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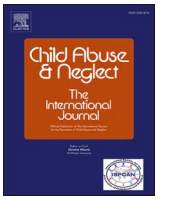

Invited Review

Adverse childhood experiences, mental health, and social functioning: A scoping review of the literature

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ABSTRACT

Background: Adverse childhood experiences (ACEs) negatively impact people's physical and mental health and social functioning. Research literature focuses on the impact of ACEs on physical and mental health, yet to our knowledge, no study has examined the literature on ACEs, mental health, and social functioning outcomes.
Objective: To map how ACEs, mental health, and social functioning outcomes have been defined, assessed, and studied in the empirical literature and identify gaps in the current research which need further investigation.
Methods: A scoping review methodology following a five-step framework was implemented. Four databases were searched CINAHL, Ovid (Medline, Embase) and PsycInfo. The analysis involved both numerical and a narrative synthesis in line with the framework.
Results: Fifty-eight studies were included in the analysis, and three key issues were identified a) the limitations of research samples to date, b) the choice of outcome measures for ACEs, social and mental health outcomes, and c) the limitations of current study designs.
Conclusion: The review demonstrates variability in the documentation of participant characteristics and inconsistencies in the definitions and applications of ACEs, social and mental health and related measurements. There is also a lack of longitudinal and experimental study designs, studies on severe mental illness, and studies including minority groups, adolescents, and older adults with mental health problems. Existing research is highly variable methodologically and limits our broader understanding of the relationships between ACEs, mental health, and social functioning outcomes. Future research should implement robust methodologies to provide evidence that could be used for developing evidence-based interventions.

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1. Introduction

Adverse childhood experiences (ACEs) are traumatic events that children and adolescents under 18 years of age have experienced (Crouch et al., 2019). ACEs cover a broad range of traumatic events, including physical and emotional neglect, physical, sexual, and emotional abuse, exposure to domestic violence, mental health problems, family incarceration, separation and substance misuse (Felitti et al., 1998). Various individual, family, and community factors can affect a child's likelihood of experiencing ACEs, such as living in unstable housing, having parents who have experienced ACEs, and growing up in communities with high levels of social and environmental dysfunction (CDC, 2021; Fagrell Trygg et al., 2019; Hargreaves et al., 2019; Walsh et al., 2019). Epidemiological research reveals that millions of children are affected by ACEs each year globally (Asmussen et al., 2020). A World Health Organization (WHO) study of 51,945 adults revealed that more than half of the respondents surveyed had experienced multiple ACEs and that ACEs were significantly associated with the risk of DSM-IV disorders across all countries (Kessler et al., 2010).

Research has long established the link between poor mental health outcomes and ACEs (Beilharz et al., 2020; McLafferty et al., 2019). People with a history of ACEs are at greater risk of experiencing a range of mental health problems, such as depression, bipolar disorder, suicide, and substance misuse (Fuller-Thomson et al., 2016; Leza et al., 2021; Merrick et al., 2017). Research has found an association between ACEs and alterations in adverse childhood experiences are associated with changes in biological systems. Children exposed to maltreatment showed smaller volume of the prefrontal cortex, greater activation of the hypothalamic-pituitary-adrenal (HPA) axis, and elevation in inflammation levels, while adults with a history of maltreatment showed smaller volume of the prefrontal cortex and hippocampus, greater activation of the HPA axis, and elevation in inflammation levels compared to non-maltreated individuals (Danese & McEwen, 2012).

Social functioning has also been identified as key in the relationship between ACEs and poor mental health outcomes (Herrenkohl et al., 2016; Hyland et al., 2019; McCrory et al., 2019). A meta-analysis of social measures (Valtorta et al., 2016) has established two dimensions of social relationships: objective (i.e., the structure and function of relationships) and subjective (i.e., involvement in relationships, perceived availability, perceived adequacy, feelings/emotions). People who are subjected to ACEs are more likely than their peers to experience difficulty developing healthy relationships due to lack of trust, poor emotional regulation skills, and maladaptive coping strategies (Poole et al., 2018). Consequently, ACEs are associated with increased social isolation (an objective deficiency in high-quality social relationships) and loneliness (a subjectively perceived gap between desired social contact and actual contact) in later life (Forster et al., 2020; Sheikh, 2018a, 2018b; Weber Ku et al., 2021). These two social functioning factors have been identified as mediators in the development of adult psychiatric morbidity for people with ACEs (Hyland et al., 2019; Shevlin et al., 2015). As research has established that loneliness and social isolation can hinder recovery from mental illness (Wang et al., 2018), these concepts have particular clinical relevance for mental health practitioners. A trauma-informed approach to clinical care takes into consideration the need to assess for ACEs and recognises the importance of the psychosocial aspects of recovery to ensure effective mental health care delivery (Oral et al., 2016; Ranjbar & Erb, 2019). Towards that aim, mental health policies (e.g., UK NHS Mental Health Implementation Plan 2019/20–2023/24) now recognise the development and implementation of trauma-informed care as a key priority for future mental health care services.

Recently published reviews have focussed on investigating the links between ACEs and health and measures and methods of ACEs in a broader context. For example, Hughes et al. (2017) systematically reviewed the effects of multiple ACEs on health and found associations between ACEs and various health outcomes, including mental ill health and substance abuse. Liu et al.'s (2021) systematic review and meta-analysis of the lifetime prevalence of ACEs in homeless people found an association between ACEs exposure, functional health and mental health problems. Karatekin et al. (2022) recently conducted a scoping review of the ACEs literature to determine the direction of current research and found that studies had predominantly focused on the effects of ACEs rather than on the causes of ACEs or how to prevent them from occurring (Karatekin et al., 2022). None of these reviews, however, focused solely on ACEs in people with mental health problems across the lifespan, nor the contribution of social functioning outcomes, such as loneliness and social isolation, in this population. There is, therefore, currently limited understanding of how ACEs are defined in the mental health literature, and a lack of clarity as to the types of mental health problems and social functioning outcomes most often examined in ACEs research. Whilst the literature has yet to be comprehensively reviewed, the breadth and potential heterogeneity of ACEs research may make it challenging to conduct a meta-analytic review in this area. Given this, an initial scoping review was considered an appropriate way to map research in mental health, social functioning outcomes and ACEs, as well as to also identify gaps and limitations to date, and provide guidance on what research is needed to advance the field (Levac et al., 2010).

2. Methods

2.1. Scoping review procedure

A scoping approach provides a preliminary assessment of the research area with the aim of identifying and determining the nature and extent of research literature in a particular area (Grant & Booth, 2009). This scoping review follows the five-step framework set out by Arksey and O'Malley (2005) (adapted by Levac et al., 2010): namely, stage 1) Identify the research question, stage 2) Identify relevant studies (search strategy), stage 3) Select studies, stage 4) Chart the data (data extraction) and stage 5) Collate, summarise, and report results.

Stage1

Targeted research questions being developed to guide the scoping review:

1. How have the concepts of ACEs, mental health and social functioning outcomes been operationalised and assessed in the empirical literature?
2. What are the gaps and limitations in current research, and which areas require further investigation?

Stage 2

CINAHL, Ovid (Medline, Embase), and PsycInfo databases were searched from 1996 until March 2022. A comprehensive search strategy was developed combining the three concepts of ACES, mental health and social functioning outcomes. Boolean operators "OR" and "AND" were used to combine these concepts. Each term used was searched as a keyword to find precise and relevant results. In Medline, the following strategy was used: (Adverse childhood experience OR childhood adversity OR ACEs) AND (Trauma OR traumatic life event*) AND (social isolation OR loneliness OR social support OR social network) AND (mental health OR mental disorder* OR mental health problem* OR mental illness OR mental health outcome* OR chronic mental illness OR mentally ill). Searches were adapted for each database. The search was filtered to only include English language studies. Only empirical studies were included, and therefore systematic reviews, literature reviews, opinion/commentary papers, editorials, dissertations, and conference papers were excluded. All study designs were included. Grey literature and social work literature were not searched due to the capacity challenges of retrieving high volumes of evidence for synthesis in this field (Adams et al., 2016).

Stage 3

Paper screening and selection were conducted using a two-step process (Fitzpatrick & Tzouvara, 2018) with identified papers being assessed against study inclusion and exclusion criteria (Table 1). Firstly, the titles, and abstracts, where available, were screened independently by three members of the research team (UF, VT, PK). Secondly, full-text screening was performed for identified studies where it was not possible to decide using the title and abstract. Full texts were read independently by three members of the research team, and discrepancies were resolved by discussion to reach a consensus (VT, UF, PK). After screening, a total of 58 studies were included in the review. See PRISMA diagram for full details of process (Fig. 1). Covidence software was used for screening and selection procedures (www.covidence.org).

Stage 4

The research team (VT, ML, UF, KW, PK) independently extracted data from the 58 studies using an extraction tool. The extraction tool included general study information (title, author, year, country, research aims), methodology (study design, power calculation, size, sampling method, sample characteristics, setting), measures (ACEs, mental health, social functioning, tool validity), and results (future steps/gaps in knowledge, limitations, and summary of outcomes).

Stage 5

The purpose of the synthesis was to understand how concepts of ACEs, mental health, and social functioning had been defined, operationalised and assessed. A narrative synthesis aligned with Popay et al.'s (2006) framework was employed to ensure transparency and trustworthiness. First, studies were tabulated and numerically categorised by type of study design, year of publication, country of investigation, population characteristics, and the measures and constructs employed to study ACEs, social functioning and mental health outcomes. As part of this process, textual descriptions of each study were also generated including key study findings, strengths, and limitations. This was followed by creating a common framework/rubric which organised the studies in relation to the main research questions of concept operationalisation (ACES, mental health, social functioning outcomes) measurement and scope, and facilitated further comparison between studies to explore overall variability in outcomes, designs, populations and settings.

Table 1
PEO framework & Inclusion and exclusion criteria.

	Inclusion criteria	Exclusion criteria
Population	Children and adult populations across the lifespan.	Institutionalized children/populations (e.g., long-term facilities / assisted facilities, prisoners, offenders, programmes for offenders etc) and homeless populations.
Exposure	ACES exposure*: Physical abuse, emotional abuse, sexual abuse, physical neglect, emotional neglect, household dysfunction: mental health issues, family members in prison, parents with alcohol/drug abuse problem, presence of domestic abuse, separation/disappearance of parent. *Informed by ACES definition by Felitti et al. (1998)	Research not related to conventional ACES e.g., trauma related to physical illness, Intergenerational trauma (e.g., trauma that passes from generation to generation), secondary trauma, and vicarious trauma.
Outcomes	Social functioning outcomes using validated or non-validated measures of objective or subjective social relationships: social isolation, social network measures, social/emotional loneliness, perceived social / emotional support. Mental health outcomes including validated/non-validated (including self-reported) measures of measures of mood disorders, anxiety disorders, personality disorders, psychotic disorders, and PTSD symptoms.	Only examined self-harm *without* other mental health outcomes. Focussed on post-partum depression.

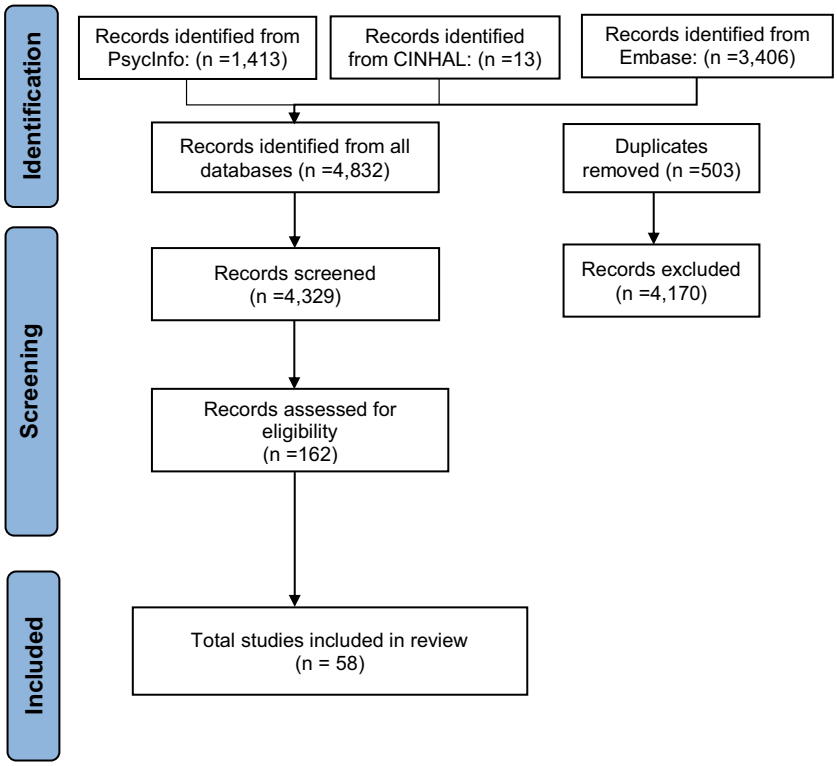

Fig. 1. PRISMA diagram.

3. Results

Fifty-eight studies met the eligibility criteria and were included in the analysis. A full description of study characteristics can be viewed in Table 2.

3.1. Countries & publication dates

Most studies were conducted in the USA (n = 28), followed by the UK (n = 6), Canada (n = 5), China (n = 5), Norway (n = 5), Ireland (n = 2), and Australia, the Netherlands, Germany, Japan, Israel, Turkey, Peru, and Japan with one study for each country. Most studies were (70.7 %) conducted between 2016 and 2021, 20.7 % were conducted between 2009 and 2015, and only 8.62 % were conducted between 2002 and 2007.

3.2. Study designs

The most common study design reported across this review was cross-sectional survey methods (n = 42), followed by cohort studies (n = 7), longitudinal studies (n = 5), experimental studies (n = 1), and secondary data analysis (n = 1), cross-lagged studies (n = 1) and one qualitative study.

Most studies were conducted with the general population or community samples (n = 41). Fourteen took place in medical or psychological settings, such as gynaecological or therapy clinics. Other settings included victim services, children's services, and a detention centre. Twenty studies used data collected as part of a larger population survey, such as the Canadian Community Health Survey (Su et al., 2020), the Longitudinal Investigation of Sexual Abuse study (Steine et al., 2020), and the Northern Ireland Study of Health and Stress (McLafferty et al., 2019). Out of all 58 studies, only two reported a power calculation to justify their sample size (Wong et al., 2019; Zhao et al., 2019).

3.3. Sample characteristics

Most studies focused on adult populations (n = 36), twelve on children and adolescent populations and a further three focused on older adults (over 65 years). The total range of mean ages reported was eight to 101 years. Eighteen studies reported no age range for the sample, while two studies reported no age range nor age group. Seven of the studies had only female participants. Of the remaining

Table 2
Characteristics of included studies.

Author, country	Aim	Study design	Sample size (n)	Population: age & age group	Population: gender & race/ ethnicity	Setting	ACEs	Mental health problems	Social outcomes	Key findings	Gaps/future studies
1.Aydin et al. (2016), Turkey	To investigate the effect of perceived social support on depression and PTSD in child victims of sexual abuse and to determine the relationship between them.	Cross-sectional survey	182	Mean (SD) = 13.93 (2.25) years Age range: 6–18 years	Female = 159 (87.4 %) Male = 23 (12.6 %) Race/ Ethnicity: N/R[a]	Ondokuz Mayis University Faculty of Medicine Forensic Medicine Department Respondents from various provinces in Turkey	• General Physical Examination [α = N/R] • Psychiatric and Psychosomatic Interview [α = N/R]	• Children's Depression Inventory [α = N/R] (self-report) • Child Post-Traumatic Stress Reaction Index [α = N/R] (semi-structured)	• Perceived Social Support Scale-Revised [In this study (α = 0.93)]	Girls had significantly higher median Children's Depression Inventory (CDI) and Child Posttraumatic Stress Reaction Index (CPTS-RI) scores than boys, while no significant difference was determined between boys and girls in terms of Perceived Social Support Scale-Revised (PSSS-R) scores. In addition, a statistically significant negative correlation was determined between CDI and PSSS-R scores, CPTS-RI scores and PSSS-R scores in girls, while no significant correlation was identified in male victims. Perceived social support in girls was observed to bestow a greater psychological benefit compared to boys.	Further studies are needed to determine the sub-factors involved in the differences exhibited by perceived social support in reducing psychological symptoms for the male and female gender, that social support needs to be increased and expanded for both genders, and that priority must be attached to protective approaches.
2.Baiden et al. (2017), Canada	To examine the effect of social support and disclosure of child abuse to Child Protection Service on lifetime suicidal ideation among Canadian adults who were abused when they were children.	Cross-sectional survey	9067	Mean = N/R Age range: 20–79 years	Female = 4619 (50.9 %) Male = 4457 (49.1 %) Race/ Ethnicity: White: 83.7 % Non White: 16.3 %	The Statistics Canada 2012 Canadian Community Health Survey–Mental Health (CCHS-MH) Respondents experienced at least one child abuse event	• Six items on child abuse experience [α = N/R]	• One question on suicidal ideation [α = N/R] (N/R) • World Health Organization version of the Composite International Diagnostic Interview [α = N/R] (diagnostic interview)	• Social Provision Scale [In this study (α = 0.93)]	Social support interventions that are effective in improving individuals' perception that support is available to them may help reduce suicidal ideation among those with a history of child abuse.	Additional studies are needed to examine the kind of mental health treatment individuals receive following disclosure in Ontario and whether this treatment has an impact on functioning in adulthood. Future studies should investigate the effect of poly victimization on suicidal ideation.
3.Beilharz et al. (2020), Australia	To investigate how childhood trauma may impact	Cross-sectional survey	111	Trauma group: Mean (SD) = 22.3 (4.9)	Female = 71 (64 %) Male = 40 (36	The Sydney Infections Outcomes Study (SIOS)	• The Childhood Trauma Questionnaire Short	• Kessler Psychological Distress Scale (K10) (self-	• Duke-UNC Functional Social Support	Childhood trauma and some trauma subtypes were significantly	Future studies would benefit from employing a

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Table 2 (*continued*)

