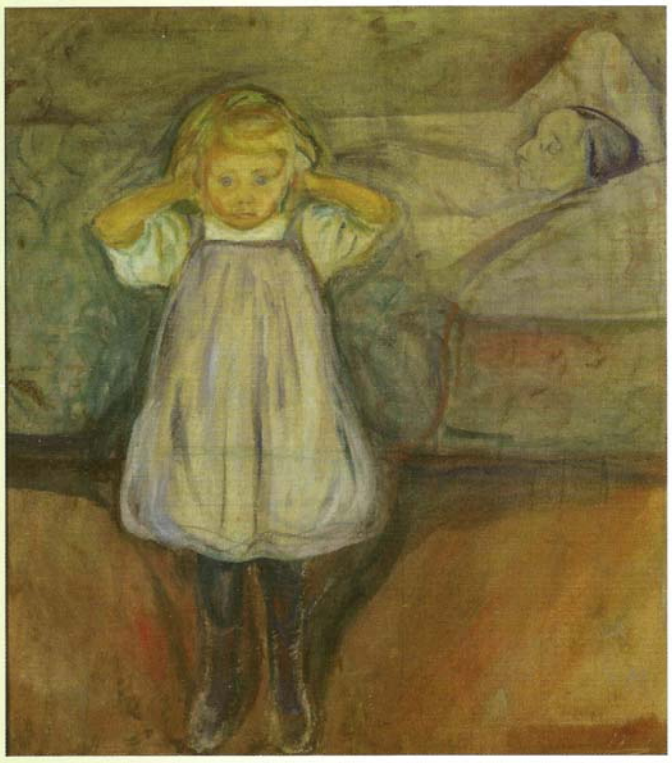
EDITED BY
Ruth A. Lanius • Eric Vermetten • Clare Pain

THE IMPACT OF EARLY LIFE TRAUMA ON HEALTH AND DISEASE



The Hidden Epidemic

CAMBRIDGE
Medicine

Chapter 8

The relationship of adverse childhood experiences to adult medical disease, psychiatric disorders and sexual behavior: implications for healthcare

Vincent J. Felitti and Robert F. Anda

In my beginning is my end.

T. S. Eliot, *Four Quartets* [1]

Introduction

Biomedical researchers increasingly recognize that childhood events, specifically abuse and emotional trauma, have profound and enduring effects on the neuroregulatory systems mediating medical illness as well as on behavior from childhood into adult life. Our understanding of the connection between emotional trauma in childhood and the pathways to pathology in adulthood is still being formed as neuroscientists begin to describe the changes that take place on the molecular level as a result of events that occurred decades earlier.

The turning point in modern understanding of the role of trauma in medical and psychiatric pathology is commonly credited to Freud, who studied patients of the French neurologist Charcot and attributed their unusual behavior to histories of trauma rather than to underlying biomedical pathology [2]. The writings of Freud and Breuer as well as Janet represented a departure from the traditional view that mental illness and unexplained medical disease were the result of divine retribution or demonic possession, instead revealing that they were strongly associated with a history of childhood abuse [2].

The focus of this chapter will be an examination of the relationship between traumatic stress in childhood and the leading causes of morbidity, mortality and disability in the USA: cardiovascular disease, chronic lung disease, chronic liver disease, depression and other forms of mental illness, obesity, smoking and alcohol and drug abuse. To do this, we will draw on our experience with the Adverse Childhood Experiences (ACE) Study, a major American epidemiological study providing retrospective and prospective analysis in over 17 000 individuals of the effect of traumatic experiences during the first 18 years of life on adolescent and adult medical and psychiatric disease, sexual behavior, healthcare costs and life expectancy [3].

The ACE Study is an outgrowth of repeated counter-intuitive observations made while operating a major weight loss program that used the technique of supplemented fasting, which allows non-surgical weight reduction of approximately 300 lb (135 kg) per year. Unexpectedly, the weight program had a high dropout rate, limited almost exclusively to patients successfully losing weight. Exploring the reasons underlying the high prevalence of patients inexplicably fleeing their own success in the program ultimately led us to recognize that weight loss is often sexually or physically threatening and that certain of the more intractable public health problems such as obesity were *also* unconscious, or occasionally conscious, compensatory behaviors that were put in place as solutions to problems dating back to the earliest years, but hidden by time, by shame, by secrecy and by social taboos against exploring certain areas of life experience. It became evident that traumatic life experiences during childhood and adolescence were far more common than generally recognized, were complexly interrelated and were associated decades later in a strong and proportionate manner with outcomes important to medical practice, public health, and the social fabric of a nation. In the context of everyday medical practice, we came to recognize that the earliest years of infancy and childhood are not lost but, like a child's footprints in wet cement, are often lifelong.

The Impact of Early Life Trauma on Health and Disease: The Hidden Epidemic, ed. Ruth A. Lanius, Eric Vermetten and Clare Pain. Published by Cambridge University Press. Copyright © Cambridge University Press 2010.

The findings from the ACE Study provide a remarkable insight into how we become what we are as individuals and as a nation. They are important medically, socially and economically. Indeed, they have given us reason to reconsider the very structure of medical, public health and social services practices in America and other countries.

The Adverse Childhood Experiences (ACE) Study: outline and setting

The ACE Study was carried out in Kaiser Permanente's Department of Preventive Medicine in San Diego, in collaboration with the US Centers for Disease Control and Prevention (CDC). This particular department provided an ideal setting for such collaboration because detailed biomedical, psychological and social (biopsychosocial) evaluations had been carried out over many years for the adult Kaiser Health Plan members (50 000 a year). The CDC contributed the essential skill sets for study design and the massive data management required for meaningful interpretation of clinical observations.

Kaiser Health Plan patients are middle-class Americans; all have high-quality health insurance. In any 4 year period, 81% of adult members in San Diego choose to come in for comprehensive medical evaluation. A group of 26 000 consecutive adults coming through the department was asked if they would help us to understand how childhood events might affect adult health status. The majority agreed and, after certain exclusions for incomplete data and duplicate participation, the ACE Study cohort had over 17 000 individuals. The study was carried out in two waves, to allow midpoint correction.

