

Associations of the ten original Adverse Childhood Experiences (ACEs) with mental health impairments after controlling for the other ACEs (meta-analysis)

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Keywords:

Adverse Childhood Experiences; "sexual abuse"; mental health; confounding; meta-analysis.

I would like to thank two people for their very interesting and helpful feedback on an earlier version of this article.

Abstract

Background: The ten original ACEs (including emotional, physical, and "sexual abuse") are associated with mental impairment among the people affected in countless studies. The corresponding bivariate associations are to a considerable extent confounding bias. The extent of the causal relationships is unresolved.

Methods: A systematic literature search was conducted to search for studies that determined the associations of each of the ten original ACEs with mental impairment in "minors" or adults after controlling for each of the nine other original ACEs (and other ACEs, if applicable). Fourteen studies met the inclusion criterion. For the ten different original ACEs, the median of the available individual results was determined for each of three types of associations with mental impairment (bivariate, after controlling for each of the nine other original ACEs and after additionally controlling for further ACEs). Furthermore, the median of the ten medians in each case was determined for the three types of associations. The effect size of the meta-analysis is the Pearson correlation coefficient r .

Results: The magnitude of the bivariate associations between the ten original ACEs and mental health impairments is typically medium across studies (median $r=0.22$), typically very small ($r=0.07$) after controlling for the nine other original ACEs, and even smaller ($r=0.05$) after controlling for additional ACEs. The ACEs incarceration of a household member ($r=-0.01$) and witnessing violence against the mother/parents ($r=0.01$) are not associated with mental health impairments after controlling for more than each of the nine other original ACEs. These associations are also very low for the ACEs "sexual abuse", divorce/separation of parents, and alcohol/drug problem of a household member ($r=0.04$ each).

Conclusions: The causal relationships between the ten original ACEs and mental health impairments are smaller than widely suspected. In the case of several original ACEs, long-term important negative health consequences are not to be assumed. The ACEs concept should be fundamentally reconsidered.

Limitations: Also, because of the many uncontrolled confounding variables (including genes and other ACEs), the associations identified by the meta-analysis are not precise causal effect sizes.

1. Introduction

With one or more exceptions (Bernard et al., 1972), it is apparently only since the mid-1980s (Olafson et al., 1993) that science has been investigating the associations of what are considered negative experiences in childhood and adolescence with health impairments in adulthood with group comparative quantitative studies. In recent years in particular, the topic of Adverse Childhood Experiences (ACEs) has gained considerable traction in this regard, leading to a great many studies and publications (Portwood et al., 2023). Going back to the seminal study by Vincent F. Felitti and colleagues (Felitti et al., 1998) and two subsequent studies (Anda et al., 1999; Dong et al., 2003), the ten original ACEs are:

- Emotional abuse,
- physical abuse,
- "sexual abuse",
- emotional neglect,
- physical neglect,
- parental separation/divorce,

- mental health problems of a household member,
- alcohol/drug dependence of a household member,
- incarceration of a household member
- and witnessing violence against the mother/parents (ACE domestic violence).

The three abuses and the two neglects are classified in the *maltreatment* domain, while the five other ACEs are classified in the *household dysfunction* domain. Except for the ACE "sexual abuse", all of the original ACEs refer only to one's own family. Globally, 60.2 percent of adults are affected by at least one of the ten original ACEs, according to a meta-analysis (Madigan et al., 2023). There are many other important ACEs, such as peer violence and rejection (Finkelhor et al., 2013; Finkelhor et al., 2015). The relatively arbitrary and unfounded selection of the original ten ACEs is often criticized (Karatekin et al., 2023). However, in ACEs studies, the ten original ACEs are the most commonly studied (Karatekin et al., 2022). Therefore, a distinction can be made between the ten original ACEs and the additional ACEs. ACEs are predominantly assigned the period 0 to 17 years.

To what extent do each of the original ACEs cause mental health impairments? To answer this question, so-called effect sizes such as correlation coefficients or odds ratios (ORs) are determined, which depict the direction and strength of an association (or a non-existent association) between an independent and a dependent variable (Kelley et al., 2012; Schäfer, 2023). Such effect sizes are often labeled small, medium, or large based on their values, going back to Cohen (Cohen, 1988), or are considered to provide evidence of no association. Cohen's evaluation recommendations in this regard (from $r=0.1$ small, from $r=0.3$ medium, and from $r=0.5$ large) are still widely used in the literature, but have proven to be at least questionable (Schäfer et al., 2019; Gignac et al., 2016). In the area of personality differences, according to a meta-analytic review of the associations determined in real studies, the values $r=0.1$, $r=0.2$, and $r=0.3$ tend to indicate small, medium, and large associations, respectively (Gignac et al., 2016). These values are therefore also used initially as a benchmark in this article and correspond to ORs 1.4, 2.1, and 3.1. I return to the question of whether these ratings make sense in the research area of ACEs in the discussion section.

Almost all ACEs studies show pronounced bivariate associations between the various original ACEs and mental health impairments in "minors" and in adults (Felitti et al., 1998; Hughes et al., 2017; Tzouvara et al., 2023). A meta-meta-analysis determined effect sizes (ORs) of 1.94 for anxiety

disorders, 1.76 for internalized disorders, 2.01 for depression, and 2.33 for suicidality for the associations of ACEs with mental health impairments (Sahle et al., 2022). These often bivariate effect sizes to a considerable extent show confounding bias when it comes to ACEs (Baldwin et al., 2023a). For example, bivariates show pronounced associations between bullying of "minors" and adverse health outcomes in many studies. However, in a meta-analysis of quasi-experimental studies on the health consequences of bullying, the long-term association with internalized problems was only (Cohen's) $d=0.06$ (equivalent to $r=0.03$, Schoeler et al., 2018). The different ACEs intercorrelate strongly. These correlations are evident for both the original ten ACEs (Dong et al., 2004; Felitti et al., 1998) and the additional ACEs (Mersky et al., 2017; Gossel, 2022). The group of people affected by a particular ACE is much more likely to also be affected by countless other ACEs than the group of people not affected by the particular ACE (this is not true for all, but for most ACEs). For example, in the dataset of the aforementioned first ACEs study, the women classified as not "sexually abused" were 8.8% affected by the ACE emotional abuse, but the women classified as "sexually abused" were 26.1% affected (Dong et al., 2003). Therefore, for the question this paper examines, it is not possible to infer from bivariate associations whether or to what extent there is a causal relationship between an ACE and mental impairment, because the bivariate relationship may be caused entirely or partially by the myriad confounding variables. Based on many studies, one can assume at least a three-digit number of at least possibly relevant confounding variables. For example, not only are there the ten original ACEs, but in the literature, if one understands the words *Adverse Childhood Experiences* literally, one finds a three-digit number of ACEs (see, among others, Karatekin et al., 2018; Karatekin et al., 2022; Gossel, 2022; Mersky et al., 2017; Finkelhor et al., 2013; Finkelhor et al., 2015; Sutton, 2022). ACEs studies that comprehensively control for this three-digit number of potential confounding variables are not available to my knowledge. This would require controlling for genes and many important ACEs, among other confounding variables. Corresponding discordant twin studies (Vitaro et al., 2009) are possible but do not appear to have been conducted to date.

Thus, we do not know whether or to what extent the ten original ACEs cause mental health impairments. A meta-analysis of studies described as quasi-experimental on the causal importance of different types of maltreatment (including emotional, physical, and "sexual abuse") for mental health identified a small to medium association with impairments after controlling for some of the relevant confounding variables in the included studies (Cohen's $d=0.31$, equivalent to $r=0.15$, Baldwin et al., 2023a). However, in the studies underlying the meta-analysis, at least for the most part, there was no comprehensive control for confounding variables in the sense

described above. For example, in all seven twin studies for the independent variable "sexual abuse", no allowance was made for any differences in twins on the other ACEs when determining effect sizes for discordant twin pairs (Magnusson et al., 2012; Bornovalova et al., 2013; Capusan et al., 2016; Nelson et al., 2006; Dinwiddie et al., 2000; Kendler et al., 2000; Nelson et al., 2002). Thus, the result of the meta-analysis again cannot depict the exact extent of the causal relationships between the original ACEs and mental health impairments.

Fortunately, a great many studies on the topic of ACEs have appeared, especially in recent years, some of which examine the associations of the various original ACEs with mental health impairments after controlling for each of the other original ACEs and, in some cases, additional ACEs (see below). These studies do not control for genes and control for only a subset of the relevant ACEs, nor do they control for many other confounding variables, so even these studies cannot determine precise results for the magnitude of causal associations. However, these studies do at least control for relatively many important confounding variables, so despite their limitations (see Discussion and Limitations), they are in my view among the most informative studies for the question raised. Therefore, a meta-analysis of these studies is performed below. Knowing which ACEs cause mental health impairments and to what extent is of great importance for, among other things, the prevention of ACEs (Portwood et al., 2023), for therapeutic work, and for scientific theory building in many fields.

