



Research article

A revised inventory of Adverse Childhood Experiences

David Finkelhor^{a,*}, Anne Shattuck^a, Heather Turner^a, Sherry Hamby^b^a Crimes Against Children Research Center, University of New Hampshire, Durham, NH, USA^b Sewanee – The University of the South, Sewanee, TN, USA

ARTICLE INFO

Article history:

Received 27 March 2015

Received in revised form 7 July 2015

Accepted 17 July 2015

Available online 7 August 2015

Keywords:

Child abuse
Maltreatment
Sexual abuse
Domestic violence

ABSTRACT

This study examines whether the items from the original Adverse Childhood Experiences (ACE) scale can be improved in their prediction of health outcomes by adding some additional widely recognized childhood adversities. The analyses come from the National Survey of Children's Exposure to Violence 2014, a telephone survey conducted from August 2013 through April 2014 with a nationally representative sample of 1,949 children and adolescents aged 10–17 and their caregivers who were asked about adversities, physical health conditions and mental health symptoms. The addition of measures of peer victimization, peer isolation/rejection, and community violence exposure added significantly to the prediction of mental health symptoms, and the addition of a measure of low socioeconomic status (SES) added significantly to the prediction of physical health problems. A revised version of the ACES scale is proposed.

© 2015 Elsevier Ltd. All rights reserved.

Introduction

The Adverse Childhood Experiences (ACE) Scale has become a very popular tool among researchers and advocates concerned about long-term effects of childhood trauma. The ACE scale, which assesses early experiences like physical abuse, neglect and sexual abuse, has been found to predict negative physical health and mental health outcomes, such as heart disease (Dong, Giles, et al., 2004), liver disease (Dong, Dube, Giles, Felitti, & Anda, 2004), substance abuse (Dube et al., 2003), depression (Edwards, Holden, Felitti, & Anda, 2003) and suicide (Dube et al., 2001).

Despite its predictive ability, the scale and its component items were not formulated by any systematic process, and there is much reason to believe it could be improved. The current scale is made up of 10 items. Five of them concern aspects of child maltreatment: physical abuse, psychological abuse, sexual abuse, physical neglect and emotional neglect. Five additional items concern parental or family incapacities: parental loss through divorce, death or abandonment, parental imprisonment, parental mental illness, parental substance abuse, and violence against the mother.

However, there is strong evidence that other common childhood adversities missing from this list also have negative long term developmental effects. Among these are childhood bullying and peer victimization, isolation and peer rejection, poverty and deprivation, and exposure to community violence, as discussed below. At the same time, some of the adversities on the original ACE list may NOT be strong predictors of problems. For example, parental divorce may at one time have subjected a child to particular stigma and deprivation. The original ACE scale sample consisted of adults most of whom grew up in the 1950s and 1960s. But the negative impact of divorce has abated as it has become more widespread (Amato & Keith, 1991). Moreover, divorcing parents have learned and are instructed to pay more attention to ways to attenuate its impact on

* Corresponding author at: CCRC, University of New Hampshire, 125 McConnell, 15 Academic Way, Durham, NH 03824, USA.

children, and professionals help them do so. Research on divorce suggests that the toxic element is exposure to protracted parental conflict more than divorce itself (Buehler et al., 1998; Kitzmann, Gaylord, Holt, & Kenny, 2003; Kline, Johnston, & Tschann, 1991; Vandewater & Lansford, 1998).

There is considerable evidence about the negative developmental effects of other childhood adversities not included in the original ACE scale. Children growing up in violent communities have serious mental health and behavioral problems (Gorman-Smith & Tolan, 1998) and these are independent of family factors (Linares et al., 2001). Bullying and peer victimization have been shown in longitudinal studies to have consequences on psychiatric disorder (Copeland, Wolke, Angold, & Costello, 2013), with effects in some instances exceeding those of parental maltreatment (Price-Robertson, Higgins, & Vassallo, 2013). In addition to bullying victimization, isolation and social rejection by peers may make an independent contribution to problems and later adjustment (Boivin, Hymel, & Hodges, 2001; Juvonen & Gross, 2005; Kupersmidt, Coie, & Dodge, 1990). Finally poverty has been shown to have multiple effects on child development leading to physical and mental health consequences in adulthood (Aber, Bennett, Conley, & Li, 1997; Duncan & Brooks-Gunn, 2000). Among the separate pathways from poverty to adult problems are things like poorer prenatal care, greater exposure to disease and environmental toxins, more accidents and lack of quality medical care. The uncertainty of life conditions under poverty may also lead to generalized stress dysregulation associated with later physical and mental health problems (Evans & Kim, 2007).