The participants were 80% white including Hispanic, 10% black and 10% Asian; 74% had attended college; their average age was 57 years. Almost exactly half were men, half women. This is a solidly middle-class group from the seventh largest city in the USA; it is not a group that can be dismissed as atypical, aberrant or "not in my practice." Disturbingly, it is us – a point not to be overlooked when considering the problems of translating the ACE Study's findings into action.

Eight categories of adverse childhood experiences (ACEs) were studied in the first wave; two categories of neglect were added in the second wave. These categories were selected empirically because of their discovered high prevalence in the weight program. Their prevalence in a general, middle-class population was also unexpectedly high. An ACE Score was created for each individual, a count of the number of *categories* of adverse experience that had occurred during the first 18 years of life. The ACE Score does not tally incidents within a category. The scoring system is simple: the occurrence during childhood or adolescence of any one category of adverse experience is scored as 1 point. There is no further scoring for multiple incidents within a category; thus, an alcoholic and a drug user within a household score the same as one alcoholic; multiple sexual molestations by multiple individuals are totaled as 1 point. If anything, this would tend to understate our findings. The ACE Score, therefore, can range from *0* to *8* or *10*, depending on the data being from wave 1 or wave 2. Specifics of the questions underlying each category are detailed in the original article [3].

Only one-third of this middle-class population had an ACE Score of 0. If any one category was experienced, there was 87% likelihood that at least one additional category was present. One in six individuals had an ACE Score of 4 or more, and one in nine had an ACE Score of 5 or more. Consequently, every physician will see several patients with high ACE Scores each day. Typically, they are the most difficult patients of the day. Women were 50% more likely than men to have experienced five or more categories of adverse childhood experiences. We believe that here is a key to what in mainstream epidemiology appears as women's natural proneness to ill-defined health problems such as fibromyalgia, chronic fatigue syndrome, obesity, irritable bowel syndrome and chronic non-malignant pain syndromes. In the light of these findings, we now see these as medical constructs, artifacts resulting from medical blindness to social realities and ignorance of the impact of gender.

Somewhat surprisingly, the ACE categories turned out to be approximately equal to each other in impact; an ACE Score of 4 consists of *any* four of the categories. The categories do not occur randomly; the number of individuals with high ACE Scores is distinctly higher than if the categories exist independently of each other [4]. The 10 reference categories experienced during childhood or adolescence are as below, with their prevalence in parentheses:

- abuse
  - emotional: recurrent threats, humiliation (11%)
  - physical: beating not spanking (28%)
  - contact sexual abuse (28% women, 16% men; 22% overall)

- household dysfunction
  - mother treated violently (13%)
  - household member was alcoholic or drug user (27%)
  - household member was imprisoned (6%)
  - household member was chronically depressed, suicidal, mentally ill or in psychiatric hospital (17%)
  - not raised by both biological parents (23%)
- neglect
  - physical (10%)
  - emotional (15%).

The essence of the ACE Study has been to match retrospectively, approximately a half century after the fact, an individual's current state of health and well-being against adverse events in childhood (the ACE Score), and then to follow the cohort forward to match ACE Score prospectively against doctor office visits, emergency room visits, hospitalization, pharmacy costs and death. The study has recently passed the 14 year mark in the prospective arm.

Findings

This section illustrates with a sampling from the findings in the ACE Study, the long-lasting, strongly proportionate and often profound relationship between adverse childhood experiences and important categories of emotional state, health risks, disease burden, sexual behavior, disability, and healthcare costs – decades later.

Psychiatric disorders

The relationship between ACE Score and self-acknowledged chronic depression is illustrated in Fig. 8.1a [5]. Should one doubt the reliability of self-acknowledged chronic depression, there is a similar but stronger relationship between ACE Score and later suicide attempts, as shown in the exponential progression of Fig. 8.1b [6]. The *p* value of all graphic depictions herein is 0.001 or lower.

One continues to see a proportionate relationship between ACE Score and depression by analysis of prescription rates for antidepressant medications after a 10-year prospective follow-up, now approximately 50 to 60 years after the ACEs occurred (Fig. 8.1c) [7]. It would appear that depression, often unrecognized in medical practice, is in fact common and has deep roots, commonly going back to the developmental years of life.

