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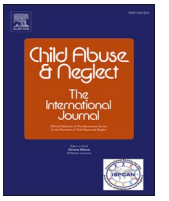

Adverse childhood experiences increase the risk for low perceived social participation and health-related quality of life in a large-scale population-based study in Germany

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ABSTRACT

Background: Adverse childhood experiences (ACEs) are highly prevalent and increase the risk for long-term adverse health outcomes. Next to well-known ACE-associated risks for morbidity, recent research is increasingly invested in exploring pathways towards health, overall functioning, and partaking in society following early adversity.
Objectives: Thus, this study aims to assess the association between latent classes of ACEs with perceived social participation and health-related Quality of Life (QoL) in a large population-based sample and to explore potential moderators of these associations.
Method: A representative sample of the German population ($N = 2531$; $M_{age} = 48.7$; 51 % women) was cross-sectionally investigated for ACEs, social participation (KsT-5), and health-related QoL (EuroQol-5D-5L). Latent Class Analysis (LCA) was performed to derive groups with similar ACE patterns. Multiple regression analyses were used to investigate the association of latent classes of ACEs with social participation and health-related QoL and to explore potential moderators.
Results: Four distinct latent classes of ACEs were identified; "no/low ACEs" ($N = 1968$, 77.8 %); "household-dysfunction" ($N = 259$, 10.2 %), "child abuse and neglect" ($N = 188$, 7.4 %), and "polyadversity" ($N = 116$, 4.6 %). Compared to participants in the no/low ACE class, those in the ACE-exposed classes showed overall lower levels of perceived social participation and health-related QoL. The polyadversity class showed lower levels of social participation compared to the two other ACE-exposed classes. Chronic stress, living with a partner, education, current job/

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educational involvement, and gender were found to moderate these associations in exploratory analyses.

Conclusions: This study shows people exposed to ACEs to have a higher risk for lower perceived social participation and lower health-related QoL – an increased risk, however, is not a deterministic uninventable fortune. Reduction of chronic stress, fostering of social support, and educational and vocational paths as interventional targets are discussed to enable those with precarious starting conditions to partake in society.

1. Introduction

Adverse childhood experiences (ACEs) are highly prevalent (Bellis et al., 2019; Greeson et al., 2011; Kessler et al., 2017) and well known to increase the risk for long-term health outcomes and costs for society (Bellis et al., 2019; Bürgin, 2021; Clemens et al., 2018; Hughes et al., 2017; Hughes et al., 2021). With the rise of interest in resilience, recent research promotes a shift from disease-focused towards health-focused research (Denckla et al., 2020; Kalisch et al., 2017; Ungar & Theron, 2020). Compared to the large literature research on health-risks of ACEs (Lovis-Schmidt et al., 2022; Sahle et al., 2021; Struck et al., 2021), research focusing on social participation and health-related quality of life (QoL) in the context of ACEs is few. Studying such outcomes is important as the mechanisms that transfer risk for disease might partially differ from those fostering health and well-being. Thus, this study aims to assess the association between latent classes of ACEs with perceived social participation and health-related QoL in a large population-based sample and to explore potential moderators of these associations.

The construct of ACEs includes different types of child maltreatment (physical, emotional, and sexual abuse, as well as physical and emotional neglect) and household dysfunctions (e.g., parental mental illness and substance abuse, etc.) (Felitti et al., 1998). Following the pioneering CDC-Kaiser ACE-studies a large body of research has shown the high prevalence and disease-associated risks of ACEs (Anda et al., 2002; Anda et al., 2006; Brown et al., 2009; Dube et al., 2001; Dube et al., 2003; Felitti et al., 1998). ACEs are highly prevalent in community and population-based samples world-wide, with multiple adversities being quite common in those exposed (Bellis et al., 2019; Bürgin et al., 2021; Copeland et al., 2007; Green et al., 2010; Hughes et al., 2017; Kessler et al., 2017; Witt et al., 2017). Next to the high prevalence, many studies have shown ACEs to increase the risk for poor health outcomes including mental disorders, but also major diseases, diseases of aging (e.g., cardio-metabolic diseases), and premature mortality (Baldwin & Danese, 2019; Bellis et al., 2019; Clemens et al., 2021; Fagundes et al., 2013; Gilbert et al., 2015; Hughes et al., 2017; Hughes et al., 2021; Jakubowski et al., 2018; Johnson et al., 2020; Riedl et al., 2019; Sahle et al., 2021). Thus, the reduction or elimination of ACEs and interventions reducing their health-associated risks should be a major public health concern.

Research on the consequences of ACEs has more strongly been focused on risk pathways towards ACEs-associated (psycho-)pathology and morbidity (Bürgin, 2021; Struck et al., 2021). Within recent years, more research is shifting from disease-focused towards health-focused research (Denckla et al., 2020; Kalisch et al., 2017; Ungar & Theron, 2020). Various studies have shown ACEs to be associated with lower self-esteem, less perceived social support, and smaller social networks (Folayan et al., 2020; Ford et al., 2011; Kim et al., 2022; Melkman, 2017; Schneider et al., 2020). Pathways towards healthy functioning following adversity might differ from those towards morbidity and as such are important to study to foster resiliency following adversity and trauma (Galatzer-Levy et al., 2018; Southwick et al., 2014).

Within this paper two broad concepts related to an individual's well-being and health are investigated – perceived social participation and health-related QoL. *Social participation* is a concept and construct studied by a wide range of disciplines with definitions arising around a person's involvement in activities that provide social interactions with others in society or the community (Fudge Schormans, 2014; Levasseur et al., 2010). Participation is an umbrella term that encompasses (legally enshrined) social participation and perceived membership and partaking in society (Berger et al., 2020). Social participation in the narrower sense refers to the actual involvement in society and the enabling structure for social interactions (Berger et al., 2020). Studying social participation in the context of ACEs is important as studies have shown that childhood adversity for instance is associated with lower social functioning and social isolation in young adulthood (Copeland et al., 2018) and that such experiences increase the risk for parental social withdrawal affecting children across generations (Greene et al., 2020). *Quality of life (QoL)* is a broad concept that includes an individual's multidimensional perception of and satisfaction with their emotional, physical, and social life circumstances and, thus their functioning in various life domains (Gander et al., 2019; Kind et al., 2020; The Whoqol, 1998). Quality of life as increasingly implemented as additional outcome beyond biomedical outcome measures within medicine and health-sciences (Haraldstad et al., 2019). Health-related QoL more narrowly focusses on functioning and perceived health, however debates in conceptualizations exist and the discrimination between health related QoL and health status remains ambiguous (Karimi & Brazier, 2016). In contrast to each other, social participation measures societal functioning and perceived social partaking comprising the domains of “social belonging”, “self-efficacy”, “need for recognition”, “self-esteem” and “integration into society”, whereas health-related QoL measures subjective individual health and functioning. Taken together, better understanding both these broad and hard-to-grasp concepts in the context of ACEs will help to target interventions towards fostering health and well-being and help to build resilience in at-risk individuals and within society.

Despite the recent and extensive interest in ACEs and their association with health-associated risks and morbidity, most studies either investigated specific ACEs or used a cumulative approach despite its known short-comings (McLennan et al., 2020; Olofson, 2017; Smith & Pollak, 2021; Struck et al., 2021). Over and beyond cumulative risk approaches, person-oriented latent modelling

approaches recently got more attention in the child maltreatment field, but also using within the ACE framework (Hajat et al., 2020; Lacey & Minnis, 2020; Olofson, 2017; Witt et al., 2016; Witt et al., 2019). These approaches, in particular latent class, and profile analyses, allow to define the cumulation of specifics and thus the pattering of ACEs (Bürgin, 2021). Compared to the broad research on ACEs and their associations with morbidity and pathology (Struck et al., 2021), fewer research focused on associations between ACEs and well-being, functioning, quality of life, and social participation. Following the World Health Organization's (WHO) understanding of health as more than the mere absence of disease (Grad, 2002), the factors and mechanisms contributing to health and well-being might differ from those increasing the risk for disease. To date, no study has investigated how latent classes of ACEs are related to social participation and health-related QoL and what moderates these associations.

Therefore, within our person-oriented descriptive study we overall aimed to investigate the association between latent classes of ACEs with perceived social participation and health-related QoL in a population-representative study in Germany and to explore potential moderators of these associations. Specifically, we aimed to answer the following research questions: 1) Which latent classes of ACEs can be described within a population representative survey in Germany? 2) Do differences in sociodemographic characteristics between population-based latent classes of ACEs exist? 3) How are latent classes of ACEs associated to perceived social participation and health-related QoL? 4) Does gender moderate these associations? 5) Are chronic stress and sociodemographic characteristics moderating these associations?

2. Methods

2.1. Sample design and study procedures

A representative sample of the German population ($N = 2531$; $M_{age} = 48.7$; 51 % women) was recruited between November 2017 and February 2018 in a three-stage approach by 'USUMA' (www.usuma.com) a German-based research institute and queried on psychosocial health and ACEs (Clemens et al., 2019, 2020; Witt et al., 2019).

In the first step, systematic area sampling was conducted based on the municipal classification of the Federal Republic of Germany (ADM F2F Sampling Frame). By doing so, around 53,000 areas all over Germany were delimited electronically, these contained an average of around 700 private households in each area. These areas were then first layered regionally according to districts into a total of around 1500 regional layers and then divided into 128 disjunct "networks". Each network served as sampling frame, containing 258 single sample points proportionate to the distribution of private households in Germany. In the second stage, private households systematically selected with a random route procedure at each sample point. Households of every third residence in a randomly selected street were invited to participate in the study. In the third stage, in multi-person households, a kish-selection grid was used to ensure random participation. For inclusion, participants had to be at least 14 years of age and have sufficient German language skills. Of 5093 designated addresses, 2531 households with one participant per household participated in the study (49.7 % participation). The main reasons for non-participation was failure to contact anyone in the residence after four attempts (14.4 %), refusal by the individual who answered the door to provide any information (16.5 %), failure to contact the randomly selected household member after four attempts (2.6 %), and refusal by the selected member to participate (15.8 %) along with other reasons.

