Widening epidemiological data on the prevalence of child maltreatment

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Widening epidemiological data on the prevalence of child maltreatment: Validation of the German ICAST-R in a student sample and national household survey

Running Title ICAST-R validation Germany

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Widening epidemiological data on the prevalence of child maltreatment: Validation of the German ICAST-R in a student sample and national household survey

Abstract

Background. A number of instruments for measuring child maltreatment (CM) prevalence have repeatedly been used across different countries. Although they hold the potential for providing benchmarks to tackle the gap of lacking comparability of CM prevalence across countries, contextual information about the adverse experiences such as perpetrator, chronicity, frequency, or severity are rarely covered. The ISPCAN Child Abuse Screening Tool - Retrospective (ICAST-R) covers these important dimensions. The German version increases the number of available versions to 21 different languages. Spoken by about 120 million people, German is one of the 20 most prevalent languages around the world. Moreover, the ICAST-R is intended to be used with young adults. This study further aims at adding towards the gap of psychometrics in older age groups.

Methods. Analyses are based on both a sample of German students (n = 333) and a nationally representative household survey (n = 2515). The validation process covered six steps: (1) Analyses of missing data on single items, (2) calculation of descriptive statistics to estimate the prevalence CM as well as subjective severity and main perpetrators. (3) Structural validity of the four conceptualized subtypes of CM (neglect, physical abuse, emotional abuse and sexual abuse) was tested using confirmatory factor analyses (CFA). Next (4), equivalence testing by multigroup confirmatory factor analyses (MGCFA) on age groups was conducted within the representative sample; (5) reliability was tested by determining internal consistencies for each subscale via the McDonald's Omega, Kuder-Richardson 20 (KR-20), and Cronbach's alpha. Lastly (6), criterion validity was tested in regression models comparing depressive/anxious symptomatology for single victimization and polyvictimization.

Results. The German ICAST-R yielded low missing values items in both samples. 16% of the participants in the national household survey reported neglect, 20.3% physical abuse, 22.2% emotional abuse, and 8.6% sexual abuse. Polyvictimization was prevalent with 20.6% of subjects reporting more than 2 types of CM. Students in the pilot-survey reported much higher prevalence estimates than participants in the nationally representative sample. The types of CM

subjectively rated as most harmful were emotional abuse and sexual abuse. In both samples, structural validity was similarly confirmed as CFA was reproducing the four conceptualized subtypes of CM with adequate fit (household survey: CFI 0.919, TLI 0.907, RMSEA 0.017, SRMR 0.046). Internal consistency achieved acceptable and comparable values for all three types of coefficients; criterion validity was established with a significant dose-response effect of CM experiences on both anxiety and depressive symptoms/diagnoses. Age dependent analyses on structural validity (MGCFA) and reliability in the household survey revealed potential weaknesses of items.

Conclusion. The German version of the ICAST-R both widens the possibility of international CM prevalence comparison and provides novel epidemiological data for Germany on subjective severity of CM and CM perpetrators. Even in the presence of a marked selection bias, the ICAST-R had similarly good psychometric properties in the student and nationally representative household sample. Except for issues with two items, equivalence testing was comparable across age groups.

Keywords child maltreatment; ICAST-R; prevalence; reliability; validity; multigroup confirmatory factor analyses (MGCFA); psychometrics; perpetrator; severity; child abuse; chronicity

1. Introduction

While systematic reviews on the prevalence of child maltreatment (CM) highlight the large, double figured percentages for the prevalence of different CM subtypes, they also point to the large variance of estimates across studies (for an overview, see Stoltenborgh et al., 2015). This is due to differing study designs and the use of a large variety of psychometric tools across and within countries to measure child maltreatment prevalence (e.g., Stoltenborgh et al., 2011). A recent systematic review has identified 80 self-report instruments that retrospectively capture incidents of child maltreatment from adults (Steele et al., 2022, forthcoming); 52 instruments focus on self-reports of adolescents (Meinck et al., 2022). A third group of instruments collect data on child maltreatment incidents from proxies – parents, teachers, or other caregivers. These different tools not only utilize broader and narrower definitions of CM (cf. Jud & Voll, 2019) but also different operationalization's to assess acts of commission and omission which result in harm, potential harm of treat of harm to a child.

A handful of instruments for measuring CM – e.g., the Childhood Trauma Questionnaire (CTQ), ISPCAN Child Abuse Screening Tool (ICAST), or the Adverse Childhood Experiences (ACE-IQ) – have repeatedly been used across different countries. They hold the potential for providing benchmarks to tackle the gap of lacking comparability of the prevalence of child maltreatment across countries. Yet, neither has measurement invariance been established for tools that have repeatedly been used in the same country, nor have these tools been examined for cross-cultural validity with the exception of the ICAST-C and ACE-BRFSS (Meinck et al., 2022; Steele et al., 2022, forthcoming).

The ICAST covers three version: The ICAST-C (child version), the ICAST-P (parent version), and the ICAST-R (young adult retrospective version) (Runyan et al., 2015). The present study focuses on the self-report instrument for young adults for several reasons: Reliable and valid adults survey tools are instrumental in monitoring the prevalence of child maltreatment as surveying young adults is both less ethically and practically challenging then regularly gathering information directly from children and adolescents; self-reports by young adults are supposedly more stable (e.g., test-retest reliability). In its Sustainable Development Goal 16.2.3 the United Nations have therefore suggested to document the proportion of child sexual abuse through surveys of young adults. The ICAST-R is a child abuse and neglect screening tool with 37 screeners with follow-up questions for those who have positively endorsed exposures (Dunne et al., 2009). The intended age target group of the ICAST-R is young adults from 18-29 years. It comes with several advantages: First, it displays adequate psychometric properties

with moderate to high internal consistency of Cronbach's α between .61 and .82, and low rates of missing values (Dunne et al., 2009; Steele et al., 2022, forthcoming) and measures experiences of neglect, physical-, emotional- and sexual abuse through behaviorally oriented items. Second, it does not only consider the acts of commission and omissions that make up child maltreatment itself. If respondents endorse having experienced a specific act of violence, they are further asked to provide a subjective rating of the severity of the act. The subjective rating addresses the criticism that the severity of a violent act is not only dependent on the academically or expert rated invasiveness, but much depends on how the act is perceived. Third, in addition to subjective severity, it also covers chronicity of child maltreatment: Respondents have to indicate each year of their childhood when a specific act occurred. Furthermore, it covers details on perpetrators and context that are not available in other instruments. It is currently available in 20 languages that are spoken in both high, low-, and middle-income countries. These translations have shown to be acceptable in the different contexts and internal consistency measured through Cronbach's alpha was similarly good- moderate across them (Cronbach's α 0.40 – 0.88): e.g., Sinhala version (Chandraratne et al., 2018), Arabic versions (Eldeeb et al., 2016), Italian version (Prino et al., 2018), or the Korean version (Lee & Kim, 2011). These studies mostly report scores only for the three subscales of physical, emotional, and sexual abuse and not for neglect. Moreover, Cronbach's α reliability coefficient has drawbacks when used with binary coded variables. Additionally, not many other psychometrics have been evaluated e.g. content validity, convergent validity, discriminant validity as many studies only report prevalence estimates (Koç et al., 2018; Ni & Hesketh, 2021; Simsek et al., 2017; for an overview, Steele et al., 2022, forthcoming). Moreover, most studies refrain from providing coefficients for different concepts of validity like convergent, discriminant or criterion-related validity. With a translation to German, we add yet another language version to the family of ICAST-R instruments. Spoken by about 120 million people, German is one of the 20 most prevalent languages around the world. In evaluating the translation, we have tackled the above-mentioned gaps in providing adequate psychometric properties for the ICAST-R.