Author, country	Aim	Study design	Sample size (n)	Population: age & age group	Population: gender & race/ ethnicity	Setting	ACEs	Mental health problems	Social outcomes	Key findings	Gaps/future studies
	physical and psychological health, sleep quality and autonomic function in a non-clinical community sample of adults.			years Control group: Mean (SD) = 21.65 (4.5) years Age range: N/R Age group: 18+	%) Race/ Ethnicity: N/R (not reported)	Community & Medical clinics	Form (CTQ-SF) (In addition, a three-item Minimization and Denial (MD) subscale is incorporated into the CTQ-SF)	report) • Perceived Stress Questionnaire (PSQ) (self-report) • Medical Outcomes Short Form 36 (SF-36) (self-report) • Pittsburgh Sleep Quality Inventory (PSQI) (self-report) • Somatic and Psychological Health Report (SPHERE) (PSYCH and SOMA subscales) (self-report) • Questionnaire upon waking on sleep and wake time and sleep quality (self-report)	Questionnaire (DFSS)	correlated with a myriad of negative physiological and physical health outcomes including elevated psychological distress, increased sleep disturbances, reduced emotional wellbeing and lower perceived social support. Autonomic dysregulation was found in those with high levels of childhood trauma, which was reflected in an increased stress response to laboratory tasks. The experience of physical abuse in childhood was significantly associated with alterations in nocturnal heart rate and heart rate variability.	longitudinal, prospective design. Longitudinal cohorts would permit better examination of the full extent and the time course of adverse effects resulting from the experience of Childhood trauma (CT). A larger study sample size would improve statistical power to conduct further subgroup analyses for the different types of CT, especially for Physical Abuse (PA) and Sexual Abuse (SA).
4.Boyda & McFeeters (2015), UK	To examine social functioning and loneliness as potential mediating pathways between early adverse experience and psychosis.	Cross-sectional survey	7403	Mean (SD) = 46 (18.6) years Age range: N/R Age group: 16+	Female = 3801 (51.4 %) Male = 3602 (48.6 %) Race/ Ethnicity: Ethnic Minority Group = 13.7 %	The Adult Psychiatric Morbidity Survey (APMS) 2007 Household-population based survey	• Adult Psychiatric Morbidity Survey (APMS; 2007) - Domestic Violence and Abuse Section, Stressful Life Events Section, Social Support Section [α = N/R] • Two items on parental separation [α = N/R] • Two items on neglect [α = N/R]	• One item on drug dependence [α = N/R] (N/R) • Psychosis Screening Questionnaire (PSQ) (hallucination item which focused solely on more commonly encountered auditory experiences excluded) [α = N/R] (N/R) • Clinical Interview Schedule Revised [α = N/R] (diagnostic interview)	• Two items on social engagement [α = N/R] • One item on loneliness [α = N/R]	Maltreatment was associated with both social functioning deficits as well as psychotic symptomology. Social functioning was found to mediate the relationship between maltreatment and psychosis. The results align with literature linking maltreatment to both social functioning deficits and psychosis.	There is a need for a complete post-abuse evaluation that covers not only the most severe forms of maltreatment and trauma-related symptoms but also incorporates an assessment of the child's social capabilities. Relationship-based interventions may prove effective to relational memories while social skills training is reported to be effective in improving the social interactions of children who present with a variety of problems. Early

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Table 2 (*continued*)

Author, country	Aim	Study design	Sample size (n)	Population: age & age group	Population: gender & race/ ethnicity	Setting	ACEs	Mental health problems	Social outcomes	Key findings	Gaps/future studies
											detection tools coupled with appropriate intervention strategies which enhance social capacities may act as a buffer against poor mental health and abate the decline towards psychopathology in the long term.
5.Brinker & Cheruvu (2016), USA	To validate the stress-buffering model in an ACE population, which is documented in other non-ACE populations.	Cross-sectional survey	12,487	Mean (SD) = 45 (N/R) years Age range: N/R Age group: 18+	Female = 7482 (50.9 %) Male = 5005 (49.1 %) Race/ Ethnicity: White Non-Hispanic = 81.1 %	The 2010 Behavioural Risk Factors Surveillance System (BRFSS) Five states: Hawaii, Nevada, Ohio, Vermont, and Wisconsin	• Behavioural Risk Factor Surveillance System (BRFSS) ACE Module [α = N/R]	• Eight-item Patient Health Questionnaire (PHQ-8) - Depression Scale [α = N/R] (N/R)	• One item on perceived and emotional support [α = N/R]	A significant negative association between Perceived social and emotional support (PSES) and current depression after controlling for all potential confounders. Among adults with ACE, PSES significantly reduced the likelihood to report current depression by at least 53 % and as high as 92 %. 7.5 % of adults who reported at least one ACE reported that they rarely/never received social and emotional support. Those who reported that they rarely/never received social and emotional support were significantly older (50.2 years of age), predominantly male (62.9 %), had less than high school education (56.9 %), were single (52.7 %), currently not employed (59.2 %), reported fair/poor general health (37.0 %), did not exercise (45.8 %) when compared to those who reported that	Future studies should assess the protective role of actual support received against current depression and if it is modified by the type of ACE or ACE score.

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Table 2 (*continued*)

Author, country	Aim	Study design	Sample size (n)	Population: age & age group	Population: gender & race/ ethnicity	Setting	ACEs	Mental health problems	Social outcomes	Key findings	Gaps/future studies
										they always or usually/sometimes received social and emotional support. The association between PSES and current depression was not altered by the type of ACE category or the ACE score.	
6.Cheong et al. (2017), Ireland	To examine whether three ACE subtypes (abuse, neglect and household dysfunction) are related to later-life depressive symptoms, and if so, whether these associations vary across levels of perceived social support.	Cross-sectional survey	2047	Baseline: Mean (SD) = 55.8 (N/R) years Age range: 50–69	Female = N/R (51 %) Male = N/R (49 %) Race/ Ethnicity: N/R	The Livinghealth Clinic in Mitchelstown Patients attending the Clinic	• Center for Epidemiologic Studies ACE Questionnaire [α = N/R]	• Center for Epidemiologic Studies - Depression Scale (CES—D) [α = N/R] (N/R)	• 3-item Oslo Social Support Scale (OSS-3) [α = N/R]	ACEs are common among older adults in Ireland and are associated with higher odds of later-life depressive symptoms, particularly among those with poor PSS. Interventions that enhance social support, or possibly perceptions of social support, may help reduce the burden of depression in older populations with ACE exposure, particularly in those reporting abuses.	Further research on the implementation and efficacy of such interventions is indicated. Further work on how this can be implemented effectively in primary care and medical training is urgently needed.
7.Cosco et al. (2018), UK	To examine the relationship between multiple childhood psychosocial adversities and later-life mental health captured on multiple occasions.	Longitudinal population-based birth cohort study	2638	Mean (SD) = N/R Age range: 53–69 years Age groups: Age 53 = 2785 Age 60–64 = 2215 Age 68–69 = 1630	Female = 1410 (50.63 %) Male = 1375 (49.37 %) Race/ Ethnicity: N/R	The Medical Research Council National Survey of Health & Development: nationally-representative birth cohort study	• Prospective & retrospective items on childhood psychosocial adversities [α = N/R]	• General Health Questionnaire (GHQ-28) [α = N/R] (N/R)	• Six items on positive and negative support [α = N/R] • Seven items on neighbourhood cohesion [In this study (α = 0.86)]	Greater adversity was associated with an average General Health Questionnaire (GHQ-28) score increase of 0.017, per unit of adversity (β = 0·017, $p < 0·001$, 95 % CI 0·011, 0·022). Lower mental distress was associated with higher levels of physical activity, occupational status, education, social support, and neighbourhood cohesion. There was no evidence that resources moderated the relationship between GHQ-28 and adversity. All	Longitudinal studies or in-depth interviews regarding early experiences to examine inconsistencies may reduce potential bias in a retrospective recall. Additional well-being measures such as quality of life or life satisfaction should be investigated.

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Table 2 (*continued*)

Author, country	Aim	Study design	Sample size (n)	Population: age & age group	Population: gender & race/ ethnicity	Setting	ACEs	Mental health problems	Social outcomes	Key findings	Gaps/future studies
										resources, save for physical activity and occupational status, partly mediated this relationship.	
8.Dion et al. (2016), Canada	To determine (1) the psychological distress trajectory over a 10-year period, from adolescence to emerging adulthood; (2) the effect of gender; (3) the unique contribution of three different forms of child maltreatment experienced in childhood (prior to age 14) namely sexual, physical and exposure to partner violence, (4) their cumulative effect, and (5) friend support at age 14 on this trajectory.	Longitudinal study	605	Mean (SD) = N/R Age range: 14–24 years	Gender: N/R Race/ Ethnicity: N/R	Public and private high schools in Saguenay–Lac-St-Jea, Canada Data from the first four waves: 2002, 2004, 2006 & 2012	• Three items on child maltreatment and a follow up question [α = N/R]	• Psychological Distress Index (14 item version) [In this study - four data collections (α = from 0.88 to 0.91)] (N/R)	• Four items developed by Bellerose et al. (2002) on friend support [In this study (α = 0.62)]	Psychological distress followed a significant decreasing curvilinear trajectory, with participants reporting fewer distressing psychological symptoms after 18 years. All three forms of child maltreatment, as well as their cumulative effect, predicted more psychological distress over 10 years above and beyond the protective effect of support from friends. Higher support from friends at age 14 was related to lower distress at baseline and over 10 years, beyond the effect of child maltreatment.	Future studies of the longitudinal course of psychological distress in maltreated youth should strive to assess manifestations of psychological distress that are relevant to females and males.
9.Elzy (2011), USA	To explore the potential for social support to act as a moderator between child sexual abuse and borderline personality disorder and to thereby identify a possible modifiable aspect to target for intervention.	Correlational study	290	Mean (SD) = 20 (N/R) years Age range: 18–35 years	Female: 290 (100 %) Race/ Ethnicity: Caucasian = 53 % African American = 19 % Latino/ Hispanic = 15 % Multiracial = 5 % Asian American = 4 % Other = 3 %	A major southeastern university Undergraduate students	• Early Sexual Experiences (ESE) Questionnaire (Modified) [α = N/R] • Two items from the Life Stressor Checklist-Revised (LSC-R; modified for use in the Women, Co-Occurring Disorders, and Violence Study) [α = N/R]	• Inventory of Altered Self-Capacities (IASC) [α = N/R] (self-report)	• The Quality of Relationships Inventory (QRI) - Support & Depth Subscales [α = N/R] • The Unsupportive Social Interactions Inventory (USII) [α = N/R]	Childhood sexual abuse (CSA) and low social support were both positively correlated with borderline personality features. The number of emotionally invalidating responses from the participants' most supportive relationship was associated with higher levels of Borderline Personality Disorder (BPD) features; however, the level of positive social support received from this primary support source was not related to these features.	The need for future research to explore the role of validating and invalidating responses in the treatment of CSA survivors. It would be helpful to examine patients with BPD to determine whether the results of this study can be generalized outside of the particular sample used in this study. It would also be helpful to look at other variables that relate to BPD in adulthood. One example mentioned

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Table 2 (*continued*)

Author, country	Aim	Study design	Sample size (n)	Population: age & age group	Population: gender & race/ ethnicity	Setting	ACEs	Mental health problems	Social outcomes	Key findings	Gaps/future studies
										Participants were likely to rate this relationship as supportive unless they felt that they had no person who supported them during the specified time in their life. In allowing participants to self-select a primary source of support, no differences were observed between a general level of support from this person and CSA or BP features. People who endorsed higher levels of BP features also reported significantly higher levels of invalidating responses at the time of their CSA or stressful life event. Participants who experienced CSA reported significantly higher levels of the bumbling type of invalidating responses.	earlier would be to explore the relationship between CSA experiences and invalidating environmental experiences. One future direction that could substantially impact the research in the area of CSA would be to develop a comprehensive assessment of CSA that objectively and subjectively measures specific abuse characteristics. Finally, perhaps the most crucial need in this area of research is longitudinal design studies.
10.Esposito & Clum (2002), USA	To examine the relationship between childhood abuse, social support, and problem-solving appraisal within a juvenile delinquent sample.	Cross-sectional survey	200	Mean (SD) = 15.7 (N/R) years Age range: 12–17 years	Female = 59 (N/R) Male = 141 (N/R) Race/ Ethnicity: Caucasian = 65 % African American = 27 % Other (Hispanic, Asian/Pacific, Mulatto, Indian) = 7 %	Three Juvenile detention centres	• Child Abuse Survey (CAS) (modelled after the Child Maltreatment Survey) [α = N/R]	• Modified Scale for Suicidal Ideation (MSSI) [In this study (α = 0.96)] (self-report) • Scale for Suicidal Behaviour (SSB) [In this study (α = 0.95)] (self-report) • Problem-Solving Inventory - Perceived Confidence Scale [In this study (α = 0.72)] (self-report)	• Social Support Questionnaire 6 (SSQ-6) [α = N/R]	Childhood sexual abuse was found to be an independent predictor of suicidal ideation and behaviour. Both problem-solving confidence and social support moderated the relationship between childhood abuse and suicidal ideation. The results of this study underscore the importance of both problem-solving appraisal and social support for suicidality	The results of this study are generalizable only to delinquent adolescents. It is possible that adolescents from the general population would respond differently than those with conduct disordered behaviour. These are questions that deserve study in future research.

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Author, country	Aim	Study design	Sample size (n)	Population: age & age group	Population: gender & race/ ethnicity	Setting	ACEs	Mental health problems	Social outcomes	Key findings	Gaps/future studies
11.Forster et al. (2020), USA	To examine if the relationships between classes of family-based adversity and non-suicidal self-injury NSSI, suicidal ideation, and suicide attempt were consistent across younger (9th grade) and older (11th grade) adolescents.	Cross-sectional survey	73,648	9th Grade: Mean (SD) = 14 (0.52) years 11th Grader: Mean (SD) = 17 (1.02) years Age range: 5–18 years	9th Grade: Female = 19,952 (50.28 %) Male = N/R 11th Grade: Female = 16,993 (50.03 %) Male = N/R Race/ Ethnicity: 9th Grade 11th Grade Non-Hispanic White = 69 % 73 % Hispanic = 9 % 8 % Non-Hispanic Black = 6 % 6 % Pacific Islander (N—H) = 6 % 6 % American Indian (N—H) = 1 % 1 % Multiple Race = 9 % 6 %	The 2016 Minnesota Student Survey in284 schools 9th & 11th Students	• Six questions adapted from the original adverse childhood experiences study (Felitti et al., 1998) [α = N/R]	• One question on non-suicidal self-injury [α = N/R] (self-report) • One question on suicidal ideation [α = N/R] (self-report) • One question on suicide attempts [α = N/R] (self-report) • Patient Health Questionnaire-2 [α = N/R] (N/R)	• Four items on teacher support from Appleton et al.'s (2006) Teacher-Student Relationships Scale from the Student Engagement Instrument [In this study (α = 0.85)] • One item on peer support [α = N/R]	in adolescents with a history of abuse. Although membership in the parent dysfunction plus maltreatment class was associated with the highest odds of NSSI, suicidal ideation, and suicide attempt, membership in either class of familial adversity elevated the risk for these behaviors compared to membership in the low or no adversity class. Peer and teacher social support can promote positive outcomes even for youth living in stressful family conditions and the protective effects of social support increase as the number of sources of support expands.	To advance our understanding of school-based sources of social support future work should consider using more robust tools to assess these constructs.
12.Gallus et al. (2015), USA	To provide a better understanding of the key factors that mitigate the relationship between early life interpersonal trauma experiences and depressive symptoms in early adolescence.	Cross-sectional survey	1615	Mean (SD) = N/R Age range: 5–18 years	Female = 816 (N/R) Male = 779 (N/R) Race/ Ethnicity: Hispanic = 43 % Black = 32 % White = 22 %	Urban School in the South Central United States 7th Grade Students	• (7-item modified version) Traumatic Events Screening Inventory–Child Report Form (TESI-CRF) [α = N/R]	• (10-item version) Center for Epidemiologic Studies–Depression Scale (CES—D) [In this study (α = 0.76)] (N/R)	• Four items on parent connectedness adapted from measures of parental care and support used in prior survey research with adolescents (Resnick et al., 1997) [In this study (α = 0.72)] • Four items on school connectedness [In this study (α = 0.77)]	Greater parent and school connectedness are associated with reduced depressive symptoms, and there was a moderating effect for parent connectedness. The protective effect of parent connectedness is diminished at high levels of trauma exposure.	Future longitudinal research is needed to fully understand the factors that increase risk and resilience for adolescents who experience trauma, as well as the causal mechanisms linking trauma exposure, social support, and depressive symptoms over time. Future studies would benefit from the use of additional measures to capture various domains of

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Author, country	Aim	Study design	Sample size (n)	Population: age & age group	Population: gender & race/ ethnicity	Setting	ACEs	Mental health problems	Social outcomes	Key findings	Gaps/future studies
											depressive symptoms and maladaptive coping.
13.Gayer-Anderson et al. (2015), UK	To investigate the relationships between childhood sexual and physical abuse and adult psychosis, and gender differences in levels of perceived social support.	Secondary analysis of a survey	468	Mean (SD) = N/R Age range: 16–65 years	Cases Control Female = 102 (50.5 %) 161 (60.5 %) Male = 100 (49.5 %) 105 (39.5 %) Race/ Ethnicity: Cases Control White British: 53.0 % 73.3 % Other: 47.0 % 26.7 %	The Aetiology and Ethnicity in Schizophrenia and Other Psychoses (AESOP) study A multi-centre population-based incidence and case-control study of first-episode psychosis	• The Childhood Experience of Care and Abuse Questionnaire (CECA. Q) [α = N/R] • Family Interview for Genetic Studies (FIGS) [α = N/R]	• Psychosis Screening (N/R)	• The Significant Others Scale (SOS) [α = N/R] • Medical Research Council (MRC) Socio-demographic Schedule [α = N/R]	There was evidence of an interaction between severe physical abuse and levels of support (namely, number of significant others; likelihood ratio test $x^2 = 3.90$, $p = 0.048$). When stratified by gender, there were no clear associations between childhood physical or sexual abuse, current social support and odds of psychosis in men. For women, the highest odds of psychosis were generally found in those who reported severe abuse and low levels of social support in adulthood. Tests for interaction by gender did not reach conventional levels of statistical significance.	Future research would benefit from investigating the resilience effects of social support earlier on in the developmental trajectory in those with and without a history of childhood adversity. In addition, future research would benefit from the use of larger samples in order to allow firmer conclusions to be drawn.
14.Haahr-Pedersen et al. (2020), USA	To determine if distinct profiles of childhood adversities exist for males and females and to examine if unique associations exist between the resultant latent profiles of childhood adversities and multiple indicators of mental health and social and emotional wellbeing in adulthood.	Cross-sectional survey	1839	Mean (SD) = 44.55 (14.89) years Age range: 18–70 years	Females = 956 (52.0 %) Males = 883 (48.0 %) Race/ Ethnicity: White, Non-Hispanic = 63.8 % Hispanic = 16.9 % Black Non-Hispanic = 11.8 % Other Non-Hispanic = 6.3 % Races, Non-	A nationally representative household sample Non-institutionalized adults currently residing in the US	• Adverse Childhood Experiences Questionnaire [α = N/R]	• Eight-item Patient Health Questionnaire (PHQ-8) - Depression Scale [In this study (α = 0.93)] (N/R) • Generalized Anxiety Disorder 7-item Scale (GAD-7) [In this study (α = 0.94)] (N/R) • The International Trauma Questionnaire (ITQ) [In this study (α = 0.92)] • Five-item World Health Organization Wellbeing Index (WHO-5) [In this study (α = 0.93)]	• Six-item De Jong Gierveld Loneliness Scale [In this study (α = 0.81)]	21 % of males and 39 % of females in the US population have been exposed to multiple ACEs in their first 18 years of life. Females were significantly more likely than males to report a range of ACEs and mental health, social, and emotional difficulties in adulthood. The analysis also indicated more complexity and variation in ACE exposures among females. For males and females, ACEs	Recognition of sex differences in patterns of childhood adversity may offer unique insights into why females are more likely to develop multiple internalizing psychiatric disorders than males during adulthood. However, replication with other populations is needed before definitely concluding that females have more complex