The underlying multistage ADM sample design ensures that each household in which target persons live has an equal probability of being sampled. Once the household is selected, individuals in larger households have a smaller probability of selection than individuals in small households. This effect must be offset by design weighting. Next to this, nonresponse might introduce bias in the distribution of various characteristics relative to the population. This is reduced by post-stratification weighting. By means of suitable iterative calculations, the weights previously determined at the household level are modified by multiplying correction factors in such a way that the weighted actual distribution of the realized sample matches the target distribution (using census data from the German federal bureau of Statistics) both for the characteristic combination "age and gender" and for the characteristic "place of residence by state".

Individuals who agreed to participate were given information about the study; informed consent was obtained. In the case of minors, participants gave informed assent with informed consent being provided by their caregivers. Participants were told that the study was about psychological health and well-being. Responses were anonymous. At the beginning of each assessment sociodemographic information was obtained in an interview-format by the research staff. Then, the researcher handed out a copy of the questionnaire and a sealable envelope and was given back to the staff in the envelop after completion of the questionnaire. The study was conducted in accordance with the Declaration of Helsinki and fulfilled the ethical guidelines of the International Code of Marketing and Social Research Practice of the International Chamber of Commerce and of the European Society of Opinion and Marketing Research. The study was approved by the Ethics Committee of the Medical Department of the University of Leipzig (Ref. No. 418-17-21122015).

2.2. Measures

Sociodemographic characteristics including age, gender (men/women; 0/1, marital/partnership status, living with a partner (no/yes; 0/1), level of education (<8, ≥ 8 years), parenthood (no/yes; 0/1), and working status (current work or education with more versus less15 h/week, coded) were assessed from all participants in an interview format at the beginning of the assessments. Participants then received paper-pencil questionnaires to fill out in the presence of an interviewer to be able to ask questions regarding any uncertainties. The following questionnaires were answered by participants:

Adverse childhood experiences (ACEs) were measured with the German version of the ACE questionnaire, which is one of the most used measures of early adversity (Wingenfeld et al., 2011). The questionnaire encompasses 10 items, one for each ACE. The ten items

ask for exposure to emotional, physical, and sexual abuse, emotional and physical neglect, separation of parents, mental illness, substance abuse and incarceration of a household member, and violence against the mother in a binary dichotomous scale (yes/no). Oftentimes, these 10 items are summed up to build an overall ACE score and then grouped into four groups (0, 1, 2, 3+ ACEs). Psychometric properties of the German version of the ACE were demonstrated with a satisfying internal consistency (Cronbach's $\alpha = 0.76$) (Wingenfeld et al., 2011). In our sample, Cronbach's α was 0.77 ($\alpha_{Age<21} = 0.80$; $\alpha_{Age[21;30]} = 0.76$, $\alpha_{Age>30} = 0.76$).

Social participation was assessed with the KsT-5 a five-item short scale assessing perceived social participation (Berger et al., 2020). The scale measures five dimensions of social partaking in society including the aspects of "social belonging", "self-efficacy", "need for recognition", "self-esteem" and "integration into society". The scale showed a good fit to a one factor solution and has a satisfactory internal consistency (Berger et al., 2020). Internal consistency within our sample was satisfactory in general and only slightly different across different age groups (Cronbach's $\alpha = 0.73$; $\alpha_{Age<21} = 0.68$; $\alpha_{Age[21;30]} = 0.70$, $\alpha_{Age>30} = 0.74$).

Health-related QoL was assessed with the EuroQol-5D-5L, after rating on its five dimensions mobility, self-care, usual activities, pain/discomfort, and anxiety/depression, a visual analogue scale assesses participants perceived health (EQ-VAS, Question "How good or bad you think your personal health is today?", Scale: 0-worst to 100-best) (Hinz et al., 2014; Rajendram et al., 2010; The EuroQol Group, 1990). Within this study, we only used data from the VAS rating as indicator of the current perceived health.

Chronic stress was assessed as a potential moderator with the "Trier Inventory for Chronic Stress" (short version) (TICS-9) (Petrowski et al., 2019). The TICS-9 assesses nine items across different dimensions related to chronic stress: "social tensions", "lack of social recognition", "work overload", "excessive demands from work", "social overload", "work discontent", "chronic worrying", "social isolation", and "pressure to perform". The scale showed a good fit for the latent construct measured and good internal consistency in general and across different age groups (Cronbach's $\alpha = 0.88$; $\alpha_{Age<21} = 0.86$; $\alpha_{Age[21;30]} = 0.87$, $\alpha_{Age>30} = 0.88$) (Petrowski et al., 2019).

2.3. Analytic plan

First, a latent class analyses (LCA) was performed fitting 1 to 6 classes over all ACE-items to define latent classes of participants with similar ACE patterning. The LCA was performed using the "poLCA" package in R (Linzer & Lewis, 2011). Models were estimated 20 times using maximum likelihood estimation with random initial parameters, selecting the lowest log-likelihood iteration. Commonly-assessed information criteria (i.e., Bayesian Information Criterion [BIC], consistent Akaike's Information Criterion [cAIC], adjusted BIC [aBIC]); were examined with lower values indicating a better fitting model (see Supplementary Table 1) (Masyn, 2013; Nylund et al., 2007). Subsequently, we defined model class assignment, classifying everyone into one of four classes based on their highest posterior probability. Second, sociodemographic information is provided descriptively as a total and by class assignment implementing post-stratification weights (see Table 1). Third, we used the class assignments as predictor in multiple linear regressions adjusting for age and gender, to model their association with either social participation or health-related QoL as separate outcomes (see Fig. 2). Forth, we included an ACE*gender interaction term into our model to test if gender moderates the association between ACE and social

Table 1
Differences in sociodemographic characteristics between latent classes of adverse childhood experiences (ACEs).

	Total (N = 2531)	No/low ACE (N = 1968, 77.76 %)	HH-DYS (N = 259, 10.23 %)	CAN (N = 188, 7.43 %)	POLY (N = 116, 4.58 %)	Test-statistic	p-Value
Gender women	1290 (51.0 %)	1001 (50.9 %)	138 (53.5 %)	89 (47.3 %)	61 (52.6 %)	$\chi^2 = 1.77$; df = 3	$p = .621$
Living with partner no	1018 (40.2 %)	762 (38.7 %)	118 (45.6 %)	87 (46 %)	51 (43.6 %)	$\chi^2 = 8.123$; df = 3	**$p = .044$** *
Education <10 years	615 (31.2 %)	615 (31.2 %)	80 (31 %)	80 (42.3 %)	55 (47.4 %)	$\chi^2 = 21.547$; df = 3	**$p < .001$** ***
Current job/education <15 hrs/week	984 (38.9 %)	726 (36.9 %)	106 (40.9 %)	86 (45.7 %)	66 (56.4 %)	$\chi^2 = 22.597$; df = 3	**$p < .001$** ***
HH net income <1500 Euro	599 (23.7 %)	399 (20.3 %)	82 (31.7 %)	70 (37.2 %)	48 (41 %)	$\chi^2 = 60.385$; df = 3	**$p < .001$** ***
German citizenship yes	2426 (95.9 %)	1887 (95.9 %)	250 (96.9 %)	176 (93.1 %)	113 (97.4 %)	$\chi^2 = 4.971$; df = 3	$p = .174$
Having children yes	1606 (63.4 %)	1244 (63.2 %)	155 (59.8 %)	122 (64.6 %)	85 (72.6 %)	$\chi^2 = 5.862$; df = 3	$p = .119$
	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)		
Age	48.7 (19.2)	48.7 (19.3)	47.1 (18.3)	51.2 (18.5)	48.6 (18.8)	F(3,2527) = 1.64	$p = .177$
ACE score	1.0 (1.7)	0.3 (0.5)	2.9 (1.0)	2.5 (1.1)	6.6 (1.3)	F(3,2527) = 4538	**$p < .001$** ***
Chronic Stress (TICS-9)[1]	19.3 (6.3)	18.4 (5.9)	21.7 (6.5)	22.2 (6.72)	24.1 (6.74)	F(3,2465) = 64	**$p < .001$** ***

Notes. HH-DYS = household dysfunction, CAN = child abuse and neglect, POLY = polyadversity; M = mean; SD = standard deviation. Bold p-values indicate significant differences.

[1] This finding is also displayed in Supplementary Fig. 3, *p*-values of respective tests are indicated at the levels $p < .05$, $p < .01$, $p < .001$.

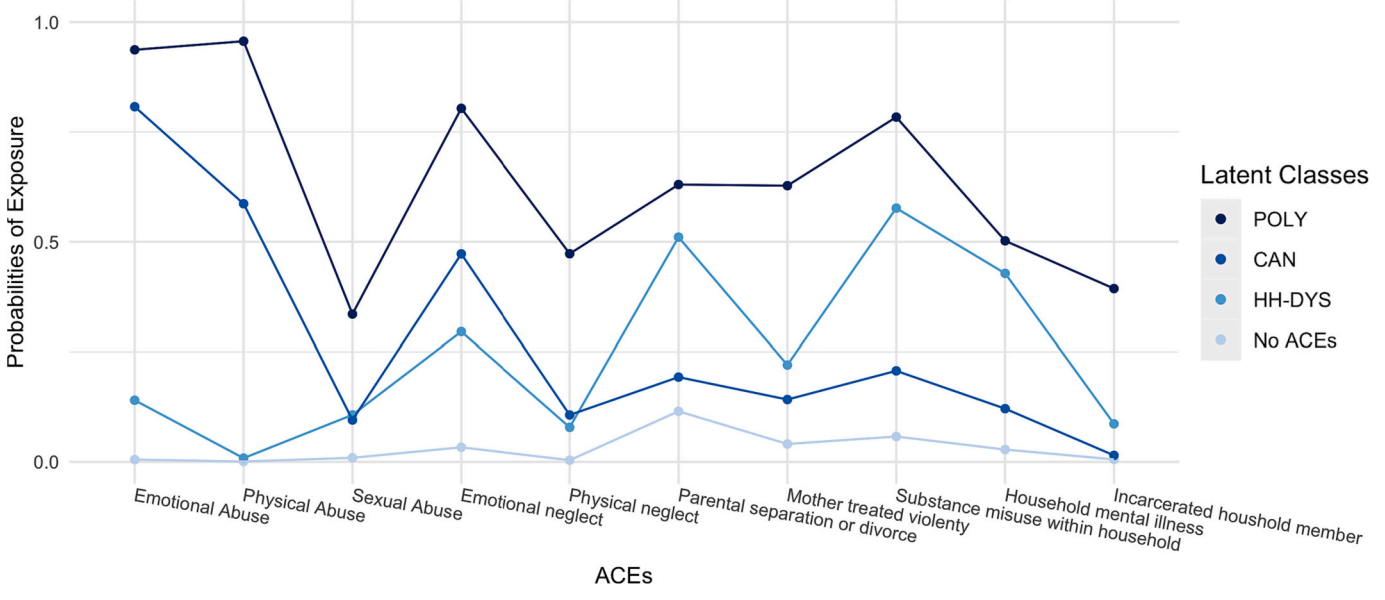

Fig. 1. Item probability profile plot displaying the probability of exposure to each adverse childhood experience (ACE) depending on the class assignment of the best fitting four class model. HH-DYS = household dysfunction, CAN = child abuse and neglect, POLY = polyadversity.

participation and health-related QoL. Fifth, we explored potential moderators of these associations adding further variables and their interaction (chronic stress, living status, education, occupational status) term into these models (see Fig. 3).

