

ORIGINAL ARTICLE

A mediational analysis of adverse experiences in childhood and quality of life in adulthood

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Abstract

Objectives: This study examined associations of three prevalent adverse childhood experiences (ACEs) – parents' problematic alcohol use (PPAU), parental separation/divorce, and lack of support from a trusted adult—with adult quality of life (QoL), and potential mediators of associations.

Methods: Data were from a representative survey ($N = 28,047$) in Norway that assessed ACEs, QoL, and potential mediators: enduring perceptions of childhood hardships (Difficult Childhood Questionnaire; DCQ), current mental distress, and current social isolation. Latent regression analyses examined potential mediators.

Results: Each ACE was positively associated with perceptions of childhood as difficult (higher DCQ scores). In turn, ACEs were negatively associated with adult QoL through indirect effects. Lack of support from a trusted adult had the strongest negative association with adult QoL, compared to PPAU and parental separation/divorce. The association between the ACEs and QoL was explained through the mediators of mental distress and social isolation.

Conclusions: Of the examined ACEs, lack of support from a trusted adult had the strongest negative impact on adult QoL. Adult support to vulnerable children could potentially ameliorate adult consequences of ACEs. In addition, adults reporting difficulties due to childhood adversities may benefit from therapeutic interventions that address both psychological distress and isolation.

KEYWORDS

adverse childhood experiences, mental health, quality of life, social isolation

1 | INTRODUCTION

Adverse experiences in childhood are common. The World Health Organization (WHO) estimated that in Europe alone, 55 million children are affected by maltreatment (Sethi et al., 2018). In WHO-supported European surveys of young adults aged 18–25 years, half of respondents reported at least one adverse childhood

experience (ACE), with 6.3% reporting four or more (Sethi et al., 2018). These ACEs included physical, emotional and sexual abuse; neglect; witnessing intimate partner violence; and growing up with a household member with substance use, mental illness, and/or a history of incarceration. ACEs have received considerable attention because they have consistently been linked with negative physical and mental health outcomes in adulthood (Hughes et al., 2017;

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Kalmakis & Chandler, 2015; McKay et al., 2021; Porter et al., 2020). For example, more than a quarter of adult cases of anxiety and depression in Europe were attributed to ACEs (Bellis et al., 2019). Clinical populations within the mental health treatment field are much more likely to report ACEs compared to general population samples. For example, a large review found that patients with borderline personality disorder were 13 times more likely to report ACEs compared to non-clinical controls (Porter et al., 2020). Additionally, evidence indicates that ACEs are associated with poorer outcomes of treatment for mental disorders (Thomas et al., 2019).

Common adverse experiences in childhood that often co-occur and may negatively affect quality of life (QoL) in adulthood are parental separation and divorce, parents' problems with alcohol use, and, more generally, lack of support from a trusted adult in childhood. For example, a meta-analysis of 18 studies published since 1980 found a significant association between parental divorce and adult offspring's depression (Sands et al., 2017). Household substance use, including growing up with problematic parental alcohol use (PPAU), is one of the most prevalent forms of ACEs (Giano et al., 2020). For example, in the US, about 1 in 10 children (7.5 million) live in households with at least one parent who had a past year alcohol use disorder (Lipari & Van Horn, 2017). Experiencing parental divorce and either maternal or paternal alcohol problems nearly doubled the likelihood of adults reporting a lifetime suicide attempt, and parental divorce plus a history of alcohol problems for both parents tripled the likelihood of attempted suicide (Thompson et al., 2017).

Currently, it is common for children and adolescents to be encouraged to identify dependable adults to turn to for support in times of need, because not having a trusted adult may lead to poorer decision-making and health outcomes (Pringle et al., 2018). However, knowledge is sparse regarding the role of trusted adults during childhood and consequences for QoL after reaching adulthood. One cross-sectional survey of adults found that having adult support from someone trusted during childhood was related to better health status (diet, smoking, alcohol consumption, mental well-being) in adulthood (Bellis et al., 2017).