The hypothesis of the present study is that these additional childhood adversities add to the ability to predict health problems and distress over and above the original ACE items using the comprehensive background information available in a national sample of youth. The current analysis parallels a previous study but adds an additional dimension of physical health as an outcome to the earlier which only assessed psychological distress (Finkelhor, Shattuck, Turner, & Hamby, 2012). The present study also makes an important contribution to the ACE literature since most of that current literature is based on adult retrospective assessment of childhood adversities, some of it quite remote, as in the original ACE sample whose average age was 55–57 (Felitti et al., 1998).

Methodology

Participants

The National Survey of Children's Exposure to Violence 2014 was designed to obtain up-to-date incidence and prevalence estimates of a wide range of childhood victimizations. This particular study focuses on the 1,949 children and adolescents from the survey whose ages were 10–17 at the time of the survey (hereinafter referred to as "youth"). Interviews were conducted over the phone from August 2013 through April 2014 by the employees of an experienced survey research firm.

Sample

A nationwide sample was obtained using four sources: (1) an address-based sample (ABS) of households from which cell and residential numbers could be dialed; (2) a pre-screened sample of households with children from recent national random-digit dialed (RDD) surveys; (3) a listed landline sample (targeted on indication of a child in the household based on commercial lists); and (4) cell phone numbers drawn from a targeted RDD sample frame. This combination of sample frames was an effort to increase nationwide coverage of households including those served only by cell phone while efficiently reaching households with children to obtain the desired number of completed interviews. The details of the study are described in more detail in (Finkelhor, Turner, Shattuck, & Hamby, 2015).

Procedure

A short interview was conducted with an adult caregiver (usually a parent) to obtain family demographic information before asking to interview the youth. Information on youth health status was also obtained in the caregiver interview. Respondents were promised complete confidentiality, and were paid \$20 for their participation. Respondents who disclosed a situation of serious threat or ongoing victimization were re-contacted by a clinical member of the research team, trained in telephone crisis counseling, whose responsibility was to stay in contact with the respondent until the situation was appropriately addressed locally. All procedures were authorized by the Institutional Review Board of the University of New Hampshire.

Response Rates

The response rates varied from 67% for the ABS sample [AAPOR RR4] to 22.9% for the matched telephone numbers on file, 30.6% for the pre-screened sample, 21.7% from the listed landline sample, and 14.2% for the cell phone RDD sample. Some of these response rates are low by historical standards, but they are as good as or better than what is typical at the current time in national survey research.

Weighting

Weights were developed to account for differential probability of selection within and across the sampling frames and to adjust for non-response. Variables used to adjust for non-response included types of phones used in the household, household income, number of adults and children in the household, parent/guardian education level and employment status, and child's age group, gender, and race/ethnicity. The final weighted sample reflects the U.S. population on a range of household, parent and child demographic characteristics.

Measurement

Current Psychological Distress

Psychological distress was measured with 28 items from the anger/aggression, depression, anxiety, dissociation, and posttraumatic stress scales of the Trauma Symptoms Checklist for Children (TSCC). The TSCC has shown very good reliability and validity in both population-based and clinical samples (Briere, 1996; Briere et al., 2001). In this study, the alpha coefficient for this scale was .93.

Physical Health Status

The NatSCEV contained 4 items regarding child health that were coded into dummy variables and summed to create a single variable reflecting the child's number of negative health indicators. All 4 items were asked in the parent interview. *Child's overall health* was coded 1 for parents who rated their child's health as poor, fair, or good as opposed to very good or excellent (15% of sample). *Number of times child missed school* or daycare in the past month due to illness or health problems was coded 1 for children who had missed school 3 or more times in the past month (7% of sample). *Number of medical visits* for illness or ongoing health problems was coded as 1 for children who had 5 or more such visits in the past year (10% of sample). *Physical limitation* was coded 1 for children whose parents reported that their child had difficulties due to health problems with "things that take quite a bit of energy like playing soccer, running, or riding a bike" or with "walking a block, climbing a flight of stairs, bending, or lifting" (5% of sample). The *physical health status* variable was created by summing these 4 recoded indicators. Values ranged from 0 to 4 (Mean: .38, SD: .03). Coding reflected an effort to increase the dispersion at the poor health end of the spectrum.

ACES Items and Additional Adversity Items

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.