The statistical software used was R (Version 4.0.4) through RStudio (RStudio, T, 2015; Version 1.4.1106, Boston, MA, USA). Correlation analyses and model performances were analyzed using the "easystats" ecosystem for R (Lüdecke et al., 2020; Lüdecke et al., 2021; Makowski et al., 2020). Plots were created using the "ggplot2" and "ggpredict" package. We included design and post-stratification weights into all descriptive analyses and linear regression models. All analyses performed are complete case analyses ($N = 2'440–2'531$), the exact number of participants is displayed for each model.

3. Results

3.1. ACEs – specific, cumulated, and latent classes of ACEs

Counting ACEs per individual showed that 57.6 % report no ACE exposure, 20.4 % were exposed to at least one of the ten ACEs, 8,3 % reported two ACEs, 13.7 % reported three or more ACEs (see Supplementary Fig. 1–2). Descriptive analyses of the ACE questionnaire showed that parental separation or divorce was the most reported ACE (18.4 %), followed by substance use within the household (15.4 %), and emotional neglect (13.2 %). The least frequently reported ACEs were incarceration of a household member (3.6 %), sexual abuse (4 %), and physical neglect (4.5 %, for an overview see Supplementary Fig. 1). Women more often reported sexual abuse and substance misuse within the household, whereas men more often reported that their mother was treated violently (see Supplementary Table 2). No gender differences in all other specific ACEs nor in the overall ACE score were apparent. Within the latent class analyses (LCA) four different ACE profiles were identified (see Fig. 1). Based on their profiles they were labelled as "no/low ACE" ($N = 1968$, 77.8 %); "household-dysfunction" (HH-DYS, $N = 259$, 10.2 %), "child abuse and neglect" (CAN, $N = 188$, 7.4 %), and "polyadversity" (POLY, $N = 116$, 4.6 %). Investigating the total ACE score (count of ACEs) by latent class assignment showed as expected a large difference between the no/low ACE (M = 0.3 ACEs) and the polyadversity class (M = 6.6 ACEs). In between these two extremes are the household dysfunction group (M = 2.9) and the child abuse and neglect group (M = 2.5) that cannot be differentiated based on their total ACE count but on their latent class profiles and thus their cumulation of specific ACEs (see Table 1). We did not find gender-differences in latent class membership (see Table 1).

3.2. Differences in sociodemographic characteristics by latent classes of ACEs

Sociodemographic characteristics are displayed within Table 1 for the total sample as well as stratified by ACE-class membership. Differences in sociodemographic variables between latent classes of ACEs were found regarding living with a partner, education, current job/educational involvement, household net income, and chronic stress. We found higher levels of chronic stress using the TICS-9 in all ACE exposed latent classes, with largest effects for the polyadversity class (see Table 1 and Supplementary Fig. 3). No significant differences in sociodemographics were observed regarding gender, German citizenship status, having children, and age of participants (see Table 1).

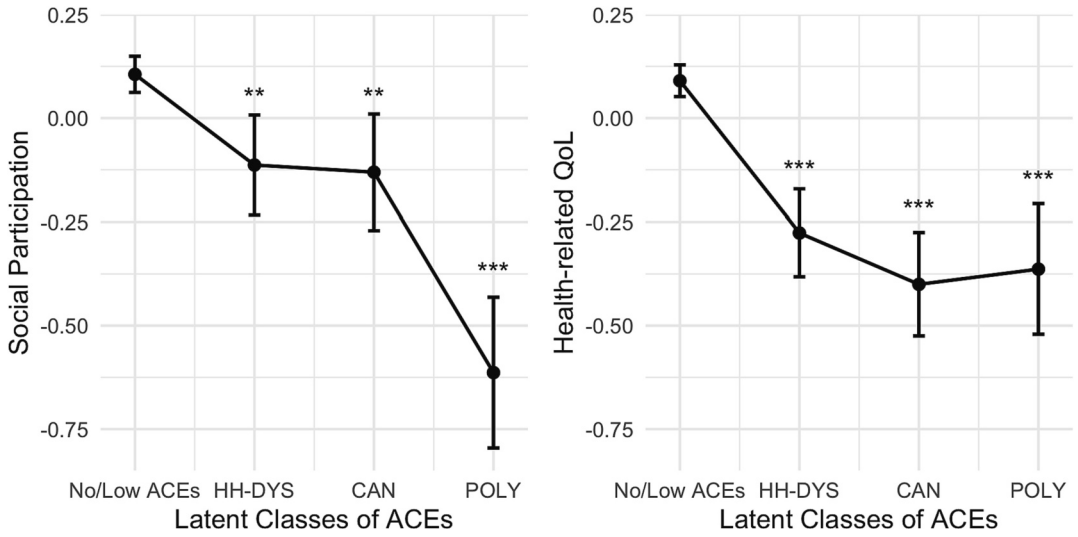

Fig. 2. Conditional Means of Latent Classes of ACEs with Social Participation and health-related QoL based on Regression Models (see Supplementary Table 3); Y scales are z-scaled; HH-DYS = household dysfunction, CAN = child abuse and neglect, POLY = polyadversity.; Error-bars are 95 % Confidence Intervals. *P*-values of regression coefficients are indicated at the levels $p < .05$, $p < .01$, $p < .001$.

3.3. Latent classes of ACEs associated with social participation and health-related QoL

We found the "polyadversity" class, the "child abuse and neglect" class and the "household dysfunction" class to report significantly lower levels of perceived social participation and health-related QoL compared to the "no/low ACE" class in multiple regression models controlling for gender and age (see Fig. 2 and Supplementary Table 3). Regarding social participation the magnitude of effects is small for household dysfunction (*std.* $\beta = -0.22$) and child abuse and neglect (*std.* $\beta = -0.24$) class membership, and medium to large for the polyadversity class (*std.* $\beta = -0.72$). Regarding health-related QoL the magnitude of effects found for all ACE exposed groups is medium (std. $\beta = 0.39$–0.49).

3.4. Gender moderations

To test if gender moderates the association between latent classes of ACEs and social participation and health-related QoL we included an ACE*gender interaction terms into the regression models above (please see Fig. 3 and Supplementary Table 4). Findings showed a significant moderation of gender with polyadversity class membership, with larger negative association within men. No significant moderations were found for the health-related QoL models, however, women in general reported lower health-related QoL than did men.

3.5. Exploratory moderator analyses

To better understand what explains these associations, we explored chronic stress and different sociodemographic characteristics (living with partner, education, and current job/educational involvement) as potential moderators of the association between latent classes of ACEs and perceived social participation and health-related QoL (see Fig. 3, Supplementary Table 4–7). Overall, low levels of chronic stress, living with a partner, higher education, and current job/educational involvement were significantly associated with higher social participation, as well as higher health-related QoL (see Supplementary Table 4–7). Over and above these factors being positively associated with social participation and health-related QoL, they also in part moderated the association between latent classes of ACEs with social participation and health-related QoL (patterning of findings displayed in Fig. 3). For instance, chronic stress was found to be moderating the association between the polyadversity class, social participation and QoL, with this association being stronger in all those with additional high levels of chronic stress (see Fig. 3, plots on the left). Next to this, lower social participation seen in the polyadversity class is much smaller in magnitude for all those that achieved >9 years of education and are currently working or doing further education (see Fig. 3). Comparing the HH-DYS class and the CAN class specifically, showed that low levels of chronic stress moderates the association between the CAN and POLY class with social participation but not the HH-DYS-class. Also