In Germany, different studies have collected data on different types of child maltreatment with nationally representative samples (for a complete overview, cf. Jud et al., 2022). Two studies in 2010 (Häuser et al., 2011) and 2016 (Witt et al., 2018) have used the Childhood Trauma Questionnaire CTQ (Bernstein & Fink, 1998; Klinitzke et al., 2012) in nationally representative samples ranging from 14 years up to 99 years. The CTQ measures severity of child maltreatment based on the invasiveness of the acts. Total prevalence including mild to severe acts of child sexual abuse are reported as 12.6% in 2010 and 13.9% in 2016.

Child physical abuse (mild to severe) was measured as 12.1% in 2010 and 12.3% in 2016 (Witt et al., 2018); emotional maltreatment (mild to severe) was measured as 15% in 2010 and 18.6% in 2016. The two subtypes of neglect were even more widespread: Subjects reported emotional neglect (mild to severe) at 49.6% of the sample in 2010 and 40.5% of the sample in 2016. Finally, 48.6% of participants reported physical neglect in 2010, 41.6% in 2016. The decrease in neglect between 2010 and 2016 has largely been attributed to the morbidity of elderly persons that have experienced the hardship of the (post-)World War II area (Witt et al., 2018). In 2018, another study has measured child maltreatment prevalence by using the ACE-10, a common and short screening tool for adverse childhood experiences that covers the experience of child maltreatment with one binary-coded item per type of child maltreatment (Witt et al., 2019). The prevalence rates were considerably lowered compared to prevalence estimates reported via the CTQ (Witt et al., 2018): Child sexual abuse was measured at 4.3% of the sample, child physical abuse at 9.1%, emotional maltreatment at 12.5%, emotional neglect at 13.4%, physical neglect at 4.3% of the sample. Obviously, the binary-coded items do not include a severity rating.

This study therefore has four aims to: 1) describe the development of the German version of the ICAST-R, 2) examine the psychometric properties (criterion validity, internal consistency, factor structure and invariance by age) of the German ICAST-R version; 3) report subjective severity of child maltreatment experience in Germany; 4) provide an overview of main perpetrators per sub-type of child maltreatment in a nationally representative sample of the adult population in Germany and a student sample.

2. Methods

The ICAST-R was translated into German by three of the co-authors, AW, AJ, and FM, who are all first language German speakers and experienced survey researchers on the epidemiology of child maltreatment. A first translation was made by AW. To achieve high cultural adaption, translations where next extensively discussed by AJ, FM, and AW until consensus was reached. A few items were deemed inadequate and were not included in the German version of the ICAST-R, e.g. the items asking about comparing own maltreatment experiences with other children your age at the time.

2.1. Data collection

Analyses for validation are based on a sample of German students and a nationally representative household sample. Both datasets are described below.

2.1.1. German Student Sample

The German student sample was collected collaboratively by Ulm University and Bielefeld University. The original survey included the ISPCAN Child Abuse Screening Tools Retrospective version (ICAST-R) to assess child maltreatment, further instruments to capture sleep disorders (Pittsburgh Sleep Questionnaire (Buysse et al., 1989), Insomnia Questionnaire for Adults (Kater & Schlarb, 2020), Nightmare Effects Questionnaire (Schlarb et al., 2016) and stress (Perceived Stress Questionnaire (Fliege et al., 2001) as well as syndromes of somatization, depression and anxiety with the Brief Symptom Inventory (Spitzer et al., 2011). The survey also obtained information on socio-demographic characteristics of students i.e., the subject area of study, the number of semesters on course as well as items related to illness and chronic physical impairment. Self-report data for all instruments was collected via an online survey (Ulm: between March 13 and August 31, 2020; Bielefeld: between the End of June and the End of August, 2020) using the survey tool Unipark. For more information see www.unipark.com. The online survey was programmed at the study site Ulm.

Due to Covid-19 related restrictions to contain the spread of infection, the recruitment of participants was accomplished via the electronic mailing lists of the department of psychology in Ulm and social media channels at both study sites (Students´ Facebook and WhatsApp groups) to avoid personal contact. Participating students from Bielefeld University were rewarded via a raffle and were given course credit points (regularly available credits for participation in studies). All participants who did not complete their questionnaires over 60% (n = 15) were removed from the present analysis resulting in a final sample size of n=333. As students were largely recruited via social media, it was not possible to quantify a maximum possible number of participants.

Participation was anonymous and voluntary. All participants had to agree to a declaration of consent at the beginning of the survey. The study was approved by the institutional review board of Ulm University (333/19).

2.1.2. German Nationally Representative Household Sample

Data on psychological health and well-being in a nationally representative sample was collected by the USUMA GmbH in Berlin (Germany) between July 2021 and October 2021. For this purpose, face-to-face interviews on sociodemographic data guided by a structured questionnaire were conducted at the participants' homes. Next, sensitive questions were self-

completed by the participants. The trained and experienced interviewer was available for advice in case of difficulties with the questionnaire. Data collection was conducted in compliance with the hygiene rules for containment of the Sars-CoV-2 pandemic.

Representativity of the sample was intended for the German-speaking population aged 16 and above. The sampling methodology was divided into three stages. In a first step a systematic area sampling of geographic units in the Federal Republic of Germany was conducted. In a second step, households for the sample were chosen via the Random-Route-Procedure. Subsequently, the random identification of a participant from a multi-person household was conducted by applying a Kish-Selection Grid. Survey participants had to be at least 16 years of age and sufficiently understand spoken and written German.

Verbal and written information about the study was provided to the randomly identified members of households. In addition, potential participants were informed about the voluntary nature of participation and their rights of withdrawal. Informed consent was obtained upon agreement to participate. Although in Germany respondents 16 years of age or older are presumed to have the capacity to consent to participation in survey research, for participants under the age of 18 informed consent was provided in consultation with at least one caregiver. All participants received a written privacy statement that contained information about confidentiality and the handling of the collected data. The study was approved by the Institutional review board of the Medical Department of the University of Leipzig (Germany).

Initially 5934 households were selected for participation. Of these, 26 could not be contacted due to being unoccupied (0.1%) or failure to identify a household-member that met selection criteria (0.3%). The survey yielded a response rate of 42.6% with a final sample size of N=2515 out of 5908 contactable households. The most common reasons for not taking part in the survey were: Household refused to provide information for the study (24%), selected person refused to participate (13.6%) and failure to contact a chosen household after four visits despite the household was inhabited (13.4%).

2.2. Instruments

2.2.1. ICAST-R

The ISPCAN Child Abuse Screening Tools Retrospective version (ICAST-R) screens "violent experiences" during childhood retrospectively via self-reports (Runyan et al., 2015) (Runyan et al., 2015, p.7). It contains 20 items about the experienced acts of neglect, physical-,

emotional- and sexual abuse, five items each for the calculation of the four scales, as well as one item on the perception of physical and emotional care. Furthermore, the instrument assesses the frequency of maltreatment (categories: too many times to count; between 10-50 times; less than 10 times), each age and year of maltreatment (chronicity, ranging from 0-18), subjective severity *"How much did this experience hurt or harm you?"* (a great deal, seriously, mildly, not at all) and information on perpetrators including parents, siblings, peers, relatives, teachers and bosses. In addition, the ICAST-R assesses demographics like e.g., age, sex, educational attainment and the housing situation, e.g. with whom one lives.

2.2.2. Instruments for criterion validity

Previous studies show that experienced child maltreatment is significantly associated with the development of depression and anxiety (Gardner et al., 2019). To test criterion validity, questionnaires screening for depressive symptoms and anxiety were used in both samples.

In the student sample the Brief Symptom Inventory (BSI-18) captured somatization, depression, and anxiety. Internal consistencies for the subscales reached Cronbach's $\alpha = .75$ for somatization, $\alpha = .86$ for depressiveness, and $\alpha = .81$ for anxiety. The total score "Global Severity Index" is thought to reflect general psychological distress. Each dimension is measured on five-point Likert scales via six items. Each scale is calculated as sum score (Spitzer et al., 2011). To test criterion validity the two subscales "Depression" and "Anxiety" were used.