Items Replicating Original ACE Scale. Each of the following items was constructed as a dummy variable with a score of 0 if the youth never experienced it and a code of 1 if he or she experienced it at any time in his or her life. Unless otherwise specified, items were asked in the youth portion of the interview. Several of the abuse items come from the Juvenile Victimization Questionnaire whose full items and psychometric properties are described elsewhere (Finkelhor, Hamby, Ormrod, & Turner, 2005). The other items were modified from a variety of sources and have not been validated elsewhere.

- *Emotional abuse:* One survey item asked "At any time in your life, did you get scared or feel really bad because grown-ups in your life called you names, said mean things to you, or said they didn't want you?" This variable was coded 1 if the youth answered "yes" and reported that the perpetrator was a parent, a step-parent or live-in partner of one parent, a foster parent, or a live-in adult relative. Relatives who did not live with the child were excluded.
- *Physical abuse:* A single survey item asked "Not including spanking on your bottom, at any time in your life did a grown-up in your life hit, beat, kick, or physically hurt you in any way?" Youth who responded "yes" received a code of 1 on this variable.
- *Sexual assault:* Four survey items asked about the child's experience of sexual assault by a known adult, an adult stranger, or a peer or sibling. The four survey items asked about forcible fondling, and attempted or completed rape by different types of perpetrators. The text of these survey items has been published elsewhere (Finkelhor et al., 2015). If the youth answered "yes" to any of the four items, this variable was coded 1.
- *Emotional neglect:* Respondents were asked how often the following four statements were true about their family: "My family really tries to help me;" "My family lets me know they care about me;" "I can talk about my problems with my family;" and "My family is willing to help me make decisions." Youth who answered that any of these statements was "never" true were considered to have experienced emotional neglect and received a code of 1 on this variable.
- *Physical neglect:* Youth were assigned a code of 1 on this variable if they responded "yes" to any of four items relating to neglect: (1) parents did not provide the child with enough food, take them to the doctor when they were sick, or make sure they had a safe place to stay; (2) parents did not care if the child was clean, wore clean clothes, or brushed his/her

hair or teeth; (3) the child had been forced to care for him/herself when a parent was incapacitated by drug or alcohol use; or (4) the child had been left alone by a parent and the parent's whereabouts were unknown.

- *Mother treated violently*: Twelve survey questions asked youth whether they had witnessed specific types of violence and abuse. Youth who responded "yes" to any of these twelve survey items and reported that their mother was the victim were coded 1 on this variable.
- *Household substance abuse*: Youth who answered "yes" to a question asking whether a member of the child's household "drank or used drugs so often that it caused problems" were assigned a code of 1 on this variable.
- *Household mental illness*: This variable was coded 1 if a sibling or parent of the youth had ever been diagnosed with depression, bipolar disorder, anxiety, or other psychiatric disorder (parent interview) or if a family member had ever attempted suicide (child interview).
- *Parental separation or divorce*: This variable was coded 1 for youth who answered "yes" to an item asking if there was ever a time when the parents with whom a child was living separated or got divorced.
- *Incarcerated household member*: This variable was coded 1 for youth who answered "yes" to a question asking if a parent or guardian had ever been sent to prison.

Additional Victimization and Adversity Items Added to a Revised ACE Scale

- *Low socioeconomic status (SES)*: Using a continuous measure of SES constructed by combining household income and the highest level of education of parents in the household, youth who fell in roughly the bottom 10% of the distribution were coded 1 as having low SES. The median income category of the lowest SES decile is \$15,000–\$20,000. This is the first category that falls below the 2013 national poverty threshold of \$23,500 for the family of four (the median family size of our sample). The median parent education of this group is less than high school.
- *Peer victimization*: This dummy variable was constructed using a total of 7 items, 4 that asked about specific types of physical assault by peers and 3 that asked about property victimizations. Youth who had experienced 4 or more of the 7 types were considered to have experienced a high level of peer victimization and were coded 1 on this variable.
- *Peer isolation/rejection*: This dummy variable was constructed by summing the number of positive responses from 4 items. The respondent: (1) had no good friends at the time of the survey; (2) had ever been called mean names, (3) had ever had rumors or lies spread about him/her, or (4) had ever been socially excluded by peers. Youth who scored 3 or higher on this summed measure were considered to have experienced high peer isolation/rejection and were coded 1 on this variable.
- *Exposure to community violence*: Four items asked about whether youth had ever witnessed an assault with a weapon in the community; had someone close to them murdered; been exposed to shooting, riots, or bombs; or been in a war zone. If a respondent had experienced two or more of these in their lifetime, he or she was assigned a code of 1 on this dummy variable to indicate high exposure to community violence.