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Author, country	Aim	Study design	Sample size (n)	Population: age & age group	Population: gender & race/ ethnicity	Setting	ACEs	Mental health problems	Social outcomes	Key findings	Gaps/future studies
					Hispanic = 1.3 %					were strongly associated with poorer mental health, and emotional, and social outcomes in adulthood. Among females, growing up in a dysfunctional home environment was a significant risk factor for adverse social outcomes in adulthood.	patterns of ACE exposures.
15.Haj-Yahia et al. (2019), Israel	To examine the relationship between witnessing interparental violence and experiencing parental violence during childhood and adolescence on the one hand, and post-traumatic stress symptoms (PTSS) during young adulthood on the other.	Cross-sectional survey	516	Mean (SD) = 24.9 (2.7) years Age range: 19–35 years	Female = N/R (90.7 %) Male = N/R (9.3 %) Race/ Ethnicity: Jews = 91.5 % Arabs = 8.5 %	Undergraduate students of social work in Israel	• (Revised version) Conflict Tactics Scale (CTS) [α = N/R]	• (30-item version) Trauma Symptom Checklist (TSC-33) [In this study (α = 0.91)]	• The Provision of Social Relations (PSR) Scale [In this study (α = 0.93)]	Exposure to each pattern of family violence (i.e., witnessing interparental violence and experiencing parental violence) predicted higher levels of PTSS. Social support was found to partially mediate the relationship between exposure to family violence during childhood and adolescence and current post-traumatic stress symptoms (PTSS) as well as its four symptoms, i.e., depression, sleep disturbance, dissociation, and anxiety.	In future studies better sampling strategies should be employed that can facilitate reaching large enough subsamples. Future research can examine witnessing of other patterns of violence (i.e., father-to-mother and father-to-siblings, etc). Furthermore, exposure to the above-mentioned types of abuse and neglect can be examined more comprehensively, rather than solely focusing on Physical Violence (PV) and Psychological aggression (PA). Future studies should ask participants to report about their exposure to the above-mentioned patterns of family violence, as well as other types and patterns of family violence during more concrete periods of life (e.g., early childhood, latency,

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Author, country	Aim	Study design	Sample size (n)	Population: age & age group	Population: gender & race/ ethnicity	Setting	ACEs	Mental health problems	Social outcomes	Key findings	Gaps/future studies
											adolescence, and early young adulthood). Data on this exposure should also be obtained from one of the participants' siblings, from one of their parents, and/or from other significant figures in the family. In addition, we believe that it would be of great value to examine additional characteristics of family violence such as the chronicity and severity of violent acts, as well as different aspects of social support such as the types, source, and frequency of social relationships. Interventions like cognitive-behavioural therapy and health promotion strategies are potentially viable. Because many survivors of abuse have experienced failed relationships, attention may also need to be focused on redressing the emotional hardship and disappointment that those earlier relationships caused. Helping survivors learn cognitive strategies that promote positive coping is also important to help them contend with past loss as well as
16.Herrenkohl et al. (2016), USA	To explore whether safe, stable, and nurturing relationships (SSNRs), characterized by warm and nurturing relationships, emotional and instrumental supports, and environmental stability (e.g., fewer caregivers, residence, and school changes), moderate or mediate the effect of physical, emotional, and sexual child abuse on adult physical and mental health.	Prospective cohort study	457	Mean (SD) = 36 (N/R) years Age range: 31–41 years	Female = 209 (46 %) Male 248 (54 %) Race/ Ethnicity: White = 80.7 % Black of African American = 5.3 % American Indian or Alaska Native = 1.3 % Native Hawaiian or Other Pacific Islander = 0.2 % Hispanic or Latino = 7 % More than one race = 11.2 % Ethnicity	The Lehigh Longitudinal Study Child welfare agencies for abuse and neglect caseloads, Head Start centres and daycare and nursery programs in the same two-county, mostly suburban area.	• Parents' reports of their own and others' disciplining practices used with children prior to the preschool and school-age waves of the study [α = N/R] • Youth and adult reports on sexual abuse [α = N/R]	• Items from the Short-Form Health Survey (SF-36) on the impacts of emotional problems on work and other daily activities [In this study (α = 0.84)] • Patient Health Questionnaire - Somatic Symptoms Severity Scale [In this study (α = 0.85)] • A measure of adult health history based on a count of the number of health problems and illnesses including alcohol problems [α = N/R]	• Safe, stable and nurturing relationships (SSNRs) social support indicators were modelled as latent variable indicators of a second-order latent construct [α = N/R]	Child abuse predicted outcomes indirectly through social support. Results suggest that social support may help explain the association between child abuse and health outcomes in midlife. However, a test of variable moderation for child abuse and social support was non significant.	

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Author, country	Aim	Study design	Sample size (n)	Population: age & age group	Population: gender & race/ ethnicity	Setting	ACEs	Mental health problems	Social outcomes	Key findings	Gaps/future studies
					unknown = 1.3 %						stressful events in the future
17.Lin et al. (2018), USA	To examine if child maltreatment (CM) is associated with worse health-related quality of life (HRQoL) in midlife women and if the association is mediated by psychosocial factors.	Prospective cohort study	443	Mean (SD) = 52.4 (2.6) years Age range: 42–52 years	Female = 443 (100 %) Race/ Ethnicity: White = 67 % Black = 33 %	The Mental Health ancillary study (MHS) at the Pittsburgh site Community	• Childhood Trauma Questionnaire (CTQ-SF) [α = N/R]	• The Short Form 36 Health Survey Questionnaire (SF-36) [α = N/R] • The Structured Clinical Interview for the Diagnosis (SCID) of DSM-IV Axis I Disorders [α = N/R] • Center for Epidemiologic Studies - Depression Scale (CES—D) [α = N/R] • Self-report for sleep problems [α = N/R] • Self-report for lifetime treatment for emotional problems [α = N/R] • Spielberger Trait Anger and Anxiety Scales [α = N/R]	• Medical Outcomes Study Social Support Survey [α = N/R]	38 % of women reported Child maltreatment (CM). The mean mental (MCS) and physical (PCS) SF-36 component scores were 2.3 points (95% CI: −4.3, −0.3) and 2.5 points (95%CI: −4.5, −0.6) lower, respectively, in women with any CM than in those without. When number of CM types increased (0, 1, 2, 3+ types), group mean scores decreased in MCS (52, 51, 48, 47, respectively; $p < 0.01$) and PCS (52, 52, 49, 49, respectively; $p = 0.03$). In separate mediation analyses, depressive symptoms, very upsetting life events, or low social support, reduced these differences in MCS, but not PCS.	Adulthood psychosocial factors (depressive symptoms, very upsetting life events, low social support) may be targeted for future intervention studies to improve the well-being of midlife victims of child maltreatment by promoting a broad spectrum of protective factors such as strengthening the social support network, reducing depressive symptoms, or alleviating sleep problems.
18.Huang et al. (2019), China	To investigate childhood trauma, life events and social support in subjects with high risk for psychosis.	Cross-sectional survey	200	1st Episode Psychosis High Risk Healthy Controls Mean (SD) 26.5 (8.5) 28.8 (8.4) 31.3 (7.9) Age group: 18–40 years	1st Episode Psychosis High Risk Healthy Controls Female = N/R N/R N/R Male = 37 (66.1 %) 44 (53.03 %) 25 (2.5 %) Race/ Ethnicity: Han Chinese = 98.2 % 98.8 % 98.4 %	Five psychiatric centres in Guangdong Province Respondents with a first episode of schizophrenia Respondents with a high risk for psychosis	• (Chinese version) Childhood Trauma Questionnaire (CTQ-SF) [α = N/R]	• Structured Interview for Prodromal Syndromes (SIPS) [α = N/R] • International Statistical Classification of Diseases and Related Problems-10th Revision (ICD-10) [α = N/R] • Mini-International Neuropsychiatric Interview (MINI) [α = N/R] • (Chinese version) Positive and Negative Syndrome Scale (PANSS) [α = N/R]	• (Chinese version) Perceived Social Support Scale (PSSS) [α = N/R]	In univariate analysis, high risk for psychosis (HR) individuals had more childhood trauma, more recent life events and less social support than the healthy control (HC) group, and these findings were also supported by ANCOVA analysis except for the results related to social support after taking age, education, marital and employment status as covariates. HR	Calls for further exploration to develop optimal psychosocial interventions which may be beneficial in improving symptoms of high-risk individuals and may therefore help to delay and reduce conversion to psychosis.

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Author, country	Aim	Study design	Sample size (n)	Population: age & age group	Population: gender & race/ ethnicity	Setting	ACEs	Mental health problems	Social outcomes	Key findings	Gaps/future studies
								• Global Assessment Function (GAF) [α = N/R] • Montgomery–Asberg Depression Rating Scale (MADRS) [α = N/R]		individuals experienced more childhood trauma, life events and social support deficit than the HC group, which may be risk factors for conversion to psychosis.	
19.Hyland et al. (2019), USA	To test for the presence of loneliness subtypes and to examine their association with multiple mental health variables.	Cross-sectional survey	1839	Mean (SD) = 44.55 (14.89) years Age range:18–70 years	Female = 956 (52 %) Male = 883 (48 %) Race/ Ethnicity: White, Non-Hispanic = 63.8 % Hispanic = 16.9 % Black Non-Hispanic = 11.8 % Other Non-Hispanic = 6.3 % 2 + Races Non-Hispanic = 1.3 %	An online research panel Household sample of non-institutionalized adults	• (Modified version) Life Events Checklist for DSM-5 [α = N/R] • Three items from the Adverse Childhood Experiences Questionnaire [α = N/R]	• Five-item World Health Organization Well-Being Index (WHO-5) [In this study (α = 0.93)] • Eight-item Patient Health Questionnaire (PHQ-8) - Depression Scale [In this study (α = 0.90)] • The Generalized Anxiety Disorder 7-item Scale (GAD-7) [In this study (α = 0.94)]	• Six-item De Jong Gierveld Loneliness Scale [In this study (α = 0.81)]	When treated as a unidimensional construct, 17.1 % of US adults aged 18–70 were classified as lonely. However, the latent class analysis results identified four loneliness classes which varied quantitatively and qualitatively: 'low' (52.8 %), 'social' (8.2 %), 'emotional' (26.6 %), and 'social and emotional' (12.4 %) loneliness. The 'social and emotional' class were characterized by the highest levels of psychological distress, followed by the 'emotional' class. The 'social' loneliness class had similar mental health scores as the 'low' loneliness class. Childhood and adulthood trauma were independently related to the most distressed loneliness classes.	Important to replicate this study among cohorts of the population that include persons over the age of 70 and to determine if current findings replicate in culturally distinct populations.
20.Jones et al. (2018), USA	To test pathways of stress proliferation and stress embodiment processes linking ACEs to mental health impairment in adulthood	Cross-sectional telephone survey	14,001	Mean (SD) = 58.2 (16.0) years Age range: N/R Age group: 18+	Female = N/R (59.8 %) Male = N/R Race/ Ethnicity: Caucasian = 86.8 % Latino/a = 5 % Asian = 2.2 %	The 2011 Behavioural Risk Factor Surveillance System (BRFSS) Non-institutionalized English or Spanish speaking adults	• Eight Centers for Disease Control (CDC) categories of Adverse Childhood Experiences [α = N/R]	• Serious mental illness index based on the Kessler 6 (Kessler et al., 2003) [α = N/R] • One item on the number of days in the past month the respondent missed usual activities [α = N/R]	• Two items on social support and marital status [α = N/R]	The model demonstrated that adult low income, social support and adult adversity are in fact conduits through which ACEs exert their influence on mental health impairment in	Future research using longitudinal data is required to test the potential for reciprocal relationships.

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Author, country	Aim	Study design	Sample size (n)	Population: age & age group	Population: gender & race/ethnicity	Setting	ACEs	Mental health problems	Social outcomes	Key findings	Gaps/future studies
					African American = 1.3 % Native American = 1 % Hawaiian/ Pacific Islander = 0.2 % Mixed/other = 3.5 %			• One item on the number of days in the past 30 the respondents reported felt they had poor mental health [α = N/R]		adulthood. Significant indirect pathways through these variables supported hypotheses that the effect of ACEs is carried through these variables.	
21.Kealy, Rice, & Cox (2020), Canada	To examine individuation difficulties and perceived social support—and their interaction—as moderators of the relationship between childhood adversity exposure and depressive symptoms.	Cross-sectional survey	119	Mean (SD) = 20.8 (2) years Age range: N/R Age group: 18–25 years	Female = 73.1 (87 %) Male = 25.2 (30 %) Other = 1.7 (2 %) Race/ Ethnicity: Asian = 52 % White = 37 % Hispanic = 6 % Africa = 4 % Multiple ethnicities = 9 % Other = 10 %	Canadian University	• Questions based on participants' experience of adversity during childhood [α = N/R]	• Patient Health Questionnaire-9 (PHQ-9) [In this study (α = 0.85)] • Dysfunctional Individuation Scale (DIS) [In this study (α = 0.75)]	• Multidimensional Scale of Perceived Social Support (MSPSS) [α = N/R]	A significant moderated moderation effect was found whereby individuation difficulties interacted with adversity exposure as perceived social support was reduced. At high levels of individuation difficulties, young adults with exposure to childhood adversity reported elevated depressive symptoms. This effect was buffered by social support such that when individuation difficulties were high, the association between adversity and depressive symptoms decreased from low to moderate and high support.	Future research should consider investigating a broader range of adversity variables—with a more comprehensive assessment—in larger and more diverse samples, and consider associations and interactions between diversity factors, types of adversity, individuation, and social support.
22.Kearney et al. (2018), USA	To explore predictors of feelings of loneliness, with a focus on trauma.	Cross-sectional survey	429	Mean (SD) = 23.51 (5.37) years Age range: 18–59 years	Female = 251 (58.5 %) Male = N/R Race/ Ethnicity: Black/African American = 38.5 % White/ Caucasian =	Students attending a large urban University	• Trauma History Screen (THS) [α = N/R]	• Dissociative Experiences Scale-II (DES-II) [In this study (α = 0.95)] • DSM-5 Trauma Exposure Survey [α = N/R]	• UCLA Loneliness Scale (Version 3; UCLA-3) [α = N/R]	Hierarchical regression analyses indicated that trauma experience and dissociation significantly predicted loneliness in the current sample.	Future researchers could explore the predictive nature of trauma and dissociation in other samples, including students on more traditional college campuses or young adults in the workforce. Nature,

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Author, country	Aim	Study design	Sample size (n)	Population: age & age group	Population: gender & race/ ethnicity	Setting	ACEs	Mental health problems	Social outcomes	Key findings	Gaps/future studies
					30.1 % Asian = 16.1 % Hispanic = 7.7 % multiracial = 3.3 % Middle Eastern = 1.4 % Native American = 0.2 % Other = 2.6 %						duration and how traumatic events affected them emotionally, could be analyzed to determine their impact on loneliness. Future researchers could also examine the predictive nature of trauma and dissociation on loneliness over time, both for nonclinical and clinical populations participating in some form of therapeutic treatment.
23.Larkin et al. (2018), USA	To investigate to what extent protective factors and ACEs are present in a representative non-clinical adult sample, to examine the association between protective factors and ACEs, and to test whether protective factors moderate the relationship between ACEs and BH service utilization (use of substance abuse treatment or mental health services).	Cross-sectional survey	807	Mean (SD) = N/R Age range: 18–34 years = 29 % 35–49 = 27 % 50–64 = 25 % 65 + = 17 %	Female = N/R (52 %) Male = N/R (48 %) Race/ Ethnicity: White = 63 % Black = 16 % Hispanic = 12 % Asian & other = 7 %	The 2009 New York State (NYS) Omnibus Survey Households	• Ten ACE items used in the original ACE survey conducted by Kaiser Permanente and the Centers for Disease Control and Preventions [α = N/R]	• One question on inpatient/outpatient substance abuse or mental health services [α = N/R]	• Four items on protective social factors [α = N/R]	ACEs were associated with increased behavioural health (BH) service use while protective factors were associated with decreased BH service use. However, no significant interaction effect was found.	Future research could make further contributions by examining the interaction between childhood protective factors and later life physical health quality. It would also be worthwhile to expand the scope and specificity of protective experiences and explore aspects of these experiences, such as duration of involvement and degree of satisfaction derived from particular activities. Mixed methods research could elucidate processes involved in the development of ACE-informed BH service and begin to study health outcomes. There is a need to identify and examine

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Author, country	Aim	Study design	Sample size (n)	Population: age & age group	Population: gender & race/ ethnicity	Setting	ACEs	Mental health problems	Social outcomes	Key findings	Gaps/future studies
											community resilience indicators associated with an ACE-informed public health approach to community-capacity building. Qualitative research would help clarify processes involved and lessons learned in addressing ACEs. Future research, including partnerships with economists, could further explore the extent to which income and other resources create protective factors and reduce costly societal consequences of ACEs. Research is needed to develop a better measure of protective factors.
24.McElroy & Hevey (2014), Ireland	To examine a diathesis stress model of the relationship between adverse child experiences (ACEs), stressors and psychosocial resources to explore their relationship with wellbeing.	Cross-sectional survey	176	Mean (SD) = N/R Age range: 18–68 years	Female = 90 (N/R) Male = 86 (N/R) Race/ Ethnicity: White Irish = 100 %	Two mental health and addiction treatment centres in Dublin Service users, Family, Friends of Service Users	• Interview questions on early experiences [α = N/R] • Childhood Trauma Questionnaire - Short Form (CTQ-SF) [α = N/R]	• The Structured Clinical Interview for DSM-IV-TR Axis I Disorders, Research Version, Patient Edition with Psychotic Screen (SCID-I/PW/ PSYSCREEN) [α = N/R] • Trait Emotional Intelligence Questionnaire (V1.50) - Long Form [In this study (α = 0.82)] • NEO-Five Factor Inventory (NEO-FFI) [α = N/R] • Coping Inventory for Stressful Situations (CISS) [α = N/R]	• Three items on perceived social support [α = N/R]	All early experiences, except physical, abuse and the death of a parent in childhood, were significantly correlated with an increased number of, stressors and lower well-being scores. A number of stressors partially mediated the relationship between ACEs and wellbeing. An increased number of ACEs was related to higher neuroticism and emotion-focused coping and lower conscientiousness, agreeableness, trait emotional intelligence and task coping	Longitudinal studies or in-depth interviewing regarding early experiences to examine inconsistencies may reduce potential bias in a retrospective recall. Additional well-being measures such as quality of life or life satisfaction should be investigated.

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Author, country	Aim	Study design	Sample size (n)	Population: age & age group	Population: gender & race/ethnicity	Setting	ACEs	Mental health problems	Social outcomes	Key findings	Gaps/future studies
										scores. These resources were significantly related to increased stressors and lower well-being. Distraction and emotional coping significantly moderated the relationship between a number of stressors and wellbeing. These findings support the diathesis-stress model and indicate that there are significant relationships between ACEs, psychosocial, resources, stressors and wellbeing.	
25.McLafferty et al. (2019), Northern Ireland, UK	To examine demographic differences in stress levels, to determine if those who had endured negative childhood experiences would be more likely to develop psychological problems and display suicidal behaviour when current stress levels were accounted for, to explore the link between coping and mental health problems, and to predict risk and protective factors related to good coping skills.	Cross-sectional online survey	716	Mean (SD) = 20.69 (5.313) years Age range: 21 years = 545 21 + = 171	Female = 451 (N/R) Male = 265 (N/R) Race/ Ethnicity: N/R	The Ulster University Undergraduate Student Wellbeing Study (part of the World Health Organization World Mental Health(WMH) International College Student Initiative) Undergraduate students from four University campuses	• Three adversity profiles were developed in the previous study using the same sample (O'Neill et al., 2018) including questions from World Health Organization WMH Survey Initiative Composite International Diagnostic Interview (WMH-CIDI) - Adverse Childhood Experiences Scale and Army Study to Assess Risk and Resilience in Service Members (Army STARRS) [α = N/R] • Five items on parental overcontrol, overprotection and overindulgence (Overindulgence Scale) [In this study (α = 0.599)]	• Questions adapted from the World Health Organization WMH Survey Initiative Composite International Diagnostic Interview (WMH-CIDI) Version 3 [α = N/R] • Self-Injurious Thoughts and Behaviors Interview (SITBI) [α = N/R] • Emotion Regulation Questionnaire [α = N/R] • One item on current stress • One item on coping with stress with four options adapted from the Hurricane Katrina Community Advisory Group Survey and one option from the Army Study to Assess Risk and Resilience in Service Members (Army STARRS) [In this study (α = 0.836)]	• Three items newly designed social support scale including one item adapted from the Childhood Trauma Questionnaire and two items developed from the Army Study to Assess Risk and Resilience in Service Members (Army STARRS) [In this study (α = 0.806)]	Females, non-heterosexuals, and older students experienced more current stress. When current stress levels were high, childhood adversities and parental overcontrol and overindulgence were related to higher rates of mental health problems, self-harm, and suicidal behaviour. Poor coping skills were associated with negative mental health outcomes. Social support and good emotion-regulation strategies were related to effective coping, while parental overcontrol and overindulgence, female gender, and younger age were	Further research examining additional factors may be advantageous.