Within the representative sample, clinical diagnoses (lifetime) for various symptomatology were queried "*Have you ever been diagnosed by a physician or psychotherapist with any of the following conditions?*" Respondents were asked to indicate "yes" or "no" for various conditions including depression and anxiety disorder. To test criterion validity these two items were used.

2.3. Statistical Analyses

The analyses in both samples followed six steps: First, missing data on individual questionnaire items were examined using STATA 15.1SE (Stata Corp. StataCorp, College Station, Tx, USA).

Second, descriptive statistics were used to estimate prevalence and frequency of maltreatment. For this, all items of the ICAST-R were dichotomized into "never experienced" or "ever experienced". This approach has become established as common practice (Meinck et al., 2020). An ordinal structure is assumed. The items were combined for each dimension (neglect, physical abuse, emotional abuse, sexual abuse) and coded into "never happened" or "ever

happened". In addition, a binary variable was coded that contained maltreatment in any dimension (any type of maltreatment: No, Yes). And finally, a variable was coded indicating a count of multiple victimization across different types of maltreatment (multiple victimization). A similar approach was applied to the frequency items as well as subjective severity ratings. The frequency items were binary coded into *10 times or less*, and *more than 10 times* (*very much, serious* vs. *weak or not at all*), combined for each dimension, binary coded across dimensions into any type frequency as well as a count of multiple victimization across different types of maltreatment (*>10 times*). The categorization at >10 times was dependent on the categories presented in the questionnaire (see section "*ICAST-R*" above). Subjective severity was binary coded into *very much, serious* vs. *weak or not at all*, again combined for each dimension, binary coded across dimensions into any type severity as well as a count of multiple severity across different types of maltreatment. The three main perpetrators per subtype of child maltreatment are reported. All analyses of the second step were run with STATA 15.1SE.

In a third step, structural validity of the four-dimensional model of child maltreatment (neglect, physical abuse, emotional abuse and sexual abuse) was tested using confirmatory factor analyses (CFA) in R lavaan (version 0.6-12) using all binary coded individual abuse items in the questionnaire. For the assumption that the variables are not normally distributed and also have a categorical or ordered data structure, it is appropriate to use the WLSMV as a robust estimator (Brown, 2015). Participants with item non-response on any ICAST-item were excluded from these analyses (students n = 8, rep. sample n= 105). For the assessment of model goodness of fit, we relied on commonly used fit indices (Comparative Fit Index (CFI) and Tucker–Lewis index (TLI) $\geq .90$ acceptable or $\geq .95$ good model fit, Root Mean Square Error of Approximation (RMSEA) $< .10$ or close to .05, Standardized Root Mean Square Residual (SRMR) $\leq .1$; (Bollen, 1989; Hu & Bentler, 1999).

In a fourth step, multigroup confirmatory factor analyses (MGCFA) on age groups was conducted in R lavaan (version 0.6-12) within the representative sample. This examined measurement equivalence by age groups. The intended age target group of the ICAST-R is young adults from 18-29 years. This was extended to 35 years in consideration of the emerging adulthood approach. Participants aged 36+ year old form the second group. First, a configural model in which loadings and intercepts are freely estimated was run. If the configural model was acceptable (CFI and TLI > .90, RMSEA < .05) (Bollen, 1989; Hu & Bentler, 1999) the metric model in which all loadings were set as equal was tested. Metric invariance was considered to exist if the deterioration of the model fit did not exceed the criteria of Chen:

RMSEA ≥ .015, CFI ≥ - .010, and SRMR ≥ .030 (Chen, 2007). Subsequently, scalar invariance was tested by additionally setting the loadings equal for all groups. Finally, strict invariance was tested by restricting loadings, thresholds and residuals. Since residuals are not parameters in the delta parameterization, the theta parameterization was used for the models. Scalar or strict invariance was considered to be met if the changes in the model fit compared to the metric invariance model fit was not greater than: RMSEA ≥ .015, CFI ≥ -.010, and SRMR ≥ .010 (Chen, 2007).

Fifth, internal consistency was tested for each subscale via McDonald's Omega and Kuder-Richardson 20 (KR-20) to account for the dichotomous nature of the variables. Additionally, Cronbach's alpha coefficients were reported to allow for comparability with previous studies. Moreover, for age specific analyses KR-20 and McDonald's Omega were run for each of the different age groups. McDonald's Omega and Cronbach's alpha were calculated in R and Kuder-Richardson 20 coefficients in STATA 15.1SE.

Lastly, criterion validity was examined using different linear or logistic regression models in STATA 15.1SE. Differences regarding depressive or anxious symptomatology between affected and unaffected individuals were tested in linear (students) and logistic regression (rep. sample) analyses, respectively, adjusting for sex and age. Based on previous findings, a significant dose-response effect of child maltreatment experiences on both anxiety and depressive symptoms was assumed (Gardner et al., 2019).

3. Results

3.1. Socio demographic characteristics

The student sample included 333 students with a mean age of 24.9 (SD 6.0) years and 78.4% females. 100 participants stated to study at Bielefeld University, further 205 at the study site Ulm. Another 17 participants said they were studying at other universities. Further 11 people did not provide any information about their university. Participants in the nationally representative sample (N = 2515) were 51.5 % female and had a mean age of 49.6 (SD 19.0) years.

3.2. ICAST-R data quality and item characteristics of acts or omissions

Missingness among the twenty items ranged from 1.1 % to 0 % in both data sets. Missing values were highest for emotional abuse items in the student survey, whereas the items of sexual abuse

are most affected by missing values in the representative sample. Overall, the missing values at scale level range between 2.1% and 0.3%.

3.2.1. Prevalence estimates

A total of 69.1% of the students (N=333) experienced any type of child maltreatment. Prevalence estimates of child maltreatment types were distributed as follows: 19.8% neglect, 28.2% physical abuse, 55.3% emotional abuse, 23.1% sexual abuse and 36.6% of students experienced more than 2 types of violence. In the nationally representative sample, prevalence estimates were as follows: 16% neglect, 20.3% physical abuse, 22.2% emotional abuse, 8.6% sexual abuse and 20.6% experienced more than 2 types of violence. Overall, students in the pilot-survey reported much higher prevalence estimates than participants in the nationally representative sample. Even when considering the younger respondents (up to age 35) in the representative sample, the students are significantly higher in their reporting. The younger respondents in the representative sample are below the 35+ age group in the representative sample except for sexual abuse (see supplement Table 1). A detailed overview of the prevalence estimates per sub-scale and at single item level for both samples can be found in Table 1.

3.2.2. Frequency estimates

Both samples indicate a similar picture in terms of the frequency of experiencing the different types of maltreatment. In both samples, respondents experienced emotional abuse most frequently. Of those experiencing emotional abuse 51.1% in the nationally representative sample and 59.2% in the student sample experienced this form of maltreatment more than 10 times. The two acts that were most frequently experienced were being "insulted or criticized" or "being told that they were unloved" (see Table 1).

---------- *Insert Table 1 here*----------

3.2.3. Severity

With regard to the subjective severity of the various forms of abuse experienced, there are clear differences among the survivors (see Figure 1). The types of maltreatment experienced as most harmful were emotional abuse (51.1% student sample; 39.7% representative sample) and sexual abuse (45.9% student sample; 43.3% representative sample). Overall, the younger student sample reports a higher average level of harm perception from the indicated adverse experiences. Regarding physical abuse the samples varies the least and have some of the lowest harm values.