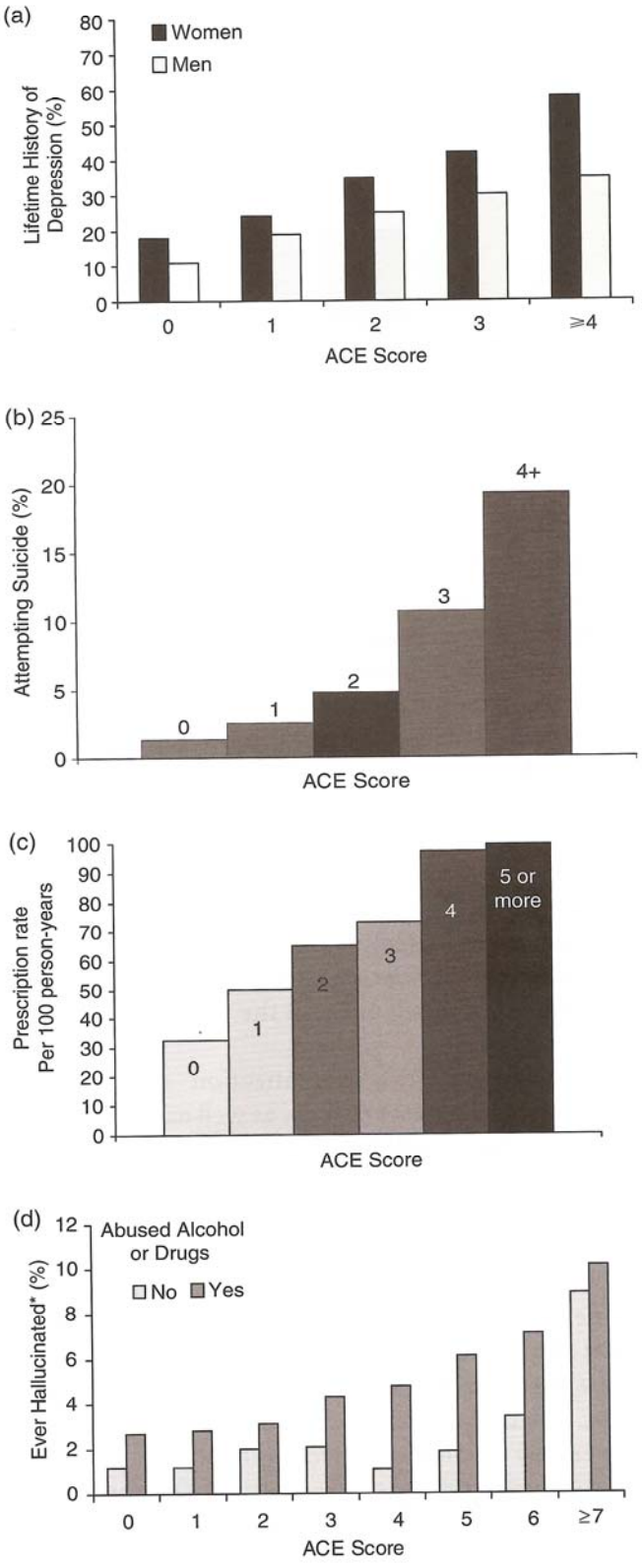


Fig. 8.1. Psychiatric disorders. The relationship between ACE Score and chronic depression (a), suicide attempts (b), rates of antidepressant prescriptions approximately 50 years later (c), hallucinations (*adjusted for age, sex, race and education) (d), and impaired memory of childhood (e).

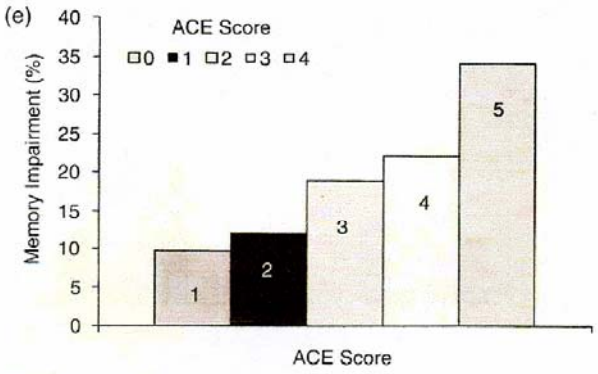


Fig. 8.1. *(Continued)*

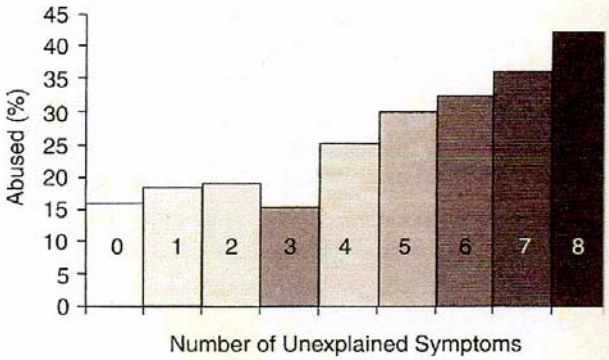


Fig. 8.2. The relationship between the likelihood of childhood sexual abuse and the number of unexplained symptoms in adulthood.

An analysis of population attributable risk (that portion of a problem in the overall population whose prevalence can be attributed to specific risk factors) shows that 54% of current depression and 58% of suicide attempts in women can be attributed to adverse childhood experiences. Whatever later factors might trigger suicide, childhood experiences cannot be left out of the equation. Seeman *et al.* [8] have described this general concept of background burden as allostatic load.

A similar relationship exists between ACE Score and later hallucinations, shown in Fig. 8.1d. As it might be suspected that, at ACE Score 7 or higher, people will likely be using street drugs or alcohol to modulate their feelings, and that *these* might be the cause of hallucinations, the results are corrected for alcohol and drug use and the same relationship exists [9].

Clinicians treating somatization or disorders with no clear medical etiology, as well as those dreading such patients, will find Fig. 8.2 of special interest. Indeed, this figure exemplifies the observation in the weight program that what one sees, the presenting problem, is often only the marker for the real problem, which lies buried in time, concealed by patient shame, secrecy and sometimes amnesia – and frequent clinician discomfort. Amnesia, usually considered a theatrical device of Hollywood movies of the 1940s, is in fact alive and well, although unrecognized, in everyday medical practice. In the weight program, 12% of the participants were partially or sometimes totally amnestic for a period of their lives, typically the few years before weight gain began. In the ACE Study, there was a distinct relationship of ACE Score and impaired memory of childhood, and we understand this phenomenon to be reflective of dissociative responses to emotional trauma (Fig. 8.1e) [10].

All told, it is clear that adverse childhood experiences have a profound, proportionate and long-lasting effect on emotional state, whether measured by depression or suicide attempts, by protective unconscious devices such as somatization and dissociation, or by self-help attempts that are misguidedly addressed solely as long-term health risks – perhaps because we physicians are less than comfortable acknowledging the manifest short-term benefits these "health risks" offer to the patient dealing with hidden trauma.

Health risks

The most common contemporary health risks are smoking, alcoholism, illicit drug use, obesity and high-level promiscuity. Although widely understood to be harmful to health, each is notably difficult to give up. Conventional logic is not particularly useful in understanding this apparent paradox. As opposing forces are not known to exist commonly in biological systems, little consideration is given to the possibility that many long-term health risks might *also* be personally beneficial in the short term. For instance, American Indians understood the psychoactive benefits of nicotine for centuries with their peace pipe, before its risks were recognized. We repeatedly hear from patients of the benefits of these "health risks." Indeed, relevant insights are even built into our language: "Have a smoke, relax." "Sit down and have something to eat. You'll feel better." Or, need "a fix," referring to intravenous drug use. Conversely, the common reference to "drug abuse" serves to conceal the short-term functionality of such behavior. It is perhaps noteworthy that the demonized street drug crystal meth is the very compound that was introduced in pure form and reliable dosage in 1940 as one of the first prescription antidepressants in the USA: methamphetamine.