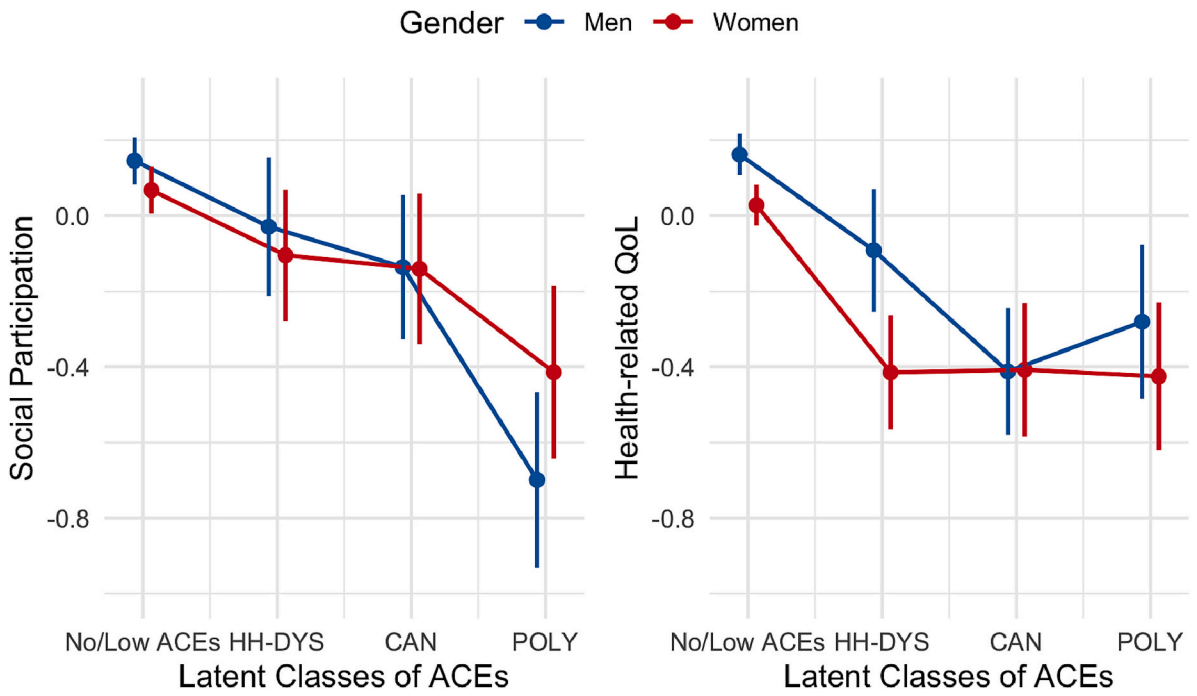

Fig. 3. Conditional Means of Latent Classes of ACEs with Social Participation and health-related QoL by gender based on regression models (see Supplementary Table 4; Y scales are z-scaled; HH-DYS = household dysfunction, CAN = child abuse and neglect, POLY = polyadversity.; Error-bars are 95 % Confidence Intervals. P-values of regression coefficients are indicated at the levels $p < .05$, $p < .01$, $p < .001$.

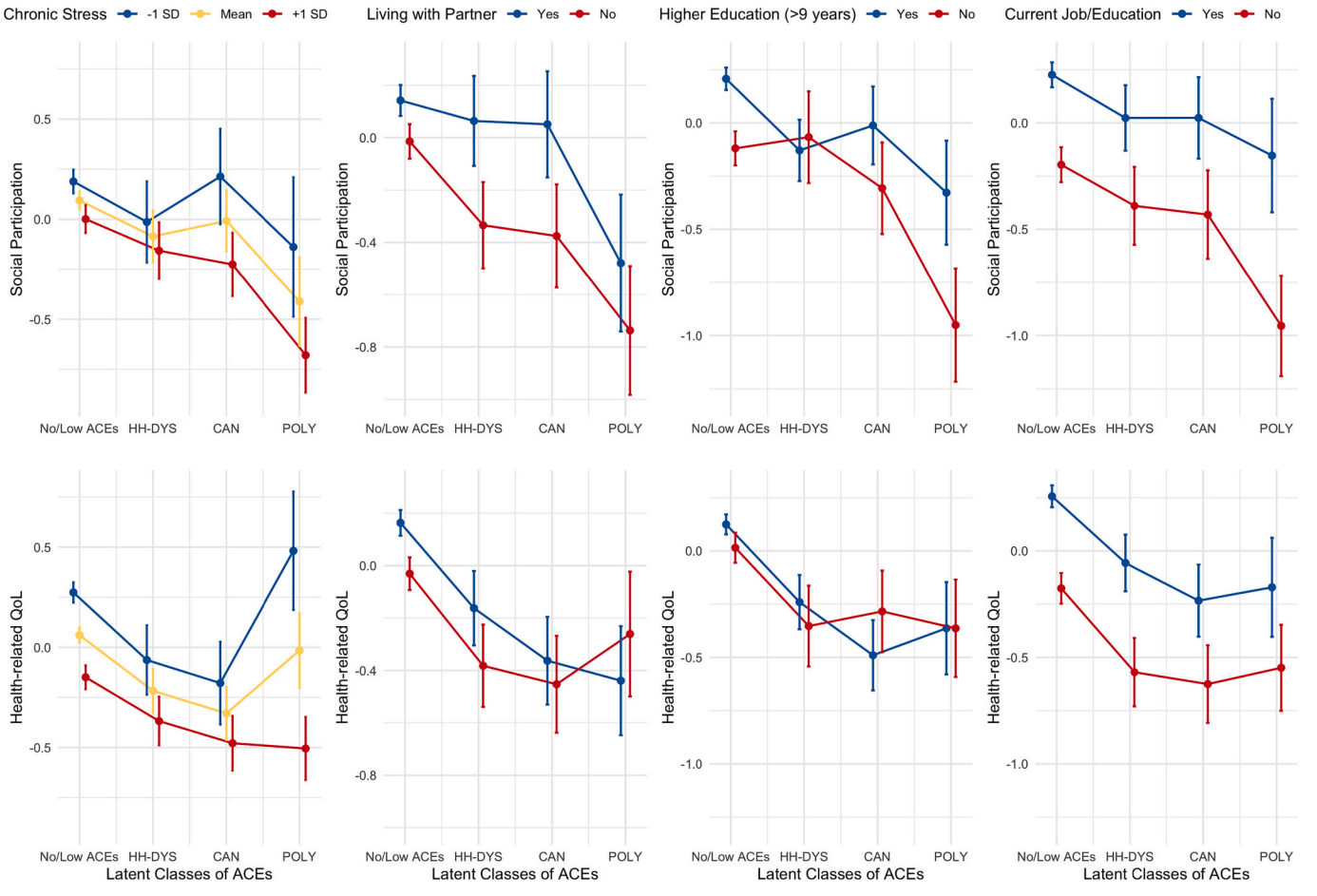

Fig. 4. Conditional means of latent classes of ACEs with social participation and health-related QoL based on regression models controlled for age and gender (see Supplementary Tables 5–8); Y axis are z-scaled; HH-DYS = household dysfunction; CAN = child abuse and neglect; POLY = polyadversity; SD = standard deviation; Error-bars are 95 % Confidence Intervals.

receiving more years of education moderated the association for CAN and social participation but not for HH-DYS (Fig. 4).

4. Discussion

This study aimed to investigate the association between latent classes of ACEs with perceived social participation and health-related QoL in a large population-based sample and to explore potential moderators of these associations. Using a descriptive and person-oriented latent modelling approach, we found four distinct latent classes of ACEs – a no/low ACE class, a household-dysfunction class, a child abuse and neglect class, and a polyadversity class. All exposure classes showed lower levels of social participation and health-related QoL compared to the no/low ACE class. The polyadversity class, in particular, showed significantly lower levels of social participation compared to the other exposure classes. Lower levels of chronic stress, living with a partner, higher education, and current job/educational involvement were associated with higher levels of social participation and health-related QoL and thus are protective factors. Adding to their protective nature in general, they in part moderate the association between ACE-class membership and social participation and health-related QoL in participants within the polyadversity class.

Our findings on the association of exposure to ACEs being associated with low social participation and health-related QoL are in line with early and recent research showing the broad array of ACEs-associated increased *relative risks* for the individual and costs for the society (Bellis et al., 2019; Bürgin, 2021; Clemens et al., 2018; Cohrdes & Mauz, 2020; Dube et al., 2001; Felitti et al., 1998; Riedl et al., 2019). Considering social participation, those individuals in the polyadversity class showed the lowest social participation underlining the importance of a cumulative impact of ACEs of both maltreatment and household dysfunction. Critically appraising our own findings, the magnitude of group differences between the "no/low ACE" class and the three exposed classes ranged from small to medium, only the polyadversity class for social participation differed largely from the unexposed class. However, our models explained only a small proportion of the total variance in both outcome measures, as ACEs "only" affect a select subgroup of the total population. This does not mean ACEs do not increase the relative risk of those exposed, but to better understand the absolute risk of low social participation and health-related QoL in the general population, ACEs are one – still important – factor of many to be considered and subsequently studied.

Considering the ever-increasing body of research in the consequences of ACEs (Struck et al., 2021); what does this study in particular add to the current body of research? In this study, we investigated two broad concepts – perceived social participation and health-related QoL. Both of these concepts with their different focus on either perceived social partaking or subjective quality of health – are important outcomes to be studied as they are in line with the Word Health Organization's (WHO) definition of health as more than the mere absence of disease (Grad, 2002). The factors and pathways contributing to health and well-being might be at least in part different from those increasing the risk for disease. Recent research is increasingly interested in filling the gap between childhood risks and adversities and disease and (psycho-)pathology by investigating moderators, mediators, mechanisms, and pathways (Danese, 2020; McLaughlin, Colich, et al., 2020; Moffitt et al., 2017). These ideas are closely linked to the rise of interest in research in resilience, a suggested paradigm shift from disease-focused towards health-oriented research, and a lively and interdisciplinary discussion about what constitutes resilience and how to best measure it (Denckla et al., 2020; Kalisch et al., 2017; Nishimi et al., 2021; Ungar & Theron, 2020). Thus, more research to better understand factors and mechanisms that constitute healthy functioning in the face of adversities is needed.

The ACE associated-risks for low social participation and health-related QoL found within our population-based sample, underscore the importance of prevention and early intervention to counteract associated risks. However, they also show that many highly ACE-exposed young people might not per se need therapeutic intervention but might need concrete and practical help to adequately manage their developmental tasks at hand to successfully be able and enabled to participate in society. As multifaced as ACEs-associated risks are, as multifaced solution strategies need to be from the functioning of the individual to the social and build environment and resources around them (Slavich, 2020; Ungar & Theron, 2020). In such a multisystemic understanding of resilience, resilience is linked to an individual's ability to harness resources, but also to the individual and collective capability to make sure that these resources are available to be harnessed by those in need (Panter-Brick & Leckman, 2013; Ungar & Theron, 2020). As such, children without the privilege of a well-functioning and nurturing family, need collective resources provided for them to be harnessed – for those affected by child maltreatment, household dysfunction and more so in those exposed to both types of adversities.