---------- *Insert Figure 1 here*----------

3.2.4. Perpetrators

Among the three most frequent perpetrators of the various forms of abuse, the following picture emerges (see Figure 2a/b; complete data see supplement Table 2):

---------- *Insert Figure 2a here*----------

---------- *Insert Figure 2b here*----------

In the student sample, perpetrators are from the closest family environment with parents and siblings for emotional abuse, physical abuse and neglect. For emotional abuse and neglect, teachers are named as the third most frequent perpetrators with 20.3% and 13.6% respectively, which is mainly due to the item on supervisory neglect. For sexual abuse, however, a different perpetrator pattern emerges. Here, the student sample indicates peers as the largest group of perpetrators with 48.1%, followed by partners or boy/girlfriend (10.1%) and siblings (9.1%). Thus, siblings are among the three most frequent perpetrators here in all forms of maltreatment.

In the representative sample, family perpetrators such as parents, siblings, and other relatives represent the three largest groups for the three most common forms of abuse, emotional and physical abuse, and neglect. Parents are the most frequently mentioned perpetrators ranging from 58.7%-68.0% of reports. In the case of emotional abuse, however, respondents name "teachers" just as frequently as "other relatives" with 23.0%. With regard to sexual abuse, other main perpetrators come to the fore. Here, neighbors are mentioned as the largest perpetrator group with 30.1%, followed by "other relatives" with 24.1% and 21.8% report abuse by peers.

3.3. Structural Validity

3.3.1. Overall four-dimensional model

In both samples, structural validity was confirmed with the CFA reproducing the four conceptualized subtypes of child maltreatment with adequate fit of the data (student sample: CFI 0.913, TLI 0.899, RMSEA 0.017, SRMR 0.075; national sample: CFI 0.919, TLI 0.907, RMSEA 0.017, SRMR 0.046). Detailed information on item loadings can be found in Table 2.

---------- *Insert Table 2 here*----------

3.3.2. Multigroup confirmatory factor analyses (MGCFA) for age group equivalence

Equivalence testing of the ICAST-R was then carried out across the two age groups, "young adults up to 35 years of age" and "older adults 36+ years of age" by testing configural, metric, scalar and strict equivalence for the constructs exposure to physical, psychological, and sexual abuse, and neglect within the representative sample.

The configural model did not achieve acceptable model fits to most fit indices (CFI = .872, RMSEA = .019, SRMR = .066). Due to configural noninvariance the model structure was redefined (Putnick & Bornstein, 2016) by omitting two items (*"Cut or Stabbed on purpose"* and *"Made to pose naked for photos or videos"*). Those decision was led by the factor loadings of the overall baseline model (i.e., < 0.3, see Table 2). The first item is less prevalent among the younger age group (<36 years of age = 0.8% vs. 36+ of age = 1.7%) and the second among the older age group (<36 years of age = 2.4% vs. 36+ of age = 0.6%).

The model fits of the adjusted model, including metric, scalar and strict invariance testing, is shown in table 3:

---------- *Insert Table 3 here*----------

With the two items removed, the configural model achieved acceptable model fit. Thus, with the addition of metric constraints, the change in the fit indexes (ΔCFI=.000, ΔRMSEA=.002, ΔSRMR=.036) is acceptable, except for SRMR, to hold metric invariance. Similar, scalar and strict invariance, fulfill the acceptable changes on the fit indexes for invariance.

3.4. Reliability and validity

3.4.1. Internal consistency

KR20 internal consistency achieves poor to adequate results among both samples for neglect, physical and emotional abuse (0.51-0.63) but good internal consistency for sexual abuse. Internal consistency with McDonald's Omega is adequate to good (Table 4).

---------- *Insert Table 4 here*----------

Cronbach's α is reported for comparability to previous studies and achieves similar moderate values (Table 5).

---------- *Insert Table 5 here*----------

Internal consistency analyses by age group in the national representative sample show that internal consistency for neglect, sexual abuse and emotional abuse differs between age groups. For neglect, younger age groups up to 25 years and the age groups 56-75 years differ from the other age groups, showing much lower values for internal consistency. The internal consistency of sexual abuse is highest especially among the younger age groups. Emotional abuse shows the lowest values in the oldest group (see Figure 3a/b).

---------- *Insert Figure 3a/b here*----------

3.4.2. Criterion validity

Criterion validity was established with a significant dose-response effect of child maltreatment experiences on both anxiety and depressive symptoms (controlled for age and sex). For the student sample, linear regression models were calculated with the number of child maltreatment experiences on the depression and anxiety subscales of the BSI-18. Here, depressive and anxious symptoms significantly increase with the number of childhood maltreatments experienced (Table 6).

---------- *Insert Table 6 here*----------

For the nationally representative sample, logistic regression models were run with the number of experienced maltreatment types on the likelihood of a depression or anxiety diagnosis. The models show a clear significant dose-response effect with an increase in probability of diagnosis with increasing number of maltreatment experiences (Table 7).

---------- *Insert Table 7 here*----------

4. Discussion

The present study is the first to comprehensively examine and confirm the new, German version of the ICAST-R with regard to its psychometric properties and possible application in both young and older adults. For this purpose, in addition to prevalence rates and "classical" psychometric properties such as Cronbach's alpha further coefficients for internal validity were used to adjust to the variables' binary structure. The four-dimensionality of maltreatment types was also verified by a confirmatory factor analysis. In addition to the age-based internal consistency analyses, multigroup confirmatory factor analyses for age group equivalence were conducted for the ICAST-R for the first time. Finally, criterion validity was demonstrated with a significant dose-response effect of child maltreatment experiences on anxiety and depressive symptoms.

Overall, the ICAST-R had adequate psychometric properties in a nationally representative German population sample. Psychometric properties were comparable for a self-selected German student sample. Age-dependent analyses indicate that some types of maltreatment appear to be more subject to social and technological change than others. Overall, retrospectively collected data on the prevalence of child maltreatment in Germany are comparable with recent ICAST-R prevalence data from other countries (e.g., Dunne et al., 2009). Prevalence rates for some maltreatment types, however, differ markedly compared to previous nationally representative surveys in Germany with different tools. Furthermore, this survey, for the first time, establishes prevalence rates for different types of perpetrators in a nationally representative German sample. While parents are clearly the most prevalent type of perpetrators for emotional abuse, neglect, and physical abuse, they are not among the three most prevalent categories of perpetrators of sexual abuse. Those are neighbors, other relatives, and peers, siblings or partners/boy- or girlfriends. The high proportion of peer perpetrators as well as partner/boy-/girlfriend in the present study is consistent with previous studies from the United States (Young et al., 2009; Gewirtz-Meydan & Finkelhor, 2020), the United Kingdom (Radford et al., 2013), Spain (Ferragut et al., 2021) and the Nordic countries (Kloppen et al., 2016). These findings are important in tailoring the prevention of child sexual abuse as strategies of prevention largely differ if perpetrators are peers or caregivers. In addition, findings highlight that the definition of (sexual) abuse using a threshold for perpetrators of 5 years older than the victim (e.g., Iffland et al., 2013; Proskynitopoulos et al., 2021; Walker et al., 1999) is problematic.

Looking at intra-German prevalence estimates with different instruments, the following picture emerges: Data collected using the ICAST-R in the nationally representative sample show that sexual abuse and neglect are lower while physical abuse and emotional abuse are higher

compared to data collected using the CTQ in 2010 (Häuser et al., 2011) and 2016 (Witt et al., 2018). Currently 8.6% of respondents report having experienced sexual abuse, while 13.9% (Witt et al., 2018) of respondents of the CTQ in 2016 and 12.6% (Häuser et al., 2011) in 2010 reported having experienced mild to severe sexual abuse. The 2016 CTQ scores of around 40% each for neglect of both a physical and emotional nature (Witt et al., 2018) is far higher than the 16% in the representative German sample presented here. With physical and emotional abuse, however, the picture turns. The prevalence estimates of the ICAST-R in the representative sample of the present study, with reported physical abuse of 20.3% and emotional abuse of 22.2%, are higher than the prevalence estimates of the CTQ from 2010 (physical abuse: 12.1%; emotional abuse: 15.0%) (Häuser et al., 2011) and 2016 (physical abuse: 12.3%; emotional abuse: 18.6%) (Witt et al., 2018). Aside from a varying conceptual breadth of items assembled under the phenomenon of child maltreatment in the two instruments that arguably contributed to varying prevalence rates, items in the ICAST-R are more behaviorally oriented than in the CTQ which leaves less discretion for interpretation by respondents.