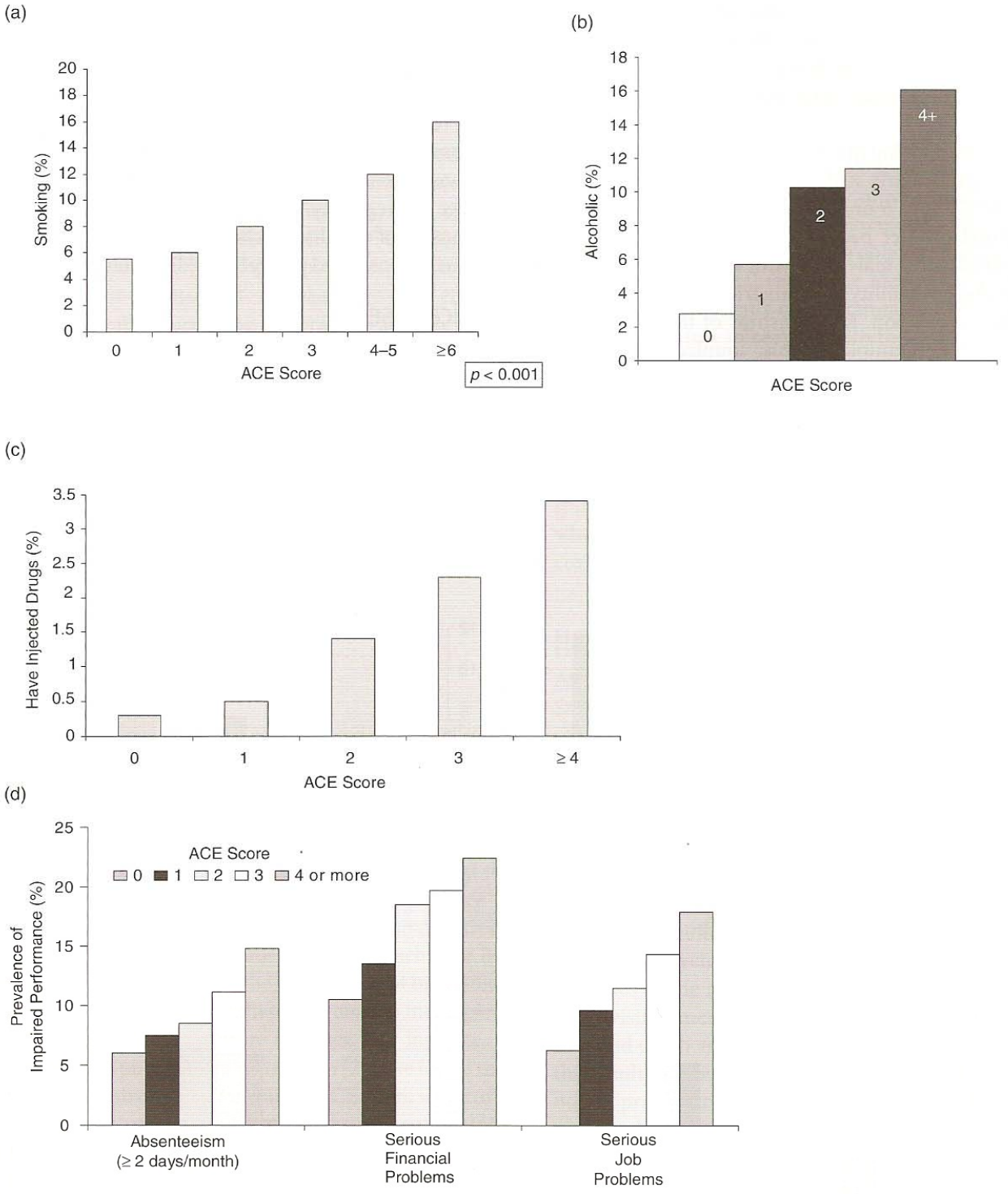


Fig. 8.3. Health risks. The relationship between ACE Score and adult smoking (a), adult alcoholism (b), intravenous drug use (c), and indicators of impaired worker performance (d).

In the ACE Study, there were strong, proportionate relationships between ACE Score and the use of various psychoactive materials or behaviors. The saying, "It's hard to get enough of something that *almost* works" provides insight. Three common categories of what are usually termed addictions (the unconscious compulsive use of psychoactive agents) are illustrated in this section. Self-acknowledged current smoking (Fig. 8.3a) [11,12], self-defined alcoholism (Fig. 8.3b) [3,5,13] and self-acknowledged injection drug use

(Fig. 8.3c) [14] are strongly related in a proportionate manner to the several specific categories of adverse experiences during childhood. Additionally, poor self-rated job performance correlated with ACE Score (Fig 8.3d) [15].

The relationship of intravenous drug use with ACE Score is particularly striking, given that male children with ACE Score 6 or more have a 46-fold increased likelihood of later becoming an injection drug user compared with a male child with an ACE Score 0; this moves the probability from an arithmetic to an exponential progression. Relationships of this magnitude are rare in epidemiology. This, coupled with related information, suggests that the basic cause of addiction is predominantly experience dependent during childhood and not substance dependent. This challenge to the usual concept of the cause of addictions has significant implications for medical practice and for treatment programs[16].

Sexual behavior

Using teenage pregnancy and promiscuity as measures of sexual behavior, the ACE Score has a proportionate relationship to these outcomes (Fig. 8.4). So too does miscarriage of pregnancy, indicating the complexity of the relationship of early life psychosocial experience to what are usually considered purely biomedical outcomes [17].