1.1 | Mediators between ACEs and adult quality of life

In a previous study, we suggested that ACEs, such as parental divorce and alcohol problems, and lacking a trustworthy adult, are associated with enduring perceptions of personal childhood hardships. Accordingly, we introduced and validated a short Difficult Childhood Questionnaire (DCQ) that captures the subjective burden of childhood adversities (Vederhus et al., 2021). With such a tool, research may better be able to examine potential mediators, such as negative affect and social isolation, through which ACEs exert their influence on adult health (Shevlin et al., 2015). That is, ACEs have mental health and social consequences, and are associated with symptoms of distress and poorer social cognitive skills during adolescence (Balistreri & Alvira-Hammond, 2016; Crawford et al., 2020). Such

impairments could potentially lead to negative affect and to social withdrawal and isolation in adulthood, which may help to explain ACEs' negative health consequences for adults (Piskulic & Addington, 2011; Shevlin et al., 2015).

1.2 | Aims of the study

To our knowledge, few or no studies have examined exposure to the ACEs of parental divorce, PPAU, and lack of a trusted adult, and their associations with overarching measures of adult health, namely QoL, through possible proximal mechanisms, particularly in a latent variable framework. The objectives of the present study were to examine associations between these ACEs and adulthood QoL, and potential mediators of these associations, including perceived childhood difficulty, mental distress and social isolation in adulthood. We hypothesized that exposure to ACEs would be positively associated with perceiving childhood as difficult and that there would be a mediated negative association with adult QoL. The analysis allowed examination of the strength of association of each ACE with adult QoL. Although the literature is inadequate to permit a hypothesis as to which ACE has the strongest association with QoL, the findings will inform clinical interventions for adults who report childhood adversities by identifying which types of adversity pose risks to adult health, and the mechanisms by which they do so.

2 | METHODS

2.1 | Participants and procedures

The study used data from the Norwegian Counties Public Health Surveys (NCPHSs), which contained questions related to childhood experiences, living conditions, health and well-being. A random sample ($N = 75,191$) of inhabitants aged 18 years or older from all 30 municipalities in the Agder county (the southern region of Norway) was drawn from the National Population Register (31.6% of the adult population in this region). After verifying contact information in the Agency for Public Management and eGovernment (Difi) register, filtering out those registered in the Reservation Register, removing deceased persons and those with an address outside the included municipalities, 61,611 residents were invited by SMS and e-mail to participate in this study during the autumn of 2019. A total of 28,047 (45.5%) consented and completed the online questionnaire.

The Norwegian Institute of Public Health (NIPH) is the official controller for the NCPHS. The survey was approved by the Norwegian Data Inspectorate and performed in line with the regulations in the Personal Health Data Filing System Act. The Regional Committee for Medical Research Ethics (REK) approved the current study (REK no. 162353/2020). Each respondent consented to participate in the study via an introductory page in the online survey that included

information about the study's purpose and a consent form, which respondents had to "click" and agree to before they were directed to the questionnaire.

2.2 | Measures

In addition to the specific measures relevant to the study objectives (see below), some basic sociodemographic variables were collected, such as educational level and relationship status. Information about age and gender was retrieved from the national population register.

2.2.1 | Adverse childhood events

Exposure to PPAU. The questionnaire included the six item version of the Children of Alcoholics Screening Test (CAST-6), used to assess whether participants perceived their parents' alcohol consumption as problematic (e.g., whether respondents had ever thought one of their parents to have a drinking problem, encouraged one of their parents to quit drinking or argued with a drinking parent) (Hodgins et al., 1993). Response categories were yes/no. Responses are summed (scale 0–6) and a score of ≥ 3 was defined as having been exposed to PPAU. The reliability of the scale has been confirmed in previous studies; for example, in a validation study, Cronbach's alpha ranged from 0.86 to 0.92 for students and patients with substance use disorders (Hodgins et al., 1993).

Parental divorce or separation. The survey assessed whether the respondent had experienced parental separation or divorce before the age of 18.

Support from trusted adult. The survey also assessed the respondent's perceived support from a trusted adult in childhood with a 5-point ordinal scale. Response categories ranged from "to a very great extent", "to a great extent", "to a limited extent", "to a very limited extent", and "not at all". In this study, the scale was dichotomized such that those responding "to a very limited extent" and "not at all" were defined as lacking support from an accessible trusted adult in childhood.