The students in the current pilot study show higher prevalence estimates overall, most notably on the emotional abuse subscales with 55.3% and sexual abuse with 23.1%. This could be due to a self-selection bias, whereby mainly student survivors participated in the study as it seemed relevant to them. Perpetrators of sexual abuse were markedly different between the two samples. While this might be associated with students as a specific socio-cultural group, in-depth insights through methodologically qualitative approaches (e.g., cognitive interviewing) are needed to illuminate reasons for the differences.

Compared to prevalence rates in 2018 using another binary-coded instrument, the ACE-10 (Witt et al., 2019), the differences in prevalence rates as gathered through the ICAST-R in this study are even more pronounced. The ACE-10 captures one item per type of child maltreatment, providing significantly lower prevalence rates than the ICAST-R, which captures five items per type of child maltreatment and comes with a narrower operationalization of the phenomena (e.g., no non-contact sexual abuse captured by ACE-10).

Differences in prevalence rates as captured by different instruments are likely not only associated with different years of data collection – particularly as the years of data collection are rather close. They are likely tied to the instruments and study designs. Structural validity was examined using CFA and the four-dimensional model of the ICAST-R suggested by previous studies fit the data well. Additionally, multigroup CFA was conducted for the German representative sample to verify the fit of the ICAST-R for older respondents, too. Here, two

items *"Cut or Stabbed on purpose"* and *"Made to pose naked for photos or videos"* performed lower than the others. Omitting these two items from the model improved the general baseline model and configural model and led to an acceptable level of invariance among all models with their constraints, respectively.

The item *"Cut or Stabbed on purpose"* is less prevalent among the younger age group. A rationale for why this item is less appropriate cannot be made in the context of this study. Further analyses with a qualitative approach may reveal cultural sensitivity of this item, i.e., this type of physical abuse may be less common in the German culture than in other cultural contexts, as it shows a rather low prevalence in both samples and among all age groups examined here. The second item *"Made to pose naked for photos or videos"* is hardly prevalent among older German participants. A possible interpretation would be that the technical equipment addressed in this second item was less widespread or available in the childhood of this older age group. As this item represents social-technical development, a certain weakness in individual age groups within a representative sample is justifiable. Since the different maltreatment scales each consist of 5 items/acts of violence, weakness of a single item might be buffered here. The same is applicable to the item "Cut or stabbed on purpose", as this also accounts for one fifth of the total physical violence experience and if changes were made to the questionnaire for individual countries, there would also be losses in terms of international comparability, which is a major objective of the ICAST-R. Nevertheless, the lower suitability and prevalence should be examined more in depth and also in a country comparison.

Considering that the ICAST-R screens the prevalence of acts and therefore unlikely reaches the same reliability as instruments that measure an underlying concept such as depression (Meinck et al., 2022). Since there are hardly any studies on the ICAST-R so far that have also used KR20 or McDonald's ώ, the discussion and classification of the results in the previous study landscape is based on Cronbach's α and the mainly reported subscales physical abuse, emotional abuse and sexual abuse. With regard to the comparison of internal consistency for the three subscales physical abuse, emotional abuse and sexual abuse, both samples achieve comparable values to previous validation studies in other languages.

Runyan et al. (2015) reported in the ICAST Manual a Cronbach's α of .61 for physical abuse, in which range the consistencies obtained here also lie at .60 and .63. Similar values were also obtained for the Arabic validation with .62. (Eldeeb et al., 2016) and the Korean with .60 (Lee & Kim, 2011). Slightly lower are the internal consistencies in the Italian study with .56 (Prino et al., 2018) and significantly lower are the values among the Sri Lankans with .40 (Chandraratne et al., 2018). Emotional abuse is lowest with internal consistencies between .51

in Italy, .55 South Korea, and .57 in Qatar and Palestine. At .61 and .63, the values obtained in the current study are within the range of internal consistencies according to the ICAST Manual at .63 and the Sri Lankan study at .64. For sexual abuse, the picture of internal consistencies is more scattered among the different countries. The Cronbach's α of .82 reported in the ICAST Manual is exceeded in the Sri Lankan study with .88, whereas Italy has the lowest α -coefficient with .59. In the present representative German sample .74 is achieved, a similar value as in the Arabic language with .73. The German student sample has a lower reliability with .66 and is more similar to the Korean α -values with .64.

The differences in internal consistency between the various age groups show that certain patterns of maltreatment are more prevalent for some age cohorts, supporting the results of the multigroup CFA. The neglect subscale, for example, shows the lowest values in the youngest age groups, whereas the oldest groups achieve a very high internal consistency. Thus, influential deprivation-filled post-World War II years among the older respondents are likely to show a better fit of the items in the current comparison to younger Germans. Conversely, the item "Made to pose naked for photos or videos" from the sexual abuse subscale showed hardly any variation among the oldest Germans. As discussed above, this could be caused by the technical equipment in previous times. The influence of technological change and its role in daily life on forms of maltreatment is increasingly coming into focus: e.g., Stonard et al. (2014) as well as Zweig et al. (2013) revealed the influence of electronic communication technologies as a new substantial avenue for (cyber) abuse specifically among adolescents and young adults. However, internal consistency was adequate-good when using MacDonald ώ and outperforms KR20. In general, MacDonald ώ is a superior measure of internal consistency compared to KR20 because it makes fewer assumptions than KR20 and thus there are fewer problems with inflation (Dunn et al., 2014; Meinck et al., 2020). Overall, the achieved reliabilities fit into the international picture without major weaknesses.

Criterion validity was tested by using different linear or logistic regression models. Differences regarding depressive or anxious symptomatology between affected and unaffected individuals were tested in linear (students) and logistic regression (rep. sample) analyses, respectively, adjusting for gender and age. Based on previous findings, a significant dose-response effect of child maltreatment experiences on both anxiety and depressive symptoms was assumed (Gardner et al., 2019) and confirmed by the analyses.

While establishing the German version of the ICAST-R as valid measure of child maltreatment in the Geman-speaking context, this study also comes with a few limitations. First, the items were dichotomized because some abusive behaviors are very rare and confirmed by only a few

respondents. This approach is, however, not unique to the ICAST-R, but used in other instruments of measuring child maltreatment. Second, the instrument retrospectively asks about events from childhood. Consequently, there may be recall biases. However, the present study used two samples, whereby the student sample is younger and thus the temporal distance to the retrospectively surveyed period is smaller, which should have a positive effect on the recall bias. Moreover, the tool explicitly is designed to retrospectively capture child maltreatment. Fourth, the student sample is a convenience sample with a disproportionally increased rate of female participants. It carries the risk of a self-selection bias, which may also be reflected in the higher prevalence estimates. In addition to the shorter temporal distance to the experience and the possible selection bias, students could also be more aware of what the social consensus and what is ok and what isn't. As mentioned above, in-depth insights through e.g., cognitive interviewing are needed to illuminate reasons for the differences.

For this purpose, the methodologically more extensive sampled representative German household sample provides the more reliable prevalence values, which have also been discussed in the context of previous comparable studies. However, the comparison of a nationally representative sample and a pilot student sample shows that student samples are able to adequately establish psychometric properties of the ICAST-R even in the presence of a marked selection bias.