Medical disease

Biomedical disease in adults had a significant relationship to adverse life experiences in childhood in the ACE Study. The implication of this observation that life experience can transmute into organic disease over time is a profound change from an earlier era when infectious diseases such as rheumatic fever or polio, or nutritional deficiency such as pellagra, would come to mind as the main medical links between childhood events and

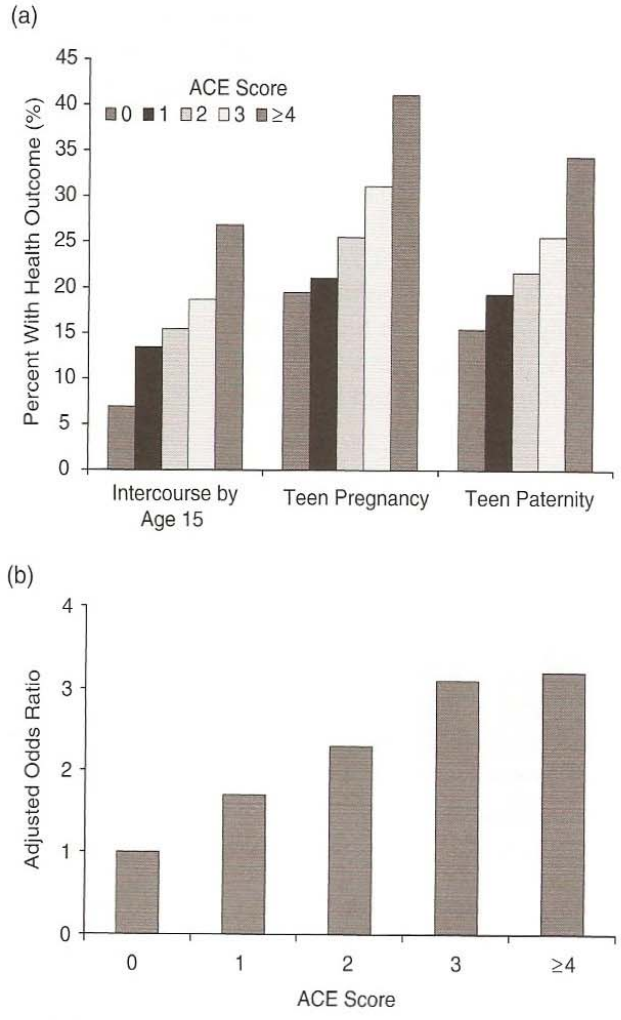


Fig. 8.4. Sexual behavior. The relationship between ACE Score and teenage sexual behavior (a) and promiscuity (likelihood of > 50 sexual partners) (b).

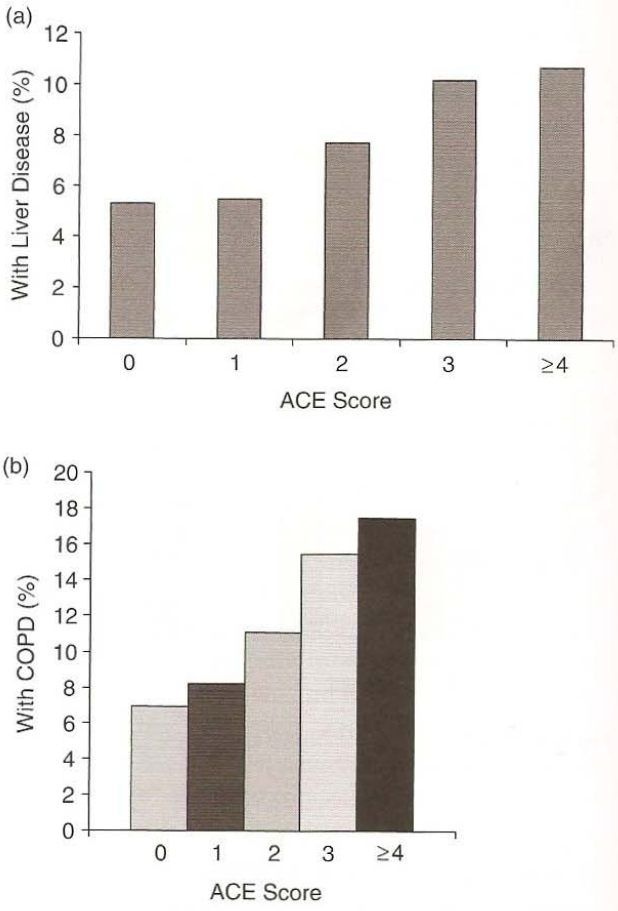


Fig. 8.5. Medical disease. The relationship between ACE Score and prevalence of liver disease (hepatitis/jaundice) (a) and chronic obstructive pulmonary disease (COPD) (b).

adult disease. In spite of this change in our understanding of the etiology of biomedical outcomes, we find no evidence that there has been a change in the frequency of overall adverse childhood experiences in various age cohorts spanning the twentieth century [18] .

Four examples of the links between childhood experience and adult biomedical disease are the relationship of ACE Score to liver disease (Fig. 8.5a) [19], chronic obstructive pulmonary disease (Fig. 8.5b) [20], coronary artery disease [21] and autoimmune disease [22]. Our data for coronary artery disease show the effect of ACE Score after correcting for, or in the absence of, the conventional risk factors for coronary disease, such as hyperlipidemia, smoking. The likelihood of heart disease was increased in all categories of ACE Score:

- emotional abuse 1.7×
- physical abuse 1.5×
- sexual abuse 1.4×
- domestic violence 1.4×
- substance abuse 1.3×
- mental illness 1.4×
- household criminal 1.7×
- emotional neglect 1.3×
- physical neglect 1.4×.

Certain of these relationships of childhood experience to later biomedical disease might initially be thought to be straightforward, for instance assuming that chronic obstructive pulmonary disease and coronary artery disease are merely the obvious outcomes of cigarette smoking. In this case, one might reasonably assume that the total relationship of adverse childhood experience to later biomedical disease lies in the observation that stressful early life experience leads to a coping behavior like smoking, which becomes the mechanism of biomedical damage. While this hypothesis is true, it is incomplete; the actual situation is more complex. For instance, in our analysis published in *Circulation* [21], we found that there was a strong relationship of ACE Score with coronary disease, *after* correcting for all the conventional risk factors such as smoking, cholesterol and so on. This illustrates that adverse experiences in childhood are related to adult disease by two basic etiologic mechanisms:

- conventional risk factors that actually are attempts at self-help through the use of agents like nicotine, with its documented, multiple psychoactive benefits, in addition to its now well-recognized cardiovascular risks
- the effects of chronic stress as mediated through the mechanisms of chronic hypercortisolemia, pro-inflammatory cytokines and other stress responses on the developing brain and body systems, dysregulation of the stress response and pathophysiological mechanisms yet to be discovered.