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Author, country	Aim	Study design	Sample size (n)	Population: age & age group	Population: gender & race/ethnicity	Setting	ACEs	Mental health problems	Social outcomes	Key findings	Gaps/future studies
										related to poorer coping	
26.McLafferty et al. (2018), Northern Ireland, UK	To examine the mediating effects of social networks on psychopathology following adverse childhood experiences and to assess if childhood adversities impact on the development of social networks.	Cross-sectional survey	1986	Mean (SD) = N/R Age range: N/R	Female = N/R Male = N/R Race/Ethnicity: N/R	The Northern Ireland Study of Health and Stress (NISHS) (part of the World Mental Health Survey Initiative) A national representative Household survey	• Using latent class analysis to identify co-occurrence of adverse childhood experiences, identified three underlying mutually exclusive profiles of childhood adversity in the Northern Ireland population [α = N/R]	• World Mental Health (WMH) Survey Initiative Version of the WHO Composite International Diagnostic Interview (WMH-CIDI) [α = N/R]	• Ten questions on social networks from the World Health Organization WMH Survey Initiative Composite International Diagnostic Interview (WMH-CIDI) [In this study (α = 0.619)]	Individuals who experienced childhood adversities had increased odds of psychopathology, especially those who experienced high levels of maltreatment. This was partially mediated by various types of social networks, including family and friend support and family harmony. Individuals who experienced adversity were less likely to have good social networks in the first instance.	Further longitudinal research in this area would be particularly beneficial.
27.Murphy et al. (2015), Northern Ireland, UK	To test a moderated mediation model of negative childhood experiences, associated cognitive processes, and psychotic experiences within a context of adolescent loneliness.	Cross-sectional survey	785	Mean (SD) = 16.20 (1.06) years Age range: 15–18 years	Female = 440 (56.1 %) Male = 345 (43.9 %) Race/Ethnicity: N/R	Secondary school adolescents	• Early Life Experiences Scale (ELES) [In this study (α = 0.87)] • Peer Victimization Scale (PVS) [total scale in this study (α = 0.89)]	• Posttraumatic Cognitions Inventory (PTCI) [In this study (α = 0.95)] • Adolescent Psychotic-like Symptom Screen (APSS) [In this study (α = 0.86)]	• UCLA Loneliness Scale [in this study (α = 0.91)]	Childhood experiences of threat and subordination were directly associated with psychotic experiences. Analyses indicated that peer victimization was a mediator of this effect and that loneliness moderated this mediated effect.	Longitudinal data and analyses should be employed to assess the direction of the relationship between loneliness and trauma-psychotic paradigm.
28.Murthi & Espelage (2005), USA	To develop a scale to assess Childhood sexual abuse (CSA)-related loss among a college sample of CSA survivors (Childhood Sexual Abuse-Loss Measure-CSALM), to examine the measure's convergent	Cross-sectional survey	116	Mean (SD) = 21.3 (1.75) years Age range: 18–31 years	Female: 116 (100 %) Race/Ethnicity: Caucasian = 75.9 % African American = 4 % Asian American = 7.8 %	Female college students from a large Midwestern University with at least one childhood sexual abuse experience	• Sexual Victimization Questionnaire (SVQ) [α = N/R]	• Childhood Sexual Abuse-Loss Measure (CSALM; created for this study) based on the Loss Measure for Survivors (LQ-S) [α = N/R] • Centre for Epidemiological Studies-Depression Scale (CES-D) [In this study (α = 0.91)] • Brief Symptom	• Perceived Social Support Scale (PSS) [α = N/R]	90 % of the sample reported Childhood sexual abuse (CSA) before age of 12, 12.3 % (n = 15) reported CSA before age 12 with an adult over 16, and 42.2 % (n = 49) reported CSA after age 12 with an adult. Analysis revealed a three-factor solution: (a) Loss of Optimism,	Future confirmatory research needs to be conducted to validate the factor structure of the CSA-related loss among a college sample of CSA survivors (CSALM). Future research needs to be conducted to cross-validate the CSALM for college women

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Author, country	Aim	Study design	Sample size (n)	Population: age & age group	Population: gender & race/ ethnicity	Setting	ACEs	Mental health problems	Social outcomes	Key findings	Gaps/future studies
	validity through associations among depression, alexithymia, coping, and social support, and to test whether social support moderates the relation between multiple experiences of CSA and loss.				Latina = 8.6 % Other = 3.7 %			Inventory-Depression Scale (BSI) [In this study (α = 0.90)] • Toronto Alexithymia Scale-20 (TAS-20) - Difficulty Identifying Feeling (DIF) & Difficulty Describing Feelings (DDF) Subscales [α = N/R] • Ways of Coping (WCQ) - Distancing (3 items deleted), Seeking Social Support & Escape Avoidance Scales [α = N/R]		(b) Loss of Self, and (c) Loss of Childhood. Convergent validity of several scales was evidenced through associations with depression, alexithymia, coping, and social support. Social support from family and friends was found to moderate the association between CSA experiences and loss dimensions.	across ethnic and racial groups. Finally, as is the case with many CSA-related investigations, our sample size was small which might have contributed to the reduced power to detect some associations.
29. Narita et al. (2020), USA	To examine the association between loneliness and psychotic episodes (below clinical diagnostic threshold) among a general population sample using data from Baltimore and New York City.	Cross-sectional survey	974	Mean (SD) = 39,8 (15.1) years Age range: N/R Age group: 18+	Female = 592 (60.8 %) Male = 382 (39.2 %) Race/ Ethnicity: White = 44.7 % Black = 41.2 % Other = 14.2 %	The Survey of Police-Public Encounters II General population in the USA	• Ten questions on the first 18 years of life [α = N/R]	• World Health Organization Composite International Diagnostic Interview (WHO-CIDI) Psychosis Screen Module [α = N/R] • One question on mental disorders [α = N/R]	• Three-Item Loneliness Scale derived from the R-UCLA Loneliness Scale [In this study (α = 0.84)]	Loneliness was significantly associated with increased odds for any Psychotic experiences (PEs) (OR = 1.25, 95 % CI = 1.13–1.39). The same applied to the association between loneliness and delusional mood (OR = 1.29, 95 % CI = 1.15–1.44). For delusion of reference and persecution, delusions of control, and hallucinations, there were no significant associations when adjusted for sociodemographic factors, adverse childhood experiences, and common mental disorders.	Further studies should examine the occurrence and role of loneliness across the psychosis continuum to further elucidate this relation and the factors that might underlie it. Future studies should confirm and expand upon our findings using longitudinal data, biological mechanisms, and using samples that are representative of the general population.
30. Negriff et al. (2019), USA	To examine social support as a mediator between maltreatment experiences (number of	Longitudinal study	454	Maltreated Comparison T1 T2 T1 T2 Mean (SD) = 1.84 (1.15) 12.02 (1.21)	Maltreated Comparison T1 T2 Female= 50 % 52 % 40 % 40 %	Maltreated Group: Active cases in the Children and Family Services (CFS) agency of a large West Coast city	• Information from child welfare case records obtained for the time period prior to study enrolment in order to quantify	• Children's Depression Inventory (CDI) [In this study T1 (α = 0.86) and T2 (α = 0.83)]	• Items on family and friends social support [α = N/R]	Results from path models indicated that depressive symptoms mediated the association between maltreatment	Future qualitative work will help to better understand the points of fracture in family support. These results should

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Author, country	Aim	Study design	Sample size (n)	Population: age & age group	Population: gender & race/ethnicity	Setting	ACEs	Mental health problems	Social outcomes	Key findings	Gaps/future studies
	victimizations, maltreatment types) and depressive symptoms in adolescence using a sample of youth referred to child welfare and a comparison group from the same neighbourhoods.			11.11 (1.15) 12.28 (1.26) Age range: 9–13 years	Male= 50 % 48 % 60 % 60 % Race/ Ethnicity: T1 T2 African Amer = 40 % 40 % 32 % 32 % Latino = 35 % 36 % 47 % 45 % White = 12 % 11 % 10 % 11 % Mixed Biracial = 13 % 13 % 11 % 12 %	Comparison Group: Names from schools lists	maltreatment experiences [α = N/R]			experiences (i.e., physical abuse, neglect, and the number of maltreatment victimizations) and family social support. There was no evidence that social support functioned as a mediator.	be replicated in order to corroborate this mediation effect from maltreatment to poor family support via depressive symptoms
31.Oshio et al. (2013), Japan	To examine the extent to which perceived social support and socio-economic status in adulthood mediate the association between interpersonal adversity in childhood and adult mental health, after controlling for childhood socio-economic status SES, based on large-scale population data in Japan.	Cross-sectional survey	3292	Mean (SD) = N/R Age range: 25–50 years	Gender: N/R Race/ Ethnicity: N/R	The Japanese Study of Stratification, Health, Income & Neighbourhood Community residents of four municipalities in and around Tokyo	• Two questions on physical abuse and neglect [α = N/R]	• 6-item K6 questionnaire [α = N/R] • One question on suicide ideation [α = N/R]	• Three questions on perceived social support [α = N/R]	Interpersonal adversity in childhood has a negative impact on adult mental health even after controlling for childhood SES. For example, the odds ratio for K6 = 5+, responding to parental maltreatment, was 2.64 (95 % CI, 2.04–3.41). Perceived social support and adult SES mediated the impact of interpersonal adversity in childhood, but a substantial proportion of the impact was unexplained by their mediating effects; social support and adult SES only mediated 11–24 % and 6–12 %, respectively. It was also found that social support and adult SES	In order to develop effective prevention policies and programmes, more studies are required to accumulate evidence on the mediating role of negative support.

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Author, country	Aim	Study design	Sample size (n)	Population: age & age group	Population: gender & race/ethnicity	Setting	ACEs	Mental health problems	Social outcomes	Key findings	Gaps/future studies
										(except educational attainment) did not moderate the negative impact of interpersonal adversity in childhood.	
32.Pitzer & Fingerman (2010), USA	To examine whether the presence of psychosocial resources in adulthood is associated with better well-being among victims of childhood parental abuse.	Cross-sectional survey	2711	Mean (SD) = 46.68 (13.06) years Age range: N/R Age group: 18+	Female = N/R (50 %) Male = N/R Ethnicity = N/R	The Midlife in the United States (MidUS i) National representative study	• Two items on physical abuse from the Conflict Tactics Scale [α = N/R]	• One item on negative affect [α = N/R] • Eight items on personal control [In this study (α = 0.85)]	• Two four-item scales on emotional support [In this study (α = 0.87)] • One item on instrumental support [α = N/R]	The study indicates that very severe physical abuse in childhood does not suggest that health and wellbeing will be poor in adulthood. Individual differences in health and well-being likely reflect differences in personal control. The presence of personal control appears to partially explain why some individuals are resilient to abuse and why others experience disadvantages.	Future research should examine associations among variables over time to see if the continued presence of personal control aids in the maintenance of healthy levels of wellbeing for victims of childhood physical abuse. Future research should consider psychosocial and social resources received early in life and currently. An important next initiative will be to examine the presence of psychosocial resources in childhood and adolescence, understanding whether stability in resources plays an important role in the stability of well-being over time for parentally abused individuals.
33.Powers et al. (2009), USA	To provide an exploratory investigation that examines childhood emotional abuse and neglect more closely in relation	Cross-sectional survey	378	Mean (SD) = N/R Median = 43 Age range: N/R Age group: 18+	Female = (N/R) 54 % Male = (N/R) 46 % Race/Ethnicity: Caucasian =	The General Medical and Obstetric/Gynaecological Clinics A not-for-profit healthcare system that serves the low-income and homeless	• Childhood Trauma Questionnaire–Short Form (CTQ-SF) (Physical neglect excluded) [α = N/R]	• Beck Depression Inventory (BDI-II) [α = N/R]	• Social Support Behaviors Scale (SSB) [α = N/R]	Childhood emotional abuse and neglect proved more predictive of adult depression than childhood sexual or physical abuse. In females only,	Future research should examine the interaction between gender, adult depression, and childhood maltreatment.

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Author, country	Aim	Study design	Sample size (n)	Population: age & age group	Population: gender & race/ ethnicity	Setting	ACEs	Mental health problems	Social outcomes	Key findings	Gaps/future studies
	to perceived social support and depression in adulthood between these variables.				3.7 % African American = 93.1 % Hispanic = 0.3 % Mixed = 1.9 % Other = 1.1 %	population in Atlanta, Georgia				perceived friend social support protected against adult depression even after accounting for the contributions of both emotional abuse and neglect. These findings may elucidate the particular importance of understanding the effects that emotional abuse and neglect have on adult depression and how perceived friendship support may provide a buffer for women with a history of early life stress who are at risk to develop adult depression.	
34.Roh et al. (2015), USA	To examine the ways in which ACEs and social support were related to depressive symptoms among American Indian (AI) older adults.	Cross-sectional survey	233	Mean (SD) = 60.7 (8.4) Age range: 50–95 years	Female = 125 (54.3 %) Male = 105 (45.7 %) Race/ Ethnicity: N/R	Two Midwestern states: South Dakota and Minnesota Rural sample of off-reservation American Indian older adults	• ACE Questionnaire [In this study (α = 0.78)]	• Geriatric Depression Scale-Short Form (GDS-SF) [In this study (α = 0.81)]	• Multidimensional Scale of Perceived Social Support (MSPSS) [In this study (α = 0.94)]	Two dimensions of ACE (i.e., childhood neglect, and household dysfunction) were positively associated with depressive symptoms. Social support was negatively associated with depressive symptoms, while perceived health and living alone were also significant predictors.	It is important to examine the possibility of culturally specific risk and protective factors relevant to depression among AI older adults. More research about the cultural relevancy of measures developed on non-AI populations is needed. Future examinations of AI/AN older adults that explore these issues (e.g., rural/urban, tribal membership, on-reservation/off-reservation, living independently assisted living) may uncover important contextual factors related to depression for these

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Author, country	Aim	Study design	Sample size (n)	Population: age & age group	Population: gender & race/ ethnicity	Setting	ACEs	Mental health problems	Social outcomes	Key findings	Gaps/future studies
											populations, thereby improving our capacity for effective, customized interventions. Research focusing on enhancing existing strengths, such as social support, among AI populations can identify pathways that could reduce existing behavioural health disparities. Qualitative research could enable greater understanding of the factors that account for resilience and the ways that social support may bolster behavioural health among AI/AN older adults.
35.Ronnenberg et al. (2020), USA	To examine the relationships between caregiver social support and child mental health services among caregivers with ACEs.	Qualitative Study	13	Mean (SD) = 7.5 (N/R) Age range: 1–13 years	Gender: Caregiver Child Female= 10 11 Male= 0 19 Race/ Ethnicity: Caregiver Child White = 10 25 Hispanic or Latinx = 0 2 Multiracial = 0 3	Caregivers of young children receiving mental health services	• 21 dichotomous questions regarding childhood experiences of abuse, neglect, and household dysfunction (Felitti et al., 1998) [α = N/R]	• N/R	• 15-question semi-structured interview on social support of families with parental ACEs [α = N/R]	Our qualitative analysis demonstrates five overarching themes related to social support and access to therapeutic services: (a) strong relationships with therapeutic providers, (b) the importance of service referrals by clinical providers, (c) high positive regard for therapeutic providers, (d) the value of support from clinical providers in times of crisis, and (e) the complexity of family service use. A majority of the caregivers in this sample had an ACE score of 4 or more (*n* = 7) and most	Future research is needed to describe the prevalence of ACEs among all caregivers and their children, especially among those with mental health needs. An important direction for future research is to examine the conditions under which therapeutic providers become integral members of clients' social support circles.

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Author, country	Aim	Study design	Sample size (n)	Population: age & age group	Population: gender & race/ ethnicity	Setting	ACEs	Mental health problems	Social outcomes	Key findings	Gaps/future studies
										reported having at least some children in their household with ACEs. Parental divorce or separation was the most common caregiver ACE, followed by witnessing neighbourhood violence and psychological or sexual abuse. Caregivers reported multiple family members receiving multiple services, often in multiple settings or locations. Despite some barriers to services, like waiting lists or insurance, caregivers reported high praise and appreciation for access to services and therapeutic providers. In fact, providers were often listed as important members of caregivers' social networks. In contrast, informal support systems were small and unstable. Most caregivers followed a complex path to services for their children. They often received multistep or multisource referrals to services from friends or family, community agencies, schools, or medical professionals.	
36.Saluja et al. (2003), USA	To explore whether social capital and social support moderate	Prospective cohort study	215	Age = 6 years	Female = 114 (53 %) Male = 101 (47 %)	The Longitudinal Studies of Child Abuse and Neglect	• Interview data at the age of 6 merged with child maltreatment reports from the	• Two items from the Child Behaviour Checklist (CBCL) [α = N/R]	• Functional Social Support Questionnaire (FSSQ) [α = N/R]	Social capital did not modify the relationship between child maltreatment	Long-term follow-up of these children and caregivers might yield different

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Author, country	Aim	Study design	Sample size (n)	Population: age & age group	Population: gender & race/ethnicity	Setting	ACEs	Mental health problems	Social outcomes	Key findings	Gaps/future studies
	the relationship between child maltreatment and emotional and behavioural outcomes such as depression, anxiety and aggression in 6-year-old children.				Race/ Ethnicity = N/R	General Community	state's Central Registry on Child Abuse and Neglect [α = N/R] • Center for Epidemiological Studies - Depression Instrument [In this study (α = 0.92)]		• Neighbourhood Risk Assessment Instrument [α = N/R]	and either aggression or depression-anxiety. The results of this study might also indicate that previous studies of social capital and health outcomes might actually be using social capital as a proxy for social support.	findings as social support and social capital might have cumulative effects. Future research is also needed to determine whether a community's level of social capital predicts its population-based measures of health and illness.
37.Schneider et al. (2020), USA	To identify groups/classes of ACEs experienced in childhood, determine the degree to these different ACE classes are associated with health and mental health outcomes in adulthood, and determine whether supportive and stressful social relationships moderate this association.	Cross-sectional survey	254	Mean (SD) = 53.5 (14.4) years Age range: N/R Age group: 18+	Female = 34.1 % Male = 65.9 % Race/ Ethnicity: White = 49.3 % Other = 50.7 %	Primary care clinics throughout Texas as part of the Residency Research Network of Texas (RRNeT)	• (17-item version) Centres for Disease Control and Prevention ACE Questionnaire (additional adaptations added from Conflict Tactics Scale and Wyatt (1985)'s questions on sexual abuse) [α = N/R]	• RAND Short Form Health Survey-36 (SF-36) - Physical HRQL Subscales [α = N/R] • Patient Health Questionnaire-8 (PHQ-8) [α = N/R] • Beck Anxiety Inventory - Primary Care (BAI-PC) [In this study (α = 0.90)]	• (Adapted version) Duke Social Support Stress Scale (DUSOCS) [α = N/R]	Statistically significant differences across the four ACE classes were found for mental health outcomes in adulthood. Although respondents who were physically and verbally abused as children reported compromised mental health, this was particularly true for those who witnessed physical abuse of their mother. A similar relationship between ACE class and physical health was not found. The quality of adult social networks partly accounted for the relationship between ACE classes and mental health outcomes. Respondents exposed to ACEs with more supportive social networks as adults had diminished odds of reporting poor mental health. Increasing numbers of stressful social	Prospective studies using population-based samples are needed in the future. Future research is likely to enrich our understanding of how social networks influence health outcomes of this population with a more in-depth assessment of individual social network members, including the quality of relationships, their earlier role in childhood abuse, their current contributions in the relationship, and frequency of contact. Research on impact of other protective factors and adverse conditions outside the family or household on adult outcomes is needed.