2. Methodology

Inclusion and exclusion criteria

The inclusion criterion for this meta-analysis is: The German- or English-language study contains numerical data (ORs, correlation coefficients r or standardized regression coefficients β) usable for the meta-analysis for the associations of the ten different original ACEs with mental health impairments after controlling for the nine other original ACEs in each case (together with a control for further ACEs/variables, if applicable). Substance addictions and drug use were not considered mental health impairments because of their also physical aspects and were not included as dependent variables. The dependent variable areas of delinquency, victimization (being a victim), and sexually risky behavior were also not included, although they are related to mental health. Further delineation of mental and other health impairments was not problematic in the practice of selecting studies for

meta-analysis because there were no cases that were not completely clear with regard to delineation in which the other aspects of the inclusion criterion would have been met. Studies that examined the association of ACEs in parents with health in their children were not included, nor were studies examining regions rather than people with regard to ACEs.

Literature research

The literature search was conducted in 2023 through 09/29/2023. Beyond that, there was no time restriction on publications to be included. On 09/29/2023, the search query "adverse childhood experience*" in the title or abstract yielded 4,907 hits in the Web of Science Core Collection database. These entries were searched by that date for studies that met the inclusion criterion. Entries for which no abstract was viewable and/or that referenced abstracts rather than full study descriptions were not included. Thirteen studies were identified in this way (Finkelhor et al., 2013; Finkelhor et al., 2015; Mersky et al., 2017; Wang et al., 2019; Witt et al., 2019; Manyema et al., 2018; Huang et al., 2021; Al Shawi et al., 2022; Silveira et al., 2023; King, 2021; Chen, 2022; Qu et al., 2023; Cavanaugh et al., 2022). One additional study known to the author (master's thesis) was added (Gossel, 2022). All other studies were published peer-reviewed. The texts of the publications were searched for additional studies meeting the inclusion criterion, which did not result in the inclusion of additional studies.

Guiney et al. (2022) examine the association between forced sexual acts with "minor" victims and impairments (among others) of the "minor" victims after controlling for two variables that ordinally ("0, 1, and 2 or more") represent the number of ACEs in the domains of *maltreatment* and *household dysfunction*, respectively. Because sexual abuse was measured differently here than in all other studies in the meta-analysis (no inclusion of voluntary sexual acts with the person 5 or more years older) and especially because of the particular confounding variable control (no control for individual ACEs), the study was not included in the meta-analysis. The type of confounding variable control undertaken by Guiney et al. (2022) likely resulted in a substantial loss of information and thus bias compared with controlling for nine individual confounding variables at a time.

Another study was not included (Clemens et al., 2022) because it examined the same sample for the dependent variable narcissism separately for women and men as another study included in the meta-analysis (Witt et

al., 2019) did for the dependent variables depression, anxiety, and low life satisfaction jointly for women and men. A sample was examined in three different publications for the dependent variables happiness (Huang et al., 2021), passion (Cheung et al., 2021), and resilience (Chen et al., 2023). Included in the meta-analysis was the study on happiness, as this variable most directly depicts mental health. Not included in the meta-analysis was a study (Cerqueira et al., 2023) that produced highly unusual results for all multivariate outcomes (e.g., effect size ACE emotional neglect β 0.39 and ACE physical neglect β -0.32).

The ACE mental problems of a household member is typically measured by asking whether a household member was/is mentally ill or whether a household member attempted suicide. One study in the meta-analysis (Chen, 2022) asked only about suicide intentions and not mental illness in this regard. The study was nevertheless included in the meta-analysis. However, the effect size obtained by this study for the ACE suicide intention was not coded as an effect size for the ACE mental problems of a household member, nor was the frequency of this ACE coded.

Coding

For each of the fourteen studies identified, three effect sizes were noted, where possible, for each of the ten original ACEs: the bivariate association with mental health impairments, the association after controlling for each of the nine other original ACEs, and the association after controlling for a number of ACEs beyond the original ACEs (and other controlled variables as appropriate, see below). Larger values for effect sizes always imply greater health impairments. The values of the study for the dependent variable happiness (Huang et al., 2021) were recoded accordingly.

The publication by Cavanaugh et al. (2022) reports the bivariate and multivariate effect sizes only separately for the 4,059 women and the 2,202 men. For this study, I converted the ORs to correlation coefficients and then averaged each to obtain cross-sex effect sizes. In two cases, multivariate ORs are missing from the paper because of bivariate nonsignificance. The two missing values were replaced by OR 1.0 in the mean calculation.

In eight of the 14 studies in the meta-analysis, there was only one dependent variable for the mental health domain, which was coded accordingly. For the six other studies, the median of the effect sizes of the

dependent variables of the mental health domain was formed and coded in each case (Table 1). The median was formed by looking at the available values for each context (bivariate, after controlling for the original ACEs, after controlling for additional ACEs), so that the crucial dependent variables in the different contexts could differ in the median formation. For median formation, effect sizes were converted to Pearson correlation coefficient r using the website www.escal.site (accessed 09/21/2023) if necessary. The median was then formed. Table 1 shows the dependent variables of the 14 studies included in the meta-analysis.

Table 1: Dependent variables of the 14 studies in the meta-analysis

Study	Dependent variable(s)
Wang et al., 2019	Suicidal thoughts
Huang et al., 2021	Happiness (recoded)
Manyema et al., 2018	Psychological distress
Mersky et al., 2016	Perceived stress
Finkelhor et al., 2013	Distress symptoms/trauma scores
Finkelhor et al., 2015	Distress symptoms/trauma scores
Cavanaugh et al., 2022	Depression
Chen, 2022	Behavioral problems
Al Shawi et al., 2022	Deviant behaviours
Witt et al., 2019	Depression, anxiety, low life satisfaction
Gossel, 2022	Depression, suicide attempt, mental health impairment, therapy participation
Silveira et al., 2023	Psychological distress, suicidal behaviors
King, 2021	Aggression (The Buss-Perry Aggression Questionnaire, The Motivated Acts MAGG, LAVA Injury to Others)
Qu et al., 2023	Poor sleep quality, emotional and behavioral problems, lower academic achievement

Eight of the 14 studies in the meta-analysis included and controlled for more than the 10 original ACEs. Table 2 shows the number and type of ACEs beyond the 10 original ACEs in these eight studies.

Table 2: Number and type of ACEs controlled in addition to the ten original ACEs in eight studies in the meta-analysis

Study	Number of additional ACEs	ACEs
Qu et al., 2023	1	Family economy was extremely hard
Manyema et al., 2018	3	Chronic illness, unemployment, parental death
Wang et al., 2019	4	Victimization by peers, isolation/rejection by peers, exposure to community violence, low socioeconomic status
Finkelhor et al., 2015	4	Low socioeconomic status, peer victimization, peer isolation/rejection, exposure to community violence
Chen, 2022	6	Parental disability, suicidal intention, parents leaving home, poor living environment, scolding, parental gambling
Mersky et al., 2016	7	Frequent family financial problems, food insecurity, homelessness, prolonged parental absence, death of parent or sibling, frequent peer victimization, violent crime victimization
Finkelhor et al., 2013	19	Peer victimization, parents always arguing, property victimization, someone close to the child had a bad accident or illness, exposure to community violence, no good friends, below-average grades, someone close to the child died because of an accident or illness, parent lost job, parent deployed to war zone, disaster, removed from family, very overweight, physical disability, ever involved in a bad accident, neighborhood violence is a "big problem", homelessness, repeated a grade, less masculine or feminine than other boys or girls his or her age
Gossel, 2022	27	Residential care/foster care, internet bullying, school bullying, hate crimes, parental rejection, peer victimization, adult sexual harassment, illness/accident (own), sexual harassment by peers, frequent moves, poverty, serious adult physical threat, peer sexual abuse, peer rejection/lack of good friends, LGBT (Lesbian/Gay/Bisexual/Transgender), grade retention, single-parent families, marital conflict/standoff between parents, witnessing community violence, suicide attempt by a loved one, corporal punishment/spanking, death parents, gambling problems parents, job loss parents, property victimization (not including siblings as perpetrators), discrimination based on "race", country of birth, and/or religion, illness/injury of a loved one

Qu et al. (2023) recorded dependence in gambling in addition to dependence in alcohol and drugs for the ACE alcohol/drug problem of a household member. This study controlled for many other variables as indicated in Table 6 in the Appendix.

Cavanaugh et al. (2022) controlled for only the bivariate statistically significant independent variables (ACEs) in the multivariate effect size calculation, so for females, the ACE divorce/parental separation and for males, the ACE emotional neglect were not controlled multivariately. The study was nevertheless included in the meta-analysis because all bivariately significant original ACEs were included in the statistical control. This restriction to control for statistically significant ACEs also applies to Wang et al. (2019).

For the bivariate associations, the publication by Manyema et al. (2018) includes information on the values adjusted for the demographic characteristics including school completion and for the non-adjusted values. For the meta-analysis, the adjusted values were coded. The differences in adjusted and nonadjusted ORs for the 10 original ACEs in this study are small (median of variances 0.12, range 0.03 to 0.26).

The publication by Wang et al. (2019) contains data on the multivariate associations adjusted for the characteristics "sex, ethnicity, academic performance, smoking, physical exercise, depression, anxiety, and stress" and non-adjusted values in this respect. For the meta-analysis, the non-adjusted values were coded, as they are more meaningful for the research question of this meta-analysis.