A public health paradox is implicit in these observations. One sees that certain common public health problems, while being often also unconscious attempted solutions to major life problems, harken back to the developmental years. The idea of the problem being a solution, while understandably disturbing to many, is certainly in keeping with the fact that opposing forces routinely coexist in biological systems. Understanding that it is hard to give up something that almost works, particularly at the behest of well-intentioned people who have little understanding of what has gone on, provides us a new way of understanding treatment failure in addiction programs, where typically the attempted solution rather than the core problem is being addressed.

Healthcare costs

At the 14 year point in the prospective arm of the ACE Study, we have only begun to analyze pharmacy data. Given the average age of the cohort, we are now looking at prescription drug use 50 to 60 years after the fact. Prescription costs are an increasingly significant portion of rapidly rising national healthcare expenditures in the USA. The relationship of ACE Score to antidepressant prescription rates has already been shown in Fig. 8.1c. Figure 8.6 shows the relationship of adverse childhood experiences to the decades-later use of antipsychotic and anxiolytic medications [5]. Analyses of the relationships of ACE Score to doctor office visits, emergency department visits, hospitalization and death are in progress. The economic effect of the results shown in Fig. 8.2 will be intuitively obvious to practitioners who have observed that patients with multiple visits to the doctor commonly do not have a unifying diagnosis underlying all the medical attention. Rather, they have a multiplicity of symptoms: illness, but not disease. Kirkengen has more fully discussed the nature, origins and often-unwitting medical creation of this complex phenomenon in her book *Inscribed Bodies* [23]. The 2000 Nobelist in Economics, James Heckman, has grasped the enormity of the economic and social consequences of the long-term effects of adverse childhood experiences and has written perceptively on the subject [24].

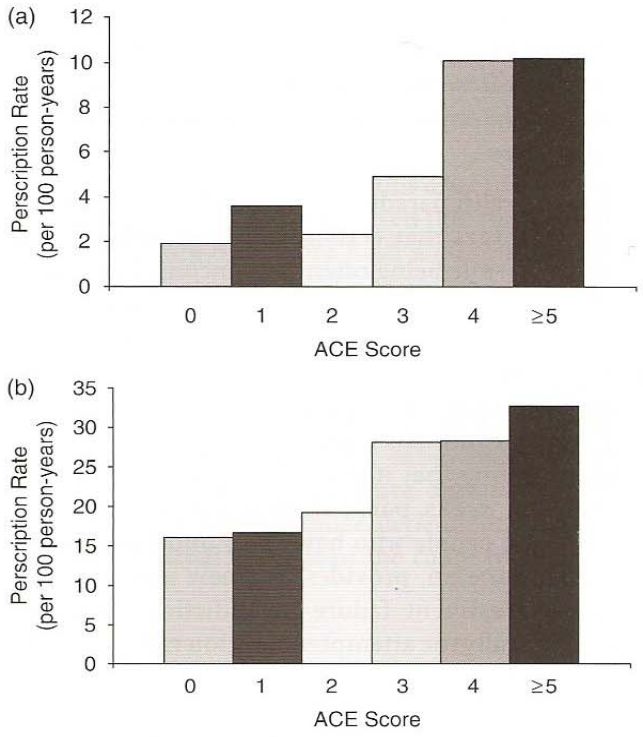


Fig. 8.6. Healthcare costs. Rates of issuing prescriptions for antipsychotic drugs (a) and anxiolytic drugs (b).

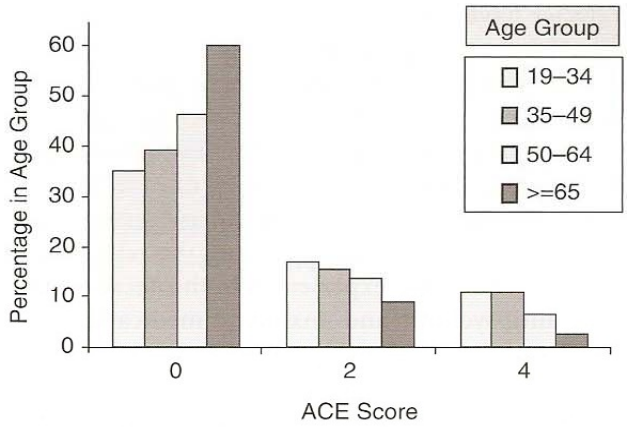


Fig. 8.7. Older individuals in the ACE Study are more likely to have low ACE Scores (null hypothesis).

Life expectancy

Given that the ACE Score has been shown to be strongly related first to health risks and then to disease, it is reasonable to expect that the relationship will continue to the major outcome of disease, premature death. Figure 8.7 shows that the older individuals in the ACE Study are more likely to have a low ACE Scores (ACE Score 0) and are substantially less likely to have higher ACE Scores (ACE Score 2 or 4). One explanation for this finding is that persons with higher ACE Scores do indeed die younger; thus older people would tend to have lower ACE Scores because others in their birth cohort were less likely to survive to be included in the study.

Reasonably, this interpretation of selective attrition could be challenged by hypothesizing that our patients were progressively so humiliated by exposure of their increasing ACE Scores that they are subsequently avoiding necessary medical care. Such an hypothesis is not supported by the findings. Some years ago we had on site for 6 months a psychoanalytically trained psychiatrist who saw selected patients with high ACE Scores immediately after their comprehensive medical evaluation, rather than after referral to psychiatry. An anonymous questionnaire, returned by 81% of the patients he saw, showed that his hour-long interview was overwhelmingly interpreted by patients as highly desirable and appreciated. Talking about the worst secret of one's life with an experienced person, being understood and coming away feeling still accepted as a human being seems to be remarkably important and beneficial, perhaps not unlike the role of confession in the Roman Catholic Church, a technique whose persistence over nearly two millennia suggests it has functional benefit for those involved in its use.