Conclusion

With the German translation of the ICAST-R, a reliable tool is offered that joins the 20 languages already available and thus contributes to the possibility of a higher international comparability of data on experienced child maltreatment. It also adds important variables on the epidemiology of child maltreatment, e.g. on perpetrators, that were missing from previous national surveys in Germany and various other countries. Apart from the weaknesses of the two items for which we have made recommendations for further steps above, the equivalence testing was comparable across the age groups. However, prevalence rates for certain maltreatment subtypes differ markedly from previous national surveys with other instruments in Germany in the last decade. In-depth analyses on these differences are needed as these differences might not only or not primarily be associated with differences in prevalence rates of surveys gathered in one decade, but rather with definitional and methodological issues.

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Figure 1

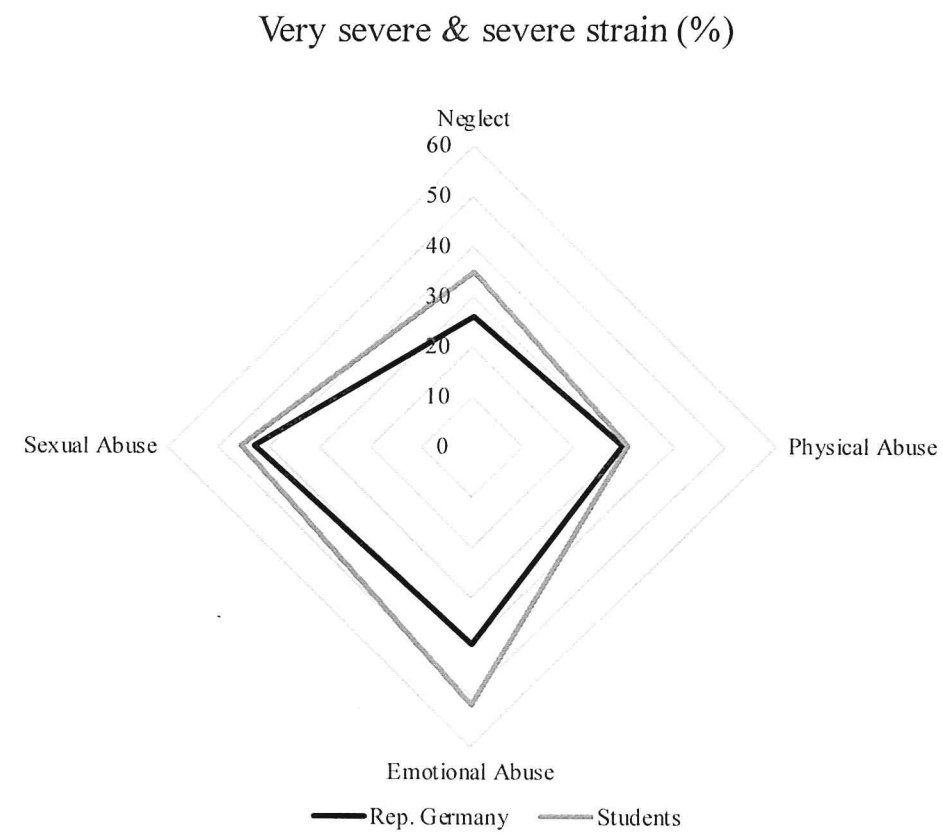
Very severe & severe strain (%)
Neglect
60
50
40
30
20
10
0
Physical Abuse
Emotional Abuse
Sexual Abuse
Rep. Germany
Students

Figure 2a

Fig. 2a. Students - Most Frequently Mentioned Perpetrators (Top 3)

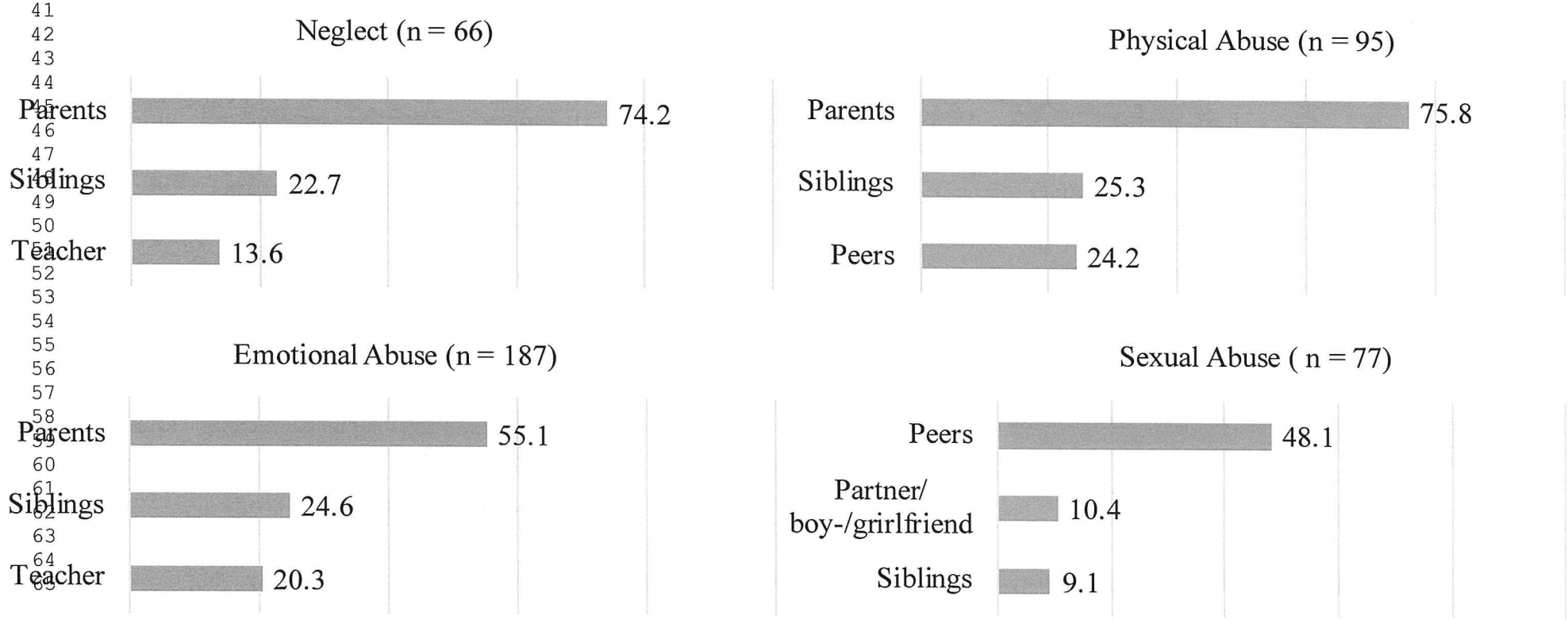

Figure 2b

Fig. 2b. Nationally rep. household sample - Most Frequently Mentioned Perpetrators (Top 3)