Within our exploratory moderator analyses, we found lower levels of chronic stress, living with a partner, higher education, and current job/educational involvement to be associated with higher levels of social participation and health-related QoL. Additionally, these factors were found to in part moderate ACE-associated risks especially for those in the polyadversity class. These findings highlight and promote important targets for future investigation and intervention: First, the reduction of chronic and toxic stress is important to consider. Social Safety Theory for instance sees developing and maintaining social bonds as a core of human functioning and thus understands threats to social safety as critical components of psychological stressors (Slavich, 2020). Such threats to social safety occur on different levels across systems from inner to outer circles, from within families, neighborhoods, schools, institutions, to nations, thus interventions need to be multisystemic (Slavich, 2020, see in particular Table 1). Thus, to address the sequalae of ACEs addressing chronic and toxic stress should be an interventional target (Shonkoff et al., 2021). Second, stable supportive relationships and social support are discussed to belong to the most important (transdiagnostic) protective factor for adversity associated psychopathology (McLaughlin, Colich, et al., 2020). Adding to the need to improve social support, strategies to alleviate despair are discussed to include embedding people in social activities and structures that foster belonging, meaning, and thus to increase people's social capital and reduce loneliness (Shanahan et al., 2019). Within the child protection system an important interventional target is discussed to be the reduction of parental stress and the reduction of social isolation by building stronger networks around high-risk families (Bauch et al., 2022; Buderer et al., 2020; Hefti et al., 2016). All these strategies might be important interventional targets

in those exposed to ACEs. Last, education and vocational paths need to be understood as interventional targets to enable young people with cumulated ACEs to partake in society. This includes understanding the consequences of ACE for the individual and providing safe or even "special" educational opportunities for at-risk young people implementing trauma-informed approaches (Bath, 2008; Forkey et al., 2021; Hopper et al., 2010). But similar, it requires to better understand the social structures in which ACEs occur, to support families, to provide sufficient resources and support for teachers and schools according to the risk and thus need.

4.1. Strengths and limitations

The strengths of this study include the investigation of data from a large-scale ($N > 2500$) population-representative German sample using a person-oriented modelling approach. Using a latent-class analyses, an empirically-driven method, allows to descriptively cluster of people with similar patterning of specific exposures and to describe the prevalence and test the impact of these patters (Lacey & Minnis, 2020). As such LCA in our study, derived a class labelled polyadversity with high ACE scores across both CAN and HH-DYS, this polyadversity class showed the lowest levels of social participation and HR-QoL, but also the large promotive and protective effects of moderators. Also, we found low levels of chronic stress and higher number of years of education to be protective moderating the risk for the CAN class for low social participation but not for the HH-DYS class. Thus, over and beyond a cumulative risk approach (see Supplementary Fig. 4 and 5), the LCA-approach allows to investigate the differences in risk and protective affects based on the patterning of ACEs in a more nuanced way than when investigating groups based on collapsed overall ACE scores.

Despite these strengths, this study comes with multiple important limitations. First, the study is cross-sectional in nature with only one measurement timepoint. Thus, the assessment of ACEs by retrospective self-report comes with a certain risk for well-known biases, as recall biases due to latency and cognitive decline, next to selection bias due to selective non-participation especially in older cohorts, or the mental state of the respondent or salience of the retrieved memories (Bürgin et al., 2020; Hardt & Rutter, 2004; Shiffman et al., 2008). Moreover, recent studies show only a small overlap between 'prospective' and retrospective measurement of adversity, which however is higher for clear cut forms of adversities (Danese, 2020; Danese & Widom, 2020). Prospective longitudinal studies are needed to tease apart which outcomes might be more strongly linked to prospective or retrospectively assessed adversity (Danese & Widom, 2020). Second, we used the ACE questionnaire as a measure for childhood adversity, the questionnaire has only 10 items that are answered with yes or no. The use of a dichotomous scale yes/no for measuring each of the ten items of ACEs does not facilitate the measurement of the frequency of each item and neither its severity, nor is it inclusive of other potentially adverse exposures in childhood. As such the ACE framework introduced is of ongoing debate (Danese, 2020; Kelly-Irving & Delpierre, 2019; Lacey & Minnis, 2020; McLennan et al., 2020; Olofson, 2017; Struck et al., 2021). Thus, clearer conceptualization, better measurement, operational definitions beyond summing up exposures, and new ways to analyze such data is urgently needed (Bürgin, 2021; Lacey & Minnis, 2020). Third, there is current debate about the definition of social participation as a construct of study, similar the concept of health-related QoL is of recent discussion (Fudge Schormans, 2014; Karimi & Brazier, 2016; Levasseur et al., 2010). This adds to the overall and recent interdisciplinary discussion about what constitutes resilience (Denckla et al., 2020; Kalisch et al., 2017). These debates are important and will stipulate future investigation but are beyond the scope of what can be addressed within this paper. Within our study both these concepts were assessed with very brief measures, that tap into these concepts but are not inclusive of all aspects related to these heterogenous concepts. Last, our study included participants with a broad age range as such adolescents, young adults, but also older adults, as such people at very different (developmental) stages of their life. Resulting from the different life stages the construct of study might have different meanings to participants of different ages, however we did not find substantial differences in regard of the internal consistency of the measure and or regression analyses were all controlled for age.

4.2. Implications & conclusion

More research is needed focusing, in particular, on young people with cumulated exposures to ACEs as these were found to report the lowest levels of social participation in our analyses. Such research should be developmentally informed to contribute to a better understanding of what contributes and underlines self-reported social participation across different developmental stages from adolescence, through young adulthood into adulthood, and should investigate gender-differences not only in exposure to ACEs but also in differences in risk following ACEs (Bürgin et al., 2021). Future research should incorporate new measures to assess childhood adversities and lifetime stressors (e.g. the MACE, the ICAST-R, or the STRAIN) which are more inclusive on different forms of adversity and stressors and allow to assess frequency, timing, duration of different exposures (Isele et al., 2014; Jarczok et al., 2023; Sturmbauer et al., 2019; Teicher & Parigger, 2015) and should make psychometrically sound decisions for measurement selection (Steele et al., 2023). Beyond new measures, an operational conceptualization of childhood violence and maltreatment are needed, which considers the different dimensions of adversity studying functioning following threat versus deprivation, harshness and unpredictability (Ellis & Del Giudice, 2019; McLaughlin, Sheridan, et al., 2020; Pollak & Smith, 2021; Smith & Pollak, 2021), or studying the consequences of psychological maltreatment (McGee & Wolfe, 1991; Spinazzola et al., 2014). Also future research might focus on latent profiles of adjustment in regard of different outcomes, in particular 'dual-factor mental health' perspectives enable to investigate psychopathology together with functioning to study those individuals that report a high quality of life despite psychopathology and thus show high adjustment (Moore et al., 2019; Petersen et al., 2021). To better understanding the concepts of social participation is important and to provide more sophisticated and multileveled measures that assess different aspects of individuals functioning and social inclusion within society. This is important as fostering (social) participation is an aim of social welfare and as such applied research is needed for empirical guidance of social policy.

Despite the large overall sample size of this representative sample only a small portion of 116 participants belonged to the

polyadversity group, highlighting the need to conduct research with young people of such "high-risk" populations who cumulate multiple different types of exposures, as for example those living in low-resource neighborhoods, vulnerable families, young people placed out-of-home, and those without a home at all. Longitudinal studies following such populations are needed to elucidate risk and protective factors and mechanisms transferring these effects, as well as to foster understanding of what resources young people are able to harness and consider to be helpful (Kind et al., submitted; Schmid, Fegert, Clemens, et al., 2022; Schmid, Fegert, Schmeck, & Boonmann, 2022). Social isolation, poverty, and parental stress are relevant risk factor for ACEs, but also a relevant barrier for the use of mental and social services (Castro-Ramirez et al., 2021; Copeland et al., 2018; Hefti et al., 2016). Thus, child protection, help and intervention efforts should work as "low-threshold services" in schools, youth centers, hospitals, and in drop-in centers for unemployed youths and adults. Mental health and psychosocial treatments should be sensitized for ACEs and how such experiences may influence the helping alliance and relationships. In sense of a trauma-informed care approach all psychosocial services should provide safe and continuous nurturing relationships, understand problem behavior on the background of exposure to ACEs and foster resilience (Bath, 2008; Forkey et al., 2021; Hopper et al., 2010).

This study shows people exposed to ACEs to have a higher risk for low perceived social participation and health-related QoL – however an increased risk is unequal to a deterministic and uninventable fortune. Reduction of chronic stress, social support, educational and vocational integration protect for low social participation and health-related QoL, they moderate ACEs-associated risks, and thus, are important targets for intervention and social policy making. Future research needs to focus on pathways, mediators, and moderators to better understand risk-trajectories and protective factors, especially within populations of high-risk for low social participation. More research and collective engagement are needed to enable those with precarious starting conditions and cumulated adversities to partake in society and to be well.

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Data availability

Data will be made available on request.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.chiabu.2023.106382.

References

Anda, R. F., Chapman, D. P., Felitti, V. J., Edwards, V., Williamson, D. F., Croft, J. B., & Giles, W. H. (2002). Adverse childhood experiences and risk of paternity in teen pregnancy. *Obstetrics and Gynecology, 100*(1), 37–45. https://doi.org/10.1016/s0029-7844(02)02063-x

Anda, R. F., Felitti, V. J., Bremner, J. D., Walker, J. D., Whitfield, C., Perry, B. D., … Giles, W. H. (2006). The enduring effects of abuse and related adverse experiences in childhood. A convergence of evidence from neurobiology and epidemiology. *European Archives of Psychiatry and Clinical Neuroscience, 256*(3), 174–186. https://doi.org/10.1007/s00406-005-0624-4

Baldwin, J. R., & Danese, A. (2019). Pathways from childhood maltreatment to cardiometabolic disease: A research review. *Adoption and Fostering, 43*(3), 329–339. https://doi.org/10.1177/0308575919856175

Bath, H. (2008). The three pillars of trauma-informed care. *Reclaiming Children and Youth, 17*(3), 17–21.