At the 14 year mark, an analysis of adult death rates has been initiated as they may be related to adverse childhood experiences. Carrying the above approach further, analysis of findings from the prospective phase of the study has confirmed the expectation outlined above with the discovery that individuals with ACE Score 6 and higher had a lifespan almost two decades shorter than seen in those with an ACE Score 0 but otherwise similar characteristics [25]. This finding supports the hypothesis that decreases in ACE Scores with age may be explained by the effects of ACEs on premature mortality.

Implications for healthcare

We have made a limited but instructive attempt to integrate the ACE Study findings into clinical practice. At Kaiser Permanente's high-volume Department of Preventive Medicine in San Diego, we have used what we learned to expand radically the nature of our Review of Systems (ROS) and Past History questionnaire. We have now asked routinely of over 440 000 adult individuals undergoing comprehensive medical evaluation a number of questions of newly discovered relevance; the following are a sample:

- Have you ever been a combat soldier?
- Have you ever lived in a war zone?
- Have you been physically abused as a child?
- Have you been sexually molested as a child or adolescent?
- Have you ever been raped?
- Who in your family has been murdered?
- Who in your family has had a nervous breakdown?
- Who in your family has been a suicide?
- Who in your family has been alcoholic or a drug user?

Such questions have been accepted by patients in the context of a well-devised medical questionnaire that is filled out at home. Examiners have learned that the most productive response to a "Yes" answer is, "I see that you have .... Tell me how that has affected you later in your life." While not a simple transition for staff, and one requiring an organized training effort, the transition has been effective and with measured benefits. An independent organization carried out a neural network analysis – an artificial intelligence approach to mathematical modeling and data mining – of the data from over 100 000 patient evaluations (2 years' work) using this new approach: a truly biopsychosocial approach to comprehensive medical evaluation. Surprisingly, a 35% reduction in doctor office visits was found in the year subsequent to evaluation, compared with the year before. Additionally, analysis showed an 11% reduction in emergency department visits and a 3% reduction in hospitalizations. This change was dramatically and unexpectedly different from a much smaller, 700-patient evaluation carried out 20 years earlier when we worked in the more usual biomedical mode. That earlier approach provided a net 11% reduction in doctor office visits compared to the antecedent year, in spite of a 14% referral rate. No evaluation was made then of emergency department visits or hospitalization. Finally, we found that the unexpectedly notable reductions in doctor office visits and emergency department visits totally disappeared in the second year after comprehensive evaluation, when there was a reversion to prior baseline. While the underlying biopsychosocial information was present in charts with laser-printed clarity, it was almost never integrated into subsequent medical visits. Interpreting the basis of this major reduction in doctor office visits was not within the purview of the ACE Study design, but the impression of the clinicians initially evaluating these patients is that the reduction represents the benefit of having, through a comprehensive medical history, the worst secrets of one's life understood by another, and still being accepted as a human being. The Swiss psychologist Alice Miller describes this as the role of "the enlightened witness" [26].

If these first year results are replicable, and we believe they should be, the implications for primary medical care are those of a paradigm shift. While offering tremendous opportunity, paradigm shifts are resisted. The philosopher Eric Hoffer has discussed this problem in his book *The Ordeal of Change* [27]. Jeffrey Masson, in *Assault on Truth* [28], describes the enormous social pressures on Freud to recant his interpretation of his findings of traumatic sexual experiences in childhood as being valid. Louise De Salvo points out in *Virginia Woolf* [29] how literary commentators almost uniformly avoid discussing the themes of incest in Woolf's work in favor of erudite discussions of her style and literary techniques.

If the treatment implications of what we have found in the ACE Study are far reaching, the problems of integrating this information into clinical practice are absolutely daunting. Simply put, it is easier for all of us to deal with the presenting symptom of the moment than to attempt to understand it in the full context of the patient, particularly when that full context involves thematic material of child abuse and household dysfunction that is usually protected by social taboos against exploring these areas of human experience. Although the proposed approach demonstrably would save time and money in the long run, most of us operate in the short term and respond to valid forces that are both external and internal.

The very nature of the material in the ACE Study is such as to make most of us uncomfortable. Why would a physician or leader of any major health agency want to leave the familiarity of traditional biomedical disease and enter this area of threatening uncertainty for which none of us have been trained? As physicians, we typically focus our attention on tertiary consequences, far downstream, while the primary causes are well protected by time, social convention and taboo. We have often limited ourselves to the smallest part of the problem, that part in which we are erudite and comfortable as mere prescribers of medication or users of impressive technologies. Consequently, although the ACE Study and its 50-some publications have generated significant intellectual interest in North America and Europe during the past dozen years, its findings are only beginning to be translated

into significant clinical or social action. The reasons for this are important to consider if this information is to be converted into meaningful social and medical opportunity.

Conclusions

The influence of childhood experience, including often-unrecognized traumatic events, is as powerful as Freud and his colleagues originally described. These influences are long lasting, and neuroscientists are now describing the intermediary mechanisms that develop as a result of these stressors. Unfortunately, and in spite of these findings, the biopsychosocial model and the biomedical model of psychiatry remain at odds rather than taking advantage of the new discoveries to reinforce each other.

Many of our most intractable public health problems are the result of compensatory behaviors such as smoking, overeating, and alcohol and drug use, which provide immediate partial relief from the emotional problems caused by traumatic childhood experiences. The chronic life stress of these developmental experiences is generally unrecognized and hence unappreciated as a second etiologic mechanism. These experiences are lost in time and concealed by shame, secrecy and social taboo against the exploration of certain topics of human experience.

The findings of the ACE Study provide a credible basis for a new paradigm of medical, public health and social service practice that would start with comprehensive biopsychosocial evaluation of all patients at the outset of ongoing medical care. We have demonstrated in our practice that this approach is acceptable to patients, affordable and beneficial in multiple ways. The potential gain is huge. So too is the likelihood of clinician and institutional resistance to this change. Actualizing the benefits of this paradigm shift will depend on first identifying and resolving the various bases for resistance to it. In reality, this will require far more planning than would be needed to introduce a purely intellectual or technical advance. However, our experience suggests that it can be done.