Data Analysis

All analyses were weighted unless otherwise noted. Psychological distress score was regressed on the predictor variables using OLS regression. Physical health status score, on the other hand, was modeled using negative binomial regression because it is an over-dispersed count variable (UCLA Statistical Consulting Group, 2015). All analyses were conducted using Stata 13.

Results

The first column of [Table 1](#) shows the frequency of occurrence of the various childhood adversities assessed in this national sample. The top 10 items are the original ACE adversities, and the bottom items are new items meant to assess other domains. The frequency of the adversities range from family mental illness (32.5%) to sexual assault (5.2%). Other adversities occurring to more than 20% were parental divorce/separation and peer social isolation. The adversity sum ranged from 0 to 11 and 11.8% of the sample had more than 5.

The remaining columns of [Table 1](#) show the regression analyses that use the original and then the original plus the additional adversity items to predict the two outcome variables, psychological distress and physical health status (number of negative health indicators). In predicting distress, 5 of the 10 ACE child maltreatment items (physical, emotional and sexual abuse, physical neglect, and family mental illness) are significant. But three of the added adversity items (peer victimization, peer isolation, and community violence) also make a strong contribution to distress when included in the second model. The Beta coefficients for peer victimization and peer isolation are quite substantial, and their additions to the model raise the R^2 considerably and significantly from .32 to .46 ($\Delta R^2 = .14$, $\Delta F = 122.4$, $p < .001$) The effect sizes for individual predictors in the model were also calculated using Cohen's f (not shown). Effect sizes of the three significant new adversity items were larger than most of the effect sizes of the original ACE items, with peer isolation (Cohen's $f = .36$) greater than all other predictors by a large margin.

In predicting health status, one of the new adversity items—low SES—makes a significant independent contribution. Low SES is in fact the variable with the second highest standardized coefficient of any in the model. The incident rate ratio (IRR) for low SES is 1.93 ($p < .01$), meaning that on average, low SES youth would be expected to have nearly twice the number of

Table 1

Prevalence of ACEs and additional adversities, OLS regression of trauma symptom scores and Poisson regression of sum of health indicators N = 1,949.

Sample description	%	OLS regression of distress symptom score		Negative binomial regression of physical health score			
		Model 1	Model 2	Model 1		Model 2	
		β	β	IRR ^a	Robust SE	IRR ^a	Robust SE
Age, years (mean)	13.7	0.02 ^{***}	−0.02	0.93	0.04	0.94	0.04
Female	49.5	0.09	0.07	0.77	0.15	0.76	0.15
Black, non-Hispanic	14.0	−0.01	−0.03	0.67	0.22	0.70	0.23
Other race, non-Hispanic	6.6	−0.02	0.01	0.49	0.22	0.49	0.22
Hispanic, any race	18.7	0.03	−0.02	2.03 ^{**}	0.42	1.78 [*]	0.44
Emotional abuse	13.5	0.16 ^{**}	0.13 ^{**}	0.77	0.26	0.81	0.28
Physical abuse	13.3	0.11 [*]	0.12 ^{**}	1.35	0.34	1.38	0.33
Sexual assault	5.2	0.20 ^{**}	0.14 ^{**}	1.21	0.44	1.14	0.40
Emotional neglect	6.4	0.10	0.07	2.32 ^{**}	0.63	1.81 [*]	0.45
Physical neglect	15.9	0.17 [*]	0.10	1.17	0.35	1.31	0.38
Parents divorce/separation	21.3	0.06	0.05	0.81	0.20	0.87	0.20
Mother treated violently	13.7	0.07	0.04	0.67	0.18	0.73	0.18
Family drug/alcohol problem	9.2	0.04	0.01	1.36	0.35	1.23	0.31
Family mental illness	32.5	0.14 ^{**}	0.08	2.12 ^{***}	0.40	2.17 ^{***}	0.40
Parent ever go to prison	7.2	−0.06	−0.07	0.72	0.25	0.75	0.27
Low socioeconomic status	10.2		0.03			1.93 ^{**}	0.42
High peer victimization	10.5		0.14 ^{**}			0.90	0.18
High peer social isolation	22.2		0.26 ^{***}			1.08	0.20
High exposure to community violence	12.3		0.20 ^{***}			0.55	0.18
Adjusted R ² (Pseudo R ² for negative binomial regression)		0.32	0.46	0.02 ^b		0.03 ^b	

* $p < .05$.** $p < .01$.*** $p < .001$.^a IRR = incident rate ratio.^b Pseudo R² for negative binomial regressions are from unweighted models.

negative health indicators as non-low SES youth controlling for the other variables in the model. A Wald test indicated that the model for physical health with the 4 additional items is a significantly better fit than one with only the original ACEs ($\chi^2(4) = 12.2, p < .05$). Model 2 also has a higher pseudo R² than model 1. It is interesting to note that some of the original ACE items do not make any significant contribution to the multivariate models predicting either distress symptoms or physical health, including parents' divorce/separation, mother treated violently, family drug/alcohol problems and parent ever going to prison. Age makes a significant contribution, demonstrating that older youth tend to report more symptoms.