Missing values

Only studies containing multivariate effect sizes for all ten original ACEs were included in the meta-analysis (apart from the special case described Chen, 2022). Other missing values on the frequencies of the ACEs and further information on the studies were requested by email if possible. This resulted in three additional pieces of information: The ACE violence against the mother/parents in the study by Silveira et al. (2023) only captured violence against the (step-) mother and not also against the (step-) father (e-mail from Henrique Pereira to the author, 9/27/2023). Furthermore, the frequencies of the ten ACEs in King's study (2021) were reported (e-mail

from Alan R. King to author, 9/28/2023) as well as the year in which this study was conducted (e-mail from Alan R. King to author, 9/28/2022).

Chen (2022) does not report the frequency of ACE alcohol/drug dependence of a household member, but separate frequencies for "Parental alcohol abuse" (5%) and "Parental drug abuse" (2%). The value coded here (5%) may therefore be slightly too low, but this did not affect the median formed for the frequency of the ACE. Chen (2022) does not report the effect size of ACE alcohol/drug dependence of a household member, but separate effect sizes for "parental alcohol abuse" and "parental drug abuse." Coded as effect size for ACE alcohol/drug dependence of a household member was the value for "Parental alcohol abuse".

Effect size used

Seven of the 14 studies report ORs, five studies report standardized regression coefficients (β), and two studies report both Pearson correlation coefficients (r) and standardized regression coefficients (β). Standardized multiple beta regression coefficients correspond to Pearson correlation coefficient r with typically minimal deviations according to a meta-analysis (Peterson et al., 2005) and can therefore generally be used as values for correlation coefficients in meta-analyses (Nieminen, 2022; Bowmann, 2010; Rosenthal, 2001). In the meta-analysis by Peterson et al. (2005), for 1,473 pairs of jointly published correlation and regression coefficients, the median of the ratio r/β was 1.10, so that only minimal deviations can be assumed, especially for small regression and correlation coefficients. Since in the meta-analysis performed here less the larger bivariate and especially the (very) small multivariate effect sizes are of interest, the recommendation of Peterson et al. (2005) was not followed to always add 0.05 when converting positive regression coefficients to correlation coefficients. This would have led to an unacceptable systematic artificial magnification of the often very small positive multivariate effect sizes. Instead, as in other meta-analyses (Bowman, 2010), beta regression coefficients were adopted directly as Pearson correlation coefficients r . One study included in the meta-analysis (King, 2021), in reporting the associations between the 10 original ACEs and three different indicators of aggression after controlling for each of the other original ACEs, included data from both the correlation and standardized regression coefficients. The mean of the absolute variances of the 30 pairs of values is 0.0049, and the median value is 0.002. The absolute values of 25 of the 30 variances are in the range of 0 to 0.010, and the five other variances are in the range >0.010 to a maximum of 0.022. Thus, the multivariate correlation and

regression coefficients were almost identical, at least in this study, indicating the appropriateness of the chosen approach. Of the eight studies in the meta-analysis that published bivariate effect sizes, only one study used only the standardized regression coefficient as the effect size, so the failure to increase the positive regression coefficients by 0.05 does not seem problematic. One study (King, 2021) includes regression and correlation coefficients as mentioned, and here the correlation coefficients were coded. Thus, the effect size of this meta-analysis is the Pearson correlation coefficient r .

Summary of effect sizes

ORs were converted to Pearson correlation coefficient r using the website <https://www.escal.site/> (retrieved 09/18/2023).

This meta-analysis distinguishes three types of associations of the ten original ACEs with mental health impairments as described: bivariate associations (available values from eight studies), associations after controlling for each of the nine other original ACEs (available values from ten studies), and associations after controlling for the nine other original ACEs and additionally at least one other ACE (and possibly other variables) (available values from eight studies, in one of the eight studies the value for the ACE mental problems of a household member is missing). For each of the ten original ACEs, the median was determined using the available individual values or the medians of the individual values of the studies for each of the three types of associations. Furthermore, for all ten original ACEs, for the five ACEs in the *maltreatment* domain, and for the five ACEs in the *household dysfunction* domain, the respective median of the ten or five medians was determined for the three types of associations. When calculating the medians in this meta-analysis, the results were rounded to two decimal places where necessary only for the presentation of results at the end. As a result, the rounding performed here may also have increased the medians by a maximum of $r=0.005$ (or decreased them in the case of negative effect sizes). The unrounded results of the meta-analysis can be found in table 7 in the appendix.

Thus, the results of the meta-analysis were not weighted by sample size. This means that outliers and the influence of sample size differences cannot distort the results, which is advantageous for the very small multivariate effect sizes that are of particular interest here. Due to the chosen procedure, no significances and no confidence intervals can be given for the determined

medians. These classifications or values have only a very limited or almost no meaning for the multivariate effect sizes of primary interest here, since in the fourteen (relatively large, see below and see Table 6 in the Appendix) studies of the meta-analysis bias arises quite predominantly not from sampling error but primarily from other factors such as, in particular, confounding variables and measurement error. Therefore, a confidence interval cannot show here anyway the range of "true" values or the like, which is often wrongly assumed. More important than statistical significance or than the confidence interval is the effect size (Wasserstein et al., 2016; Wasserstein et al., 2019; Rigdon, 2023).

Studies identified

The surveys were conducted in the USA (5x), China (4x), Germany (2x), Iraq, South Africa, Brazil and other countries (one survey was conducted in several countries). The 14 studies were conducted between 2004 and 2022 and published between 2013 and 2023. Four studies surveyed "minors" and ten studies surveyed (mostly) adults. The median number of respondents/surveyed is 1,981 people (range 401 to 6,263, range of 13 of the 14 studies 989 to 6,263). A total of 34,896 people were surveyed/sampled. Five studies surveyed (mostly) students/academics, five studies were representative of their age group (one of which surveyed only "black" people in the age group), two studies surveyed non-representative people from the general population, and two studies surveyed special samples ("diverse, low-income sample of women who received home visiting services"/"homeless adults with mental illness"). Twelve studies surveyed females and males, and two studies surveyed females only. All studies were cross-sectional. In almost all studies, the measurement of the ten original ACEs followed relatively closely the study by Felitti et al. (1998) (see Table 6 in the Appendix). For the other ACEs, self-developed individual questions were often asked. The ACE "sexual abuse" captures only sexual acts with older persons in ten studies and also acts forced by peers in four studies. The ACE violence against mother/parents inquires only about violence against the (step-) mother in twelve studies, in one study also violence against the (step-) father, in one study this was not reported. Only one of the 14 studies (Silveira et al., 2023) controlled for ACEs ordinally rather than binary. In all studies, ACEs were controlled individually and not as an ACEs score. Almost all studies measured the dependent variables with item series rather than individual items. Further details of the studies can be found in Table 6 in the Appendix.

3. Results

Frequencies of the original ACEs

Respondents were most likely to be affected by the ACE mental problems of a household member (24.0%), according to the median of 12 of the 14 studies in the meta-analysis with corresponding data. Percentages for all original ACEs are shown in Table 3.

Table 3: Frequencies of the ten original ACEs in the studies of the meta-analysis (medians of the values from eleven and twelve studies, respectively, with corresponding data in percent)

ACE	%
Mental problems household member	24,0
Separation/divorce of parents	21,8
Alcohol/drug dependence household member	17,2
Emotional abuse	15,6
Physical abuse	12,9
Emotional neglect	12,8
Witnessing violence against the mother/parents	12,7
"Sexual abuse"	9,0
Incarceration household member	8,1
Physical neglect	8,0

Determined effect sizes

The bivariate associations between the ten original ACEs and mental health impairments were on average of medium size (median of the ten medians $r=0.22$); after controlling for each of the nine other original ACEs, the associations were typically very small (median of the ten medians $r=0.07$) and even smaller after controlling for additional ACEs (median of the ten medians $r=0.05$). The ACEs witnessing violence against the mother/parents (median $r=0.01$) and incarceration of a household member (median $r=-0.01$) show no associations with mental health impairments. The ACEs "sexual abuse", divorce/separation of parents, and alcohol/drug problem of

a household member also show very small associations, each with $r=0.04$. The results for all original ACEs are shown in Table 4.

Table 4: Associations of the ten original ACEs with mental health impairments (Pearson correlation coefficient r - indicated in each case is the median of the effect sizes determined in the individual studies or the medians of these effect sizes)

ACE	Bivariate associations	Associations after controlling for the nine other original ACEs	Associations after a control of additional ACEs
Emotional abuse	0,26	0,13	0,10
Physical abuse	0,21	0,09	0,06
"Sexual abuse"	0,23	0,08	0,04
Emotional neglect	0,26	0,11	0,10
Physical neglect	0,25	0,06	0,07
Witnessing violence against the mother/parents	0,19	0,02	0,01
Separation/divorce of parents	0,12	0,05	0,04
Alcohol/drug dependence household member	0,18	0,05	0,04
Mental problems household member	0,23	0,09	0,08
Incarceration household member	0,19	0,03	-0,01
Median of the ten medians	0,22	0,07	0,05
Median of the five medians of the ACEs <i>maltreatment</i>	0,25	0,09	0,07
Median of the five medians of ACEs <i>household dysfunction</i>	0,19	0,05	0,04

As can already be seen in Table 4, after controlling for more than the nine other original ACEs, the strongest associations is shown between the ACEs emotional abuse and emotional neglect and impairment of mental health (median $r=0.10$ in each case). Table 5 shows, in order of magnitude, the

effect sizes already shown in Table 4 for the ten original ACEs after controlling for more than each of the nine other original ACEs.