2.2.2 | Potential mediators between ACEs and adult QoL

Perceived childhood difficulties. The survey used the Difficult Childhood Questionnaire (DCQ), which had three items that assessed retrospectively quarrelling and conflicts in the family environment; memories about adverse experiences during childhood due to loss, violence or abuse; and a general evaluation of childhood (Vederhus et al., 2021). The questions were scored on a 5-point ordinal scale. The response option on the first two questions ranged from 'not at all' to "very much" and the response categories for the last question ranged from very good to very difficult, that is, a higher score represented a more difficult childhood. The reliability of the scale was

excellent in the validation study of the scale (Composite Reliability [CR] = 0.86) (Vederhus et al., 2021).

Mental distress. The survey assessed mental distress with five items measuring negative affect, for example, worried, anxious, sad/depressed. The items have been used in large, national public health surveys in Norway (Nes et al., 2018). The five items were rated on 0–10 point scales, from "not at all" to "very much", with higher scores representing higher mental distress. The reliability of the scale in the present study was good (Cronbach's alpha = 0.88).

Social Isolation. The Oslo Social Support Scale (OSSS) includes three items assessing social support (e.g., "How much interest and concern do people show in what you do?") (Kocalevent et al., 2018). In the original scale, higher scores mean higher social support. For simplicity and interpretability, we reversed the scale and a higher score therefore means less social support, that is, higher social isolation. Although Cronbach's alpha was a bit low in the validation study (0.64), the reliability was considered satisfactory due to the scale's brief nature and the alpha's known tendency to underestimate reliability when there are few items in a scale (Kocalevent et al., 2018).

QoL. Three items were used to assess subjective QoL; these items have been suggested as part of a "minimum" list for measuring QoL in national public health surveys in Norway (Nes et al., 2018). The items represented three dimensions: satisfaction with life, happiness and meaningfulness (Phillips, 2006; Ryan & Deci, 2001). Conceptually, the first two are classical subjective well-being dimensions (satisfaction and happiness), combined with the third item representing the eudaimonic dimension (meaningfulness). The last corresponds to whether a person lives up to his/her perceived potential and/or in accordance with one's perceived purpose in life (Nes et al., 2018). The items were rated on 0–10 point scales, with higher scores representing better QoL. The reliability of this scale was excellent in a previous study (CR = 0.90) (Vederhus et al., 2021).

2.3 | Statistical analyses

Descriptive statistics were used for sample characteristics. The endogenous constructs used in the following analyses were handled as latent variables in a SEM framework, which means that the questions were modeled as reflective indicators of their respective constructs (Brown, 2006). Our hypotheses were tested with latent regression and results reported with unstandardized β and 95% confidence interval (CI). Analyses were performed with the maximum likelihood (ML) estimator in the Mplus version 8.5 software program. To assess model fit we used the Root Mean Square Error of Approximation (RMSEA) and the Comparative Fit Index (CFI); cut-off value for RMSEA was <0.06 and <0.08 for a good and acceptable model fit, respectively, and >0.90 (acceptable model fit) and >0.95 (good model fit) for CFI (Hu & Bentler, 1999; Little, 2013). The full information maximum likelihood (FIML) was used to handle missing values, which is the default procedure in Mplus. The significance level was set at $p < 0.05$. The R square (R^2) value was used to assess the

percentage of the variation in the latent constructs explained by the model.

3 | RESULTS

3.1 | Sample description

The mean age of the sample was 47 years ($SD = 16$), and slightly more than one-half (53%) were females (Table 1). About one-half had a higher educational level (at least a bachelor degree) and 2 in 10 lived without a spouse or partner (Table 2). According to the conventional CAST-6 cut-off, about 1 in 6 was defined as a child of a parent(s) who had problematic alcohol use. Roughly 2 out of 10 had experienced a parental separation/divorce (18%) and one in ten reported lack of adult support during childhood (Table 1).

3.2 | Latent regression analyses to examine mediation

The covariance coverage of the indicators used in the following analyses were good, above 99.3% in all cases. When we examined the different ACEs' relative influence on the DCQ score and QoL, the exogenous independent variables (PPAU, parental separation/divorce and lack of support from a trusted adult) were allowed to correlate, as is the default procedure in Mplus (Figure 1). This was also meaningful substantively, as there was a substantial overlap between exposures to ACEs. Compared to the group without PPAU, a much higher proportion of the PPAU group had experienced parental separation/divorce (38% vs. 15%) and lack of support from a trusted adult (21% vs. 8%). Similarly, a higher proportion of those who had experienced parental separation/divorce also reported lack of support from a trusted adult during childhood (18% vs. 8%).

