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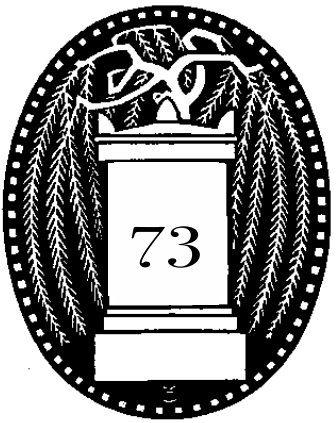

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From the Editors

Learning Disrupted, Learning Derailed: What Doesn't Kill You, Doesn't Make You Stronger

Although for many years one has known childhood trauma negatively affects children's behaviors and their receptiveness to learning, one has tended to talk about trauma resulting from war, natural disasters, accidents, and sexual abuse rather than from adverse or painful events in a child's daily life. In the past 30–35 years doctors and researchers have not only begun to make connections between childhood adversity and physical illness but discovered what one might consider a mild adverse event has the same physical impact in children, especially as they become adults as more extreme adverse events.[1] Some researchers assert only a parent's repeatedly humiliating a child results in a marginally more injurious impact correlating with a slightly increased likelihood of adult physical illness and depression than do other adverse childhood experiences (Walsh, Dalgleish, Lombardo, Dunn, Van Harmelen, Ban, & Goodyer, 2014). Contradicting the adage that time heals all wounds, scientists have also learned wounds a child's brain is too young to retain, his/her body remembers into and, if never healed, throughout adulthood (Walsh et al., 2014). Those childhood wounds manifest as adult-onset organic diseases and mental disorders (Walsh et al., 2014). Many medical doctors and researchers now have biological data evidencing adults' bodies remember even such events as their own difficult birthing, their bodies expressing such events' impact through ongoing illness and disease, many over which doctors continue to puzzle and find difficult to treat (Nakazawa, 2015).

Moreover, since Dr. Vincent J. Felitti first considered childhood adverse events might be responsible for adults' physical illnesses and mental disorders (~1990) and later, with Dr. Robert F. Anda, evidenced the correlation, scientists have uncovered actual, deep-biological changes resulting from childhood adversities: cellular damages causing premature cell aging, telomeres' erosion which effects DNA health, underdeveloped neurological interconnections, decreases in brain size, and decreases in one's longevity, for example (Anda, Tietjen, Schulman, Felitti, & Croft, 2010; Brown, Anda, Felitti, Edwards, Malarcherm, Croft, & Giles, 2010; Dong, Anda, Felitti, Dube, Williamson, Thompson, Loo, & Giles, 2004; Dube, Fairweather, Pearson, Felitti, Anda, & Croft, 2009; Goodwin & Stein, 2004; Price, Kao, Burgers, Carpenter, & Tyrka, 2013; Shalev, Entringer, Wadhwa,

Wolkowitz, Puterman, Lin, & Epel, 2013). That is, rather than "just getting over it," one's early-life stories script one's biology, and one's biology scripts how one's life evolves (Myss, 1997). Particularly unsettling, as biological research expanded beyond marking the direct biological changes children's adverse experiences effected, many scientists began investigating the link to adult organic disease between generations, discovering not merely the "nurture" link, as when a child having experienced domestic violence becomes an adult doling out such violence, but a biological—genetic—link between a parent who experienced childhood adverse events and that parent's children (Labonte, Suderman, Maussion, Navaro, Volodymyr, Bureau, Mechawar, Szyf, Meaney, & Turecki, 2012; Nelson, 2014; Romens, McDonald, Svaren, & Pollak, 2014; Weder, Zhang, Jensen, Yang, Simen, Jackowski, Lipschitz, Douglas-Palumberi, Ge, Perepletchikova, O'Loughlin, Hudziak, Gelernter, & Kaufman, 2014). These scientists name correspondences among childhood adverse events, brain architecture, immunologic functioning, and adult physical and mental health the new "theory of everything": one's emotions become one's physical biology (Anda et al., 2010; Brown et al., 2010; Dong et al., 2004; Dube et al., 2009; Goodwin & Stein, 2004; Price et al., 2013; Shalev et al., 2013).