Discussion

This study shows that there are other childhood adversities besides those included in the original ACE scale that are important predictors of physical and mental health problems and improve overall statistical prediction. The particular additional predictors are peer victimization, isolation and peer rejection, exposure to community violence, and low socioeconomic status. The current study confirms a previous study (Finkelhor et al., 2012) and other findings in the literature that emphasize the developmental importance of these adversities (Boivin et al., 2001; Copeland et al., 2013; Duncan & Brooks-Gunn, 2000; Gorman-Smith & Tolan, 1998).

It is noteworthy that low SES was a predictor of health status, but not significant in predicting psychological distress. Meanwhile peer victimization and the other maltreatment variables, emotional abuse, physical abuse and sexual assault, were significant in predicting distress but not health status. This may suggest that there are different pathways from childhood adversities to later outcomes.

There are several implications of the present results for the different uses of the ACE scale research. On the one hand, ACE research has been used as an advocacy tool, as an argument that more attention should be addressed to preventing childhood adversities and particularly child abuse and neglect. The present research clearly implies that the advocacy agenda needs a somewhat broader focus with attention to peer relationships, poverty and neighborhood violence. This can be seen as a useful expansion, because there are established evidence-based prevention strategies for some of these additional adversities such as peer victimization (Ttofi & Farrington, 2011) and reducing childhood poverty (Barrientos & DeJong, 2006).

The other main apparent usage for ACE research is as a screening tool, as a way of flagging youth or adults who may need additional support to prevent subsequent health and behavioral problems. Unfortunately, practice in this area is not yet well developed. It is not clear what kinds of interventions are best suited to improve outcomes for people who score generically

high on the ACE scale. There is considerable orientation toward recommending trauma-focused treatments to youth and adults high in ACE (Saunders, Berliner, & Hanson, 2004), but this raises the question of whether there are any advantages to screening for ACE over and above screening for trauma symptoms. There is also a possibility that the interventions may need to be tailored, not only to the level of ACE but also to their specifics. In other words, a history that included poverty might merit different interventions than one that included simply family violence exposure. It would be our speculation nonetheless that the incorporation of the additional adversities identified in this study could improve the targeting and effectiveness of screening that leads to intervention. But that obviously is a proposition that needs to considerable additional testing, not just to confirm the list of predictors, but also to evaluate what kinds of interventions are effective based on the screening.

We believe that the argument is strong for adding items to the ACE scale that embody the 4 domains of adversity identified as significant in this study. We are proposing the four additional items highlighted in Table 2, at the bottom of the list that includes the original ACE items. These new items do not use the exact wording of the variables from the present study, but rather use reformulated content based on those variables in a format more consistent with the original ACE items. Additional testing is warranted to make sure that these items work in the original ACE scale context.

These four additions do not encompass other potential adversities that were identified as significant predictors of distress in a previous paper analyzing the independent contribution of different adversities, including property victimization, having someone close with a bad illness or accident and parents always arguing. The first two of these adversities (property victimization, and someone close with a bad illness or accident) were not included in this paper or this analysis because the literature on these adversities is not as well developed and consistent in demonstrating their long-term effects. The adversity concerning “parents always arguing” was deemed to overlap very much with other parental conflict measures already in the ACEs inventory (parents’ divorce/separation and mother treated violently). It is problematic that these latter

Table 2
Revised Adverse Childhood Experience Items.

(all items preceded by “prior to your 18th birthday...”)