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Author, country	Aim	Study design	Sample size (n)	Population: age & age group	Population: gender & race/ethnicity	Setting	ACEs	Mental health problems	Social outcomes	Key findings	Gaps/future studies
										relationships contributed to adverse mental health outcomes.	
38.Schumm et al. (2006), USA	To examine how child abuse, adult rape, and social support impact inner-city women.	Cross-sectional survey	777	Mean (SD) = 21.7 (3.8) Age range: N/R Age group = 18+	Female = 777 Race/Ethnicity: African American = 64 % European American = 31 % Other = 5 %	Two obstetric–gynaecological clinics serving low-income women in a mid-sized, Midwestern city	• (Abbreviated version) Childhood Trauma Questionnaire (CTQ) [α = N/R]	• Center for Epidemiologic Studies–Depression Scale (CES—D) [In this study (α = 0.88)] • PTSD Symptom Scale-Self-report (PSS-SR) [In this study (α = 0.96)]	• Ten items from the Social Provisions Scale [In this study (α = 0.83)]	The experience of child abuse, rape, and a lack of perceived support, enormously increases women's likelihood of probable clinical depression and, especially, probable post-traumatic stress disorder (PTSD). Child abuse was a significant risk factor for adult rape, such that women who were abused as children were twice as likely to experience adult rape, compared to those not abused. Women who reported both child abuse and adult rape reported more severe depressive moods and were more likely to be at risk for major depression than those without trauma histories. Women with trauma in both developmental periods were over three times as likely to be at high risk for probable depression compared to those with no trauma. Finally, women who reported child abuse or adult rape exclusively reported higher depressive mood than women not reporting child abuse or adult rape, but less	Future research should attempt to examine the impact of social support for women with cumulative traumatic experiences in a longitudinal design.

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Author, country	Aim	Study design	Sample size (n)	Population: age & age group	Population: gender & race/ethnicity	Setting	ACEs	Mental health problems	Social outcomes	Key findings	Gaps/future studies
39.Seeds et al. (2010), Canada	To test the stress deterioration model of social support in adolescent depression.	Cross sectional survey	101	Mean (SD) = 15.51 (1.27) years Age range: 13–18 years	Female = 64 Male = 37 Race/Ethnicity European Ancestry = 98 Other = 3	Midsized community in eastern Ontario, Canada	• (Adolescent version) Childhood Experience of Care and Abuse Questionnaire (CECA. Q) - Antipathy Scale, Indifference Scale, Physical Abuse Scale, Bullying Scale [α = N/R]	• Beck Depression Inventory (BDI–II) [In this study (α = 0.95)]	• Interpersonal Support Evaluation List (ISEL) [In this study (α = 0.86)] • One question on the perceived size of participants' peer network [α = N/R]	than women with both traumas. Father-perpetrated maltreatment was associated with lower perceptions of tangible support and of belonging in a social network. These forms of support mediated the association of father-perpetrated maltreatment with greater depression severity. Other-perpetrated maltreatment was associated with higher perceptions of tangible support.	Maternal and paternal maltreatment should be examined separately in future research as they may have unique predictive relations to psychopathological outcomes. Future fine-grained research may help in understanding why mother-perpetrated victimization differs from father-perpetrated victimization in its relation to social support and depression symptoms. Future longitudinal prospective studies utilizing multiple assessment points are required to more firmly sort out the causal pathway and determine when social support is most influential. Future work is needed to determine whether support from parents versus peers differentially mediates the relation of victimization to depression symptoms and whether social support at the time of the victimization is related to future perceptions of social support and

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Author, country	Aim	Study design	Sample size (n)	Population: age & age group	Population: gender & race/ ethnicity	Setting	ACEs	Mental health problems	Social outcomes	Key findings	Gaps/future studies
40.Sheikh (2018a), Norway	To assess the mediating role of perceived social isolation in adulthood in the association between childhood physical maltreatment and internalizing symptoms in adulthood.	Prospective cohort study	4530	Mean (SD) = 54.69 (0.15) years Age range: 25–74 years	Female = 2681 (59.2 %) Male = 1849 (40.8 %) Race/ Ethnicity: N/R	Tromsø Study Based on data collected from 1994 to 2008	• Two items on childhood physical maltreatment from the Tromsø VI questionnaire [α = N/R] • One item on mother's/father's history of psychiatric disorders [α = N/R]	• Hopkins Symptom Checklist (HSCL-10) [In this study (α = 0.86)]	• One question on perceived social isolation [α = N/R]	Childhood physical maltreatment was associated with an up to 68 % [relative risk (RR) = 1.68, 95 % confidence interval (CI): 1.33–2.13] a higher risk of perceived social isolation in adulthood. In addition, childhood physical maltreatment and perceived social isolation in adulthood were associated with greater levels of internalizing symptoms in adulthood ($p < 0.01$). A dose-response association was observed between childhood physical maltreatment and internalizing symptoms in adulthood ($p < 0.001$). Perceived social isolation in adulthood mediated up to 14.89 % ($p < 0.05$) of the association between childhood physical maltreatment and internalizing symptoms in adulthood.	depression symptoms. The results indicate the need to take perceived social isolation over the life course into account when considering the long-term impact of childhood physical maltreatment on internalizing symptoms (depression & anxiety) in adulthood.
41.Sheikh (2018b), Norway	To assess the mediating role of quantity and quality of social support in adulthood in the association between childhood	Prospective cohort study	4530	Mean age = 54.69 Age range: 25–74 years	Female = 2681 (59.2 %) Male = 1849 (40.8 %) Race/ Ethnicity: N/R	Tromsø Study Based on data collected from 1994 to 2008	• Six indicators of childhood adversity from Tromsø VI [α = N/R]	• Hopkins Symptom Checklist (HSCL-10) [In this study (α = 0.86)]	• Two items on social support in adulthood [α = N/R]	Childhood adversity was associated with deficits in quantity and quality of social support in adulthood ($p < 0.05$). On the other hand, childhood adversity and deficits in quantity and	There is a need to take quantity and quality of social support over the life course into account when considering the long-term impact of childhood adversity on

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Author, country	Aim	Study design	Sample size (n)	Population: age & age group	Population: gender & race/ ethnicity	Setting	ACEs	Mental health problems	Social outcomes	Key findings	Gaps/future studies
	adversity and psychological distress in adulthood.									quality of social support were associated with psychological distress in adulthood ($p < 0.05$). Quantity and quality of social support significantly ($p < 0.05$) mediated the association between childhood adversity and psychological distress in adulthood.	psychological distress in adulthood. Understanding how childhood adversity continues to adversely influence psychological distress can help shape social service and public health interventions that are designed to alleviate the burden carried by individuals who have had adverse childhood experiences.
42.Sheikh et al. (2016), Norway	To examine (i) the relative contribution of structural conditions (gender, age, CSES, psychological abuse, physical abuse, and substance abuse distress) to social support and behavioural factors in adulthood; (ii) the relative contribution of socio-demographic factors, CSES, CTEs, social support, and behavioural factors to three multi-item instruments of mental health (SCL-10), health (EQ-5D), and subjective well-	Prospective cohort study	12,984	Mean (SD) = 51.52 (0.11) years Age range: 30–89 years	Female = 6928 (53.4 %) Male = 6053 (46.6 %) Race/ Ethnicity: N/R	Tromsø Study Based on data from the sixth wave, conducted in 2007/2008	• One item on childhood traumatic experiences from Tromsø VI [α = N/R]	• Hopkins Symptoms Check List (HSCL-10) [In this study (α = 0.87)] • EuroQol-5D (EQ-5D) [α = N/R]	• One question on instrumental/ tangible support [α = N/R] • One question on emotional support [α = N/R]	Childhood socioeconomic status childhood socioeconomic status (CSES) explained the most variation in instrumental support and smoking, while socio-demographic variables explained the most variation in emotional support and alcohol use. Instrumental support explained most of the variation in mental health, while gender explained most of the variation in health, and emotional support explained most of the variation in well-being. Childhood traumatic experiences (CTEs) were relatively more important to mental health than CSES. However, CSES were relatively more important to health	Alcohol use may act as a mediator in the association between social support factors, and health and well-being in adulthood. Future studies should address this question.

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Author, country	Aim	Study design	Sample size (n)	Population: age & age group	Population: gender & race/ ethnicity	Setting	ACEs	Mental health problems	Social outcomes	Key findings	Gaps/future studies
	being (SWLS) in adulthood; (iii) the impact of CTEs on mental health, health, and well-being in adulthood, and; (iv) the mediating role of adult social support and behavioural factors in these associations.									and well-being than CTEs. Social support factors were relatively more important to mental health, health, and well-being, as compared to behavioural factors. When mental health was included, it explained most variation in both health, and well-being. Our findings suggest that childhood traumatic experiences increase the risk of being unhealthy and having a low level of well-being and that some of this effect is mediated by social support and behavioural factors in adulthood.	
43.Steenkamp et al. (2019), Netherlands	This study tested the hypotheses that (i) the relationship between a history of childhood abuse and the severity of psychosis is mediated by loneliness; (ii) the relationship between loneliness and psychosis is mediated by within-person fluctuations in depressive and anxious feelings.	Longitudinal study design	59	Mean (SD) = 31.8 (9.4) years Age range: 19–57 years	Female = N/R Male = 34 (57.6 %) Race/ Ethnicity: N/R	Part of a larger research project Community treatment teams in the Netherlands (Leiden, Voorhout, Zoetermeer, and Zeist)	• Childhood Experience of Care and Abuse Questionnaire (CECA. Q) [α = N/R]	• Seven items on the severity of positive symptoms [α = N/R] • Two items on depressive and anxious feelings [α = N/R]	• One item on loneliness [α = N/R]	The relationship between the severity of childhood abuse and positive symptoms was mediated by loneliness, while the relationship between loneliness and positive symptoms was mediated by within-person fluctuations in both depressive and anxious symptomatology. Depression was a stronger mediator than anxiety.	Investigating loneliness in the context of dopamine sensitization may be a fruitful venue for future research, as various other social adversities, including childhood abuse, hearing impairment, and migration have been related to a sensitized mesolimbic dopamine system.
44.Steine et al. (2020), Norway	To examine the directionality of the longitudinal associations between perceived social support and	Longitudinal study design	458	Age at first abusive incident: Mean = 5.9 (3.5) years	Female = 96.4 % Male = 3.6 % Race/ Ethnicity: N/R	"Longitudinal Investigation of Sexual Abuse (LISA)" A collaboration between the University of Bergen	• Childhood Trauma Questionnaire - Short Form (CTQ-SF) [α = N/R]	• Impact of Event Scale-Revised (IES-R) [In this study waves 1 & 2 (α = 0.95) and wave 3 (α = 0.96)]	• Multidimensional Scale of Perceived Social Support (MSPSS) [In this study (α = 0.92)] • Five items on	The analysis revealed significant weak reciprocal associations between perceived social support and	The findings should be replicated in samples comprising individuals that have been followed longitudinally since

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Author, country	Aim	Study design	Sample size (n)	Population: age & age group	Population: gender & race/ ethnicity	Setting	ACEs	Mental health problems	Social outcomes	Key findings	Gaps/future studies
	symptoms of post-traumatic stress, anxiety, depression and insomnia in survivors of childhood sexual abuse.			Age range: 0–16 years		and four of the largest support centres for sexual abuse survivors in Norway			relational difficulties [In this study (α = 0.78)]	depression, post-traumatic stress symptoms and anxiety symptoms, but not with insomnia symptoms. The observed effects were partly overlapping and partly inconsistent across the different symptom domains. Relational problems predicted social support cross-sectionally and longitudinally, whereas only cross-sectional associations were found between the relational problems variable and mental health symptoms.	the time of abuse disclosure. Longitudinal reciprocal associations between perceived social support and mental health symptoms should be addressed in a sample of adult survivors of CSA followed from childhood to adulthood. Future studies should integrate negative social reactions in their analyses and measures of social connectedness. Finally, future studies should also examine attachment style and personality traits as predictor variables.
45.Stevens et al. (2013), USA	To examine whether current difficulties with emotion regulation mediated the relationship between childhood abuse and current post traumatic stress (PTS) symptom severity in adults. We were especially interested in the association between difficulties with emotion regulation when the social context of adult abuse survivors,	Cross-sectional survey	139	Mean (SD) = 28.46 (7.76) Age range: N/R Age group: 18+	Female = 139 (100 %) Race/ Ethnicity: African American = 83.5 % Hispanic/ Latina = 4.3 % White/Non Hispanic = 5.8 % Other = 6.4 %	Outpatient obstetric-gynaecological clinic at a large inner-city medical center in Chicago, IL	• Childhood Trauma Questionnaire (CTQ) [In this study (α = 0.91)]	• Difficulties With Emotion Regulation Scale (DERS) [In this study (α = 0.95)] • PTSD Symptom Scale–Self Reported (PSS-SR) [In this study (α = 0.95)]	• Social Supports Provision Scale (SSPS) [In this study (α = 0.78)]	The model accounted for 63 % of the variance in adult PTS symptoms. Child abuse exerted a direct effect on PTS symptoms and indirect effects through difficulties with emotion regulation, lower social support, and greater exposure to adult interpersonal violence.	Future research might investigate the potential benefits of emphasizing emotion regulation skills in individual psychotherapy for individuals exposed to abuse. Future longitudinal studies can determine temporal precedence of abuse experiences (prior to the development of difficulties with emotion regulation) and of difficulties with emotion regulation (prior to and during the development of PTS symptoms).

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Author, country	Aim	Study design	Sample size (n)	Population: age & age group	Population: gender & race/ethnicity	Setting	ACEs	Mental health problems	Social outcomes	Key findings	Gaps/future studies
	particularly social support and interpersonal violence, was taken into account.										
46.Struck et al. (2020) Germany	To examine attachment insecurity and low social support as potential mediators of the association between childhood maltreatment (CM) types and depression severity in patients with a lifetime history of major depressive disorders (MDD).	Cross-sectional survey	580	Mean (SD) = 37.2 (13.4) years Age range: 18–65 years	Female = 62 % Male = 38 % Race/ Ethnicity: N/R	FOR 2107 research project An ongoing multicenter study	• (21-item German version) Childhood Trauma Questionnaire (CTQ-SF) [α = N/R]	• Structured Clinical Interview for DSM-IV (SCID I) [α = N/R] • Beck Depression Inventory (BDI) [In this study (α = 0.91)]	• (30 items German version) Relationship Scales Questionnaire (RSQ) [α = N/R] • Perceived Social Support Questionnaire (F-SozU) [In this sample (α = 0.87)]	Attachment avoidance and anxiety partially mediated the effect of CM on depression. In the path model including the different CM types, there were significant indirect effects of emotional abuse on depression via attachment anxiety and of emotional neglect on depression via attachment avoidance. Results also supported the hypothesized sequential mediation via attachment insecurity and social support.	More longitudinal studies examining the causal directions of the relationships are needed.
47.Su et al. (2020), Canada	To assess in an integrated model the mediating roles of both social support and positive coping skills in the relationship between childhood maltreatment and psychological distress and positive mental health in the general population.	Cross-sectional survey	25,113	Mean (SD): N/R Age groups (n, %): 15–24 4013 16.0 25–44 6906 27.5 45–64 8077 32.2 ≥65 6117 24.3	Female = 13,773 (54.8 %) Male = 11,340 (54.2 %) Race/ Ethnicity: White = 20,972 (83.5 %) Non white = 4141 (16.5 %)	Canadian Community Health Survey—Mental Health 2012 (CCHS-MH 2012) A cross-sectional health survey designed to explore the mental health and behaviors of Canadians	• Six items on childhood maltreatment (exposure to intimate partner violence and physical abuse from Childhood Experiences of Violence Questionnaire (CEVQ) and sexual abuse from a Statistics Canada survey) [In this study (α = 0.78)]	• Kessler Psychological Distress Scale [In this study (α = 0.78)] • Mental Health Continuum Short Form [In this study (α = 0.76)]	• (10 items shortened version) The Social Provisions Scale (SPS) [In this study (α = 0.92)]	Childhood maltreatment was found to be negatively associated with social support, positive coping skills, and positive mental health but positively associated with psychological distress. Social support and positive coping skills predicted higher rates of positive mental health but lower rates of psychological distress. Social support and positive coping skills partially mediated the negative consequences of	Future longitudinal studies following children exposed to maltreatment are required to definitively establish causal relationships and test how mental health issues and resilience interact over time. Childhood maltreatment needs to be more comprehensively assessed to capture more dimensions of such experiences.