Because Felitti and Anda have contributed to many science-research publications corresponding to their numerous studies and because many others have now conducted research concerning different aspects of childhood adverse experiences and the physiological and neurobiological changes that occur in brain and body during childhood that affect adult health and well-being, I can neither include all their work nor problematize researchers' findings and the conclusions they draw, presenting counterarguments, leaps in logic, and false premises. I can caution that naming all adverse events "trauma," as do so many physicians, science-researchers, and neuropsychiatrists engaged in this research, is problematic. Placing "everything" under the trauma umbrella might easily lead to victimizing, judging, and blaming children who have experienced adversity and those children-become-adults suffering from organic diseases and mental disorders. Being labeled "victim" or being judged or blamed for things outside one's control only adds insult to injury rather than helping one achieve physical and mental health and well-being. I also caution that some researchers begin their work with the premise that the population they are researching is particularly vulnerable. Such a premise not only sets the stage for victimizing (rather than targeting a particular population for research), judging, and blaming but for deficit thinking (Valencia, 2010). It means, before even doing the science they aimed to do, these researchers had begun dismantling participants' agency and imposing that dismantled agency on others navigating similar circumstances outside the study. Although I see problems with how some interpret researchers' findings and the conclusions they draw and although I have more concerns about how some writing for the general public "translate" the science for public consumption, I am drawn to the 30–35 years so many scientists

have been studying the possible biological links between childhood adverse experiences and adult-onset organic disease and mental disorders and the consistency with which they have been seeing direct connections. I also think educators should be aware of this research and consciously and consistently strive to know about and better children's lives.

Here, I present not an argument, not a problematization, not a philosophy, not a history but information about which many educators remain unaware. I merely highlight correspondences researchers identify between childhood adverse experiences and adult-onset illness, disease, and mental disorders, the physiological changes adverse childhood events incite that lead to health issues in adulthood, and the means by which one's male or female biology dictates the ways childhood trauma may well cause physiological changes to brain and body. I intend this information to serve as the first step in advocating for including information on childhood adverse events and its effects on children and their adult selves in school administrators and teachers' professional development trainings, in education for college educators of future teachers and school administrators, and in pre-service teachers and school-administrators' education programs.

In this article's second block, I touch upon steps to self-healing these researchers recommend. Here, again, I do not problematize; I do not present counterarguments. I write no argument, no philosophy, and no history but present information as a preliminary means of advocating for including education and training for public-school administrators and teachers, for educators of future teachers and school administrators, and for pre-service teachers and school-administrators' education programs. At every level, education administrators and teachers know, usually in the abstract, children experience a range of adverse events. Yet, such basics as learning how to identify a child in need, how to help children de-stress, how to teach children to navigate and heal from adversity remain absent from administrators and teachers' pre-service education and their in-service professional development. By organizing and presenting this information, I advocate for including meaningful, valuable, healing activities in public schools' curricula and for training teachers how to de-stress and heal themselves, to orchestrate and monitor activities for children; for introducing into schools psychologists who specialize in recognizing children experiencing trauma and know how effectively to work with these children one-on-one; and for offering education and training to parents, so to stop or at least curtail the damage many parents and guardians inflict upon their children.

Children's Adverse Experiences and Their Correlation to Adult-Onset Organic Diseases

Although researchers have historically associated childhood trauma with children's experiencing war, natural disasters, accidents, and sexual abuse, some have now correlated and biologically evidenced children's

experiencing adverse events outside the parameters of war, natural disasters, accidents, and sexual abuse to affect their brains and bodies in the same ways. Notably, Drs. Felitti and Anda have discovered children's bodies respond to such events as being repeatedly derided and humiliated, living with a depressed parent, or losing a parent through separation or divorce in the same ways they react to those events historically associated with trauma (Anda, Whitfield, Felitti, Chapman, Edwards, Dube, & Williamson, 2002; Chapman, Whitfield, Felitti, Dube, Edwards, & Anda, 2004; Dube, Anda, Felitti, Edwards, & Williamson, 2002; Edwards, Holden, Felitti, & Anda, 2003; Felitti, 2002). Similarly, such frequent occurrences in western society as one's parent's dying, one's growing up in poverty, being continually bullied, witnessing a sibling's or parent's abuse, living with a mentally-ill or an alcoholic parent, or witnessing violence in one's community activate the body's fight–flight or freeze mechanism that in turn keeps firing because rather than "run and done," the adverse event continues indefinitely, preventing the body's recovery (Felitti, 2002; Felitti & Anda, 2010). Conversely, after animals survive fighting or fleeing, they begin to shake all over, ridding themselves of the hormonal flood the need to fight, flee, or freeze triggered and stopping that mechanism from firing. Some researchers argue because humans' fight, flee, or freeze mechanism keeps firing under chronic stress, childhood adversities alter a child's brain architecture and the ways genes' controlling stress hormones express themselves, triggering inflammation, predisposing one to lifelong disease, and beating down the body for early death (Brown, Anda, Tiemeier, Felitti, Edwards, Croft, & Giles, 2009; Dube et al., 2009; Goodwin & Stein, 2004). These researchers biologically connect adults' suffering from such adult-onset illnesses as autoimmune diseases, migraine, chronic bowel disorders, cancer, back pain, heart disease, depression, fibromyalgia, and stroke at disproportionately high rates with their having undergone adverse experiences during childhood.