1. Did a parent or other adult in the household **often or very often** ...
Swear at you, insult you, put you down, or humiliate you?
or
Act in a way that made you afraid that you might be physically hurt?
Yes No If yes enter 1 _____
2. Did a parent or other adult in the household **often or very often** ...
Push, grab, slap, or throw something at you?
or
Ever hit you so hard that you had marks or were injured?
Yes No If yes enter 1 _____
3. Did an adult or person at least 5 years older than you **ever** ...
Touch or fondle you or have you touch their body in a sexual way?
or
Attempt or actually have oral, anal, or vaginal intercourse with you?
Yes No If yes enter 1 _____
4. Did you **often or very often** feel that ...
No one in your family loved you or thought you were important or special?
or
Your family didn’t look out for each other, feel close to each other, or support each other?
Yes No If yes enter 1 _____
5. Did you **often or very often** feel that ...
You didn’t have enough to eat, had to wear dirty clothes, and had no one to protect you?
or
Your parents were too drunk or high to take care of you or take you to the doctor if you needed it?
Yes No If yes enter 1 _____
6. Was a biological parent **ever** lost to you through divorce, abandonment, or other reason ?
Yes No If yes enter 1 _____

Table 2 (Continued)

7. Was your mother or stepmother:

Often or very often pushed, grabbed, slapped, or had something thrown at her?

or

Sometimes, often, or very often kicked, bitten, hit with a fist, or hit with something hard?

or

Ever repeatedly hit over at least a few minutes or threatened with a gun or knife?

Yes No

If yes enter 1 _____

8. Did you live with anyone who was a problem drinker or alcoholic, or who used street drugs?

Yes No

If yes enter 1 _____

9. Was a household member depressed or mentally ill, or did a household member attempt suicide?

Yes No

If yes enter 1 _____

10. Did a household member go to prison?

Yes No

If yes enter 1 _____

11. Did other kids, including brothers or sisters, **often or very often** hit you, threaten you, pick on you or insult you?

Yes No

If yes enter 1 _____

12. Did you **often or very often** feel lonely, rejected or that nobody liked you?

Yes No

If yes enter 1 _____

13. Did you live for 2 or more years in a neighborhood that was dangerous, or where you saw people being assaulted?

Yes No

If yes enter 1 _____

14. Was there a period of 2 or more years when your family was very poor or on public assistance?

Yes No

If yes enter 1 _____

Now add up your “Yes” answers: _____ **This is your ACE Score**

two items did not make a significant contribution in our present analysis, and therefore are possible candidates for removal or replacement. We are not recommending such action at this time because we wished to be conservative in not changing too much about a measure that has had a very widespread adoption. However, the issue of how to best measure the impact of exposure to parental conflict does merit considerably more research. The topics for such future research might include more exploration of some of the original ACE items that did not appear to be significant in the current analysis. For example, physical neglect has been widely found to be a precursor to later physical and mental health problems (Hildyard & Wolfe, 2002). The failure of this item to associate with problems in this survey may be due to measurement issues, particularly since neglect is a challenging construct in assessments (Dubowitz, Pitts, & Black, 2004). Moreover, in light of the failure of this study to find low SES associated with psychological distress (only physical health), future studies should also look at a variety of measures of economic deprivation to see if some more targeted or detailed assessments can identify aspects of deprivation associated with psychological distress.

The limitations of the current study also should be recognized in assessing its contribution and planning future research. The adversities being measured are retrospective and cover a lengthy period and so may be vulnerable to memory. The operationalization of ACE constructs is different in this study than in many of the original ACE studies. The adversities and

presumed outcomes are being measured simultaneously and from the same respondents which raises the possibility of reverse temporal ordering and response bias. Moreover, the youth being studied are still young and yet to develop many physical and psychological conditions of the sort ACE research is concerned about.

Although this research has focused on improving the ability of the ACE inventory to predict health and mental health outcomes, we do have some reservations about slavishly pursuing a line of research that tries to simply add, subtract and test new pools of items in the goal of ever increasing predictive ability. There is clearly a well-developed literature now about a large variety of childhood adversities that can have long-term consequences. Additional research on the relative importance of various adversities and the best way to measure them can make valuable contributions. But a parallel goal at this point would seem to be developing and testing interventions that mitigate the effects of these adversities, programs like Trauma-Focused Cognitive Behavioral Therapy that allay effects of sexual abuse (Cohen, Deblinger, Mannarino, & Steer, 2004). Once we have a library of such intervention programs targeted at specific adversities or adversities in general, it may become clearer what would be the best array to include in a screening instrument. That is to say, predictive ability may not be the only or the most important criterion to include in a screening test. A screening test may need also to be tempered by knowledge of the kinds of intervention options and what kinds of indicators suggest success with those options. So, for example, if the available treatments for physical abuse are not effective for those the attention deficit disorder (to make up an example), then it would be important to screen for attention deficit disorder whether or not it improves the ACE prediction ability. So the realities of intervention need to be taken into account as well in thinking about adversity screening.