Table 5: Rank order of the associations of the ten original ACEs with mental health impairments already listed in Table 4 after controlling for more than each of the nine other original ACEs (Pearson correlation coefficient r , median of the effect sizes reported in the individual studies or the medians of these effect sizes, respectively)

ACE	r
Emotional abuse	0,10
Emotional neglect	0,10
Mental problems household member	0,08
Physical neglect	0,07
Physical abuse	0,06
Alcohol/drug dependence household member	0,04
"Sexual abuse"	0,04
Separation/divorce of parents	0,04
Witnessing violence against the mother/parents	0,01
Incarceration household member	-0,01

4. Discussion

The main finding of this meta-analysis is an overall very small association between the ten original ACEs and mental health impairments after controlling for more than each of the nine other original ACEs (median $r=0.05$). This relationship is larger for the five abuse and neglect ACEs at $r=0.07$ (median) than for the five other original ACEs in the *household dysfunction* domain at $r=0.04$ (median). For the ACEs witnessing violence against the mother/parents ($r=0.01$) and incarceration of a household member ($r=-0.01$), there is no association with (long-term) mental health impairment according to the results of this meta-analysis. The corresponding associations are also very small for the ACEs "sexual abuse" ($r=0.038$), divorce/separation of parents ($r=0.037$), and alcohol/drug problem of a household member ($r=0.038$), and in a range that does not allow reliable conclusions about long-term important mental health impairments, also because of the failure to completely control for confounding variables. Accordingly, according to the results of this meta-

analysis, long-term important negative health consequences cannot be assumed with certainty for five of the ten original ACEs. In addition, the voluntary sexual acts of "minors" and (much older) adults that predominantly constitute the ACE "sexual abuse" in its original conception (Rind, 2022; Rind, 2023a) do not seem to cause any health impairments in the affected former "minors" overall, according to the majority of the few studies available on this question (see Arreola et al., 2009; King et al., 2002; Kilpatrick, 1992; Sandfort, 2013; Gossel, 2022, among others). The current ACEs approach should be fundamentally reconsidered.

As can be seen in Table 4, after controlling for more than the nine other original ACEs, ACE physical neglect shows a minimally higher value of $r=0.07$ than after controlling for only the nine other original ACEs, $r=0.06$. This is surprising because, in principle, additional control of confounding variables leads to smaller effect sizes. In the four of the 14 studies in this meta-analysis in which values are available for the ACE physical neglect for both types of associations (after controlling for the other original ACEs and after controlling for additional ACEs), a decrease in effect sizes is shown in each case. The minimal increase in effect size seen here in the overall results after controlling for additional ACEs is therefore likely due to specifics of the studies and would probably not show up in a larger number of studies.

This meta-analysis identified only a very small association between the ACE "sexual abuse" of "minors" and mental health impairments after controlling for more than the nine other original ACEs, at $r=0.04$ (unrounded $r=0.03775$). The values in this regard for the eight studies controlling for more than the nine other original ACEs are $r=0.01$, $r=0.03$, $r=0.03$, $r=0.04$, $r=0.04$, $r=0.05$, $r=0.14$, and $r=0.16$, as shown in Table 8 in the Appendix. Thus, six of the eight studies were consistent in finding minimal or very small associations. Because six of the eight results are consistent, these results cannot be explained by some specifics of individual studies, such as student surveys (see below). Nevertheless, many researchers will "intuitively" think the numbers are too small. However, the numbers are consistent with the state of research. Many other individual studies, after controlling for confounding variables, have found no statistically significant association between (variously defined) "sexual abuse" of "minors" and health and other impairments (Eckenrode et al., 1993; Widom et al., 1995; Higgins et al., 1994; Hankin et al., 2005; Cyr et al., 2014; Hengartner et al., 2015; Hodson et al., 2006; Richter et al., 2018; Rehan et al., 2016; Young-Wolff et al., 2011; Daly, 2021; Skaug et al., 2022; Racine et al., 2018; Lehnig et al., 2019; Mills et al., 2013; Widom et al., 2007; Gallo et al., 2017; Gonggrijp et al., 2023). I am aware of two other meta-analyses

on the causal relationship of "sexual abuse" of "minors" and health impairments apart from the present work. Rind et al. (1998) found a small association ($r=0.09$) of "sexual abuse" of "minors" and impairments in college samples bivariately. After controlling for a portion of the relevant confounding variables, the associations with the various impairments were predominantly no longer statistically significant. The aforementioned meta-analysis of studies described as quasi-experimental (Baldwin et al., 2023a) again found, after controlling for a portion of the relevant confounding variables for abuse in general, an association with mental health impairments that was small by its own terms and small to moderate by the assessment standard I use here (as noted, Cohen's $d=0.31$, equivalent to $r=0.15$). "Sexual abuse" was not more strongly associated with impairments than other abuses in the meta-analysis by Baldwin et al. (2023a). Emotional abuse, for example, showed stronger associations than "sexual abuse". Thus, according to all meta-analyses I am aware of on the causal importance of "sexual abuse" of "minors" for health impairments, the associations with impairments are not medium or large or even very large, but smaller. According to representative studies (Felson et al., 2019; Rind, 2022; Rind, 2023a), the sexual acts of "minors" and adults classified as "sexual abuse" are predominantly noncoerced sexual acts that are frequently enjoyed by the "minors," which contributes to the very small multivariate effect sizes. The effect sizes for forced sexual acts (especially for acts forced multiple times and for acts forced by close persons) might be larger (see Reidy et al., 2021; Gossel, 2022). All three meta-analyses, or the studies on which they are based, controlled for only a subset of the relevant confounding variables, so in the future, if the quality of confounding variable control continues to advance, I suspect we can expect effect sizes to decline.

According to the results of the 14 studies in this meta-analysis, the effect sizes for the three types of correlations between "sexual abuse" and mental health impairments (bivariate, after controlling for the nine other original ACEs, after controlling for additional ACEs) are $r=.023$, $r=0.08$ and $r=0.04$, as already shown in Table 4. Four of the 14 studies also contain data in this regard or only for female respondents (Gossel, 2022; Mersky et al, 2016; Cavanaugh et al., 2022; Manyema et al., 2018). The three effect sizes calculated using the results of these four studies are $r=0.22$, $r=0.13$ and $r=0.03$ for female respondents only. These three values do not indicate more impairments for women than for men, but are based on only a few studies.

The very small association ($r=0.04$) between the ACE "sexual abuse" of "minors" and mental health impairments, identified by this meta-analysis

and often based on Cohen (1988, p. 104) referred to as "trivial" in other contexts, was identified for this variable as a whole and may not apply, in principle, to subgroups of this variable. Whether specifically the voluntary sexual acts of "minors" and (much older) adults have positive or negative consequences for the mental (including sexual) health of "minors" has not been scientifically clarified by quantitative studies comprehensively controlling for genes and confounding variables. The current state of research does not allow for an effect size to be specified for voluntary acts, which is also important for justice processes. As an aside, five out of six meta-analyses I know of on this question have concluded that there is no statistically significant association between the age of "minors" in acts considered "sexually abusive" and later impairment of the "minors" involved (Arriola et al., 2005; Li et al., 2023; Nagtegaal et al., 2022; Paolucci et al., 2001; Rind et al., 1998). The sixth meta-analysis had this result for the majority of the gender and age groups studied; the deviating finding could have been caused by non-representative samples (Li et al., 2020). The view, apparently prevalent in the literature, that voluntary sexual acts by "minors" and adults would have negative health consequences for the "minors" involved is only conjecture and not supported by meaningful scientific studies. This meta-analysis surprisingly shows an association (albeit minimal) with improved mental health ($r=-0.01$) for ACE incarceration of a household member after controlling for more than the nine other original ACEs. I believe such a negative result is also possible and likely in the future for the independent variable of voluntary sexual acts by "minors" and adults. In this regard, the science of the future will distinguish between the consequences of sexual acts and the consequences of human relationships differently than it has in the past. Gossel (2022) identified only very small/"trivial" and statistically nonsignificant associations between voluntary sexual acts of "minors" and adults and many dependent variables, such as depression (OR 1.20) and suicide attempts (OR 1.16), but an outstanding medium to large and statistically significant association of these voluntary sexual acts with smoking (OR 2.49). In contrast, for forced sexual acts by "minors" and adults, the OR for smoking in the study was only 1.13 (not statistically significant). Presumably, voluntary sexual acts did not cause smoking, otherwise forced sexual acts would also have to be strongly associated with smoking, which was not the case in the study. Instead, "minors" with voluntary sexual contact with adults might possibly be more prone to breaking rules (and therefore more likely to start smoking) on the one hand, and/or more likely to learn about smoking through increased human contact with older people who smoke, and at an earlier age through them. In both cases, however, it was not the sexual acts that caused the smoking.

Voluntary sexual relationships of "minors" and adults currently take place in an extremely pedophobic-poisoned climate, which has consequences for the formation and consequences of these relationships. Empirical studies can necessarily only measure the health and other consequences of these relationships in the real existing social climate and not the consequences that would be evident in a society that respects and encourages these relationships. Empirical studies, then, do not measure the consequences of these relationships and sexual acts per se, but only ever measure the consequences of these relationships and sexual acts under the given social conditions.