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Author, country	Aim	Study design	Sample size (n)	Population: age & age group	Population: gender & race/ ethnicity	Setting	ACEs	Mental health problems	Social outcomes	Key findings	Gaps/future studies
										childhood maltreatment on mental health outcomes. Surprisingly, no sex differences were observed among these associations.	
48.Trauelsen et al. (2016), Norway	To examine associations between childhood adversities and premorbid adjustment trajectories and social outcomes in a larger first-episode psychosis (FEP) sample.	Experimental study design	101	FEP: Median = 22.5 years Age range: 18–34 years Control: Median = 22 years Age range: 18–33 years	First Episode Psychosis Controls Female 26 (53 %) 26 (53 %) Male 75 (74 %) 75 (74 %) Race/ Ethnicity: N/R	OPUS (1 April 2011–1 April 2013) A nationwide early intervention program (OPUS) for people with first-episode psychosis	• (Danish version) Childhood Trauma Questionnaire (CTQ) [α = N/R] • Childhood Experience of Care and Abuse Questionnaire (CECA. Q) [α = N/R] • Interview questions on first-degree psychiatric illness [α = N/R]	• The operational criteria (OPCRIT) checklist for the psychotic and affective illness diagnostic system was used to obtain ICD-10 diagnoses based on patient records and a Positive and Negative Symptom Scales (PANSS) interview [α = N/R] • Mini-International Neuropsychiatric Interview (MINI) 6 [α = N/R]	• The Premorbid Adjustment Scale (PAS) [α = N/R] • Two questions on perceived social support from the Childhood Experience of Care and Abuse Questionnaire [α = N/R]	There were no associations between the number of childhood adversities and different social or academic premorbid trajectories. Those with more adversities had lower global functioning the year prior to treatment start and reported lower rates of perceived support during childhood along with less current face-to-face contact with family members. Lack of peer support remained a significant predictor of psychosis when adversities were adjusted for; peer support diminished the risk of psychosis caused by childhood adversities by 10 %.	Pre-morbid trajectories or social outcome factors should be examined in longitudinal studies where resilience and risk factors can be assessed simultaneously and may be more closely examined.
49.Vranceanu et al. (2007), USA	To provide a better understanding of the mechanism through which child multi-type maltreatment (CMM) may negatively impact women's lives, by examining the role of social support and stress in the development of depression and	Cross-sectional survey	100	Mean (SD) = 28.92 (10.52) years Age range: N/R Age group: N/R	Female = 100 (100 %) Race/ Ethnicity: European American = 48 % African America = 47 % Other = 5 %	A gynaecological treatment centre for low-income women located in the inner city of a mid-sized, Mid-western US city	• Comprehensive Child Maltreatment Scale (CCMS) for Adults [In this study (α = 0.94)]	• Diagnostic Inventory for Depression (DID) - Symptom Scale [In this study - Symptom Scale (α = 0.91)] • (Abbreviated version) Conservation of Resources Evaluation (COR-E) [α = N/R] • (Short version) Perceived Stress Inventory (PSI) [In this study (α = 0.92)]	• Social Support Questionnaire-6 (SSQ-6) [In this study (α = 0.94)] • (Shortened version) Interpersonal Support Evaluation List-Short form (ISEL) [In this study (α = 0.85)]	Findings support both direct and mediational effects of social resources on adult depression and post-traumatic disorder (PTSD) symptoms in women with histories of child multi-type maltreatment (CMM), suggesting that resources are key factors in the	Future studies should attempt to replicate these results using larger samples and to assess other established maltreatment sequelae which can act as mediators between CMM and PTSD and depression, such as impaired coping styles, perceived

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Author, country	Aim	Study design	Sample size (n)	Population: age & age group	Population: gender & race/ethnicity	Setting	ACEs	Mental health problems	Social outcomes	Key findings	Gaps/future studies
	post-traumatic stress disorder (PTSD).							• PTSD Symptom Scale-Interview (PSS-I) [In this study (α = 0.91)]		psychological adjustment of CMM victims.	control, anger, hostility and shame, would buttress the understanding of the complex aetiology of depression and PTSD in victims of child maltreatment.
50.Wan et al. (2019), China	To examine the individual and interaction effects of ACEs and social support on (non-suicidal self-injury) NSSI, suicidal ideation and suicide attempt in adolescents, and explore gender differences.	Cross-sectional survey	14,820	Mean (SD): 5.4 years (1.8) years Age range: 10–20 years	Female = 50.2 % Male = 49.8 % Race/Ethnicity: N/R	Bengbu in Anhui province, Zhengzhou in Henan province and Guiyang in Guizhou province Broadly representative of the average population within China in terms of economic development and demographic composition, and are also where the adolescent health research network is located	• (Chinese version) Child Trauma Questionnaire (CTQ) [In this study (α = 0.737)] • Questions on household dysfunction from The Centers for Disease Control and Kaiser Permanente Adverse Childhood Experiences Study [In this study (α = 0.705)]	• Multidimensional Sub-health Questionnaire of Adolescents - Psychological Domain [In this study (α = 0.92)] • 'Middle School Questionnaire' of the 2013 Youth Risk Behaviour Surveillance System in the USA [α = N/R] • A questionnaire on non-suicidal self-injury (NSSI) [In this study (α = 0.749)]	• Adolescent Social Support Scale [In this study (α = 0.940)]	89.4 % reported one or more categories of ACEs. The 12-month prevalence of NSSI, suicidal ideation and suicide attempt was 26.1 %, 17.5 % and 4.4 %, respectively; all were significantly associated with increased ACEs and lower social support. The multiple adjusted odds ratio of NSSI in low versus high social support was 2.27 (95 % CI 1.85–2.67) for girls and 1.81 (95 % CI 1.53–2.14) for boys, and their ratio was 1.25 ($P = 0.037$). Girls with high ACEs scores (5–6) and moderate or low social support also had a higher risk of suicide attempts than boys (RORs: 2.34, 1.84 and 2.02, respectively; all $P < 0.05$).	Further studies on the interaction effects between ACEs and social support on NSSI, suicidal ideation and suicide attempt will be needed to further elucidate this complex interaction; it may be important to understand an individual's subjective experience of ACEs.
51.Wang et al. (2018), China	To explore the occurrence of childhood trauma and importantly to determine the impacts of childhood trauma on psychosocial features in a Chinese sample of young adults.	Cross-sectional survey	555	Female age: Mean (SD) = 9.0 (2.00) years Male (SD) = 19.2 (1.75) years Age range: N/R	Female = 454 Male = 101 Race/Ethnicity: N/R	A four-year undergraduate-level normal university located in Changsha city	• (Chinese version) Childhood Trauma Questionnaire–Short Form (CTQ-SF) [α = N/R]	• (Chinese Version) Self-rating Depression Scale (SDS) [In this study (α = 0.862)] • (Chinese Version) Self-rating Anxiety Scale (SAS) [In this study (α = 0.931)] • (Chinese Version) Dysfunctional Attitudes Scale (DAS)	• Social Support Rating Scale (SSRS) [α = N/R]	18.6 % of university students had self-reported childhood trauma exposures. Subjects with childhood trauma reported higher scores of self-rating depression scale (SDS), self-rating anxiety scale (SAS),	Findings need to be replicated in a larger and better designed study

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Author, country	Aim	Study design	Sample size (n)	Population: age & age group	Population: gender & race/ethnicity	Setting	ACEs	Mental health problems	Social outcomes	Key findings	Gaps/future studies
				Age group: 18+				[In this study (α = 0.87)] • (48-item revised Chinese version) Eysenck Personality Questionnaire (EPQ) [α = N/R]		dysfunctional attitudes scale (DAS), and psychoticism and neuroticism dimensions of EPQ (t = 4.311–5.551, p < 0.001); while lower scores of social support rating scale (SSRS) and extraversion dimension of Eysenck Personality Questionnaire (EPQ) (t = −4.061 to −3.039, p < 0.01). Scores of SAS and dysfunctional attitudes questionnaire (DAS) were positively (Adjusted B = 0.211–0.230, p < 0.05), while scores of SSRS were negatively (Adjusted B = -0.273–−0.240, p < 0.05) associated with specific Childhood Trauma Questionnaire (CTQ) scores.	
52. Weber Ku et al. (2021), USA	To examine the rates at which youth who experienced physical or sexual abuse by a caregiver reported the presence of informal mentors, the characteristics of these mentoring relationships, and the extent to which these relationships serve as protective factors by buffering the	Prospective cohort study	12,270	Mean (SD) = 15.43 (0.12) years Age range: N/R	Female = 49.4 % Male = 50.6 % Race/Ethnicity: Non-Hispanic White = 65.8 % Black or African American = 15.5 % Hispanic = 11.9 % Asian or Pacific Islander = 3.6	National Longitudinal Study of Adolescent Health (Add Health) Large, longitudinal, nationally representative sample	• Two questions on caregiver physical and sexual abuse [α = N/R]	• One item on suicidal ideation [α = N/R] • One item on recent binge drinking [α = N/R] • Items on recent nonviolent antisocial behaviour [α = N/R] • Items on recent violent social behaviour [α = N/R]	• Questions on mentoring [α = N/R]	28.82 % and 4.86 % reported caregiver childhood physical and sexual abuse, respectively. Youth who reported caregiver childhood physical abuse were more likely than those who did not endorse abuse to report having a natural mentor, but their mentoring relationships were characterized by lower interpersonal closeness, shorter duration, and less	Future studies should attempt to explore the impact of mentor relationship length from the impact of age separately to understand which one has a stronger buffering effect. Future research should utilize longitudinal methods that follow children from an earlier age (to eliminate limitations of retrospective

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Author, country	Aim	Study design	Sample size (n)	Population: age & age group	Population: gender & race/ ethnicity	Setting	ACEs	Mental health problems	Social outcomes	Key findings	Gaps/future studies
	negative impact of trauma on adult outcomes.				% Other = 3.2 %					frequent contact. Exposure to caregiver childhood abuse was associated with adverse outcomes during adulthood, including antisocial behaviour, physical health limitations, and suicidality; the presence of a natural mentor did not buffer the negative impact of trauma on adult outcomes. Longer mentoring relationships during adolescence buffered the strength of the association between both caregiver physical and sexual abuse during childhood and suicidality during early adulthood.	reporting) and examine the impact of cumulative caregiver abuse exposure on adult outcomes and the protective role of natural mentoring relationships.
53. Wilson et al. (2019), USA	To examine the interaction between child abuse type and social support in relation to adulthood suicidal ideation.	Cross-sectional survey	141	Mean (SD) = 24.26 (10.26) years Age range: 18–73 years	Female = 141 (100 %) Race/ Ethnicity: Caucasian/ White = 100 (70.9 %) Hispanic/ Latino = 11 (7.8 %) African American/ Black/African origin = 9 (6.4 %) Asian American/ Asian Origin/ Pacific Islander = 5 (3.5 %) American Indian/Alaska	Childhood experiences and daily life survey 30-min online survey of childhood abuse, social support, and suicidal ideation	• Childhood Trauma questionnaire-Short form (CTQ-SF) - Sexual Abuse Scale, Physical Abuse Scale & Minimization/ Denial Subscale [α = N/R]	• Five items from the Beck Scale for Suicide Ideation (BSSI) [In this study (α = 0.82)]	• Multidimensional Scale of Perceived Social Support (MSPSS) [α = N/R]	The findings demonstrated a significant interaction between childhood abuse type and family support, and the interaction between childhood abuse type and friend support approached significance. The study provides evidence that family and friend support may be particularly beneficial in helping to buffer the effects of childhood sexual abuse on the risk of adulthood suicidal ideation.	Future researchers should use a longitudinal design which would allow them to better establish the temporal order of the variables, assess the variables of interest at multiple time points, and account for additional relevant factors (e.g., prior psychotherapy, more recent traumatic events). The degree to which these findings might generalize to individuals of other genders (e.g., individuals who identify as men or non-binary) is

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Author, country	Aim	Study design	Sample size (n)	Population: age & age group	Population: gender & race/ethnicity	Setting	ACEs	Mental health problems	Social outcomes	Key findings	Gaps/future studies
					Native = 3 (2.1 %) Middle Eastern = 1 (0.7 %) Bi-racial/ Multi-racial = 11 (7.8 %) Other = 1 (0.7 %)						unknown and should be a focus of future research. Future research should consider whether the buffering effect of social support on the relationship between childhood abuse and suicidal ideation is impacted by other variables.
54.Wong et al. (2019), USA	To examine whether self-concept clarity mediates mental health outcomes commonly associated with ACEs: suicide behaviour, depression, loneliness, perceived stress, and life distress.	Cross-sectional survey	308	Mean (SD) = 35.49 (11.03) years Age range: 18–70 years	Female = 46 % Male = 54 % Race/ Ethnicity: White = 81 % Hispanic = 7 % Black = 8 % Asian = 8 % American Indian and Alaskan Native = 2 %	Amazon's Mechanical Turk website $1.75 for completing the 15 min survey, equivalent to an hourly wage of $7	• (ra hbr 10 24 06 version) 10-item ACE scale [α = N/R]	• Suicide Behaviors Questionnaire-Revised (SBQ-R) [α = N/R] • Beck Depression Inventory Short Form (BDI-SF) [In this study (α = 0.94)] • Perceived Stress Scale [In this study (α = 0.92)] • Life Distress Inventory [In this study (α = 0.92)] • Rosenberg Self Esteem Scale [In this study (α = 0.94)] • Self-Concept Clarity (SCC) Scale [In this study (α = 0.94)]	• 6-item De Jong Gierveld Loneliness Scale [In this study (α = 0.92)]	Results supported the hypothesized process: self-concept clarity mediated the effects of ACEs on all outcomes with small to medium indirect effect sizes and remained controlling for demographic variables. After including self-esteem as another mediator, all self-concept clarity indirect effects remained significant except for suicide behaviour.	Future research would be strengthened by a study design showing self-concept clarity's mediating effects even after controlling for earlier measurements of these mental health outcomes (i.e. actor, autoregressive effects).
55.Xei et al. (2018), China	To investigate the prevalence of childhood trauma in a sample of patients with mental disorders in southern China and to identify correlations between childhood trauma, suicidal ideation, and social support.	Cross-sectional survey	679	Mean (SD) reported for each group: Depression = 27.78 (8.1) Bipolar = 25.50 (9.3) Schizophrenia = 27.91 (8.3) Control = 27.86 (4.8) Age range: N/R Age group: 18+	Depression Bipolar Schizophrenia Control Female = 127 (55.5 %) 54 (52.9 %) 108 (50 %) 54 (40.9 %) Male = 102 (44.5 %) 48 (47.1 %) 108 (50 %) 78 (59.1 %) Race/ Ethnicity: Depression	Department of Clinical Psychology at the affiliated Brain Hospital of Guangzhou Medical University, Guangzhou, Guangdong, China	• Childhood Trauma Questionnaire–Short Form (CTQ-SF) [α = N/R] • Questions on family medical history from the demographic questionnaire [α = N/R]	• ICD-10 Diagnostic Criteria [α = N/R] • Self-rating Idea of Suicide Scale (SIOSS) - Sleep Scale, Desperation Scale, Optimism Scale [α = N/R] • Questions on diagnosis from the demographic questionnaire [α = N/R]	• Social Support Rating Scale (SSRS) [α = N/R]	In patient groups, physical neglect (PN) and emotional neglect (EN) were most reported, and sexual abuse (SA) and physical abuse (PA) were the least reported. Childhood Trauma Questionnaire–Short Form (CTQ-SF) and Social Support Rating Scale (SSRS) total scores, and most of their subscale scores in patient groups were significantly different	Future studies are needed to verify and explain the relationship between childhood trauma and mental disorders. Such studies should use larger samples, control for more demographic features, and use instruments other than self-rating scales.

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Author, country	Aim	Study design	Sample size (n)	Population: age & age group	Population: gender & race/ ethnicity	Setting	ACEs	Mental health problems	Social outcomes	Key findings	Gaps/future studies
					Bipolar Schizophrenia Control Han = 217 (94.8 %) 93 (91.2 %) 210 (97.2 %) 123 (93.2 %) Minority = 12 (5.2 %) 3(2.9 %) 6(2.8 %) 9 (6.8 %)					from the control group. After controlling demographic characteristics, mental disorders were associated with higher CTQ-SF scores and lower Self-rating Idea of Suicide Scale (SSRS) scores. CTQ-SF scores and the number of trauma types were positively correlated with the SIOSS score. Negative correlations existed between SSRS scores and the SIOSS score.	
56. Yearwood et al. (2019), Peru	To examine the longitudinal associations between environmental adversity, complex trauma, and adolescents' internalizing and externalizing symptoms.	Cross-lagged panel research design	644	Mean (SD) = 13.89 (1.31) years Age range: 11–18 years	Female = 53.1 % Male = 46.9 % Race/ Ethnicity: N/R	Larger longitudinal study in Villa El Salvador, Lima, Peru.	• Questionnaire of Exposure to Violence (QEV) - Exposure to Violence in School, Community, Media & Exposure to Violence in the Household Scales [α = N/R] • (Spanish Version) Childhood Trauma Questionnaire-Short Form (CTQ-SF) - Physical Abuse, Emotional Abuse, Sexual Abuse, & Emotional Neglect Scales [α = N/R] • (Spanish and	• Youth Self-Report (YSF) [α = N/R]	• Quality of Relationships Inventory (QRI) - Support Scale [In this study - Support Scale (T1) (α = 0.82)]	There were significant unidirectional dynamic relations, where both environmental adversity and complex trauma were associated with higher levels of internalizing and externalizing symptoms. Peer support significantly moderated this effect, but only for complex trauma, in that higher levels of peer support were associated with a decreased impact of	Future research should focus on further exploring the underlying mechanisms of attachment as a protective factor and should include larger sample sizes and explore age effects. Other relationships (besides peer attachment) should be further explored, both from the household (for example parents and siblings) as from the

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Author, country	Aim	Study design	Sample size (n)	Population: age & age group	Population: gender & race/ ethnicity	Setting	ACEs	Mental health problems	Social outcomes	Key findings	Gaps/future studies
							longitudinal study adapted version) Fourteen items from the Family Health History Questionnaire (FHHQ)			complex trauma on internalizing and externalizing symptoms.	broader environment of the participants (teachers).
57.Zhao et al. (2019), China	To explore the mediating roles of emotional intelligence and social support in the relationship between childhood maltreatment and mental symptoms.	Cross-sectional survey	811	Mean (SD) = 19.5 (1.86) years Age range: 17–26 years	Female = 594 Male = 217 Race/ Ethnicity: N/R	Several universities in mainland China	• (23-item adaptation of Zhao et al.) Childhood Trauma Questionnaire (CTQ) [In this study (α = 0.78)]	•) Symptom Checklist 90 Scale (SCL-90) [In this study (α = 0.96)] • (Bao et al., 2015 adaptation) Wong Law Emotional Intelligence Scale (WLEIS) [In this study (α = 0.90)]	• Perceived Social Support Scale (PSSS) - Support Scale [In this study - Support Scale (α = 0.90)]	Childhood maltreatment not only directly increases the likelihood of developing mental symptoms but also affects emotional intelligence through influencing social support and then indirectly increasing the likelihood of developing mental symptoms. While emotional intelligence and social support both do not directly mediate the relationship between childhood maltreatment and mental symptoms, childhood maltreatment affects emotional intelligence by influencing social support, thus indirectly increasing the likelihood of developing mental symptoms. This study provided a theoretical basis for ameliorating the adverse effects of childhood maltreatment on mental symptoms by enhancing emotional intelligence and social support.	Additional longitudinal research is needed to assess its stability.

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Table 2 (*continued*)

Author, country	Aim	Study design	Sample size (n)	Population: age & age group	Population: gender & race/ ethnicity	Setting	ACEs	Mental health problems	Social outcomes	Key findings	Gaps/future studies
58. Colburn et al. (2021), USA	To understand how adverse experiences, individually and cumulatively, are directly and indirectly related to psychosocial outcomes in college students.	Cross-sectional survey	722	Mean (SD) = 21.67 (5.07) years Age range: N/R Age group: N/R	Female = 485 (67.17 %) Male = 232 (32.13 %) Other = 5 (0.69 %) Race/ Ethnicity: White = 539 (74.65 %) Black = 28 (3.88 %) Hispanic = 79 (10.94 %) Asian = 24 (3.32 %) Biracial = 43 (5.96 %) Other = 9 (1.25 %)	Two large public universities and one medium-sized private university located in the Midwestern and Southern United States	• Experiences of trauma during childhood were based on the original ACE study conducted by the Center for Disease Control and Prevention and Kaiser Permanente (Felitti et al., 1998) [In this study (α = 0.80)]	• Four items from the Medical Outcomes Study Short-Form 36-Item Health Survey [In this study - 4 items used (α = 0.85)] • Four items from the Perceived Stress Scale [In this study - 4 items used (α = 0.77)]	• Six items from the Interpersonal Support Evaluation List (ISEL-12) [In this study - 6 items used (α = 0.78)]	ACEs are significantly related to stress, social support, and mental health. Household dysfunction and other traumas result in a maladaptive stress response, low social support, and impaired mental health.	Future research should examine gender differences, consider the severity, duration, and frequency of experiences with long term outcomes & the age at which the adverse experience occurred and its relationship with mental health. Additional adverse experiences such as the death of a close family member, exposure to community violence, and discrimination should also be considered. These variables should be examined at different time points.

[a] N/R: not reported.

studies, the majority of participants were female (n = 49), while nine studies reported a higher percentage of males in the sample. Twenty-two studies did not provide information on participants' ethnicity/race. Papers reporting ethnicity/race information stated the highest percentages of participants from White ethnic backgrounds (n = 21), followed by two studies with the highest percentage of participants from African American origin.

