]	0.42	57.45 (6.16)	<0.001[***]	0.82	63.38 (7.83)
YSR Anxious/Depressed	59.12 (9.03)	0.116	0.25	58.86 (8.59)	0.021[*]	0.53	63.89 (10.12)
YSR Thought problems	62.91 (9.24)	0.144	0.23	61.95 (7.12)	0.008[*]	0.63	67.87 (10.38)
YSR Rule-breaking behavior	60.47 (8.39)	<0.001[***]	0.67	64.09 (9.29)	0.027[*]	0.5	68.57 (9.07)
YSR Aggressive behavior	57.98 (7.72)	0.013[*]	0.46	59.41 (7.16)	0.022[*]	0.54	63.43 (7.79)

[*] $p < 0.05$.
[***] $p <$ adjusted Alpha-level according to the procedure of Holm.
[a] Differences between adolescents with no interpersonal trauma and adolescents with interpersonal trauma (single and multiple).
[b] Differences between adolescents with single interpersonal trauma and adolescents with multiple trauma.

3.7. Relationship to perpetrator and associated psychopathology

As stated above, 55.7% of adolescents had experienced at least one interpersonal trauma (single or multiple trauma). Overall, 42.9% ($n = 159$) of the total population had experienced at least one interpersonal trauma inflicted by a known person, and 12.7% ($n = 47$) of adolescents had suffered at least one interpersonal trauma inflicted by a person unknown to them. Female adolescents were more frequently affected by interpersonal trauma caused by a known person than were males ($\chi^2[1] = 9.49$, $p = 0.002$, Cramer's $V = 0.215$). Adolescents with trauma caused by a known person were evaluated by caregivers as having significantly more thought problems ($t[164] = 2.34$, $p = 0.021$, $d = 0.44$), and these adolescents reported significantly more internalizing problems themselves ($t[161] = 2.13$, $p = 0.035$, $d = 0.40$), compared to adolescents who had experienced trauma inflicted by a person not known to them. When analyzing boys separately, no significant differences were found. Regarding diagnoses, adolescents (boys and girls combined) with trauma inflicted by a known person were more likely to suffer from affective disorders ($\chi^2[1] = 7.68$, $p = 0.006$, Cramer's $V = 0.195$), and this association was confirmed also in boys analyzed separately ($\chi^2[1] = 4.63$, $p = 0.031$, Cramer's $V = 0.193$).

4. Discussion

The present study aimed to assess the prevalence of different interpersonal trauma experiences (single vs. multiple) among adolescents in residential care and the association with specific internalizing and externalizing psychopathology. We found that 80.3% of adolescents in residential care reported at least one traumatic experience, which is a considerably higher proportion than 22.5 to 56% in the general population (see Essau, Conradt, & Petermann, 1999; Landolt, Schnyder, Maier, Schoenbucher, & Mohler-Kuo, 2013). Interpersonal traumatic experiences were most commonly reported, with approximately 30% of adolescents having experienced multiple interpersonal trauma. Greeson et al. (2011) reported a 70.4% prevalence of multiple interpersonal trauma in a sample of children and adolescents referred to a National Child Traumatic Stress Network site for treatment. The considerably larger proportion of multiple interpersonal trauma in the study by Greeson et al. (2011) may be explained by the nature of the institution from which the participants were recruited. In contrast to the patients in the Greeson study, our study participants lived in residential care and did not undergo treatment for mental health problems or a specific trauma-related condition.

In our study, female adolescents more frequently reported multiple interpersonal traumatic events than did male adolescents. Recent research revealed that boys report much more potentially traumatic events compared to girls (Tolin & Foa, 2006), but girls seem to predominantly report interpersonal trauma involving sexual abuse or betrayal

(Goldberg & Freyd, 2006; Tolin & Foa, 2006). Moreover, adolescents with multiple interpersonal trauma in our sample were older, making verbal description more likely. Additionally, parental or caregiver surveillance decreases with increasing age and older adolescents are more likely to spend their time out of home, which makes them more vulnerable to peer violence or sexual assaults. Further research is therefore needed in order to examine gender differences in prevalence rates of multiple interpersonal trauma, by assessing trauma experiences not only in self-reports but also with other sources of information. Interestingly, adolescents reporting multiple interpersonal trauma had more frequently lived in another residential care institution, rather than with their parents or relatives, before the current institutionalization. This may be due to the interpersonal traumatic experiences which led to an early out-of-home placement. Additionally, posttraumatic symptoms (e.g. emotional and behavioral problem) can lead to more frequent changes of institution, as a recent prospective study has shown (Aarons et al., 2010).