From my point of view, this must also be considered: The association between the ACE "sexual abuse" with mental health impairments after controlling for the other nine original ACEs is $r=0.081$ in this meta-analysis. Already when additionally controlling for a single-digit number of other ACEs thereafter, this association is reduced to $r=0.036$ (median of seven studies excluding the 27 additional ACEs controlling study by Gossel, 2022). One cannot rule out, rather it seems likely, that when additional ACEs and other confounding variables and genes are controlled for, the effect size of the ACE "sexual abuse" will approach zero. This is another reason why there is currently no scientific evidence that the ACE "sexual abuse" (or the sexual acts attributed to it) would cause mental impairment to any important degree in the long term. Scientific evidence shows only a very small association of the independent variable "sexual abuse" and various dependent variables. The causes of these associations are unexplained.

The aforementioned meta-analysis by Rind et al. (1998), due to its results, not only led to the condemnation of a scientific study by both chambers of the U.S. Congress in a historically unique way (Dallam et al., 2001), but also to an intense debate in science (Dallam et al., 2001; Whittenburg et al., 2000; Ondersma et al., 2001; Rind et al., 2001). Most of the scientific criticism of the meta-analysis by Rind et al. (1998), such as the limitation to college samples, does not apply to the 14 studies in this meta-analysis or to this meta-analysis itself. For all 14 studies in the meta-analysis, the effect sizes for the associations of the ACE "sexual abuse" with mental impairment are bivariate, after controlling for each of the nine other original ACEs and after controlling for additional ACEs, $r=0.23$, $r=0.08$, and $r=0.04$, respectively (Table 4). The corresponding values for the five (adult) student samples only are $r=0.24$, $r=0.13$, and $r=0.03$. The corresponding values for the nine non-student samples only are $r=0.22$, $r=0.10$, and $r=0.05$. Thus, bivariate show even minimally larger associations with health impairments in the student samples than in the non-student samples. Even though these figures are based on very few studies, they do not confirm the background

of the central argument against the meta-analysis by Rind et al. (1998) (restriction to college samples). The median value for the association between the ACE "sexual abuse" and mental impairment after controlling for more than the nine other original ACEs is $r=0.043$ in the four pupil studies in this meta-analysis and $r=0.035$ in the four corresponding adult studies. Again, these figures are very similar and do not support the central argument against the meta-analysis by Rind et al. (1998) that completely different results would have emerged if representative studies had been considered. Relative to all 14 studies in this meta-analysis, the association between the ACE "sexual abuse" and mental health impairments after controlling for more than each of the nine other original ACEs is $r=0.04$. This median value is based on eight studies. Four of the eight studies only recorded sexual acts with older people (median $r=0.043$), and four studies also recorded sexual acts coerced by peers (median $r=0.0305$). Thus, in both cases, the median is again very similar. Although again based on very few studies, this comparison does not support the assumption that the very small association between the ACE "sexual abuse" and mental impairment identified by the meta-analysis can be explained by the inclusion of peer-forced sexual acts after controlling for more than the nine other original ACEs. All 14 studies in the meta-analysis, at least according to my interpretation of the item wording, targeted sexual acts involving physical contact when measuring the "sexual abuse" variable and did not include, for example, exhibitionism or voluntary acts with peers. However, it also captured only attempted and unconsummated sexual acts, which may have reduced effect sizes. In the debate at the time, Rind et al. (1998) control for confounding variables from the family environment was criticized (Dallam et al., 2001). However, in a representative survey from Finland, only 7.0% of all sexual contacts of "minors" with substantially older people (age interval at least four years) involved contacts with close or distant relatives (Rind, 2022). For this reason, too, the control of confounding variables from the familial sphere, which is necessary to avoid confounding bias, seems justified.

According to the result of this meta-analysis, substantially more people are affected by the ACE mental problems of a household member (24.0%) than by the ACE "sexual abuse" (9.0%). The calculated bivariate association between the ACE mental problems of a household member with mental impairment ($r=0.23$) is as large as the bivariate association between the ACE "sexual abuse" with mental impairment ($r=0.23$). In the multivariate associations with a control of more than the nine other original ACEs, a larger association is seen for the ACE mental problems of a household member ($r=0.08$) than for the ACE "sexual abuse" ($r=0.04$). This comparison alone shows that the impression created by some clinicians (see, for example, Spiegel, 2000) of the special and outstanding

harmfulness of those sexual acts that are labeled "sexual abuse" of "minors" is not true. In six of the eight studies identified by this meta-analysis, controlling for more than the nine other original ACEs, the association of the ACE "sexual abuse" with mental impairment is shown to be smaller than small (and may again have been caused mostly or almost entirely by confounding variables) after controlling for these confounding variables. Accordingly, neither the bivariate nor the multivariate associations, nor the frequencies, reveal in this meta-analysis the salient importance of the alleged "sexual abuse" of "minors" for mental health that some clinicians claim. This is matched by the results of a survey of 579 U.S. young adults published in 2023 (Miller et al., 2023). The women and men were first asked to indicate which of seven experiences (including "sexual victimization NOT by peers") they themselves had experienced at "minor" age. Then, respondents were asked to rank only the experiences they had themselves in terms of the importance of those experiences to their mental health in childhood and adolescence. The first place in this ranking order was taken by the experience of "bullying and victimization by peers" by a wide margin, at 28.5 percent. The experience "sexual victimization NOT by peers" ranked second to last at 9.9 percent. Of course, the description of this result is not meant to gloss over anything and is also dependent on the frequencies of the seven experiences not reported in the article. But the result shows that the alleged or real "sexual abuse" in the experience of those affected does not have the prominent special position that some clinicians (and the mass media) often ascribe to it. How can we explain the contradiction between the often dramatic descriptions of clinicians and the findings of this meta-analysis (and many other studies)? Nine aspects might be important, among others:

1. Until the 1980s, the then very quickly gaining the upper hand and until today apparently dominating view of clinicians of the allegedly outstanding harmfulness of "sexual abuse" of "minors" did not exist (Rind, 2023b). Otherwise, for example, the intense debate in the 1980s in the Federal Republic of Germany over the legalization of "pedosexuality" would not have been possible (Walter et al., 2015). According to scientific reappraisals of this process of change, at that time it was propagandistically caused almost overnight and not based on a factual analysis of scientific data (Rind, 2023b). There was never a scientifically serious data basis for the completed change of views.
2. Speculatively, and without precise knowledge of what was going on at the time, I suspect that effect sizes for the associations between the "sexual abuse" variable of "minors" and mental health impairments in adulthood played an important and perhaps the critical role in the emergence of the abuse panic in the late 1980s. As

noted, these effect sizes have apparently only been available since the mid-1980s. Prior to that, relevant studies were not conducted, so corresponding results were not available and logically could not have consequences. The first effect sizes obtained for the variable "sexual abuse" of "minors" were often huge because, on the one hand, clinical samples with people with many difficulties were often studied and, on the other hand, there was often no or at least no major confounding variable control (Beitchman et al., 1991). The (ultimately spurious) large effect sizes repeatedly found for the independent variable "sexual abuse" may have shaped the thinking of many clinicians and continue to do so today.

3. Clinicians often see people with major problems, so they do not see the typical cases (selection bias). Clinicians are likely to see a disproportionate number of intra-family cases that have come to the attention of authorities regarding sexual acts of "minors" and adults that are considered "abusive". Psychological problems presumably manifest more frequently in this group than in other groups, which may then be erroneously generalized. To my knowledge, however, there are almost no, or in fact no, meaningful studies on the causal health consequences of intrafamilial sexual acts (but see Gossel, 2022).
4. As this meta-analysis also shows, the group of "minors" considered to be "sexually abused" actually has significantly more psychological difficulties than the group of "minors" who are not "sexually abused", so clinicians will often be inclined to attribute these difficulties to the sexual acts in accordance with the zeitgeist (confirmation bias).
5. Clinicians often operate in state systems and are involved in the punishment of people who are incarcerated or in "preventive detention" (Sicherungsverwahrung) as a result of mutually desired sexual acts. Clinicians may need to assume the harmfulness of these sexual acts in order to maintain their positive self-image.
6. The history of mankind is (also) a history of oppression of minorities. Pedophobic views of clinicians could partly satisfy base instincts and therefore be represented. Institutionalized homophobia has also long and always hidden behind caring. Scientific studies of the views of those convicted of voluntary sexual acts with "minors" on the thoughts and actions of clinicians and other state officials are lacking (but see Drapeau et al., 2005).
7. It is possible that the view of all clinicians dealing with the topic is different (more deliberative and skeptical) than that of the clinicians

expressing themselves publicly on this issue. Opinions that differ from the prevailing public view may not be expressed for fear of consequences (Schweigespirale/spiral of silence, Noelle-Neumann, 1989). An honest description of reality is almost impossible today in the case of sexual acts by "minors" and adults. In 1937, Laretta Bender (inventor of the Bender Gestalt Test) and Abram Blau published the article *The Reaction of Children to Sexual Relations with Adults* in *The American Journal of Orthopsychiatry* (Bender et al., 1937). They report their professional experience with 5- to 12-year-olds who have had sexual "contacts" with adults: "This study seems to indicate that these children undoubtedly do not deserve completely the cloak of innocence with which they have been endowed by moralists, social reformers and legislators. The history of the relationship in our cases usually suggested at least some cooperation of the child in the activity, and in some cases the child assumed an active role in initiating the relationship." (p. 514) About the 16 people/cases described in their article, Laretta Bender and Abram Blau noted, "The sexual relationship between the child and adult in these cases did not appear to depend solely on the adult. The child was either a passive or active partner in the sexual relations with the adult, and in some instances seemed to be the initiator or seducer. Nearly all of the children had conspicuously charming and attractive personalities. It cannot be stated whether their attractiveness was the cause or effect of the experience, but it is certain that the sexual experience did not detract from their charm. Their emotional reactions were remarkably devoid of guilt, fear or anxiety regarding the sexual experience. There was evidence that the child derived some emotional satisfaction from the experience." (p. 517) Such a publication would be almost unthinkable today.