References

1. Eliot, T. S. (1943). Four Quartets. New York: Harcourt, Brace, and World.
2. Breuer, J. and Freud, S. (1893–95). Studies on hysteria. In J. Strachey (ed.), *The standard edition of the complete psychological works of Sigmund Freud*, Vol. 2. London: Hogarth Press, 1955.
3. Felitti, V. J., Anda, R. F., Nordenberg, D. *et al.* (1998). The relationship of adult health status to childhood abuse and household dysfunction. *American Journal of Preventive Medicine,* **14,** 245–258.
4. Dong, M., Anda, R. F., Felitti, V.J. *et al.* (2004). The interrelatedness of multiple forms of childhood abuse, neglect, and household dysfunction. *Child Abuse & Neglect,* **28,** 771–784.
5. Anda, R. F., Whitfield, C. L., Felitti, V. J. *et al.* (2002). Alcohol-impaired parents and adverse childhood experiences: The risk of depression and alcoholism during adulthood. *Psychiatric Services,* **53,** 1001–1009.
6. Dube, S. R., Anda, R. F., Felitti, V. J. *et al.* (2001). Childhood abuse, household dysfunction and the risk of attempted suicide throughout the life span: Findings from the Adverse Childhood Experiences Study. *Journal of the American Medical Association,* **286,** 3089–3096.
7. Anda, R. F., Brown, D. W., Felitti, V. J. *et al.* (2007). The relationship of adverse childhood experiences to rates of prescribed psychotropic medications in adulthood. *American Journal of Preventive Medicine,* **32,** 389–394.
8. Seeman, T., McEwen, B., Rowe, J. and Singer, B. (2001). Allostatic load as a marker of cumulative biological risk. *Proceedings of the National Academy of Sciences USA,* **98,** 4770–4775.
9. Whitfield, C. L., Dube, S. R., Felitti, V. J. and Anda, R. F. (2005). Adverse childhood experiences and subsequent hallucinations. *Child Abuse and Neglect,* **29,** 797–810.
10. Anda, R. F., Felitti, V. J., Walker, J. *et al.* (2006). The enduring effects of abuse and related adverse experiences in childhood: A convergence of evidence from neurobiology and epidemiology. *European Archives of Psychiatry and Clinical Neurosciences,* **256,** 174–186.
11. Anda, R. F., Croft, J. B., Felitti, V. J. *et al.* (1999). Adverse childhood experiences and smoking during adolescence and adulthood. *Journal of the American Medical Association,* **282,** 1652–1658.
12. Edwards, V. J., Anda, R. F., Gu, D., Dube, S. R . and Felitti, V. J . (2007). Adverse childhood experiences and smoking persistence in adults with smoking-related symptoms and illness. *Permanente Journal,* **11,** 5–13.
13. Dube, S. R., Miller, J. W., Brown, D. W. *et al.* (2006). Adverse childhood experiences and the association with ever using alcohol and initiating alcohol use during adolescence. *Journal of Adolescent Health,* **38,** 444.
14. Dube, S. R., Anda, R. F., Felitti, V. J., Chapman, D. P. and Giles, W. H. (2003). Childhood abuse, neglect, and household dysfunction and the risk of illicit drug use: The adverse childhood experiences study. *Pediatrics,* **111,** 564–572.

15. Anda, R. F., Fleisher, V. I., Felitti, V. J. *et al.* (2004). Childhood abuse, household dysfunction, and indicators of impaired worker performance in adulthood. *Permanente Journal*, **8**, 30–38.
16. Felitti, V. J . (2003). Ursprünge des Suchtverhaltens: Evidenzen aus einer Studie zu belastenden Kindheitserfahrungen. *Praxis der Kinderpsychologie und Kinderpsychiatrie,* **52**, 547–559.
17. Hillis, S. D., Anda, R. F., Dube, S. R. *et al.* (2004). The association between adolescent pregnancy, long-term psychosocial outcomes, and fetal death. *Pediatrics,* **113**, 320–327.
18. Dube, S. R., Felitti, V. J., Dong, M., Giles, W. H . and Anda, R. F . (2003). The impact of adverse childhood experiences on health problems: Evidence from four birth cohorts dating back to 1900. *Preventive Medicine,* **37**, 268–277.
19. Dong, M., Dube, S. R., Felitti, V. J., Giles, W. H. and Anda, R. F . (2003). Adverse childhood experiences and self-reported liver disease: New insights into a causal pathway. *Archives of Internal Medicine,* **163**, 1949–1956.
20. Anda, R. F., Brown, D. W., Dube, S. R. *et al.* (2010). Adverse childhood experiences and chronic obstructive pulmonary disease in adults. *American Journal of Preventive Medicine,* **34**, 396–403.
21. Dong, M., Giles, W. H., Felitti, V. J. *et al.* (2004). Insights into causal pathways for ischemic heart disease: Adverse Childhood Experiences Study. *Circulation*, **110**, 1761–1766.
22. Dube, S., Fairweather, D., Pearson, W. *et al.* (2009). Cumulative childhood stress and autoimmune diseases in adults. *Psychosomatic Medicine*, **71**, 243–250.
23. Kirkengen, A. L. (2001). Inscribed bodies. Dordrecht: Kluwer Academic.
24. Heckman, J., Knudsen, E., Cameron, J. and Shonkoff, J. (2006). Economic, neurobiological, and behavioral perspectives on building America's future workforce. *Proceedings of the National Academy of Sciences USA*, **103**, 10155–10162.
25. Brown, D. W., Anda, R. A., Tiemeier, H. *et al.* (2009). Adverse childhood experiences and the risk of premature mortality. *American Journal of Preventive Medicine*, **37**, 389–396.
26. Miller, A . (2006). *The body never lies.* New York: Norton.
27. Hoffer, E. (1959). *The ordeal of change.* New York: Harper and Row.
28. Masson, J. M . (1984). *Assault on truth.* New York: Farrar, Straus, and Giroux.
29. De Salvo, L . (1989). *Virginia Woolf: The impact of childhood sexual abuse on her life and work.* Boston, MA: Beacon Press.