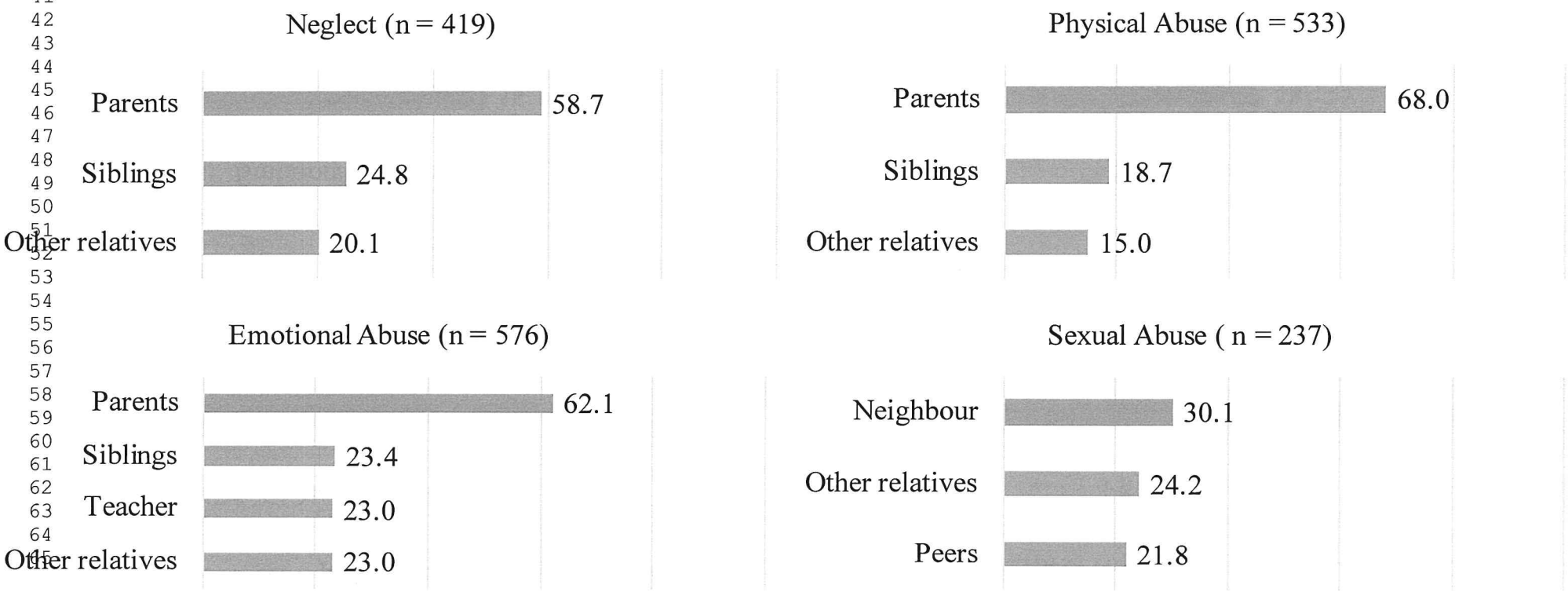

Figure 3a/b

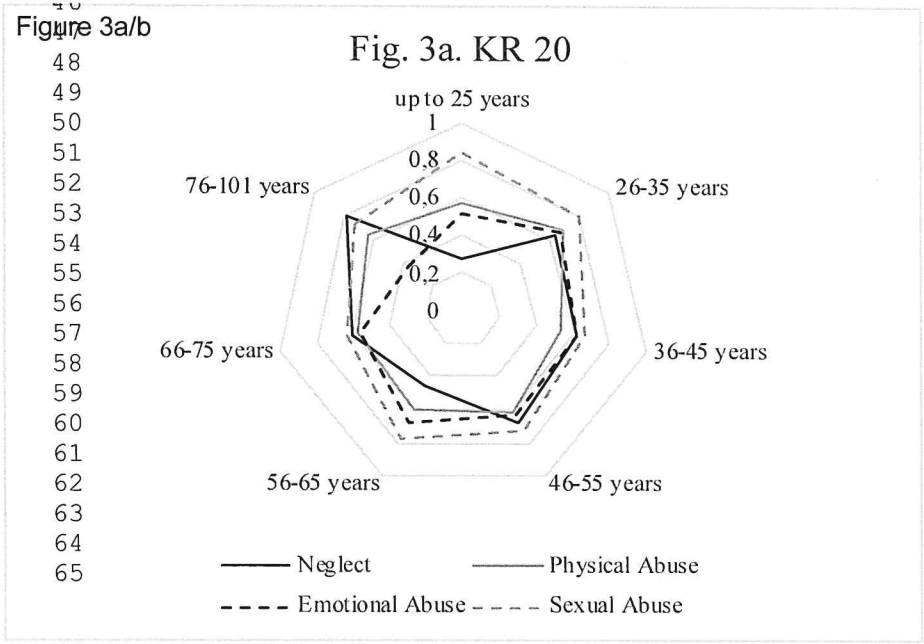
Fig. 3a. KR 20
up to 25 years
26-35 years
36-45 years
46-55 years
56-65 years
66-75 years
76-101 years
1
0,8
0,6
0,4
0,2
0
Neglect
Physical Abuse
Emotional Abuse
Sexual Abuse

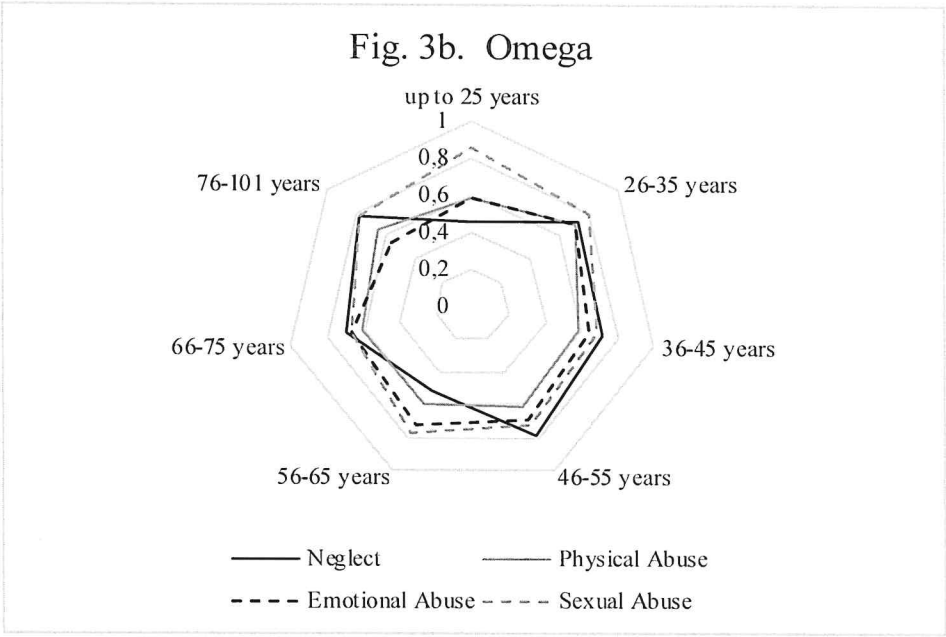
Fig. 3b. Omega
up to 25 years
26-35 years
36-45 years
46-55 years
56-65 years
66-75 years
76-101 years
1
0,8
0,6
0,4
0,2
0
Neglect
Physical Abuse
Emotional Abuse
Sexual Abuse

Figure 1. Subjective Severity of Maltreatment.

Figure 2a/b. Three most frequent perpetrators (%)

Figure 3a/b. Internal consistency (KR20 and Omega) among age-groups in the nationally representative household sample (N = 2410).