Bauch, J., Hefti, S., Oeltjen, L., Perez, T., Swenson, C. C., Furstenau, U., … Schmid, M. (2022). Multisystemic therapy for child abuse and neglect: Parental stress and parental mental health as predictors of change in child neglect. *Child Abuse & Neglect, 126*, Article 105489. https://doi.org/10.1016/j.chiabu.2022.105489

Bellis, M. A., Hughes, K., Ford, K., Ramos Rodriguez, G., Sethi, D., & Passmore, J. (2019). Life course health consequences and associated annual costs of adverse childhood experiences across Europe and North America: A systematic review and meta-analysis. *The Lancet Public Health, 4*(10), e517–e528. https://doi.org/10.1016/S2468-2667(19)30145-8

Berger, U., Kirschner, H., Muehleck, J., Glaser, A., Werner, B., Kurz, M., … Strauss, B. (2020). Short scale measuring perceived social participation: Factorial structure, internal consistency, content validity, convergent validity and standard values in a representative German sample. *Psychotherapie, Psychosomatik, Medizinische Psychologie, 70*(9–10), 396–404. https://doi.org/10.1055/a-1088-1354 (Kurz-Skala zur Erfassung wahrgenommener sozialer Teilhabe (KsT-5): faktorielle Struktur, interne Konsistenz, inhaltliche und konvergente Validitat sowie Normwerte in einer reprasentativen Stichprobe.)

Brown, D. W., Anda, R. F., Tiemeier, H., Felitti, V. J., Edwards, V. J., Croft, J. B., & Giles, W. H. (2009). Adverse childhood experiences and the risk of premature mortality. *American Journal of Preventive Medicine, 37*(5), 389–396. https://doi.org/10.1016/j.amepre.2009.06.021

Buderer, C., Hefti, S., Fux, E., Pérez, T., Swenson, C. C., Fürstenau, U., … Schmid, M. (2020). Effects of Multisystemic Therapy for Child Abuse and Neglect on severity of neglect, behavioral and emotional problems, and attachment disorder symptoms in children. *Children and Youth Services Review, 119*. https://doi.org/10.1016/j.childyouth.2020.105626

Bürgin, D. (2021). *The biopsychosocial sequel of childhood adversity from a developmental life-course perspective–from understanding to caring*. University of Basel. https://doi.org/10.5451/unibas-ep84256

Bürgin, D., Boonmann, C., Schmeck, K., Schmid, M., Tripp, P., Nishimi, K., & O'Donovan, A. (2021). Compounding stress: Childhood adversity as a risk factor for adulthood trauma exposure in the health and retirement study. *Journal of Traumatic Stress, 34*(1), 124–136. https://doi.org/10.1002/jts.22617

Bürgin, D., Boonmann, C., Schmid, M., Tripp, P., & O'Donovan, A. (2020). Fact or artefact? Childhood adversity and adulthood trauma in the U.S. population-based Health and Retirement Study. *European Journal of Psychotraumatology, 11*(1), 1721146. https://doi.org/10.1080/20008198.2020.1721146

Castro-Ramirez, F., Al-Suwaidi, M., Garcia, P., Rankin, O., Ricard, J. R., & Nock, M. K. (2021). Racism and poverty are barriers to the treatment of youth mental health concerns. *Journal of Clinical Child and Adolescent Psychology, 50*(4), 534–546. https://doi.org/10.1080/15374416.2021.1941058

Clemens, V., Berthold, O., Witt, A., Sachser, C., Brahler, E., Plener, P. L., … Fegert, J. M. (2019). Child maltreatment is mediating long-term consequences of household dysfunction in a population representative sample. *European Psychiatry, 58*, 10–18. https://doi.org/10.1016/j.eurpsy.2019.01.018

Clemens, V., Berthold, O., Witt, A., Sachser, C., Brahler, E., Plener, P. L., … Fegert, J. M. (2020). Lifespan risks of growing up in a family with mental illness or substance abuse. *Scientific Reports, 10*(1), 15453. https://doi.org/10.1038/s41598-020-72064-w

Clemens, V., Bürgin, D., Huber-Lang, M., Plener, P. L., Brähler, E., & Fegert, J. M. (2021). The interplay between child maltreatment and stressful life events during adulthood and cardiovascular problems—A representative study. *Journal of Clinical Medicine, 10*(17), 3937. https://doi.org/10.3390/jcm10173937

Clemens, V., Huber-Lang, M., Plener, P. L., Brahler, E., Brown, R. C., & Fegert, J. M. (2018). Association of child maltreatment subtypes and long-term physical health in a German representative sample. *European Journal of Psychotraumatology, 9*(1), 1510278. https://doi.org/10.1080/20008198.2018.1510278

Cohrdes, C., & Mauz, E. (2020). Self-efficacy and emotional stability buffer negative effects of adverse childhood experiences on young adult health-related quality of life. *The Journal of Adolescent Health, 67*(1), 93–100. https://doi.org/10.1016/j.jadohealth.2020.01.005

Copeland, W. E., Keeler, G., Angold, A., & Costello, E. J. (2007). Traumatic events and posttraumatic stress in childhood. *Archives of General Psychiatry, 64*(5), 577–584. https://doi.org/10.1001/archpsyc.64.5.577

Copeland, W. E., Shanahan, L., Hinesley, J., Chan, R. F., Aberg, K. A., Fairbank, J. A., … Costello, E. J. (2018). Association of childhood trauma exposure with adult psychiatric disorders and functional outcomes. *JAMA Network Open, 1*(7), Article e184493. https://doi.org/10.1001/jamanetworkopen.2018.4493

Danese, A. (2020). Annual research review: Rethinking childhood trauma-new research directions for measurement, study design and analytical strategies. *Journal of Child Psychology and Psychiatry, 61*(3), 236–250. https://doi.org/10.1111/jcpp.13160

Danese, A., & Widom, C. S. (2020). Objective and subjective experiences of child maltreatment and their relationships with psychopathology. *Nature Human Behaviour, 4*(8), 811–818. https://doi.org/10.1038/s41562-020-0880-3

Denckla, C. A., Cicchetti, D., Kubzansky, L. D., Seedat, S., Teicher, M. H., Williams, D. R., & Koenen, K. C. (2020). Psychological resilience: An update on definitions, a critical appraisal, and research recommendations. *European Journal of Psychotraumatology, 11*(1), 1822064. https://doi.org/10.1080/20008198.2020.1822064

Dube, S. R., Anda, R. F., Felitti, V. J., Chapman, D. P., Williamson, D. F., & Giles, W. H. (2001). Childhood abuse, household dysfunction, and the risk of attempted suicide throughout the life span: Findings from the Adverse Childhood Experiences Study. *JAMA, 286*(24), 3089–3096. https://doi.org/10.1001/jama.286.24.3089

Dube, S. R., Felitti, V. J., Dong, M., Giles, W. H., & Anda, R. F. (2003). The impact of adverse childhood experiences on health problems: Evidence from four birth cohorts dating back to 1900. *Preventive Medicine, 37*(3), 268–277. https://doi.org/10.1016/s0091-7435(03)00123-3

Ellis, B. J., & Del Giudice, M. (2019). Developmental adaptation to stress: An evolutionary perspective. *Annual Review of Psychology, 70*, 111–139. https://doi.org/10.1146/annurev-psych-122216-011732

Fagundes, C. P., Glaser, R., & Kiecolt-Glaser, J. K. (2013). Stressful early life experiences and immune dysregulation across the lifespan. *Brain, Behavior, and Immunity, 27*(1), 8–12. https://doi.org/10.1016/j.bbi.2012.06.014

Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson, D. F., Spitz, A. M., Edwards, V., … Marks, J. S. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults. The Adverse Childhood Experiences (ACE) Study. *American Journal of Preventive Medicine, 14*(4), 245–258. https://doi.org/10.1016/s0749-3797(98)00017-8

Folayan, M. O., Oginni, O., Arowolo, O., & El Tantawi, M. (2020). Internal consistency and correlation of the adverse childhood experiences, bully victimization, self-esteem, resilience, and social support scales in Nigerian children. *BMC Research Notes, 13*(1), 331. https://doi.org/10.1186/s13104-020-05174-3

Ford, E., Clark, C., & Stansfeld, S. A. (2011). The influence of childhood adversity on social relations and mental health at mid-life. *Journal of Affective Disorders, 133*(1), 320–327. https://doi.org/10.1016/j.jad.2011.03.017

Forkey, H., Szilagyi, M., Kelly, E. T., Duffee, J., Council On Foster Care, A, Kinship Care, C. O. C. P. C. O. C. A, … Family, H. (2021). Trauma-informed Care. *Pediatrics, 148*(2). https://doi.org/10.1542/peds.2021-052580

Fudge Schormans, A. (2014). Social Participation. In A. C. Michalos (Ed.), *Encyclopedia of quality of life and well-being research* (pp. 6135–6140). Netherlands: Springer. https://doi.org/10.1007/978-94-007-0753-5_2779.

Galatzer-Levy, I. R., Huang, S. H., & Bonanno, G. A. (2018). Trajectories of resilience and dysfunction following potential trauma: A review and statistical evaluation. *Clinical Psychology Review, 63*, 41–55. https://doi.org/10.1016/j.cpr.2018.05.008

Gander, T., Boonmann, C., Fegert, J. M., Kolch, M., Schmeck, K., Di Gallo, A., … Schmid, M. (2019). Predictive factors for changes in quality of life among children and adolescents in youth welfare institutions. *Social Psychiatry and Psychiatric Epidemiology, 54*(12), 1575–1586. https://doi.org/10.1007/s00127-019-01724-8

Gilbert, L. K., Breiding, M. J., Merrick, M. T., Thompson, W. W., Ford, D. C., Dhingra, S. S., & Parks, S. E. (2015). Childhood adversity and adult chronic disease: An update from ten states and the District of Columbia, 2010. *American Journal of Preventive Medicine, 48*(3), 345–349. https://doi.org/10.1016/j.amepre.2014.09.006

Grad, F. P. (2002). The preamble of the constitution of the World Health Organization. *Bulletin of the World Health Organization, 80*(12), 981–984. https://www.ncbi.nlm.nih.gov/pubmed/12571728.