We hypothesized that adolescents with interpersonal traumatic experiences would be more affected by a diversity of psychopathological symptoms compared to adolescents without interpersonal trauma, and adolescents with multiple interpersonal trauma would be most affected by psychopathology. Our hypotheses were partially confirmed. Interestingly, not only multiple interpersonal trauma but also single interpersonal traumatic experiences, are associated with a diversity of more pronounced psychopathology compared to adoelscents without interpersonal traumatic experiences, i.e. more self-reported somatic complaints, rule-breaking and aggressive behavior, as well as more rule-breaking behavior and thought problems observed by other people, e.g. caregivers. However, adolescents with a history of multiple interpersonal trauma reported more internalizing symptoms (i.e. somatic complaints, anxiety or depression, thought problems) and also more externalizing symptoms (i.e. rule-breaking and aggressive behavior) compared to adolescents with a history of single interpersonal trauma. However, this more pronounced psychopathology only showed up in self-reports. This emphasizes the need for further sensibilisation of caregivers for psychopathological symptoms. The phenomenon of insufficient agreement between self-report and informant report (e.g. parents, caregivers) regarding traumatic events and associated psychopathological symptoms has already been described – caregivers tend to underreport psychopathological symptoms of children and adolescents (Handwerk, Larzelere, Soper, & Friman, 1999; Kind et al., 2014; Oransky, Hahn, & Stover, 2013; Stover, Hahn, Im, & Berkowitz, 2010). This insufficient agreement seems to be particularly severe in the residential care setting: residential staff evaluating an adolescent they have known for less than a year underestimate the severity of problems perceived by the adolescents themselves (Gearing, Schwalbe, MacKenzie, Brewer, & Ibrahim, 2015).

The study aim was also to detect gender-specific psychopathology associated with interpersonal traumatic experiences. In both girls and

boys, rule-breaking behavior and, only in boys, somatic complaints, were more frequent in adolescents with a history of any interpersonal traumatic experience (compared to adolescents without any interpersonal traumatic experience). Further, multiple interpersonal trauma was predominantly associated with internalizing symptoms (thought problems in boys, somatic complaints in girls), i.e. symptoms that are often overlooked in the residential care setting.

In this study, we also addressed the frequency of clinician-rated diagnoses. Adolescents with multiple interpersonal trauma seemed to be more prone to a mental disorder with comorbid conditions (three to five). Boys with multiple trauma seemed to be at risk of developing substance use and affective disorders, while girls with multiple trauma appeared to be more prone to developing disorders of attention and activity as well as conduct disorders. Interestingly adolescents with multiple interpersonal trauma clearly seem to be more affected by clinician-rated diagnoses compared to adolescents with single interpersonal trauma. This is in contrast to the results reported above, where only a few significant differences between single and multiple interpersonal trauma regarding caregiver-reported and self-reported psychopathology have been found. It seems therefore, that single and multiple interpersonal trauma are both associated with caregiver-reported and self-reported psychopathological symptoms, but clinical diagnoses are clearly more prominent in adolescents with multiple interpersonal trauma compared to single interpersonal trauma. However, the numbers of subjects in the various categories (3 different trauma types ∗ diagnoses), were relatively small, resulting in a power problem when testing for significant differences. Across the whole sample, only 4.9% fulfilled diagnostic criteria for PTSD and interpersonal trauma was not associated with a higher risk for PTSD. This is surprising given the considerably higher prevalence rates that have recently been reported (15.9%) (Alisic et al., 2014). Our finding may be due to chance since we analyzed a rather small sample of only 126 girls and girls exposed to interpersonal trauma seem to be most affected by PTSD (Alisic et al., 2014). Another possible explanation is that in this high-risk population of adolescents in residential care with a history of deficient care stability (i.e. 20% of adolescents lived in another institution before the actual institutionalization), interpersonal trauma is more associated with a broad band of internalizing and externalizing symptoms rather than with PTSD. Frameworks that reach beyond PTSD are the proposed diagnoses of developmental trauma disorder or complex PTSD in children and adolescents. They include not only the dimension of anxiety and avoidance, but also capture attentional and behavioral problems as well as identity problems and difficulties with relationships (Cloitre, Garvert, Brewin, Bryant, & Maercker, 2013; D'Andrea, Ford, Stolbach, Spinazzola, & van der Kolk, 2012; Maercker et al., 2013; Stolbach et al., 2013; van der Kolk, 2005). Future research should examine the clinical utility of this proposed framework.