All of the ACEs in the analysis were positively associated with the DCQ score (Figure 1). The β s were 0.70 (95% CI = 0.67/0.73, $p < 0.001$) for PPAU, 0.65 (95% CI = 0.63/0.68, $p < 0.001$) for parental separation/divorce and 1.07 (95% CI = 1.04/1.10, $p < 0.001$) for lack of support from a trusted adult. Thus, lack of support from a trusted adult was the strongest factor associated with the DCQ score. As hypothesized, there was a negative association between the DCQ score and QoL ($\beta = -0.81$, 95% CI = $-0.84/0.79$, $p < 0.001$, Figure 1). The indirect effects (the β s on the DCQ \times the β on QoL) from the ACEs to QoL were -0.57 (95% CI = $-0.60/-0.54$, $p < 0.001$) and -0.53 (95% CI = $-0.56/-0.51$, $p < 0.001$) for PPAU and parental separation/divorce, respectively, while lack of support from a trusted adult had a β of -0.87 (95% CI = $-0.91/-0.83$, $p < 0.001$), that is, a $>50\%$ higher β than the other two ACEs. All were significant at the $p < 0.001$ level. Thus, the same pattern emerged as when the analysis examined the ACEs' association with the DCQ score; lack of support from a trusted adult exhibited the strongest association. The model explained 39% of the variance in the DCQ score and 15% of the

variance in QoL. The model fit was excellent with RMSEA = 0.05 and CFI = 0.99.

When mental distress and social isolation were added as proximal mediators to the model, almost all of the DCQ's association with the QoL score could be traced via the mediators; the direct path between DCQ and QoL was reduced to $\beta = -0.05$ (95% CI = $-0.07/-0.02$, $p < 0.001$, Figure 2). The mediators were allowed to correlate in the analysis, because there is a known correlation between these constructs as seen in previous studies (Ge et al., 2017). The DCQ score was positively associated with mental distress ($\beta = 0.96$, 95% CI = 0.93/1.00, $p < 0.001$) and social isolation ($\beta = 0.23$, 95% CI = 0.22/0.24, $p < 0.001$), that is, the level of mental distress and social isolation increased when the DCQ score increased. Both mental distress ($\beta = -0.42$) and social isolation ($\beta = -1.56$) were negatively associated with QoL at the $p < 0.001$ level (Figure 2). The indirect effect from the ACEs to QoL are shown in Table 2. The total indirect effects were quite similar to those seen in the previous analysis (Figure 1), but the table shows that roughly half of the indirect effect from each of the ACEs to QoL was mediated through mental distress, while 43%–45% was mediated through social isolation. The model explained 15% of the variance in mental distress, 18% of the variance in social isolation, 39% of the variance in the DCQ score and 65% of the variance in QoL. The model fit was good with RMSEA = 0.05 and CFI = 0.97. Descriptive values of the mediators and outcomes by ACE group are shown in Supplemental Material 1.

4 | DISCUSSION

The examined ACEs (PPAU, parental separation/divorce and lack of support from a trusted adult) were all positively associated with adult perceptions of childhood as difficult, and negatively associated with QoL in adulthood through indirect effects. Lack of support from a trusted adult exhibited the strongest association with perceiving childhood as difficult and with poorer adult QoL, indicating that it was the most impactful ACE. When mental distress and social isolation were added as mediators, the association between the ACEs and QoL was almost fully attributable to these constructs.

Overall, the results are in line with previous findings about various ACEs and their associations with adult QoL, which have reported sustained losses in QoL relative to persons who reported no ACEs (Corso et al., 2008). Similar to previous accounts (Anda et al., 2002; Dong et al., 2004; Dube et al., 2001), this study found that there was a "clustering" of ACEs in the present population sample, that is, if an individual had one ACE, there was an increased risk of being exposed to other ACEs. For example, compared to non-exposed respondents, those who reported PPAU were more than 2.5 times more likely to have experienced parental separation/divorce and lack of support from a trusted adult.