3.4. Measures

3.4.1. ACEs

There were 302 discrete variables measured under the category of ACEs across the studies included in this review. While many studies measured physical abuse (n = 47), sexual abuse (n = 41), and emotional abuse (n = 35), the operational definition and measurement tool for each type of abuse varied across studies. For example, 39 out of 41 studies examining sexual abuse defined the concept simply as sexual abuse, but a further four studies adopted different definitions: inappropriate touching, sexual abuse by a parent or adult in the home, sexual abuse by anyone, and sexual assault.

Most articles (87.93 %) used variants of the original ACES measure (Felitti et al., 1998) as their operational definition of ACES, while 2 % used the original framework. In addition, 22.4 % of articles used additional sub-categories to ACEs, such as bullying or witnessing mugging. The most frequently used tool for assessing ACES was the Childhood Trauma Questionnaire (CTQ). However, it was common that modifications were made to its format and analysis approach. For example, Yearwood et al. (2019) used the short form of the questionnaire (CTQ-SF) to create a latent variable called Complex Trauma, which was then used in the analysis. Additionally, Schumm et al. (2006) also used an “abbreviated version” of CTQ-SF. It is unclear whether this is a reference to the accepted Short Form version of the tool or if they made extra changes. In addition, only 18 papers reported any reliability and/or validity scores for ACEs measures. A comprehensive list of ACEs discrete variables and measurements can be found in Table 3.

3.4.2. Social functioning outcomes

Studies measured both objective and subjective aspects of social functioning outcomes (loneliness: n = 8; social isolation/social support: n = 63). Loneliness included a range of subjective variables such as emotional loneliness, family and friend harmony, and perception of others' fondness for self. Social isolation also included a range of objective variables such as family resources, financial assistance, and neighbourhood cohesion. A further four studies also considered variables measuring social relationships, such as annual income (Haahr-Pedersen et al., 2020) and transitions and changes (Herrenkohl et al., 2016). These variables were included in bespoke tools created for the purpose of the study, and no validity or reliability figures were reported.

Of the measures that included social functioning outcome measurements, 35 % reported any reliability or validity scores for social relationship measures. Like other measures in this review, many of the social isolation and loneliness scales used were modified or ad hoc instruments (e.g., Larkin et al., 2018; Steine et al., 2020; Wang et al., 2018). Of the 58 papers included in this review, over 20 relied on non-validated measures of social isolation and loneliness, including large-scale population surveys (n = 3) and other bespoke questionnaires (n = 15). A further two studies assessed aspects of social relationships qualitatively through semi-structured interviews (n = 2). Social support emerged as a distinct, with 46 studies examining some facets of social support such as perceived and actual emotional support, peer support, and family support. However, consideration of the complexity of social support was lacking, and the distinctions between the objective and subjective nature of social support in the research were not regularly addressed in the choice of research measures. A comprehensive list of social functioning outcome measurements can be viewed in Table 4.

3.4.3. Mental health outcomes

Categories of mental health examined in the 58 studies covered mood disorders (n = 44), anxiety disorders (n = 19), PTSD (n = 11), psychotic disorders (n = 12), personality disorders (n = 1). Additionally, there were 37 miscellaneous aspects of mental health examined, such as sleep disorders (n = 3), suicide/self-harm (n = 14), and substance misuse (n = 7). The most frequently examined mental illness was depression (n = 36). A broad range of tools was used to assess mental health, but only 52/58 studies used established and validated measures, and only 33 studies reported reliability or validity scores. The most frequently used tool was the Patient Health Questionnaire (PHQ) or a PHQ variant version (n = 7). However, other measures were frequently present in modified and short-form versions. For example, five studies used the Beck Depression Inventory (BDI) scale, four studies used the Epidemiologic Studies - Depression Scale (CES—D), three studies used the Generalized Anxiety Disorder 7-item Scale (GAD-7) and the Hopkins Symptom Checklist (HSCL-10), and two studies used the PTSD Symptom Scale–Self Reported (PSS-SR). A comprehensive list of Mental health categories and outcome measures can be found in Table 5.

4. Discussion

The aims of this review were to examine how the concepts of ACEs, mental health, and social functioning outcomes have been defined, assessed, and studied in the empirical literature to date and to identify gaps or weaknesses in current research to guide further investigation. This review identified 58 studies examining ACEs, social functioning outcomes, and mental health outcomes in a wide range of populations. Whilst many studies employed a robust design and methodology, there was high variability and substantial discrepancies in the definition and operationalisation of key concepts and the outcome measures used. The following issues emerged from the narrative synthesis: a) the limitations of research samples to date, b) the choice of outcome measures for ACEs, social functioning and mental health outcomes, and c) the limitations of current study designs.

Table 3
ACEs, measurements and discrete variable in included studies.

Authors, year, country	ACEs measures	Emotional abuse	Physical abuse	Sexual abuse	Unspecified type of abuse	Emotional neglect	Physical neglect	Unspecified type of neglect	Incarceration	Domestic violence	Parental separation	Mental illness &/or suicide	Substance misuse	Unspecified
Aydin et al. (2016), Turkey	· General Physical Examination · Psychiatric and Psychosomatic Interview			X										
Baiden et al. (2017), Canada	· Six items on child abuse experience		X	X						X				
Beilharz et al. (2020), Australia	· The Childhood Trauma Questionnaire Short Form (CTQ-SF) & three-item Minimization and Denial (MD) subscale	X	X	X		X	X				X			
Boyda & McFeeters (2015), UK	· Adult Psychiatric Morbidity Survey (APMS; 2007) - Domestic Violence and Abuse Section, Stressful Life Events Section, Social Support Section · Two items on parental separation · Two items on neglect		X	X		X		X						
Brinker & Cheruvu (2016), USA	· Behavioural Risk Factor Surveillance System (BRFSS) ACE Module	X	X	X					X	X	X	X	X	
Cheong et al. (2017), Ireland	· Center for Epidemiologic Studies ACE Questionnaire	X	X	X		X	X		X	X	X	X	X	
Cosco et al. (2018), UK	· Prospective & retrospective items on childhood psychosocial adversities										X	X	X	
Dion et al. (2016), Canada	· Three items on child maltreatment and a follow-up question		X	X						X				
Elzy (2011), USA	· Early Sexual Experiences (ESE) Questionnaire (Modified) · Two items from the Life Stressor Checklist-Revised (LSC-R)			X										
Esposito & Clum (2002), USA	· Child Abuse Survey (CAS)		X	X										
Forster et al. (2020), USA	· Six items adapted from the original adverse childhood experiences study (Felitti et al., 1998)	X	X	X					X	X			X	
Gallus et al. (2015), USA	· Traumatic Events Screening Inventory–Child Report Form (TESI-CRF) (7-item modified version)		X						X		X			
Gayer-Anderson et al. (2015), UK	· The Childhood Experience of Care and Abuse Questionnaire (CECA.Q) · Family Interview for Genetic Studies		X	X								X		
Haahr-Pedersen et al. (2020), USA	· Adverse Childhood Experiences Questionnaire	X	X	X		X	X		X	X	X	X	X	
Haj-Yahia et al. (2019), Israel	· Conflict Tactics Scale (CTS) (Revised version)	X	X											
Herrenkohl et al. (2016), USA	· Parents' reports of their own and others' disciplining practices used with children prior to the preschool and school-age waves · Youth and adult reports on sexual abuse	X	X	X										
Lin et al. (2018), USA	· Childhood Trauma Questionnaire (CTQ-SF)	X	X	X		X	X							

(*continued on next page*)

Table 3 (*continued*)

Authors, year, country	ACEs measures	Emotional abuse	Physical abuse	Sexual abuse	Unspecified type of abuse	Emotional neglect	Physical neglect	Unspecified type of neglect	Incarceration	Domestic violence	Parental separation	Mental illness &/or suicide	Substance misuse	Unspecified
Huang et al. (2019), China	· Childhood Trauma Questionnaire (CTQ-SF) (Chinese version)	X	X	X		X	X							
Hyland et al. (2019), USA	· Three items from Life Events Checklist for DSM-5 (LEC-5) (Modified version) · Adverse Childhood Experiences Questionnaire		X	X			X							
Jones et al., 2022, USA	· Eight Centers for Disease Control (CDC) categories of Adverse Childhood Experiences	X	X	X					X	X	X	X	X	
Kealy, Rice, & Cox (2020), Canada	· Items on participants' experience of adversity during childhood	X	X	X								X	X	
Kearney et al. (2018), USA	· Trauma History Screen (THS)		X	X										
Larkin et al. (2018), USA	· 10 ACE items from the original ACE survey conducted by Kaiser Permanente and the Centers for Disease Control and Preventions	X	X	X		X	X		X	X	X	X	X	X
McElroy & Hevey (2014), Ireland	· Items on early experiences · Childhood Trauma Questionnaire - Short Form (CTQ-SF)	X	X	X		X	X					X	X	
McLafferty et al. (2019), Northern Ireland	· Five items on parental overcontrol, overprotection and overindulgence (Overindulgence Scale) · Three adversity profiles from the previous study using the same sample	X	X	X				X	X	X		X	X	X
McLafferty et al. (2019), Northern Ireland	· Three underlying mutually exclusive profiles of childhood adversity in the Northern Ireland population		X	X				X		X		X	X	
Murphy et al. (2015), Northern Ireland	· Early Life Experiences Scale (ELES) · Peer Victimization Scale (PVS)	X												
Murthi & Espelage (2005), USA	· Sexual Victimization Questionnaire (SVQ)			X										
Narita et al. (2020), USA	· Ten items on the first 18 years of life	X	X	X		X	X		X	X	X	X	X	X
Negriff et al. (2019), USA	· Information from child welfare case records obtained for the time period prior to study enrollment to quantify maltreatment experiences)	X	X	X				X						
Oshio et al. (2013), Japan	· Two items on physical abuse and neglect:		X				X							
Pitzer & Fingerman (2010), USA	· Two items on physical abuse from the Conflict Tactics Scale		X											
Powers et al. (2009), USA	· Childhood Trauma Questionnaire–Short Form (CTQ-SF) (Physical neglect excluded)	X	X	X		X								
Roh et al. (2015), USA	· ACE Questionnaire	X	X	X			X		X	X	X	X	X	

(*continued on next page*)

Table 3 (*continued*)

Authors, year, country	ACEs measures	Emotional abuse	Physical abuse	Sexual abuse	Unspecified type of abuse	Emotional neglect	Physical neglect	Unspecified type of neglect	Incarceration	Domestic violence	Parental separation	Mental illness &/or suicide	Substance misuse	Unspecified
Ronnenberg et al. (2020), USA	· Twenty one items on childhood experiences of abuse, neglect, and household dysfunction (Felitti et al., 1998)				X			X				X		
Saluja et al. (2003), USA	· Interview data at age of 6 merged with child maltreatment reports from the state's Central Registry on Child Abuse and Neglect · Center for Epidemiological Studies - Depression Instrument				X			X				X		
Schneider et al. (2020), USA	· Centres for Disease Control and Prevention ACE Questionnaire (additional adaptations added from Conflict Tactics Scale and Wyatt (1985)'s questions on sexual abuse) (17-item version)	X		X	X				X	X		X	X	
Schumm et al. (2006), USA	· Childhood Trauma Questionnaire (CTQ) (Abbreviated version)		X	X										
Seeds et al. (2010), Canada	· Childhood Experience of Care and Abuse (CECA) (Adolescent version) - Antipathy Scale, Indifference Scale, Physical Abuse Scale, Bullying Scale	X	X			X	X							
Sheikh (2018a), Norway	· One item on childhood physical maltreatment from the Tromsø VI questionnaire · One item on mother's/father's history of psychiatric disorders	X	X									X		
Sheikh (2018b), Norway	· Six indicators of childhood adversity from Tromsø VI	X	X										X	
Sheikh et al. (2016), Norway	· One item on childhood traumatic experiences from Tromsø VI:	X	X										X	
Steenkamp et al. (2019), Netherlands	· Childhood Experience of Care and Abuse Questionnaire (CECA.Q)	X	X	X										
Steine et al. (2020), Norway	· Childhood Trauma Questionnaire - Short Form (CTQ-SF)	X	X	X		X	X							
Stevens et al. (2013), USA	· Childhood Trauma Questionnaire (CTQ)	X	X	X										
Struck et al. (2021), Germany	· Childhood Trauma Questionnaire (CTQ-SF) (21-item German version)	X	X	X		X	X	X						
Su et al. (2020), Canada	· Six items on childhood maltreatment		X	X						X	X			
Trauelsen et al. (2016), Norway	· Childhood Trauma Questionnaire (CTQ) (Danish version) · Childhood Experience of Care and Abuse Questionnaire (CECA.Q) · Interview questions on first-degree psychiatric illness	X	X	X		X	X				X	X		
Vranceanu et al. (2007), USA	· Comprehensive Child Maltreatment Scale (CCMS) for Adults	X	X	X				X		X				

(*continued on next page*)

Table 3 (*continued*)

Authors, year, country	ACEs measures	Emotional abuse	Physical abuse	Sexual abuse	Unspecified type of abuse	Emotional neglect	Physical neglect	Unspecified type of neglect	Incarceration	Domestic violence	Parental separation	Mental illness &/or suicide	Substance misuse	Unspecified
Wan et al. (2019), China	· Child Trauma Questionnaire (CTQ) (Chinese version) · Items on household dysfunction from The Centers for Disease Control and Kaiser Permanente Adverse Childhood Experiences Study	X	X	X		X	X			X	X	X	X	X
Wang et al. (2018), China	· Childhood Trauma Questionnaire–Short Form (CTQ-SF) (Chinese Version)	X	X	X		X	X							
Weber Ku et al. (2021), USA	· Two items on caregiver physical and sexual abuse		X	X										
Wilson et al. (2019), USA	· Childhood Trauma questionnaire-Short form (CTQ-SF) - Sexual Abuse Scale, Physical Abuse Scale & Minimization/Denial Subscale		X	X										
Wong et al. (2019), USA	· 10-item ACE scale (ra hbr 10 24 06 version)	X	X	X		X	X		X	X	X	X	X	
Xei et al. (2018), China	· Childhood Trauma Questionnaire–Short Form (CTQ-SF) · Items on family medical history from the demographic questionnaire	X	X	X		X	X					X		
Yearwood et al. (2019), Peru	· Questionnaire of Exposure to Violence (QEV) - Exposure to Violence in School, Community, Media & Exposure to Violence in the Household Scales · Childhood Trauma Questionnaire-Short Form (CTQ-SF) - Physical Abuse, Emotional Abuse, Sexual Abuse, & Emotional Neglect Scales (Spanish Version) · Fourteen items from the Family Health History Questionnaire (FHHQ) (Spanish and longitudinal study adapted version)	X	X	X		X			X	X	X	X	X	
Zhao et al. (2019), China	· Childhood Trauma Questionnaire (CTQ) (23-item adaptation of Zhao et al.)	X	X	X		X	X							
Colburn et al. (2021), USA	· Childhood trauma experiences based on the original ACE study by the Center for Disease Control and Prevention and Kaiser Permanente (Felitti et al., 1998)	X	X	X		X	X		X	X	X	X	X	
Total		37	51	46	2	21	21	8	14	19	16	23	20	4

Table 4
Social functioning outcome measures and constructs.

Subjective & objective social functioning constructs				
Social functioning outcome measures	Network quantity/ structure	Network quality	Appraisal emotional/ loneliness	Appraisal resources
Perceived Social Support Scale	x			
Social Provision Scale				x
Duke-UNC Functional Social Support Questionnaire (DFSS)				x
Social engagement: two items			x	
One item on loneliness			x	
One item on perceived and emotional support	x			
3-item Oslo Social Support Scale (OSS-3):	x		x	x
Six items on positive and negative support:				
Seven items on neighbourhood cohesion:			x	x
Four items on friend support			x	x
The Quality of Relationships Inventory (QRI): Support & Depth Subscales		x		x
The Unsupportive Social Interactions Inventory (USII)		x		
Social Support Questionnaire 6 (SSQ-6)		x	x	
Four items on teacher support: fTeacher-Student Relationships Scale from the Student Engagement Instrument			x	
One item on peer support			x	
Four items on parent connectedness adapted from measures of parental care and support used in prior survey research with adolescents			x	
Four items on school connectedness:				x
The Significant Others Scale (SOS)			x	
Medical Research Council (MRC) Socio-demographic Schedule	x			
Six-item De Jong Gierveld Loneliness Scale			x	
The Provision of Social Relations (PSR) Scale			x	
Safe, stable and nurturing relationships (SSNRs) social support indicators		x		
Medical Outcomes Study Social Support Survey				x
Two items on social support	x			
Multidimensional Scale of Perceived Social Support (MSPSS)			x	x
UCLA Loneliness Scale			x	
Four items on protective social factors				x
Three items on perceived social support				x
Three items newly designed social support scale including one item adapted from the Childhood Trauma Questionnaire and two items developed from the Army Study to Assess Risk and Resilience in Service Members (Army STARRS)				x
Ten questions on social networks from the World Health Organization WMH Survey Initiative Composite International Diagnostic Interview (WMH-CIDI)	x			x
Three-Item Loneliness Scale derived from the R-UCLA Loneliness Scale			x	
Items on family and friends' social support	x			
Three questions on perceived social support			x	
Two four-item scales on emotional support			x	x
One item on instrumental support				x
Social Support Behaviors Scale (SSB)				x
15-question semi-structured interview on social support of families with parental ACEs	x			x
Functional Social Support Questionnaire (FSSQ)				x
Neighbourhood Risk Assessment Instrument				x
Duke Social Support Stress Scale (DUSOCS)		x		
Ten items from the Social Provisions Scale				x
Interpersonal Support Evaluation List (ISEL)				x
One question on the perceived size of participants' peer network:	x			
One question on perceived social isolation				x
Two items on social support in adulthood	x			
One question on instrumental/tangible support				x
One question on emotional support				x
One item on loneliness			x	
Five items on relational difficulties			x	
Social Supports Provision Scale (SSPS)				x
Relationship Scales Questionnaire (RSQ)				x
Perceived Social Support Questionnaire (F-SozU)				x
Social Provisions Scale (SPS)			x	
Premorbid Adjustment Scale (PAS)				
Two questions on perceived social support from the Childhood Experience of Care and Abuse Questionnaire (CECA.Q)				x
Adolescent Social Support Scale				x
Social Support Rating Scale (SSRS)				x
Questions on mentoring	x		x	

(*continued on next page*)

Table 4 (*continued*)

Subjective & objective social functioning constructs				
Social functioning outcome measures	Network quantity/ structure	Network quality	Appraisal emotional/ loneliness	Appraisal resources
Quality of Relationships Inventory (QRI) - Support Scale			x	x
Perceived Social Support Scale (PSSS) - Support Scale				x
Six items from the Interpersonal Support Evaluation List (ISEL-12):				x

4.1. Diversity in research samples

The documentation of sample characteristics was highly variable across the included studies, which makes results difficult to replicate, validate, or generalize. This review found that within the studies which provided information, the majority of the populations were women and binary gender populations. This disparity highlights the need to examine ACEs, and social and mental health outcomes in populations with different gender identities, including LGBTQ+ and non-binary populations, and men to advance our understanding of these subgroups, who have varying risks for poor social, emotional, and mental health (Almuneef et al., 2017; Haahr-Pedersen et al., 2020; Jones et al., 2022). Similarly, only twenty-six studies documented participants' ethnicity information, while twenty of them examined White ethnic populations (n = 20). Previous studies have focused on ethnic/racial disparities in ACEs (Maguire et al., 2020), while others examined these differences predominantly in relation to mental health (Lee & Chen, 2017; Zhang & Monnat, 2022); however, there is very little research that examines the role of social outcomes in these populations. Research suggests that there are racial differences in both the number and types of ACEs experienced by racial groups (Maguire-Jack et al., 2020). Racial/ethnic differences in ACEs, social outcomes, and mental health have important implications for intervention development and clinical practice if they are to effectively address poly victimization, racism, racial stigma, stereotypes, and discrimination which increase poor mental health and negative social outcomes (Zhang & Monnat, 2022). The majority of studies were conducted in the US, UK and Canada, and thus it is desirable that ACES research from other countries, with different cultural environments and potentially different attitudes to mental health and social support, is adequately represented in the published literature to avoid bias.