Further, we were interested in the influence of perpetrator identity on posttraumatic outcomes. Our analyses partially confirmed Freyd's (1996) 'betrayal trauma theory'. Adolescents traumatized by a known person reported slightly more pronounced symptoms than adolescents whose trauma had been inflicted by an unknown person. However, since only a few significant differences with small to medium effect sizes were found, we assume that the sample size of the subgroup 'trauma caused by an unknown person' was too small to detect differences. Especially associations within gender remain unknown due to the small sample size of e.g. girls with traumatic experiences caused by an unknown person.

Nevertheless, we found impressive prevalence rates for interpersonal traumatic experiences inflicted by a known person: 42.9% of the whole sample reported such experiences, the majority of which were girls. More research with larger sample sizes is needed in order to examine patterns in the vulnerable population of traumatized girls living in residential care.

Overall, our results suggest that

1. interpersonal trauma appears to substantially affect mental health of adolescents in residential care, especially if the trauma occurred in two or more different domains (multiple interpersonal trauma).
2. interpersonal trauma (especially multiple interpersonal trauma) in this high-risk population of adolescents in residential care may be linked to a diversity of different diagnoses including internalizing and externalizing symptoms rather than to PTSD.
3. among adolescents traumatized by a person known to them, thought problems and affective disorders seem to be more frequent than in adolescents traumatized by a person unknown to them.
4. Caregivers should be sensitized to

    a. the specific psychopathological symptoms associated with interpersonal trauma (i.e. rule-breaking behavior, thought problems, somatic complaints)
    b. the specific diagnoses associated with multiple interpersonal trauma (i.e. affective disorders and substance use disorders in boys and disorders of attention and activity and conduct disorders in girls) in order to enhance care stability.

However, our study has several limitations. One major limitation was the varied sources of information. Traumatic experiences were assessed by self-report only, and the interviews on mental disorders were conducted with the adolescents and professional caregivers alone (not with the parents). In addition, some significant differences between adolescents with missing data and those with complete data were seen, especially between those with/without data on traumatic experiences. We have to assume that adolescents with more pronounced psychopathology and delinquency are not part of our sample, which threatens representativity. Therefore, general validity of the findings is limited. Furthermore, the cross-sectional study design does not allow any conclusions about the cause of association between traumatic events and psychopathology. Since the sample size of the present study is rather small, conclusions about the target population should be drawn with caution. It should be noted that gender did not moderate associations between traumatic experiences and psychopathology within gender, since the moderator analysis did not reach statistical significance. However, according to a power analysis, our study sample could only detect effects of medium to large magnitude. Effects of small magnitude may remain undetected.

Future studies should focus on the longitudinal course of symptoms of the present sample and should address reasons for discrepancies between assessments by caregivers and adolescents. Given the high occurrence of traumatic events in this population, youth welfare concepts should be developed in terms of trauma-sensitive care, containing a routine screening for traumatic experiences. Methods that make disclosure more likely should be developed, especially considering the vulnerability of involved children and adolescents (Becker-Blease & Freyd, 2007; McElvaney, Greene, & Hogan, 2014; Read, Hammersley, & Rudegeair, 2007). Further, subgroups such as girls affected from interpersonal traumatic experiences caused by a known person should be examined in larger samples in order to develop prevention and intervention programs. Psychiatric liaison services should also be established, taking into account the specific needs of children and adolescents as well as their parents, foster parents, or residential care staff (Besier, Fegert, & Goldbeck, 2009; Cloitre et al., 2009; Schmid, 2012). And finally, efforts should be made to promote and enhance resilience factors, self-efficacy, and social as well as emotion regulation skills (Schmid, 2010; Schmid et al., 2013).

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