Several studies suggest that social support in adulthood could mitigate the negative health consequences of ACEs, and conversely,

TABLE 1 Sample characteristics (N = 28,047)

	N (%) or Mean (SD)
Age (years)	47 (16)
Sex (female %)	14,925 (53)
Educational level (N = 27,923)	
Primary and secondary school (up to 10 years of education)	3333 (12)
High school (up to 13 years of education)	11,088 (40)
University college or university (\geq bachelor's degree)	13,502 (48)
Living without a spouse or partner (N = 27,977)	6084 (22)
Adverse childhood experiences (ACEs)	
Experienced parental divorce or separation before 18 years of age (N = 27,946)	5141 (18)
Reported 'lack of support from a trusted adult' during childhood (N = 27,912)	2812 (10)
Child of parent(s) with a problematic alcohol use (PPAU) (N = 27,901)	4346 (16)

TABLE 2 Indirect and total effects for each Adverse Childhood Experience (ACE) regressed on Quality of Life (QoL), as visualized in Figure 2

Path	Unstandardized β and 95% confidence interval
Problematic parental alcohol use (PPAU)	
Total effect	-0.56 (-0.59/-0.54)*
Specific indirect: PPAU - DCQ - Mental distress - QoL	-0.28 (-0.30/-0.27)*
Specific indirect: PPAU - DCQ - Social isolation - QoL	-0.25 (-0.26/-0.23)*
Specific indirect: PPAU - DCQ - QoL	-0.03 (-0.05/-0.02)*
Parental separation/divorce (PD)	
Total effect	-0.53 (-0.55/-0.50)*
Specific indirect: PD - DCQ - Mental distress - QoL	-0.27 (-0.28/-0.25)*
Specific indirect: PD - DCQ - Social isolation - QoL	-0.23 (-0.25/-0.22)*
Specific indirect: PD - DCQ - QoL	-0.03 (-0.05/-0.01)*
Lack of support from trusted adult (LS)	
Total effect	-0.87 (-0.91/-0.83)*
Specific indirect: LS - DCQ - Mental distress - QoL	-0.44 (-0.46/-0.42)*
Specific indirect: LS - DCQ - Social isolation - QoL	-0.38 (-0.41/-0.36)*
Specific indirect: LS - DCQ - QoL	-0.05 (-0.08/-0.02)*

Abbreviation: DCQ, Difficult Childhood Questionnaire.

* $p < 0.001$.

that increasing numbers of stressful social relationships contributed to adverse mental health outcomes in respondents exposed to ACEs (Brinker & Cheruvu, 2017; Schneider et al., 2020). The present study examined lack of support from a trusted adult in childhood, which yielded similar findings. Unexpectedly, lack of adult support in childhood was actually the strongest predictor for the perception of childhood as difficult, and for poorer adult QoL. The findings indicate that lack of support from a trusted adult should be counted and assessed as an independent childhood burden. Lack of support from a trusted adult may also be a

common side effect of many ACEs, including PPAU; ACEs may deprive the child of the needed support from trusted adults to cope with difficult events.

For PPAU, the toxicological effects of alcohol use on parents can in itself be problematic, as children may experience their parents as less emotionally available, unpredictable or changed during intoxication (Miller et al., 1997). Parental alcohol use may also affect parenting practices. For example, parental alcohol use disorder has been associated with parental over-reactivity, lack of structure and stability, impaired parent-child interactions and less involvement and