Green, J. G., McLaughlin, K. A., Berglund, P. A., Gruber, M. J., Sampson, N. A., Zaslavsky, A. M., & Kessler, R. C. (2010). Childhood adversities and adult psychiatric disorders in the national comorbidity survey replication I: Associations with first onset of DSM-IV disorders. *Archives of General Psychiatry, 67*(2), 113–123. https://doi.org/10.1001/archgenpsychiatry.2009.186

Greene, C. A., Haisley, L., Wallace, C., & Ford, J. D. (2020). Intergenerational effects of childhood maltreatment: A systematic review of the parenting practices of adult survivors of childhood abuse, neglect, and violence. *Clinical Psychology Review, 80*, Article 101891. https://doi.org/10.1016/j.cpr.2020.101891

Greeson, J. K., Briggs, E. C., Kisiel, C. L., Layne, C. M., Ake, G. S., 3rd, Ko, S. J., … Fairbank, J. A. (2011). Complex trauma and mental health in children and adolescents placed in foster care: Findings from the National Child Traumatic Stress Network. *Child Welfare, 90*(6), 91–108. https://www.ncbi.nlm.nih.gov/pubmed/22533044.

Hajat, A., Nurius, P., & Song, C. (2020). Differing trajectories of adversity over the life course: Implications for adult health and well-being. *Child Abuse & Neglect, 102*, Article 104392. https://doi.org/10.1016/j.chiabu.2020.104392

Haraldstad, K., Wahl, A., Andenaes, R., Andersen, J. R., Andersen, M. H., Beisland, E., … network, L.. (2019). A systematic review of quality of life research in medicine and health sciences. *Quality of Life Research, 28*(10), 2641–2650. https://doi.org/10.1007/s11136-019-02214-9

Hardt, J., & Rutter, M. (2004). Validity of adult retrospective reports of adverse childhood experiences: Review of the evidence. *Journal of Child Psychology and Psychiatry, 45*(2), 260–273. https://doi.org/10.1111/j.1469-7610.2004.00218.x

Hefti, S., Kölch, M., Di Gallo, A., Stierli, R., Roth, B., & Schmid, M. (2016). Welche Faktoren beeinflussen, ob psychisch belastete Kinder mit einem psychisch kranken Elternteil Hilfen erhalten? *Kindheit und Entwicklung.*. https://doi.org/10.1026/0942-5403/a000193

Hinz, A., Kohlmann, T., Stobel-Richter, Y., Zenger, M., & Brahler, E. (2014). The quality of life questionnaire EQ-5D-5L: Psychometric properties and normative values for the general German population. *Quality of Life Research, 23*(2), 443–447. https://doi.org/10.1007/s11136-013-0498-2

Hopper, E., Bassuk, E., & Olivet, J. (2010). Shelter from the storm: Trauma-informed care in homelessness services settings. *The Open Health Services and Policy Journal, 3*(1). https://doi.org/10.2174/1874924001003010080

Hughes, K., Bellis, M. A., Hardcastle, K. A., Sethi, D., Butchart, A., Mikton, C., … Dunne, M. P. (2017). The effect of multiple adverse childhood experiences on health: A systematic review and meta-analysis. *The Lancet Public Health, 2*(8), e356–e366. https://doi.org/10.1016/S2468-2667(17)30118-4

Hughes, K., Ford, K., Bellis, M. A., Glendinning, F., Harrison, E., & Passmore, J. (2021). Health and financial costs of adverse childhood experiences in 28 European countries: A systematic review and meta-analysis. *The Lancet Public Health, 6*(11), e848–e857. https://doi.org/10.1016/s2468-2667(21)00232-2

Isele, D., Teicher, M. H., Ruf-Leuschner, M., Elbert, T., Kolassa, I.-T., Schury, K., & Schauer, M. (2014). KERF–ein Instrument zur umfassenden Ermittlung belastender Kindheitserfahrungen. *Zeitschrift für Klinische Psychologie und Psychotherapie, 43*(2), 121–130. https://doi.org/10.1026/1616-3443/a000257

Jakubowski, K. P., Cundiff, J. M., & Matthews, K. A. (2018). Cumulative childhood adversity and adult cardiometabolic disease: A meta-analysis. *Health Psychology, 37*(8), 701–715. https://doi.org/10.1037/hea0000637

Jarczok, M., Lange, S., Meinck, F., Witt, A., Clemens, V., Fegert, J. M., & Jud, A. (2023). Widening epidemiological data on the prevalence of child maltreatment: Validation of the German ICAST-R in a student sample and national household survey. *Child Abuse & Neglect, 137*, Article 106038. https://doi.org/10.1016/j.chiabu.2023.106038

Johnson, J., Chaudieu, I., Ritchie, K., Scali, J., Ancelin, M. L., & Ryan, J. (2020). The extent to which childhood adversity and recent stress influence all-cause mortality risk in older adults. *Psychoneuroendocrinology, 111*, Article 104492. https://doi.org/10.1016/j.psyneuen.2019.104492

Kalisch, R., Baker, D. G., Basten, U., Boks, M. P., Bonanno, G. A., Brummelman, E., … Kleim, B. (2017). The resilience framework as a strategy to combat stress-related disorders. *Nature Human Behaviour, 1*(11), 784–790. https://doi.org/10.1038/s41562-017-0200-8

Karimi, M., & Brazier, J. (2016). Health, health-related quality of life, and quality of life: What is the difference? *Pharmacoeconomics, 34*(7), 645–649. https://doi.org/10.1007/s40273-016-0389-9

Kelly-Irving, M., & Delpierre, C. (2019). A critique of the adverse childhood experiences framework in epidemiology and public health: Uses and misuses. *Social Policy and Society, 18*(3), 445–456. https://doi.org/10.1017/s1474746419000101

Kessler, R. C., Aguilar-Gaxiola, S., Alonso, J., Benjet, C., Bromet, E. J., Cardoso, G., … Koenen, K. C. (2017). Trauma and PTSD in the WHO World Mental Health Surveys. *European Journal of Psychotraumatology, 8*(sup5), 1353383. https://doi.org/10.1080/20008198.2017.1353383

Kim, Y., Lee, H., & Park, A. (2022). Patterns of adverse childhood experiences and depressive symptoms: Self-esteem as a mediating mechanism. *Social Psychiatry and Psychiatric Epidemiology, 57*(2), 331–341. https://doi.org/10.1007/s00127-021-02129-2

Kind, N., Bürgin, D., Clemens, V., Jenkel, N., & Schmid, M. (2020). Disrupting the disruption cycle – A longitudinal analysis of aggression trajectories, quality of life, psychopathology and self-efficacy in closed youth residential care. *Children and Youth Services Review, 113*, Article 105015. https://doi.org/10.1016/j.childyouth.2020.105015

Kind, N., Seker, S., d'Huart, D., Bürgin, R., Jenkel, J., Boonmann, C., … Schmid, M. (2023). *High-risk substance use and psychosocial functioning in young adult care leavers: Findings from a 10-year follow-up study*. Submitted.

Lacey, R. E., & Minnis, H. (2020). Practitioner review: Twenty years of research with adverse childhood experience scores - advantages, disadvantages and applications to practice. *Journal of Child Psychology and Psychiatry, 61*(2), 116–130. https://doi.org/10.1111/jcpp.13135

Levasseur, M., Richard, L., Gauvin, L., & Raymond, E. (2010). Inventory and analysis of definitions of social participation found in the aging literature: Proposed taxonomy of social activities. *Social Science & Medicine, 71*(12), 2141–2149. https://doi.org/10.1016/j.socscimed.2010.09.041

Linzer, D. A., & Lewis, J. B. (2011). poLCA: An R package for polytomous variable latent class analysis. *Journal of Statistical Software, 42*(1), 1–29. https://doi.org/10.18637/jss.v042.i10

Lovis-Schmidt, A., Schilling, J., Pudschun, C., & Rindermann, H. (2022). Adverse childhood experiences and physical diseases in adulthood: A summary of meta-analyses. *Traumatology*. https://doi.org/10.1037/trm0000412. Advance online publication.

Lüdecke, D., Ben-Shachar, M., Patil, I., & Makowski, D. (2020). Extracting, computing and exploring the parameters of statistical models using R. *Journal of Open Source Software, 5*(53). https://doi.org/10.21105/joss.02445

Lüdecke, D., Ben-Shachar, M., Patil, I., Waggoner, P., & Makowski, D. (2021). Performance: An R package for assessment, comparison and testing of statistical models. *Journal of Open Source Software, 6*(60). https://doi.org/10.21105/joss.03139

Makowski, D., Ben-Shachar, M., Patil, I., & Lüdecke, D. (2020). Methods and algorithms for correlation analysis in R. *Journal of Open Source Software, 5*(51). https://doi.org/10.21105/joss.02306

Masyn, K. E. (2013). *25 latent class analysis and finite mixture modeling. 2* p. 551).

McGee, R. A., & Wolfe, D. A. (1991). Psychological maltreatment: Toward an operational definition. *Development and Psychopathology, 3*(1), 3–18. https://doi.org/10.1017/s0954579400005034

McLaughlin, K. A., Colich, N. L., Rodman, A. M., & Weissman, D. G. (2020). Mechanisms linking childhood trauma exposure and psychopathology: A transdiagnostic model of risk and resilience. *BMC Medicine, 18*(1), 96. https://doi.org/10.1186/s12916-020-01561-6

McLaughlin, K. A., Sheridan, M., Humphreys, K., Belsky, J., & Ellis, B. J. (2020). The value of dimensional models of early experience: Thinking clearly about concepts and categories. In Press. In *Perspectives on Psychological Science*. https://doi.org/10.31234/osf.io/29fmt.