Table 1

Table 1. Single item and scale prevalence estimates with binary coded frequency of incidents experienced by victims

	Students (N = 333)			Rep. Germany (N = 2515)		
Scale	**Yes (%)[a]**	**Missing (%)[a]**	**Frequency ">10 times" (%)[b]**	**Yes (%)[a]**	**Missing (%)[a]**	**Frequency ">10 times" (%)[b]**
Any type of maltreatment	**69.1**	**-**	**54.1**	**35.1**	**-**	**51.3**
Multiple victimization (at least 2 types)	**36.6**	**-**	**73.8**	**20.6**	**0.2**	**63.3**
Neglect	**19.8**	**-**	**30.3**	**16.0**	**0.3**	**38.4**
No care in case of sickness or injury	7.2	0.0	50.0	4.0	0.0	49.7
Not enough food or drink	1.2	0.0	0.0	2.7	0.0	81.1
No adequate clothing	0.6	0.0	0.0	4.0	0.0	72.7
Injuries due to supervisory neglect	15.0	0.0	22.0	11.9	0.0	20.6
No safe place to live	1.8	0.0	83.3	1.5	0.3	59.4
Physical Abuse	**28.2**	**0.3**	**32.3**	**20.3**	**1.2**	**41.2**
Hit or punched	22.8	0.0	38.2	15.7	0.1	46.9
Kicked	6.0	0.3	23.8	4.7	0.7	36.4
Beaten with an object	11.4	0.0	34.2	8.7	0.0	39.6
Shaken hard	4.5	0.0	26.3	4.5	0.2	21.9
Cut or Stabbed on purpose	1.2	0.0	50.0	0.8	0.3	13.2
Emotional Abuse	**55.3**	**2.1**	**59.2**	**22.2**	**1.6**	**51.1**
Insulted or criticized	52.6	0.3	62.9	19.6	0.2	54.0
Told they were unloved	9.9	0.6	41.2	4.1	0.2	54.8
Told "wish you had never been born/or were dead"	9.0	0.3	30.0	1.7	0.1	37.3
Threatened to be hurt or killed	5.1	0.9	21.1	1.6	0.8	39.2
Threatened to be abandoned or refused into home	14.7	0.9	33.3	7.5	0.3	24.8
Sexual Abuse	**23.1**	**0.3**	**23.0**	**8.6**	**2.1**	**29.6**
Someone exposed their genitals	11.7	0.3	25.6	4.2	0.5	27.0
Made to pose naked for photos or videos	1.5	0.3	20.0	1.1	0.1	26.3
Someone touched child's genitals	12.0	0.3	22.5	4.8	1.1	25.8
Verbal sexual harassment	8.4	0.3	28.6	2.8	0.5	28.0
Made to have intercourse	6.9	0.3	26.1	4.0	0.2	23.1

Note: [a] based on N of total population. [b] based on n of victims indicating "yes"

Table 2. Standardized results of confirmatory factor analysis of the ICAST-R four-dimensional model

Scale	Students (N = 325) Beta	S.E.	Rep. Germany (N = 2410) Beta	S.E.
Neglect				
No care in case of sicknes or injury	0.577***	0.029	.553***	0.011
Not enough food or drink	0.471*	0.025	.465***	0.010
No adequate clothing	0.348	0.019	.463***	0.011
Injuries due to supervisory neglect	0.470***	0.027	.616***	0.012
No safe place to live	0.445*	0.027	.381***	0.008
Physical Abuse				
Hit or punched	0.587***	0.027	.740***	0.011
Kicked	0.515***	0.029	.478***	0.010
Beaten with an object	0.625***	0.027	.606***	0.011
Shaken hard	0.485***	0.028	.369***	0.009
Cut or Stabbed on purpose	0.437***	0.023	.182**	0.006
Emotional Abuse				
Insulted or criticized	0.442***	0.020	.611***	0.010
Told they were unloved	0.666***	0.028	.538***	0.010
Told "wish you had never been born/or were dead"	0.614***	0.029	.428***	0.009
Threatend to be hurt or killed	0.450***	0.028	.344***	0.008
Threatend to be abandoned or refused into home	0.491***	0.030	.622***	0.011
Sexual Abuse				
Someone exposed their genitals	0.454***	0.031	.784***	0.013
Made to pose naked for photos or videos	0.536*	0.026	.262***	0.008
Someone touched child's genitals	0.725***	0.029	.800***	0.012
Verbal sexual harrasment	0.501***	0.030	.509***	0.011
Made to have intercourse	0.490***	0.031	.582***	0.012
CFI	0.916		0.919	
TLI	0.903		0.907	
RMSEA	0.016		0.017	
SRMR	0.075		0.046	
Chi2	177.969		279.646	
df	164		164	

Notes: * $p < .05$. ** $p < .01$. *** $p < .001$. CFI = Comparative Fit Index. TLI = Tucker-Lewis Index. RMSEA = Root Mean Square Error of Approximation. SRMR = Standardized Root Mean Squared Residual.

Table 3

Table 3. Model fits of MGCFA-adjusted (Rep. Germany N = 2410)

Adjusted Model	Chi2	df	CFI	TLI	RMSEA	SRMR
Baseline overall Model	222.367	129	0.936	0.924	0.017	0.041
Configural Model	384.439	286	0.922	0.916	0.017	0.056
Metric Model	346.358	272	0.922	0.991	0.015	0.092
Scalar Model	348.918	268	0.991	0.990	0.016	0.087
Strict Model	371.216	286	0.991	0.990	0.016	0.092

Table 4. Internal Consistency coefficients

Scale	Students (N=325)			Rep. Germany (N=2410)		
	KR20	McDonald's ω-coefficient	Cronbach's α	KR20	McDonald's ω-coefficient	Cronbach's α
Neglect	0.51	0.66	0.51	0.63	0.69	0.63
Physical Abuse	0.63	0.67	0.63	0.60	0.61	0.60
Emotional Abuse	0.63	0.68	0.63	0.61	0.67	0.61
Sexual Abuse	0.66	0.69	0.66	0.74	0.75	0.74

Table 5

Table 5. Comparison of Cronbach's α with other validation studies

	Students	Rep. Germany	Dunne et al. (2009)	Chandraratne et al., 2018	Eldeeb et al., 2016	Prino et al., 2018	Lee & Kim, 2011
Language	**German**	**German**	**Six languages_overall***	**Sinhala**	**Arabic_overall**	**Italian**	**Korean**
Physical Abuse	0.63	0.60	0.61	0.40	0.62	0.56	0.60
Emotional Abuse	0.63	0.61	0.63	0.64	0.57	0.51	0.55
Sexual Abuse	0.66	0.74	0.82	0.88	0.73	0.59	0.64
Neglect	0.51	0.63	n.r.	n.r.	n.r.	n.r.	n.r.

Note: * Assessed in six languages and combined sample analyses. These values are used as reference values in the ICAST manual. “n.r.” = not reported.

Table 6

Table 6. Linear regression of polyvictimization on depressive and anxious symptomology (students)

	Depression (BSI-18)			Anxiety (BSI-18)		
Predictor	B	CI	p Value	B	CI	p Value
Multiple Victimization						
1	1.09	-.08 – 2.27	0.068	.76	-.27 – 1.78	0.147
2	2.26	.85 – 3.66	0.002	1.27	.18 – 2.35	0.023
3	4.55	2.14 – 6.95	<0.0001	2.92	.85 – 4.98	0.006
4	5.86	2.92 – 8.81	<0.0001	5.35	2.52 – 8.18	<0.0001
Covariates						
Male	-1.39	-2.66 -.119	0.031	-1.80	-2.63 – -.96	<0.0001
Age	0.39	-0.78 – 0.16	0.516	.020	-.051 – .091	0.575
R2:	0.138			0.143		
No. of observations	310			310		

Table 7. Logistic regression of polyvictimization on depression and anxiety diagnoses (nationally representative sample)

	Depression diagnosis			Anxiety diagnosis		
Predictor	OR	CI	p Value	OR	CI	p Value
Multiple Victimization (Count)						
1	1.70	1.13 - 2.54	0.010	1.99	1.22 - 3.26	0.006
2	3.40	2.33 - 4.95	<0.0001	3.97	2.52 - 6.25	<0.0001
3	6.23	4.16 - 9.32	<0.0001	4.51	2.66 - 7.69	<0.0001
4	10.42	5.93 - 18.31	<0.0001	9.05	4.69 - 17.45	<0.0001
Covariates						
Male	0.50	0.37 - 0.66	<0.0001	0.36	0.24 - 0.52	<0.0001
Age	1.003	1.00 - 1.01	0.409	1.00	0.99 - 1.01	0.441
Cragg & Uhler's R2:	0.122			0.110		
McFadden's Adj R2:	0.081			0.074		
No. of observations	2488			2488		
LR chi2(6)	148.47			101.91		

Supplement Table 1

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Supplement Table 1 .pdf