8. There has been an extreme pedophobia for about 30 years, which suppresses dissenting opinions and makes it difficult or impossible for "minors" to objectively view sexual experiences with older people and to process them in a carefree positive way. The brainwashing of mass media and partly only alleged science could often cause self-doubt in "minors", which could seemingly confirm negative assessments of clinicians.
9. The human mind has produced absurd and oppressive ideologies and views in every century and in countless areas over the last millennia (Thieme, 1991). Until 1957, the Civil Code of the Federal Republic of Germany contained the so-called obedience paragraph (Gehorsamsparagraf). The first sentence of §1354 read (translated), "The man is entitled to make decisions in all matters concerning joint marital life; in particular, he determines the place of

residence and the home." (<https://de.wikipedia.org/wiki/Gehorsamsparagraph>, retrieved 09/20/2023). In 1966, judges of the German Federal Supreme Court ruled that wives are obligated to have sexual intercourse with their husbands and may not show indifference or reluctance in doing so (translated): "The wife does not satisfy her marital duties merely by allowing the cohabitation to take place apathetically. If, as a result of her disposition or for other reasons, which may include the ignorance of the spouses, she is prevented from finding satisfaction in conjugal intercourse, marriage nevertheless requires her to grant it in conjugal affection and sacrifice, and forbids the display of indifference or reluctance." (<https://opiniojuris.de/entscheidung/1659>, accessed 09/20/2023). The judges will not have been aware of the arrogance and insanity of this judgment. Mankind is so far not able to distinguish fundamentally between normality and insanity. Therefore, the madness pedophilia can give itself the false appearance of normality and spread.

With that, let's return to all of the original ACEs. For ACE incarceration of a household member (see Jackson et al., 2021), surprisingly, the eight studies controlling more than the nine other original ACEs show an overall minimal negative effect size, i.e., an association with improved mental health ($r=-0.01$). One can speculate that after controlling for other confounding variables, this negative association will be more pronounced. One speculative explanation for this counterintuitive result is that incarceration of a household member often results in the removal of violent people from the families of the "minors" and that this has an overall positive effect on the mental health of the "minors" in the long run.

The genetic aspect appears to be important for mental health and for the associations of ACEs with mental health (Baldwin et al., 2023b). Because the 14 studies in the meta-analysis did not comprehensively control for the genetic aspect or the myriad of interrelated ACEs, and also did not (overwhelmingly) account for many other relevant confounding variables such as different health states prior to experiencing ACEs and protective factors and confounding variables in adulthood, the result of this meta-analysis cannot represent the exact extent of the causal relationships. However, the result of this meta-analysis illustrates that the causal relationships between the various original ACEs and mental health impairments are smaller than widely suspected. In general, the more confounding variables controlled for, the smaller the associations. Because multivariate studies of the health consequences of ACEs typically control for only a fraction of the relevant confounding variables, they produce

systematically inflated research artifacts that depend less on the actual magnitude of the causal associations and more on the confounding variables controlled for by the respective researchers. Partially, ACEs research (as well as many other research fields) is in an effect size delusion in which numbers that are centrally dependent on confounding variable control and thus self-created are confused with reality. Multivariate ACEs effect sizes, like many other results of empirical studies (Kriz, 1981), are predominantly research artifacts.

The bivariate and multivariate associations of original ACEs with physical impairments are much smaller than the associations with mental impairments (Gossel (2022) p. 40). Therefore, associations of ACEs with physical impairments are also often unlikely to have an important causal basis.

The fundamental question arises as to what effect sizes ACEs research should regard as evidence of an important causal relationship. According to Cohen (1988), effect sizes of $r=0$ are not achievable in the practice of behavioral science; effect sizes up to $r=0.10$ were described by Cohen as "trivial" ("trivially small", Cohen (1988) p: 104) in one context and as evidence of a non-existent relationship. Also, since possible causal consequences of ACEs could relate to very many different impairments, the threshold of $r=0.10$ seems clearly too high for importance. It seems important whether the corresponding effect size was determined after comprehensive control of confounding variables. This is not the case in the studies of this meta-analysis, as apparently in the other ACEs studies. Meta-analytically determined causal effect sizes of ACEs research in the range of $r=0$ to $r=0.050$ are, in my view, currently evidence of a nonexistent or at least an uncertain important causal relationship. With these very small effect sizes, it currently remains unclear whether the associations were caused by residual confounding and other bias (Christenfeld et al., 2004).

Proper control of confounding variables is not an easy task and statistical control is often an illusion (Christenfeld et al., 2004). Therefore, scientific efforts undertaken by groups that comprehensively control for the myriad ACEs and the many other confounding variables would seem to make sense. For example, different groups of scientists from different regions of the world could each study and compare mental health consequences for 50 ACEs determined across groups. Such an approach would, on the one hand, overcome the seemingly irrational focus on the ten original ACEs and, on the other hand, could lead to an exchange of researching scientists and groups of scientists to a greater extent than is currently the case. It is an

open question whether the ACE to repeat a year at school or the ACE of "sexual abuse" causes mental health impairments to a greater extent (see the findings of Gossel, 2022). Simultaneous investigation of the health consequences of these two ACEs would have the advantage that interest-driven methodological bias would be more likely to be detected and thus avoided/reduced. The results of the different research groups could be analyzed, compared, and discussed. Within a few years, ACEs research could reach a new level that might otherwise be missed even in decades. Such efforts should include discordant twin studies that, unlike in the past, take full account of discordant twin differences in the various ACEs. It also seems important to conduct studies that, in addition to asking about many ACEs (e.g., out of 75 ACEs), also ask about the time of onset of each of these ACEs, so that, for example, only ACEs with onset up to age 14 can then be statistically controlled (or the sum of) for the association of certain ACEs from age 15 with impaired health. This would allow investigation of whether such a research design with a consideration of the temporal aspect would show substantially different results than a research design without a consideration of the temporal aspect. Of course, appropriate longitudinal studies as well as propensity score studies (Austin, 2011) comprehensively controlling for confounding variables are also desirable and necessary.

The "true" effect sizes for the causal associations between the various ACEs with mental health impairments are likely to be predominantly in the range $r=0.00$ to $r=0.05$. Methodologically sophisticated studies are needed to clarify whether the effect size for a particular ACE is $r=0.00$ or $r=0.02$, for example. Retrospective, nongenetic studies that artificially dichotomize and do not comprehensively control for confounding variables will likely often fail to determine the exact causal effect sizes in the first place. Basing ACEs studies on respondent self-report is also problematic (Newbury et al., 2017). What appears necessary is a fundamentally new scientific approach. Presumably, this will also require more precise measurement and control of individual ACEs than has been the case to date (Krinner et al., 2021; Bond et al., 2021; Reidy et al., 2021).

My guess is that in the research area of ACEs, effect sizes that are considered small today will be considered large in the future, because comprehensive confounding variable control (which is already developing) will lead to much smaller effect sizes than before, which will then serve as a new and different standard of evaluation. The average person, in a comprehensive understanding of ACEs, is affected not by one or by two ACEs, but by perhaps 20 ACEs, each of which can typically have only a very small negative effect, if any, on health. Otherwise, almost everyone would have to be depressed in the clinical sense, for example, which fortunately

is not the case. In the case of ACEs, comparisons of the causal effect sizes of the various ACEs could be more meaningful than the schematic size assessments of effect sizes described in the introductory section, which go beyond research areas. However, such comparisons are possible and useful only after comprehensive control of confounding variables and often only after effect sizes have been determined in comparable research designs. The multivariate effect sizes potentially relevant for meta- and meta-meta-analyses should (also) be published with three instead of two decimal places, as is currently often the case, because otherwise rounding in the case of very small effect sizes makes precise effect size determination by meta- and meta-meta-analyses difficult.