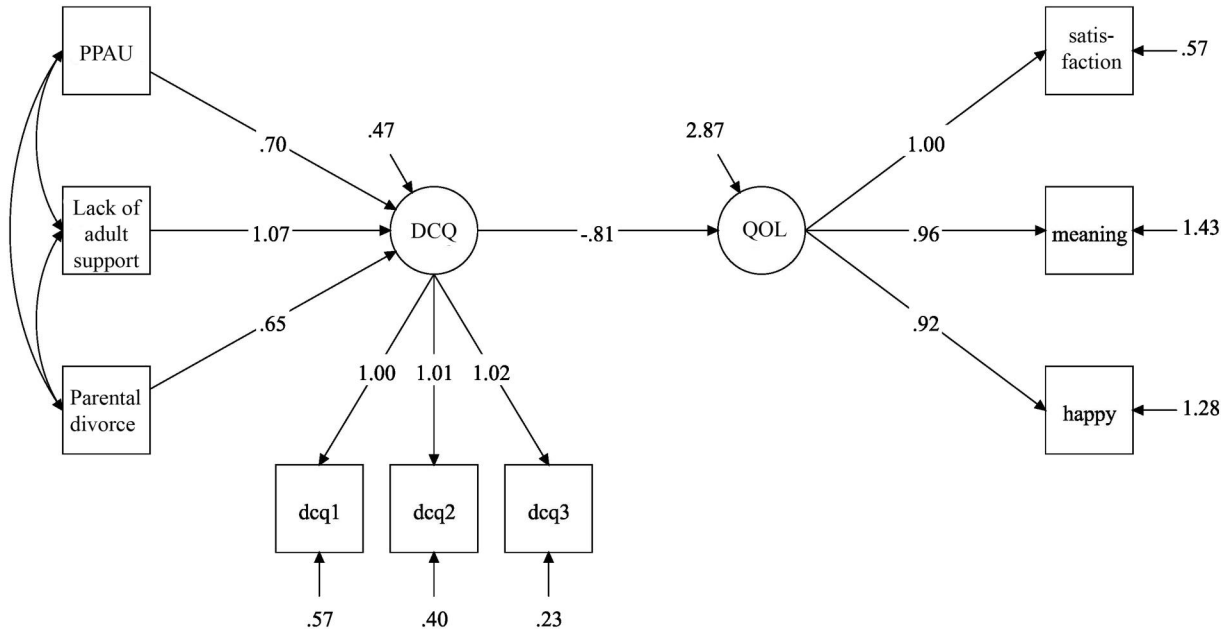


FIGURE 1 Latent regression analysis showing the association between Adverse Childhood Experiences (ACEs) and the perception of childhood difficulties (DCQ), and in turn adulthood Quality of Life (QoL). The figure shows the measurement and structural model with unstandardized factor loadings. PPAU, Parental problematic alcohol use