An additional point is worth mentioning. There are many childhood adversities that we would want to prevent and mitigate even if they were not associated with long-term health and mental health consequences. Even if all children recovered from the effects of sexual abuse, for example, no one would argue that it should be a low priority problem, because we acknowledge that children deserve protection from and help for certain adversities whatever their long-term effects. So here again, the goal of creating the most predictive screening scale is not necessarily the best or only way to inform priorities for child protection. Nonetheless, to the extent that the ACE scale is being used as part of the process of educating and researching childhood adversities, we believe that it needs to represent a more complete inventory that is more faithful to the research evidence that has undergirded this field.

References

- Aber, J. L., Bennett, N. G., Conley, D. C., & Li, J. (1997). The effects of poverty on child health and development. *Annual Review of Public Health, 18*(1), 463–483. <http://dx.doi.org/10.1146/annurev.publhealth.18.1.463>
- Amato, P. R., & Keith, B. (1991). Parental divorce and the well-being of children: A meta-analysis. *Psychological Bulletin, 110*, 26–46.
- Barrientos, A., & DeJong, J. (2006). Reducing child poverty with cash transfers: A sure thing? *Development Policy Review, 24*(5), 537–552. <http://dx.doi.org/10.1111/j.1467-7679.2006.00346.x>
- Boivin, M., Hymel, S., & Hodges, E. V. E. (2001). Toward a process view of peer rejection and harassment. In J. Juvonen, & S. Graham (Eds.), *Peer harassment in school: The plight of the vulnerable and victimized*. New York, NY: Guilford Press.
- Briere, J. (1996). *Professional manual for the Trauma Symptom Checklist for Children (TSCC)*. Odessa, FL: Psychological Assessment Resources.
- Briere, J., Johnson, K., Bissada, A., Damon, L., Crouch, J., Gil, E., Hanson, R., & Ernst, V. (2001). The Trauma Symptom Checklist for Young Children (TSCYC): Reliability and association with abuse exposure in a multi-site study. *Child Abuse & Neglect, 25*(8), 1001–1014.
- Buehler, C., Krishnakumar, A., Stone, G., Anthony, C., Sharon, P., Gerard, J., & Barber, B. K. (1998). Interparental conflict styles and youth problem behaviors: A two-sample replication study. *Journal of Marriage and Family, 60*(1), 119–132. <http://dx.doi.org/10.2307/353446>
- Cohen, J. A., Deblinger, E., Mannarino, A. P., & Steer, R. A. (2004). A multisite, randomized controlled trial for children with sexual abuse-related PTSD symptoms. *Journal of the American Academy of Child & Adolescent Psychiatry, 43*(4), 393–402. <http://dx.doi.org/10.1097/00004583-200404000-00005>
- Copeland, W. E., Wolke, D., Angold, A., & Costello, E. (2013). Adult psychiatric outcomes of bullying and being bullied by peers in childhood and adolescence. *JAMA Psychiatry, 70*(4), 419–426. <http://dx.doi.org/10.1001/jamapsychiatry.2013.504>
- Dong, M., Dube, S. R., Giles, W. H., Felitti, V., & Anda, R. F. (2004). Adverse childhood experiences and self-reported liver disease: New insights into the causal pathway. *Archives of Internal Medicine, 164*(4), 460–461.
- Dong, M., Giles, W. H., Felitti, V. J., Dube, S. R., Williams, J. E., Chapman, D. P., & Anda, R. F. (2004). Insights into causal pathways for ischemic heart disease: Adverse childhood experiences study. *Circulation, 110*(13), 1761–1766. <http://dx.doi.org/10.1161/01.cir.0000143074.54995.7f>
- Dube, S. R., Anda, R. F., Felitti, V. J., Chapman, D. P., Williamson, D. F., & Giles, W. H. (2001). Childhood abuse, household dysfunction, and the risk of attempted suicide throughout the life span: Findings from the Adverse Childhood Experiences Study. *JAMA, 286*(24), 3089–3096.
- Dube, S. R., Felitti, V., Dong, M., Chapman, D. P., Giles, W. H., & Anda, R. F. (2003). Childhood abuse, neglect and household dysfunction and the risk of illicit drug use: The Adverse Childhood Experiences Study. *Pediatrics, 111*(3), 564–572.
- Dubowitz, H., Pitts, S. C., & Black, M. M. (2004). Measurement of three major subtypes of child neglect. *Child Maltreatment, 9*(4), 344–356. <http://dx.doi.org/10.1177/1077559504269191>
- Duncan, G. J., & Brooks-Gunn, J. (2000). Family poverty, welfare reform, and child development. *Child Development, 71*(1), 188–196. <http://dx.doi.org/10.1111/1467-8624.00133>
- Edwards, V. J., Holden, G. W., Felitti, V. J., & Anda, R. F. (2003). Relationship between multiple forms of childhood maltreatment and adult mental health in community respondents: Results from the adverse childhood experiences study. *American Journal of Psychiatry, 160*(8), 1453–1460.
- Evans, G. W., & Kim, P. (2007). Childhood poverty and health cumulative risk exposure and stress dysregulation. *Psychological Science, 18*(11), 953–957. <http://dx.doi.org/10.1111/j.1467-9280.2007.02008.x>
- Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson, D. F., Spitz, A. M., Edwards, V., & Marks, J. S. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: The Adverse Childhood Experiences (ACE) Study. *American Journal of Preventative Medicine, 14*(4), 245–258.
- Finkelhor, D., Hamby, S. L., Ormrod, R. K., & Turner, H. A. (2005). The JVC: Reliability, validity, and national norms. *Child Abuse & Neglect, 29*(4), 383–412.
- Finkelhor, D., Shattuck, A., Turner, H. A., & Hamby, S. L. (2012). Improving the adverse childhood experiences study scale. *Archives of Pediatrics & Adolescent Medicine, 167*(1), 70–75. <http://dx.doi.org/10.1001/jamapediatrics.2013.420>
- Finkelhor, D., Turner, H., Shattuck, A., & Hamby, S. (2015). Estimates of childhood, youth exposure to violence, crime and abuse. *JAMA Pediatrics, 169*(8), 746–754. <http://dx.doi.org/10.1001/jamapediatrics.2015.0676>
- Gorman-Smith, D., & Tolan, P. H. (1998). The role of exposure to community violence and developmental problems among inner-city youth. *Development and Psychopathology, 10*(1), 101–116.