Limitations

Because of the many uncontrolled confounding variables (including genes, other ACEs, health differences before experiencing ACEs, protective factors, and confounding variables in adulthood), the multivariate associations identified in the meta-analysis do not reflect the causal relationships between ACEs and mental impairments and must be interpreted in the overall context. Only one database was searched for the literature search; other databases may contain additional studies meeting the inclusion criterion for the meta-analysis. The independent and dependent variables were based almost entirely on respondent self-report rather than objective diagnoses. In an ACEs study not included in the meta-analysis, retrospective self-report resulted in much larger effect sizes than prospective information from others (Newbury et al., 2017). The reliability of retrospective ACEs measures is problematic (Baldwin et al., 2019; Coleman et al., 2023). ACEs could be both confounders and mediators to some extent, so controlling for ACEs as confounding variables could lead to bias that reduces effect sizes. With one exception (Silveira et al., 2023), all studies in the meta-analysis artificially dichotomized the independent variables. Seven of the 14 studies also artificially dichotomized the dependent variables. Artificial dichotomization of variables leads to information loss and bias and can lead to a reduction in effect sizes when analyzing bivariate relationships (MacCallum et al., 2002; Fernandes et al., 2019; DeCoster et al., 2009). The effect size reducing or magnifying influence of artificial dichotomization of ACEs when controlling for many ACEs multivariately is unclear (see also Reidy et al., 2021). Many independent variables and also some dependent variables in the 14 studies in the meta-analysis were measured with only one question, which will have led to inaccurate measurements and bias. The studies in the meta-analysis are cross-sectional studies with the known difficulties for causal inference. Only five of the 14 studies were representative. The meta-analysis is based

on relatively few (14) studies, so specifics of individual studies are likely to have influenced individual results relatively strongly. Ten of the 14 studies examined (predominantly) adults. If "minors" were examined separately, other effect sizes might emerge. The studies in the meta-analysis examine the long-term consequences of ACEs, and the short-term consequences might differ. The median of the four medians of the ten medians of the four studies with values for "minors" after controlling for more than the ten original ACEs is $r=0.0695$, whereas the corresponding median of the four studies with values for adults is $r=0.046$. This could indicate larger causal associations among "minors" than among adults. However, the difference is based on very few and different studies and is therefore questionable. It is unclear whether there are any "true" and ascertainable effect sizes at all for the association of the various ACEs and impairments in health (see also Briggs et al., 2021). Mental health is a multidimensional construct (Coronel-Santos et al., 2022; Fusar-Poli et al., 2020; Galderisi et al., 2015; Kittleson, 2019; Manwell et al., 2015; Wren-Lewis et al., 2021), so the associations between an ACE and these different dimensions could vary, and these variations are not represented by the summary associations identified here. The question of the quantifiability of individual psychological characteristics such as mental health is controversial in terms of scientific theory (Cooper, 2024; Michell, 2008). The studies in the meta-analysis measure only the differences in mental health across samples and do not capture the extent of prevented mental health compared with a world without ACEs. Therefore, the actual mental impairments caused by ACEs could be much greater. The Indian philosopher Jiddu Krishnamurti is credited on the Internet with the quote, "It is no sign of health to be well adapted to a society that is fundamentally sick." (THE FOUNDATION STAFF, no year) Similarly, psychoanalyst Erich Fromm said (translated), "The most normal are the sickest. And the sickest are the healthiest." (Lämmle et al., 1980) Perhaps the meta-analysis studies are using the wrong scale and the wrong dependent variables for measuring mental health.

Literature

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Appendix

Table 6: Details of the 14 studies identified

Aspect	Witt et al., 2019	Gossel, 2022	Wang et al., 2019	Finkelhor et al., 2013	Finkelhor et al., 2015
Country	Germany	Germany	China	USA	USA
Type of sample	representative	Students	Students	representative	representative
Sample size	2.531	4.109	989	2.030	1.949
Age of respondents	14 years and older, mean 48.6 years	18 to 39 years, mean 24.0 years	17 to 25 years	10 to 17 years	10 to 17 years
Gender of respondents	female and male	female and male	female and male	female and male	female and male
ACEs measuring instrument	"Adverse childhood experiences were recorded using the German version (11) of the ACE Questionnaire".	German version of the Adverse Childhood Experiences Questionnaire (ACE) and 27 mostly self-developed items	"revised Adverse Childhood Experiences Scale (Finkelhor et al., 2015)."	"This survey used an enhanced version of the Juvenile Victimization Questionnaire, an inventory of childhood victimization."	"For this study, survey items were selected and coded to match the 10 items of the ACE scale as closely as possible. Four additional items were created to capture other dimensions of childhood adversity."
Number of ACEs queried	10	37	14	29	14
ACE "sexual abuse"	only actions with seniors	only actions with seniors	also actions forced by peers	also actions forced by peers	also actions forced by peers
Dependent variable(s)	Depression, anxiety, low life satisfaction	Depression, suicide attempt, mental health impairment, therapy participation	Suicidal ideation	Distress symptoms/trauma scores	Current psychological distress/trauma symptom scores

In addition to the ACEs, controlled confounding variables without weights	no	no	no	no	no
Indication of bivariate associations	yes	yes	yes	no	no
Indication of associations after controlling for the nine other original ACEs	yes	yes	no	yes	yes
Indication of the associations after a control of additional ACEs	no	yes	yes	yes	yes
Effect size	OR	OR	OR	β	β

OR=Odds Ratios

β =standardized regression coefficients

Continued Table 6: Details of the 14 studies identified

Aspect	Mersky et al., 2016	Manyema et al., 2018	Huang et al., 2021	Al Shawi et al., 2022	Qu et al., 2023
Country	USA	South Africa	China	Iraq	China
Type of sample	"diverse, lowincome sample of women who received home visiting services in Wisconsin"	Single children of women residing in Soweto-Johannesburg.	Students	non -random convenient sample/majority students	Pupils
Sample size	1.241	1.223	1.871	401	6.363
Age of respondents	16 to 46 years, average 24.2 years	22 to 23 years	not specified (students)	18 to 20 years	Mean 12.3 years, SD 1.83
Gender of respondents	female	female	female and male	female and male	female and male
ACEs measuring instrument	"ACE data were drawn from participant responses to the Childhood Experiences Survey, a measure that has been integrated into standard assessment protocols by Wisconsin's FFHV program."	"questionnaire adapted from the ACE Study Questionnaire"/"Data on chronic illness, unemployment and parental death were also collected in addition to the original ten ACEs."	"Adverse Childhood Experience (ACE) scale (Centers for Disease Control and Prevention, n.d.)."	"The Adverse Childhood Experiences Questionnaire (ACEs)."	"Chinese version of Childhood Trauma Questionnaire-Short Form (CTQ-SF)."
Number of ACEs queried	17	13	10	10	11
ACE "sexual abuse"	only actions with seniors	only actions with seniors	only actions with seniors	only actions with seniors	only actions with seniors
Dependent variable(s)	Perceived stress	Psychological distress	Happiness	Deviant behaviours	"Poor sleep quality, Emotional and behavioral

					problems, Lower academic achievement."
In addition to the ACEs, controlled confounding variables without weights	"All regression models include covariates for race and ethnicity as well as participant age."	"In step 1, we adjusted for demographic variables of age, gender and marital status. The second step added household SES, current employment and completion of high school. The adult life stress variable was added in the third step of the hierarchical regression."	For the meta-analysis, effect sizes were coded without the control variable mindfulness / "This study controlled for basic socio-economic characteristics of the respondents. We collected information about respondents' age, sex (0 = male; 1 = female), ethnicity (0 = other, 1 = Han), and household registration (HR) (rural; city with prior rural registration; city). We also collected information about their family backgrounds, including parents' marital status (married, separated, divorced and widowed), parents' highest	Gender and "Financially independent"	For the dependent variables "Poor sleep quality" and "Emotional and behavioral problems" these additional variables were controlled: "Adjusted for age, sex, BMI, resilience score, serious disease in the past year, family location, the only child in family, paternal educational level, maternal educational level". For the dependent variable "Lower academic achievement", these other variables were controlled: "Adjusted for age, sex, BMI, resilience score, serious disease in the past year, family location, the only

			<p>educational attainment (elementary school or below, middle school, high school and some college or above), number of family members, annual family income in the last year and welfare status (0 = no; 1 = yes) in the last year. Finally, this study also controlled for specific college characteristics, or college-fixed effect, in consideration of the possibility that college characteristics, such as college culture, may influence individuals' mindfulness and happiness (Fletcher, 2010)."</p>		<p>child in family, paternal educational level, maternal educational level, emotional and behavioral problem, and poor sleep quality".</p>
Indication of bivariate associations	yes	no	no	no	no
Indication of associations after controlling for the	yes	no	yes	yes	no

nine other original ACEs					
Indication of the associations after a control of additional ACEs	yes	yes	no	no	yes
Effect size	β	OR	β	β	OR

SD=standard deviation

OR=Odds Ratios

β =standardized regression coefficients

Continued Table 6: Details of the 14 studies identified

Aspect	Silveira et al., 2023	King, 2021	Chen, 2022	Cavanaugh et al., 2022.
Country	Brazil, Portugal, other countries	USA	China	USA
Type of sample	Almost only students and doctorates	"Amazon's Mechanical Turk"	representative	representative for "black" people
Sample size	1.006	2.013	2.910	6.260
Age of respondents	18 to 80 years	18 to 87 years, average 35.2 years	12 to 14 years	Average 45 years
Gender of respondents	female and male	female and male	female and male	female and male
ACEs measuring instrument	"Portuguese-language version of the Family Adverse Childhood Experiences Questionnaire (Silva & Maia, 2008) assessed the report of ACEs through 10 items."	"ACE items in this sample closely approximated the content domain of the 10 adversity categories (top of Table 1) measured previously (Dong et al., 2004); (Felitti et al., 1998)."	"After the CDC-Kaiser and domestic research in China, ACEs including 5 types of child abuse and 11 types of family dysfunction faced by children in early adolescence (12-14 years), were investigated in this study. Child abuse comprises emotional, physical, and sexual abuse, and emotional and physical neglect. Family dysfunction covers divorce, witnessing domestic violence, parental disability, parental alcohol abuse,	"Questions were adapted from the Adverse Childhood Events study (Dong et al., 2003; Dube et al., 2003) and were originally part of an extensive battery of questions appearing on the Conflict Tactics Scale (CTS: Straus, 1979; Straus and Gelles, 1990) and the Childhood Trauma Questionnaire (CTQ: Bernstein et al., 1994; Wyatt, 1985)." (Ruan et al., 2008)

			parental drug abuse, parental suicidal intention, parents leaving home, poor living environment, scolding, parental gambling, and parental criminal records." / "In this study, childhood trauma questionnaire (CTQ) was used to examine maltreatment (19). The Chinese version of the questionnaire has good reliability and validity, and is widely used to measure child abuse (20, 21)."	
Number of ACEs queried	10	10	16	10
ACE "sexual abuse"	only actions with seniors	only actions with seniors	"Sexual abuse was measured using five items, such as "someone intimidates or tempts me to do sexual things with him/her""	only actions with seniors