McLennan, J. D., MacMillan, H. L., & Afifi, T. O. (2020). Questioning the use of adverse childhood experiences (ACEs) questionnaires. *Child Abuse & Neglect, 101*, Article 104331. https://doi.org/10.1016/j.chiabu.2019.104331

Melkman, E. P. (2017). Childhood adversity, social support networks and well-being among youth aging out of care: An exploratory study of mediation. *Child Abuse & Neglect, 72*, 85–97. https://doi.org/10.1016/j.chiabu.2017.07.020

Moffitt, T. E., Belsky, D. W., Danese, A., Poulton, R., & Caspi, A. (2017). The longitudinal study of aging in human young adults: Knowledge gaps and research agenda. *The Journals of Gerontology. Series A, Biological Sciences and Medical Sciences, 72*(2), 210–215. https://doi.org/10.1093/gerona/glw191

Moore, S. A., Dowdy, E., Nylund-Gibson, K., & Furlong, M. J. (2019). A latent transition analysis of the longitudinal stability of dual-factor mental health in adolescence. *Journal of School Psychology, 73*, 56–73. https://doi.org/10.1016/j.jsp.2019.03.003

Nishimi, K., Choi, K. W., Cerutti, J., Powers, A., Bradley, B., & Dunn, E. C. (2021). Measures of adult psychological resilience following early-life adversity: How congruent are different measures? *Psychological Medicine, 51*(15), 2637–2646. https://doi.org/10.1017/S0033291720001191

Nylund, K. L., Asparouhov, T., & Muthén, B. O. (2007). Deciding on the number of classes in latent class analysis and growth mixture modeling: A Monte Carlo simulation study. *Structural Equation Modeling: A Multidisciplinary Journal, 14*(4), 535–569. https://doi.org/10.1080/10705510701575396

Olofson, M. W. (2017). A new measurement of adverse childhood experiences drawn from the panel study of income dynamics child development supplement. *Child Indicators Research, 11*(2), 629–647. https://doi.org/10.1007/s12187-017-9455-x

Panter-Brick, C., & Leckman, J. F. (2013). Editorial commentary: Resilience in child development—interconnected pathways to wellbeing. *Journal of Child Psychology and Psychiatry, 54*(4), 333–336. https://doi.org/10.1111/jcpp.12057

Petersen, K. J., Humphrey, N., & Qualter, P. (2021). Dual-factor mental health from childhood to early adolescence and associated factors: A latent transition analysis. *Journal of Youth and Adolescence*. https://doi.org/10.1007/s10964-021-01550-9

Petrowski, K., Kliem, S., Albani, C., Hinz, A., & Brahler, E. (2019). Norm values and psychometric properties of the short version of the Trier Inventory for Chronic Stress (TICS) in a representative German sample. *PLoS One, 14*(11), Article e0222277. https://doi.org/10.1371/journal.pone.0222277

Pollak, S. D., & Smith, K. E. (2021). Thinking clearly about biology and childhood adversity: Next steps for continued Progress. *Perspectives on Psychological Science, 17456916211031539*.

Rajendram, N., Gusi, P. R., & Olivares, R. (2010). *The EQ-5D health-related quality of life questionnaire*.

Riedl, D., Beck, T., Exenberger, S., Daniels, J., Dejaco, D., Unterberger, I., & Lampe, A. (2019). Violence from childhood to adulthood: The influence of child victimization and domestic violence on physical health in later life. *Journal of Psychosomatic Research, 116*, 68–74. https://doi.org/10.1016/j.jpsychores.2018.11.019

RStudio, T. (2015). *RStudio: Integrated development for R*. Boston, MA: RStudio, Inc.. http://www.rstudio.com

Sahle, B. W., Reavley, N. J., Li, W., Morgan, A. J., Yap, M. B. H., Reupert, A., & Jorm, A. F. (2021). The association between adverse childhood experiences and common mental disorders and suicidality: An umbrella review of systematic reviews and meta-analyses. *European Child & Adolescent Psychiatry*. https://doi.org/10.1007/s00787-021-01745-2

Schmid, M., Fegert, J. M., Clemens, V., Seker, S., d'Huart, D., Binder, M., … Bürgin, D. (2022). Misshandlungs- und Vernachlässigungserfahrungen in der Kindheit: Ein Risikofaktor für die soziale Teilhabe ehemals außerfamiliär platzierter junger Erwachsener. *Kindheit und Entwicklung, 31*(1), 22–39. https://doi.org/10.1026/0942-5403/a000366

Schmid, M., Fegert, J. M., Schmeck, K., & Boonmann, C. (2022). Was wird aus Care Leavern? *Kindheit und Entwicklung, 31*(1), 1–8. https://doi.org/10.1026/0942-5403/a000364

Schneider, F. D., Loveland Cook, C. A., Salas, J., Scherrer, J., Cleveland, I. N., Burge, S. K., … o. T.. (2020). Childhood trauma, social networks, and the mental health of adult survivors. *Journal of Interpersonal Violence, 35*(5–6), 1492–1514.

Shanahan, L., Hill, S. N., Gaydosh, L. M., Steinhoff, A., Costello, E. J., Dodge, K. A., … Copeland, W. E. (2019). Does despair really kill? A roadmap for an evidence-based answer. *American Journal of Public Health, 109*(6), 854–858. https://doi.org/10.2105/AJPH.2019.305016

Shiffman, S., Stone, A. A., & Hufford, M. R. (2008). Ecological momentary assessment. *Annual Review of Clinical Psychology, 4*, 1–32. https://doi.org/10.1146/annurev.clinpsy.3.022806.091415

Shonkoff, J. P., Boyce, W. T., Levitt, P., Martinez, F. D., & McEwen, B. (2021). Leveraging the biology of adversity and resilience to transform pediatric practice. *Pediatrics, 147*(2). https://doi.org/10.1542/peds.2019-3845

Slavich, G. M. (2020). Social safety theory: A biologically based evolutionary perspective on life stress, health, and behavior. *Annual Review of Clinical Psychology, 16*(1), 265–295. https://doi.org/10.1146/annurev-clinpsy-032816-045159

Smith, K. E., & Pollak, S. D. (2021). Rethinking concepts and categories for understanding the neurodevelopmental effects of childhood adversity. *Perspectives on Psychological Science, 16*(1), 67–93. https://doi.org/10.1177/1745691620920725

Southwick, S. M., Bonanno, G. A., Masten, A. S., Panter-Brick, C., & Yehuda, R. (2014). Resilience definitions, theory, and challenges: Interdisciplinary perspectives. *European Journal of Psychotraumatology, 5*(1), 25338. https://doi.org/10.3402/ejpt.v5.25338

Spinazzola, J., Hodgdon, H., Liang, L.-J., Ford, J. D., Layne, C. M., Pynoos, R., … Kisiel, C. (2014). Unseen wounds: The contribution of psychological maltreatment to child and adolescent mental health and risk outcomes. *Psychological Trauma Theory Research Practice and Policy, 6*(Suppl. 1), S18–S28. https://doi.org/10.1037/a0037766

Steele, B., Neelakantan, L., Jochim, J., Davies, L. M., Boyes, M., Franchino-Olsen, H., … Meinck, F. (2023). Measuring violence against children: A COSMIN systematic review of the psychometric and administrative properties of adult retrospective self-report instruments on child abuse and neglect. *Trauma, Violence & Abuse, 15248380221145912*.

Struck, S., Stewart-Tufescu, A., Asmundson, A. J. N., Asmundson, G. G. J., & Afifi, T. O. (2021). Adverse childhood experiences (ACEs) research: A bibliometric analysis of publication trends over the first 20 years. *Child Abuse & Neglect, 112*, Article 104895. https://doi.org/10.1016/j.chiabu.2020.104895

Sturmbauer, S. C., Shields, G. S., Hetzel, E. L., Rohleder, N., & Slavich, G. M. (2019). The Stress and Adversity Inventory for Adults (Adult STRAIN) in German: An overview and initial validation. *PLoS One, 14*(5), Article e0216419. https://doi.org/10.1371/journal.pone.0216419

Teicher, M. H., & Parigger, A. (2015). The "Maltreatment and abuse chronology of Exposure" (MACE) scale for the retrospective assessment of abuse and neglect during development. *PLoS One, 10*(2), Article e0117423. https://doi.org/10.1371/journal.pone.0117423

The EuroQol Group. (1990). EuroQol-A new facility for the measurement of health-related quality of life. *Health Policy, 16*(3), 199–208. https://doi.org/10.1016/0168-8510(90)90421-9

The Whoqol, G. (1998). The World Health Organization quality of life assessment (WHOQOL): Development and general psychometric properties. *Social Science & Medicine, 46*(12), 1569–1585. https://doi.org/10.1016/s0277-9536(98)00009-4

Ungar, M., & Theron, L. (2020). Resilience and mental health: How multisystemic processes contribute to positive outcomes. *The Lancet Psychiatry, 7*(5), 441–448. https://doi.org/10.1016/s2215-0366(19)30434-1

Wingenfeld, K., Schafer, I., Terfehr, K., Grabski, H., Driessen, M., Grabe, H., … Spitzer, C. (2011). The reliable, valid and economic assessment of early traumatization: First psychometric characteristics of the German version of the Adverse Childhood Experiences Questionnaire (ACE). *Psychotherapie, Psychosomatik, Medizinische Psychologie, 61*(1), e10–e14. https://doi.org/10.1055/s-0030-1263161 (Reliable, valide und okonomische Erfassung fruher Traumatisierung: Erste psychometrische Charakterisierung der deutschen Version des Adverse Childhood Experiences Questionnaire (ACE).)

Witt, A., Brown, R. C., Plener, P. L., Brahler, E., & Fegert, J. M. (2017). Child maltreatment in Germany: Prevalence rates in the general population. *Child and Adolescent Psychiatry and Mental Health, 11*(1), 47. https://doi.org/10.1186/s13034-017-0185-0

Witt, A., Munzer, A., Ganser, H. G., Fegert, J. M., Goldbeck, L., & Plener, P. L. (2016). Experience by children and adolescents of more than one type of maltreatment: Association of different classes of maltreatment profiles with clinical outcome variables. *Child Abuse & Neglect, 57*, 1–11. https://doi.org/10.1016/j.chiabu.2016.05.001

Witt, A., Sachser, C., Plener, P. L., Brahler, E., & Fegert, J. M. (2019). The prevalence and consequences of adverse childhood experiences in the German population. *Deutsches Ärzteblatt International, 116*(38), 635–642. https://doi.org/10.3238/arztebl.2019.0635