- Hildyard, K. L., & Wolfe, D. A. (2002). Child neglect: Developmental issues and outcomes. *Child Abuse & Neglect*, 26(6–7), 679–695. [http://dx.doi.org/10.1016/S0145-2134\(02\)00341-1](http://dx.doi.org/10.1016/S0145-2134(02)00341-1)
- Juvonen, J., & Gross, E. F. (2005). The rejected and the bullied: Lessons about social misfits from developmental psychology. In K. D. Williams, J. P. Forgas, & W. V. Hippel (Eds.), *The social outcast: Ostracism, social exclusion, rejection, and bullying* (pp. 155–170). New York, NY, USA: Psychology Press.
- Kitzmann, K., Gaylord, N. K., Holt, A. R., & Kenny, E. D. (2003). Child witnesses to domestic violence: A meta-analytic review. *Journal of Consulting and Clinical Psychology*, 71(2), 339–352.
- Kline, M., Johnston, J. R., & Tschann, J. M. (1991). The long shadow of marital conflict: A model of children's postdivorce adjustment. *Journal of Marriage and Family*, 53(2), 297–309. <http://dx.doi.org/10.2307/352900>
- Kupersmidt, J. B., Coie, J. D., & Dodge, K. A. (1990). The role of poor peer relationships in the development of disorder. In S. R. Asher, & J. D. Coie (Eds.), *Peer rejection in childhood* (pp. 274–301). New York: Cambridge University Press.
- Linares, L. O., Heeren, T., Bronfman, E., Zuckerman, B., Augustyn, M., & Tronick, E. (2001). A mediational model for the impact of exposure to community violence on early child behavior problems. *Child Development*, 72(2), 639–652. <http://dx.doi.org/10.1111/1467-8624.00302>
- Price-Robertson, R., Higgins, D. J., & Vassallo, S. (2013). Multi-type maltreatment and polyvictimisation: A comparison of two research frameworks. *Family Matters*, 93, 84–98.
- Saunders, B. E., Berliner, L., & Hanson, R. F. (2004). *Child physical and sexual abuse: Guidelines for treatment*. Charleston, SC: National Crime Victims Research and Treatment Center.
- Ttofi, M. M., & Farrington, D. P. (2011). Effectiveness of school-based programs to reduce bullying: A systematic and meta-analytic review. *Journal of Experimental Criminology*, 7, 27–56.
- UCLA Statistical Consulting Group. (2015). *Stata data analysis examples: Negative binomial regression*. Retrieved from <http://www.ats.ucla.edu/stat/stata/dae/nbreg.htm>
- Vandewater, E. A., & Lansford, J. E. (1998). Influences of family structure and parental conflict on children's well-being. *Family Relations*, 47(4), 323–330. <http://dx.doi.org/10.2307/585263>