Dependent variable(s)	Psychological distress and suicidal behaviors	Aggression (The Buss-Perry Aggression Questionnaire, The Motivated Acts MAGG, LAVA Injury to Others)	Behavioral problems	Depression
In addition to the ACEs, controlled confounding variables without weights	no	no	no	no
Indication of bivariate associations	yes	yes	no	yes
Indication of associations after controlling for the nine other original ACEs	yes	yes	no	yes
Indication of the associations after a control of additional ACEs	no	no	yes	no
Effect size	β	β and r	OR	OR

OR=Odds Ratios

β =standardized regression coefficients

r=Pearson correlation coefficients

Table 7: Unrounded results from Table 4: Associations of the ten original ACEs with mental health impairments (Pearson correlation coefficient r - indicated in each case is the median of the effect sizes determined in the individual studies or their medians)

ACE	Bivariate associations	Associations after controlling for the nine other original ACEs	Associations after a control of additional ACEs
Emotional abuse	0,26225	0,13100	0,10100
Physical abuse	0,21200	0,08750	0,05800
"Sexual Abuse"	0,23150	0,08100	0,03775
Emotional neglect	0,26050	0,11000	0,09500
Physical neglect	0,24775	0,06025	0,07000
Witnessing violence against the mother/parents	0,18500	0,01650	0,01000
Separation/divorce of parents	0,12050	0,04775	0,03700
Alcohol/drug dependence Household member	0,17950	0,05075	0,03825
Mental problems household member	0,23450	0,08500	0,08000
Incarceration household member	0,19900	0,02550	-0,01000
Median of the ten medians	0,22175	0,07063	0,04813
Median of the five ACEs <i>maltreatment</i>	0,24775	0,08750	0,07000
Median of the five ACEs <i>household dysfunction</i>	0,18500	0,04775	0,03700

Table 8: Coded effect sizes of the 14 studies

For each study, the left column shows bivariate effect sizes where available, the middle column shows effect sizes after controlling for the nine other original ACEs, and the right column shows effect sizes after controlling for additional ACEs. The top row in each case shows the results for the ACE emotional abuse, below which come, in that order, the ACEs physical abuse, "sexual abuse", emotional neglect, physical neglect, divorce/separation of parents, violence against mother/parents, alcohol/drug problem household member, mental problems household member, and incarceration household member. The Pearson correlation coefficient r is indicated in each case.

Gossel, 2022:			Wang et al., 2019:		
0,2845	0,102	0,058	0,331	-	0,16
0,2335	0,021	0,0265	0,306	-	-0,139
0,244	0,1315	0,0395	0,31	-	0,013
0,344	0,2425	0,179	0,447	-	0,306
0,3105	0,012	-0,0245	0,379	-	0,052
0,197	0,0455	0,0025	0,358	-	0,193
0,2325	-0,0175	-0,045	0,252	-	-0,258
0,209	0,0515	0,0355	0,424	-	0,199
0,301	0,188	0,1565	0,379	-	0,013
0,2235	-0,0015	-0,0275	0,412	-	0,27
Witt et al., 2019:			Finkelhor et al., 2013:		
0,355	0,166	-	-	0,16	0,08
0,342	0,048	-	-	0,16	0,13
0,292	0,074	-	-	0,08	0,05
0,347	0,177	-	-	0,12	0,12
0,293	-0,075	-	-	0,09	0,07
0,193	0,052	-	-	-0,01	-0,05
0,194	-0,006	-	-	0,05	-0,02
0,217	0,059	-	-	0,08	0,01
0,331	0,215	-	-	0,08	0,04
0,277	0,021	-	-	0,02	-0,01
Finkelhor et al., 2015:			Mersky et al., 2016:		
-	0,16	0,13	0,24	0,1	0,06
-	0,11	0,12	0,22	0,09	0,08
-	0,2	0,14	0,14	0,07	0,03
-	0,1	0,07	0,17	0,05	0,03
-	0,17	0,1	0,14	0,05	0,05
-	0,06	0,05	0,09	0,05	0,04
-	0,07	0,04	0,13	-0,07	-0,07
-	0,04	0,01	0,15	0,04	0,03
-	0,14	0,08	0,2	0,09	0,07

-	-0,06	-0,07	0,12	0,03	-0,01
Manyema et al., 2018:			Qu et al., 2023:		
0,178	-	0,026	-	-	0,336
0,17	-	0,036	-	-	0,142
0,219	-	0,157	-	-	0,031
0,272	-	0,186	-	-	0,055
0,217	-	0,135	-	-	0,07
0,034	-	-0,011	-	-	0,106
0,176	-	0,055	-	-	0,068
0,133	-	0,059	-	-	0,041
0,266	-	0,218	-	-	0,222
0,031	-	-0,065	-	-	0,174
Huang et al., 2021:			Al Shawi et al., 2022:		
-	0,21	-	-	0,08	-
-	0,11	-	-	0,18	-
-	0,07	-	-	0,138	-
-	0,24	-	-	-0,119	-
-	0,09	-	-	0,145	-
-	0,08	-	-	0,045	-
-	0,02	-	-	0,013	-
-	0,05	-	-	0,101	-
-	0,05	-	-	0,118	-
-	0,01	-	-	0,08	-
Cavanaugh et al., 2022:			Silveira et al., 2023:		
0,3215	0,177	-	0,211	0,1005	-
0,203	0,016	-	0,153	-0,036	-
0,277	0,1575	-	0,1715	0,082	-
0,1395	0,0565	-	0,249	0,136	-
0,2785	0,0705	-	0,142	0,0465	-
0,0405	0,018	-	0,127	0,051	-
0,254	0,06	-	0,0865	-0,085	-
0,2405	0,137	-	0,1075	-0,032	-
0,203	0,0635	-	0,1615	0,0675	-
0,215	0,03	-	0,106	0,07	-
King, 2021:			Chen, 2022:		
0,192	0,04	-	-	-	0,122
0,204	0,085	-	-	-	0,021
0,104	0,028	-	-	-	0,036
0,134	-0,008	-	-	-	0,064
0,133	0,027	-	-	-	0,106
0,114	0,013	-	-	-	0,034
0,166	0,058	-	-	-	0,092
0,101	0,005	-	-	-	0,046
0,106	-0,001	-	-	-	-

0,161	0,11	-	-	-	0,072
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Table 9: Coded frequencies of the original ACEs in 12 studies in percent

	Gossel, 2022	Wang et al.,2019	Witt et al., 2019	Finkelhor et al., 2013	Finkelhor et al., 2015
Emotional abuse	25,40	10,70	12,50	17,70	13,50
Physical abuse	12,40	3,80	9,10	14,90	13,30
"Sexual Abuse"	11,60	3,40	4,30	6,60	5,20
Emotional neglect	32,20	11,50	13,40	7,70	6,40
Physical neglect	4,30	5,00	4,30	4,00	15,90
Divorce/separation of parents	22,20	3,90	19,40	41,20	21,30
Violence against mother/parents	5,70	5,40	9,80	13,10	13,70
Alcohol/drug problem household member	17,50	1,20	16,70	16,80	9,20
Mental problems household member	32,80	2,50	10,60	27,90	32,50
Incarceration household member	2,20	2,80	3,50	11,10	7,20
	Mersky et al., 2016	Manyema et al., 2018	Huang et al., 2021a	Silveira et al, 2023	Chen, 2022
Emotional abuse	28,80	41,00	11,00	32,70	9,00
Physical abuse	41,80	11,00	6,00	23,30	8,00
"Sexual Abuse"	26,10	7,00	11,00	21,60	7,00
Emotional neglect	18,30	46,00	12,00	29,90	9,00
Physical neglect	11,60	18,00	3,00	10,60	8,00
Divorce/Separation of parents	43,00	49,00	14,00	25,60	6,00
Violence against mother/parents	38,40	20,00	2,00	14,00	5,00
Alcohol/drug problem household member	51,80	36,00	2,00	26,30	5,00
Mental problems household member	40,90	20,00	5,00	30,80	-
Incarceration household member	38,40	25,00	3,00	18,20	2,00

	Cavanaugh et al., 2022.	King, 2021
Emotional abuse	8,70	50,70
Physical abuse	19,60	33,80
"Sexual Abuse"	12,40	28,50
Emotional neglect	12,10	43,40
Physical neglect	8,00	17,70
Divorce/separation of parents	19,50	49,40
Violence against mother/parents	12,20	18,80
Alcohol/drug problem household member	22,40	40,20
Mental problems household member	5,40	52,60
Incarceration household member	9,00	13,90