This review found that children, adolescents, and older adults remain under-researched in this area. Cross-sectional and longitudinal studies have established the negative relationships between ACEs and poor mental health outcomes in children and adolescents, yet the impacts on social functioning outcomes have been largely overlooked. Teenagers with one ACE are also at greater risk of experiencing Attention Deficit Hyperactivity Disorder, behavioural/conduct problems, substance abuse disorders or a mental health diagnosis compared to youth without ACEs (Bomysoad & Francis, 2020). Traditionally, most of the published literature has focused on adult samples and retrospective reports on adversities experienced during childhood due to the definition of ACEs as experiences that occur before the age of 16 years (Struck et al., 2021). Although an increasing trend of studying the effects of ACEs on younger samples is noted, there is still an urgent need for more research on this population.

The wider literature also suggests that ACEs exposure is a key risk factor for serious mental illness (SMI), including substance use disorders (Bryant et al., 2020) and schizophrenia disorders (Prokopez et al., 2018). However, a limited number examined people with SMI, psychiatric comorbidities and/or inpatients in mental health care facilities and only one study in this review examined social functioning outcomes and ACEs in people with personality disorders. Certainly, more research is needed to understand the breadth and extent of these relationships in people experiencing SMI and/or receiving care in mental health services. The latter will help us to understand the mechanisms of ACEs and will support trauma-informed care in mental health care services (NHS England, 2019).

4.2. Inconsistent outcome measures for ACEs, social functioning and mental health

Conceptualisation and operationalisation discrepancies can negatively impact the interpretation of the literature, while discrepancies in conceptual models explaining the relationships and predictive power of ACEs on outcomes impose a risk for policy and intervention development (Bentall et al., 2012). This review shows that the majority of studies have focused on physical abuse, sexual abuse and emotional abuse, with little research on neglect, and family dysfunction variables. Felitti's (1998) typology of ACES was used to inform the scope of ACES literature in this study. Indeed, it is a widely accepted framework and is currently used by the Centres for Disease Control and Prevention and the Scottish Government. Although this approach to quantifying exposure to ACEs, which is based on 10 adverse experiences, has “predictive validity” (Lewer et al., 2020, p. 493), it has been the focus of criticism in recent years. Indeed, it has been argued that it does not adequately capture a sufficient range of adverse events, particularly in vulnerable populations (Zhang & Monnat, 2022) and that other indicators such as socioeconomic adversities (e.g., economic hardship) are more important in predicting health outcomes. Recent studies argue that rather than counting the number of ACEs as a cumulative, linear dose, research should reflect the interplay between different ACEs that occur. It is suggested that a mixture of modelling approaches to identifying clusters of adversities might explain the impact of adverse experiences more effectively (Zhang & Monnat, 2022). Notably there was a lack of consistency and clarity to the measurement of social functioning outcomes, with variability between studies and with the distinction between objective and subjective social support not regularly addressed. Whilst the concepts are directly related and often used interchangeably, they are distinct in that one can occur with or without the other. Therefore it is argued that social isolation and loneliness should be researched as separate but related entities (Newall & Menec, 2019).

The poor operationalisation of certain outcomes was also reflected by the range of measures used to capture ACEs, social

Table 5
Mental health measures and categories in included studies.

Mental health measures	Mental health category	Citations
Adult health history, including alcohol problems	Substance Abuse	Herrenkohl et al. (2016), USA
Adolescent Psychotic-like Symptom Screen (APSS)	Psychosis	Murphy et al. (2015), Northern Ireland
One Coping stress question	Coping	McLafferty et al. (2019), Northern Ireland
Beck Anxiety Inventory - Primary Care (BAI-PC)	Anxiety	Schneider et al. (2020), USA
Beck Depression Inventory: (BDI-II; BDI-SF)	Depression	Herrenkohl et al. (2016), USA
Brief Symptom Inventory-Depression Scale (BSI)	Depression	Murthi & Espelage (2005), USA
Beck Scale for Suicide Ideation (BSSI) - 5 questions	Suicide	Wilson et al. (2019), USA
Child Behaviour Checklist (CBCL) - 2 questions	Child: Aggression, Depression, Anxiety	Saluja et al. (2003), USA
Children's Depression Inventory (CDI)	Child Depression	Aydin et al. (2016), Turkey; Negriff et al. (2019), USA
Center for Epidemiologic Studies - Depression Scale (CES-D)	Depression	Cheong et al. (2017), Ireland; Lin et al. (2018), USA; Gallus et al. (2015), USA; Schumm et al. (2006), USA; Murthi & Espelage (2005), USA
Clinical Interview Schedule Revised (CIS-R)	Anxiety, Depression	Boyda & McFeeters (2015), UK
Coping Inventory for Stressful Situations (CISS)	Coping	McElroy & Hevey (2014), Ireland
Conservation of Resources Evaluation (COR-E) (Abbreviated version)	Stress	Vranceanu et al. (2007), USA
Child Post-Traumatic Stress Reaction Index	Child PTSD	Aydin et al. (2016), Turkey
Childhood Sexual Abuse-Loss Measure (CSALM; created for this study) based on the Loss Measure for Survivors (LQ-S)	PTSD	Murthi & Espelage (2005), USA
Dysfunctional Attitudes Scale (DAS) (Chinese version)	Depression	Wang et al. (2018), China
Difficulties With Emotion Regulation Scale (DERS)	Emotion Regulation	Stevens et al. (2013), USA
Dissociative Experiences Scale-II (DES-II)	PTSD	Kearney et al. (2018), USA
Diagnostic Inventory for Depression (DID) - Symptom Scale	Depression	Vranceanu et al. (2007), USA
Dysfunctional Individuation Scale (DIS)	Depression	Kealy, Rice, & Cox (2020), Canada
Eysenck Personality Questionnaire (EPQ)(48-item revised Chinese Vers.)	Personality	Wang et al. (2018), China
EuroQol-5D (EQ-5D)	Anxiety, Depression	Sheikh (2016), Norway
Emotion Regulation Questionnaire	Emotion Regulation	McLafferty et al. (2019), Northern Ireland
Generalized Anxiety Disorder 7-item Scale (GAD-7)	Anxiety	Haahr-Pedersen et al. (2020), USA; Hyland et al. (2019), USA
Global Assessment Function (GAF)	General Functioning	Huang et al. (2019), China
Geriatric Depression Scale-Short Form (GDS-SF)	Depression	Roh et al. (2015), USA
General Health Questionnaire (GHQ-28)	Anxiety, Depression	Cosco et al. (2018), UK
Hopkins Symptom Checklist (HSCL-10)	Mental Health, Anxiety, Depression	Sheikh (2016), Norway; Sheikh (2018a), Norway; Sheikh (2018b), Norway
Inventory of Altered Self-Capacities (IASC)	Borderline Personality Disorder	Elzy (2011), USA
ICD-10 Diagnostic Criteria	Depression, Bipolar, Schizophrenia, Psychosis	Xei et al. (2018), China; Huang et al. (2019), China
Impact of Event Scale - Revised (IES-R)	PTSD	Steine et al. (2020), Norway
International Trauma Questionnaire (ITQ)	PTSD	Haahr-Pedersen et al. (2020), USA
Kessler Psychological Distress Scale	Distress, Anxiety, Mood Disorders, Depression	Beilharz et al. (2020), Australia; Su et al. (2020), Canada; Oshio et al. (2013), Japan; Jones et al. (2018), USA
Life Distress Inventory	Stress	Wong et al. (2019), USA
Montgomery – Asberg Depression Rating Scale (MADRS)	Depression	Huang et al. (2019), China
Mini-International Neuropsychiatric Interview (MINI) 6	Mental Health, Psychosis	Trauelsen et al. (2016), Norway; Huang et al. (2019), China
'Middle School Questionnaire' of the 2013 Youth Risk Behaviour Surveillance System in the USA	Suicide	Wan et al. (2019), China
Multidimensional Sub-health Questionnaire of Adolescents: Psych Domain	Mental Health	Wan et al. (2019), China
Modified Scale for Suicidal Ideation (MSSI)	Suicide	Esposito & Clum (2002), USA
NEO-Five Factor Inventory (NEO-FFI)	Personality	McElroy & Hevey (2014), Ireland
Operational criteria (OPCRIT) checklist for the psychotic and affective illness diagnostic system was used to obtain ICD-10 diagnoses & a Positive and Negative Symptom Scales (PANSS) interview	Psychosis	Trauelsen et al. (2016), Norway
Positive and Negative Syndrome Scale (PANSS) (Chinese version)	Psychosis	Huang et al. (2019), China
Psychological Distress Index (14 item version)	Distress	Dion et al. (2016), Canada
Patient Health Questionnaire	Depression	Hyland et al. (2019), USA; Brinker & Cheruvu (2016), USA; Haahr-Pedersen et al. (2020), USA; Schneider et al. (2020), USA; Kealy, Rice, & Cox (2020), Canada; Forster et al. (2020), USA; Herrenkohl et al. (2016), USA
Psychosis Screening	Psychosis	Gayer-Anderson et al. (2015), UK
Perceived Stress Inventory (PSI) (Short version)	Stress	Vranceanu et al. (2007), USA
Problem-Solving Inventory - Perceived Confidence Scale	Cognition	Esposito & Clum (2002), USA

(*continued on next page*)

Table 5 (*continued*)

Mental health measures	Mental health category	Citations
Perceived Stress Questionnaire (PSQ)	Stress	Beilharz et al. (2020), Australia
Psychosis Screening Questionnaire (PSQ) (hallucination item excluded)	Psychosis	Boyda & McFeeters (2015), UK
Pittsburgh Sleep Quality Inventory (PSQI)	Sleep	Beilharz et al. (2020), Australia
Perceived Stress Scale: 4 questions, Colburn et al. (2021), USA	Stress	Wong et al. (2019), USA
PTSD Symptom Scale: Interview (PSS-I)	PTSD	Vranceanu et al. (2007), USA; Schumm et al. (2006), USA; Stevens et al. (2013), USA
Posttraumatic Cognitions Inventory (PTCI)	PTSD	Murphy et al. (2015), Northern Ireland
Rosenberg Self Esteem Scale	Self-esteem	Wong et al. (2019), USA
Self-rating Anxiety Scale (SAS) (Chinese version)	Anxiety	Wang et al. (2018), China
Suicide Behaviors Questionnaire - Revised (SBQ-R)	Suicide	Wong et al. (2019), USA
Self-Concept Clarity (SCC) Scale	Self-concept	Wong et al. (2019), USA
Structured Clinical Interview: DSM-IV (SCID I)	Depression, Substance Abuse, Mood Disorders, Anxiety	Struck et al. (2021), Germany; Lin et al. (2018) (2018), USA; McElroy & Hevey (2014), Ireland
Symptom Checklist 90 Scale (SCL-90) (Tang and Cheng, 1999 adaptation)	Obsessive-Compulsive Disorder, Anxiety, Depression, Psychosis	Zhao et al. (2019), China
Self-rating Depression Scale (SDS) (Chinese version)	Depression	Wang et al. (2018), China
Short Form 36 Health Survey Questionnaire (SF-36)	Mental health, Well-being, Emotional Problems	Lin et al. (2018), USA; Beilharz et al. (2020), Australia; Zhao et al. (2019), China; Herrenkohl et al. (2016), USA; Schneider et al. (2020), USA
Self-rating Idea of Suicide Scale (SIOSS): Sleep, Desperation, Optimism Scales	Suicide	Xei et al. (2018), China
Structured Interview for Prodromal Syndromes (SIPS)	Psychosis	Huang et al. (2019), China
Self-Injurious Thoughts and Behaviors Interview (SITBI)	Suicide	McLafferty et al. (2019), Northern Ireland
Somatic and Psychological Health Report (SPHERE) (Psych/Som subscales)	Stress	Beilharz et al. (2020), Australia
Scale for Suicidal Behaviour (SSB)	Suicide	Esposito & Clum (2002), USA
Spielberger Trait Anger & Anxiety Scales	Personality	Lin et al. (2018), USA
Toronto Alexithymia Scale-20 (TAS-20) - Difficulty Identifying Feeling (DIF) & Difficulty Describing Feelings (DDF) Subscales	Alexithymia	Murthi & Espelage (2005), USA
Trait Emotional Intelligence Questionnaire (V1.50) - Long Form	Personality	McElroy & Hevey (2014), Ireland
DSM-5 Trauma Exposure Survey	PTSD	Kearney et al. (2018), USA
Trauma Symptom Checklist (TSC-33) (30-item version)	PTSD	Haj-Yahia et al. (2019), Israel
Ways of Coping (WCQ) - Distancing Scale (3 items deleted), Seeking Social Support Scale, Escape Avoidance Scale	Coping	Murthi & Espelage (2005), USA
World Health Organization Composite International Diagnostic Interview (WHO-CIDI)	Psychosis, Substance Abuse, Anxiety, Depression, Bipolar, Mood Disorders, Well-being	Baiden et al. (2017), Canada; Narita et al. (2020), USA; McLafferty et al. (2019), Northern Ireland; Hyland et al. (2019), USA; Haahr-Pedersen et al. (2020), USA
Wong Law Emotional Intelligence Scale (WLEIS) (Bao et al., 2015 adpt)	Emotional Intelligence	Zhao et al. (2019), China
Questions adapted from the World Health Organization WMH Survey Initiative Composite International Diagnostic Interview (WMH-CIDI) Version 3	Anxiety, Depression	McLafferty et al. (2019), Northern Ireland
Youth Self-Report (YSF)	Internalizing and Externalizing	Yearwood et al. (2019), Peru
Current stress - 1 question	Stress	McLafferty et al. (2019), Northern Ireland
Demographic questionnaire diagnosis questions	Mental health	Xei et al. (2018), China
Depressive and anxious feelings - 2 question	Anxiety, Depression	Steenkamp et al. (2019), Netherlands
Drug dependence - 1 question	Substance Abuse	Boyda & McFeeters (2015), UK
Inpatient/outpatient substance abuse or mental health services - 1 question	Substance Abuse, Mental Health	Larkin et al. (2018), USA
Lifetime treatment for emotional problems - self-report	Emotional Problems	Lin et al. (2018), USA
Mental disorders - 1 question	Mental Health	Narita et al. (2020), USA
Mental Health Continuum Short Form	Well-being	Su et al. (2020), Canada
Negative affect - 1 question	Depression	Pitzer & Fingerman (2010), USA
Number of days in the past 30 the respondents reported felt they had poor mental health - 1 question	Mental Health	Jones et al., 2022, USA
Personal control - 8 questions	Personal Control	Pitzer & Fingerman (2010), USA
Positive symptom severity - 7 questions	Psychosis	Steenkamp et al. (2019), Netherlands
Recent binge drinking - 1 question	Substance Abuse	Weber Ku et al. (2021), USA
Recent nonviolent antisocial behaviour	Behavioural Problems	Weber Ku et al. (2021), USA
Recent violent social behaviour	Behavioural Problems	Weber Ku et al. (2021), USA
Sleep problems - self-report	Sleep	Lin et al. (2018), USA
Suicidal ideation	Suicide	Weber Ku et al. (2021), USA; Baiden et al. (2017), Canada; Forster et al. (2020), USA; Oshio et al. (2013), Japan; Forster et al. (2020), USA; Forster et al. (2020), USA
Suicidal self-injury questionnaire (NSSI)	Suicide	Wan et al. (2019), China

functioning outcomes, and mental health outcomes. A significant number of studies used non-validated or ad hoc measures, particularly in the assessment of social functioning outcomes, which have less established conceptual definitions. In ACEs measurement, although the use of validated instruments was more common, it was also noted that tools were modified or adapted for use, often without justification or reliability data for the version used. Similarly, in the assessment of mental health outcomes, there was still a failure to provide reliability and validity data for population use on the tools or measures used. This wide variability of the types of instruments used across the literature means that comparisons, replicability, and accurate conclusions on the relationships between the constructs is challenging. The lack of psychometric data also raises significant questions about the validity, generalisability, and quality of each study (Bryman, 2012). Finally, the use of self-reported measures also raises concerns due to social desirability bias, response bias, the risk for discrepancies in the interpretations of questions and lack of response flexibility (Demetriou et al., 2015).

4.3. Limitations of current research designs

This review found that cross-sectional designs were the most widely implemented research design, followed by cohort studies, while only a limited number of longitudinal studies were identified. In addition, power calculations were only performed in two studies, highlighting the limitations of the current literature in relation to a precise and accurate conclusion in the absence of an appropriate sample size (Nayak, 2010). Even adequately powered cross-sectional retrospective designs are vulnerable to attrition and recall biases due to the nature of their design (Hardt & Rutter, 2004; Hartas, 2019; Reuben et al., 2016). They require retrospective recall of childhood adversities which could be affected by a) inconsistencies in early memories, b) limited capacity to remember the time of event sequences, c) the frequency of recall and consolidation of traumatic memory, d) childhood amnesia, and e) individual's personality (Hartas, 2019). Limitations related to retrospective cross-sectional designs highlight the need for more longitudinal studies since they allow both within- and between-group comparisons through the collection of multiple data at different points in time. They are also able to differentiate between environmental effects on personal outcomes and personal effects on the environment, as well as assess attrition bias which increases the validity of the study findings (Hardt & Rutter, 2004). Finally, increasing reports of domestic violence, and therefore ACEs during and after the Covid-19 pandemic, along with poor social and mental health outcomes (World Health Organisation (WHO), 2020, Dawson et al., 2021), signifies the need to study the impact of ACEs longitudinally. However, it is perhaps not surprising that cross-sectional studies continue to dominate, given that longitudinal studies require large sample sizes and are time-consuming and expensive compared to cross-sectional designs (Caruana et al., 2015).

5. Limitations

Whilst a scoping review framework was implemented in this review, ensuring trustworthiness and allowing replicability, only four databases were searched, and grey literature and non-peer reviewed studies were not included. In addition, papers were limited to those published in the English language, and thus the review may have missed key papers, leading to a failure to capture culturally specific issues regarding ACES research and limiting the generalisability of the review's findings. Another limitation relates to the use of Felitti et al.'s (1998) framework for conceptualising ACEs which fails to capture more recent potential constructs of ACEs such as socio-economic dimensions. However, the framework is still valid and is so widely used in the ACEs literature to date that a pragmatic decision was made to employ this approach for the review.

6. Conclusion

This study mapped the evidence in relation to the definitions and operationalisation of ACEs and mental health and social functioning outcomes in current research. It highlighted the limited evidence on populations from diverse backgrounds and various gender identities, as well as the lack of evidence on minority groups. The shift towards examining ACEs clusters and attributing relationships at the cluster level is crucial since there is evidence that specific types of mental health disorders are associated with specific types of childhood adversities (Bruni et al., 2018). Similarly, the mechanisms of social predictors in mental health need to be established for comparisons between outcomes. The validity and reliability and the development of established measurements for assessing ACEs and social outcomes are important. By doing so, we will be in a better future position to effectively examine the relationships between the concepts and identify significant mechanisms and pathways that will allow comparisons between studies and inform future research and interventions.

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Declaration of competing interest

None.

Data availability

Data will be made available on request.

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