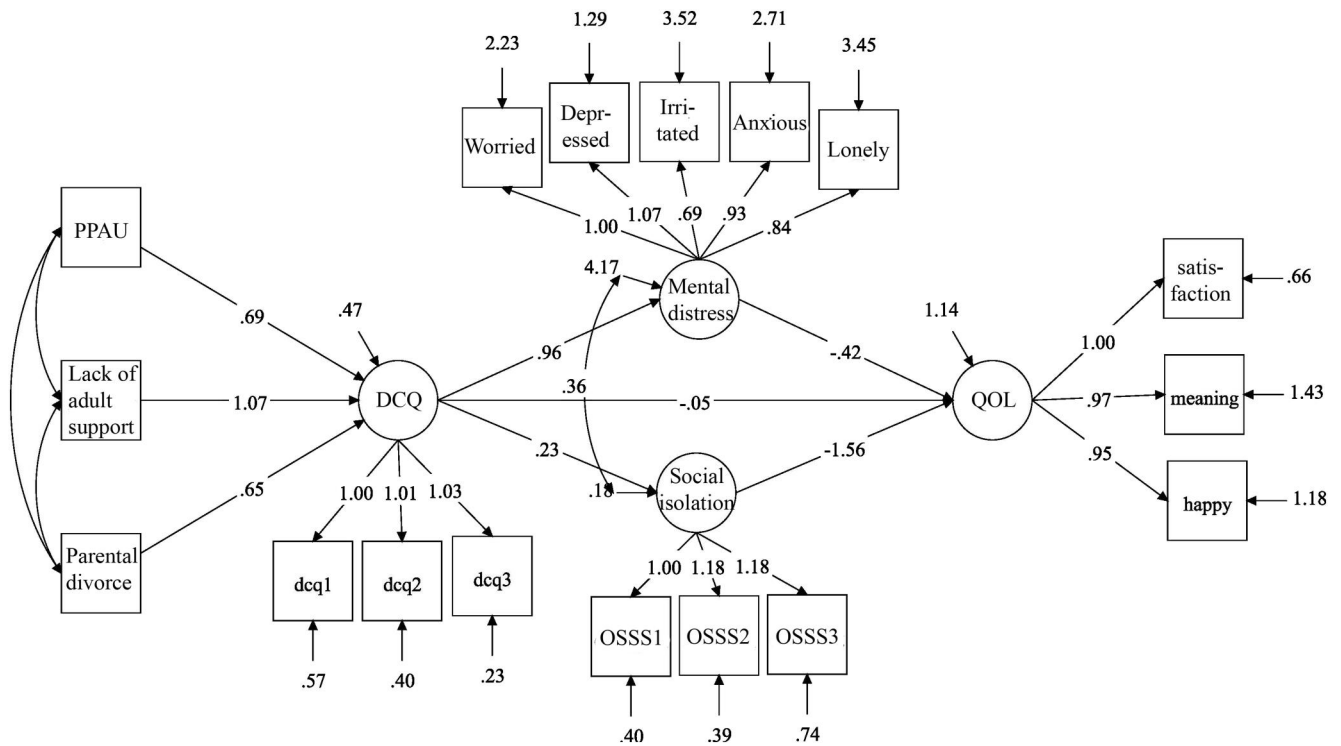


FIGURE 2 Latent regression analysis showing the association between Adverse Childhood Experiences (ACEs) and the perception of childhood difficulties (DCQ), and in turn adulthood Quality of Life (QoL). Mental distress and social isolation were modeled as mediators between the DCQ and QoL. The figure shows the measurement and the structural model with unstandardized factor loadings. PPAU, Parental problematic alcohol use

monitoring (Edwards et al., 2009; Eiden et al., 2009; Freisthler et al., 2015; Su et al., 2018). Our findings indicate that it is vital to “see” children who have experienced or are vulnerable to ACEs and

give them alternative adult support, whether this support is someone from the extended family network, a teacher, a health provider or a social worker. Such alternative adult support in childhood could

potentially counter a potential trajectory of poor outcomes in later life (Salinas-Miranda et al., 2015).

The relationship between ACEs and mental health problems and between mental health problems and QoL have been documented in several studies before (Hughes et al., 2017; Vederhus et al., 2016). Indeed, mental health is one of several determinants of QoL, along with physical well-being, social support, and financial stability (Henchoz et al., 2017). Similarly, it has been demonstrated that ACEs are associated with poorer social cognitive skills (Crawford et al., 2020), a finding that may partly rest on downregulation in the neuroendocrine system (Gunnar & Donzella, 2002). These deficits may in turn result in impaired social connectedness in adulthood, which is strongly and negatively associated with QoL (Hawton et al., 2011). The present study combined these previous findings in a simultaneous mediation analysis, which suggested that mental distress and social isolation are roughly equal contributors in terms of mediated effects, and act as potential mechanisms through which ACEs exert their influence on QoL in later life. It is noteworthy that the association between the ACEs and QoL, mediated solely via the DCQ score, was substantially reduced when mental distress and social isolation were included as mediators. This points to the importance of including subsequent mechanisms in a model (e.g., affected mental health) when examining the associations between ACEs and adult health and QoL.

4.1 | Methodological considerations

We note that the CAST-6 assesses PPAU as seen from the perspective of the offspring and cannot tell whether the diagnostic criteria for an alcohol use disorder were met. The present study examined some of the most common ACEs, but future studies should include all of the most prevalent ACEs in comparative analyses. The interpretive recall and meaning given to childhood events may be part of the causal chain between the difficult events and adult functioning (Colman et al., 2016; LaNoue et al., 2013). For example, LaNoue suggested that negative affect in adulthood may predict how adults perceive the impact of ACE's and whether they are rated as negative, regardless of the severity and number of ACE's (LaNoue et al., 2013). Thus, with the present study's retrospective reporting of childhood events, we cannot exclude that recall bias may have influenced the findings. The large sample size drawn from a general population remains a strength of the study.

5 | CONCLUSIONS

This study's findings raise the possibility that although ACEs are not currently assessed in routine medical practice, perhaps they should be (Jelley et al., 2020). As ACEs are associated with poorer outcomes in treatment for mental disorders, it is vital to assess and be aware of childhood adversities in specialized treatment settings (Thomas et al., 2019). Many adults reporting ACEs cope with their childhood adversity and poor quality of life using

strategies that have potentially severe long-term health consequences (Jelley et al., 2020). Importantly, the negative mental health and social consequences suffered in adulthood of ACEs can be treated with evidence-based approaches to helping patients with trauma, including cognitive-behavioral therapy and mindfulness interventions. Preventing childhood adversity, and treating its negative consequences in adulthood, may positively affect health and broader life decisions and opportunities that reach to subsequent generations.

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CONFLICT OF INTEREST

The authors declare that they have no competing interest.

AUTHOR CONTRIBUTIONS

JKV and SHH designed the study. JKV performed the analyses. All authors participated in the interpretation of the findings, drafting of the manuscript and approved the final version.

DATA AVAILABILITY STATEMENT

The controller for this public health survey (NIPH) will deposit the data in a publicly available data repository: <https://helsedata.no/en/>. For more information, contact the first author.

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