The Epiphany Launching the Research

Not only researchers, scientists, and medical doctors but educators and the general public now have access to information concerning adverse childhood experiences and ways one may heal from such events because Dr. Felitti (1991, 1993) noticed and acted upon what he first observed as an oddity among patients in his weight-loss program.[2] Felitti incorporated questions about childhood adversities into a standardized, comprehensive medical examination and evaluation for 26,000 people at the Health Appraisal Division of Kaiser Permanente's Department of Preventive Medicine in San Diego. Working with Dr. Felitti, the CDC's Dr. Robert F. Anda traveled between Atlanta and San Diego for several years to collaborate with Dr. Felitti, analyzing patients' answers to childhood adversity questions and those answers against patients' medical histories (Nakazawa, 2015, p. 242).[3] Over several years, Felitti and Anda worked to perfect a survey instrument from which they could determine the effects childhood adverse events

contribute to adult disease. The Adverse Childhood Experiences (ACE) Questionnaire and ACE Study (n = 17,000) emerged from Felitti and Anda's collaboration. Comprised of yes/no items designed to measure 10 types of adversity one has experienced prior to age 18, the ACE instrument includes five personal items and five items concerning family members and one's household environment.[4] Each "yes" answer receives 1 point toward one's total ACE score.[5]

Felitti and Anda expected their respondents' ACE scores to be low because their participants averaged 57 years old, were white, middle-class individuals who grew up in neither disadvantaged nor troubled households, because ¾ were college educated, and because most had stable jobs with health benefits. Not only did respondents have higher ACE scores than predicted, but Felitti and Anda's findings revealed a clear scientific link among multiple kinds of adverse childhood events, physical illness, disease, and mental health disorders (Felitti, 2009; Felitti & Anda, 2010, 2014; Felitti, Anda, Nordenberg, Williamson, Spitz, Edwards, Koss, & Marks, 1998).

> Two-thirds—64 percent—of participants answered yes to one or more categories, meaning they had experienced at least one of these [10] forms of childhood adversity [named in the instrument] before turning eighteen. And 87 percent of those who answered yes to one ACE question also had additional Adverse Childhood Experiences. Forty percent had experienced two or more categories of Adverse Childhood Experiences, and 12.5 percent had an ACE Score of 4 or more. … Only a third of participants had an ACE Score of zero. (Nakazawa, 2015, pp. 13–14)

Felitti and Anda then (2010) analyzed the data to determine correlations between categories of adverse childhood events each respondent had experienced and the level of illness and disease he/she was enduring as an adult. The total number of adverse, childhood-experience categories a patient indicated (ACE Score) accurately predicted the patient's last-year's doctor visits, quantity of unexplained symptoms, and medical care the individual would need in adulthood (Felitti & Anda, 2010). Immediately, Felitti and Anda (2010) considered the possibility that, having experienced childhood adversity, one might be more likely to turn to such unhealthy, self-coping practices as smoking, drinking, or overeating. While noting some patients had practiced such self-coping to manage their chronic anxiety, those scoring 7 or higher who neither smoked nor drank, whose cholesterol was in range, who were neither diabetic nor overweight, still had a 360% higher heart-disease risk than those scoring zero on the ACE (Anda, Brown, Dube, Bremner, Felitti, & Giles, 2008; Brown et al., 2009; Dong, Giles, Felitti, Dube, Williams, Chapman, & Anda, 2004). Unhealthy coping mechanisms did not explain patients' poor health.

Because researchers represent some findings as odds ratios and others as probabilities, please recall, odds ratios signify the likelihood of one event's happening over another while probability denotes the likelihood of

one particular outcome out of all possible outcomes. For everyday readers, researchers often represent odds ratios as "times" rather than as a regression coefficient. For example, an author may say one is two times more likely to get cancer than not get cancer rather than representing the likelihood of getting cancer vs. not getting cancer as a 0.7 regression coefficient. In contrast, researchers represent probability as percentages:10–15% of smokers get lung cancer—out of all the other possible outcomes one might have from smoking.[6] Please note, too, Felitti and Anda base their findings on actual diagnoses; therefore, the number of sufferers likely exceeds the numbers reflected in the data (see Table 1).

Condition	**ACE SCORE**	**odds ratio**
cancer	4	2x more likely to get cancer than not get cancer
Condition	**ACE SCORE**	**probability**
depression	4	460% higher probability of depression than ACE=0
autoimmune disease	1	20% higher probability of autoimmune disease for women, 10% for men than ACE=0
	2	40% higher probability of autoimmune disease for women, 20% for men than ACE=0
	3	60% higher probability of autoimmune disease for women, 30% for men than ACE=0
	4	80% higher probability of autoimmune disease for women, 40% for men than ACE=0
	5	100% higher probability of autoimmune disease for women, 50% for men than ACE=0
	6	120% higher probability of autoimmune disease for women, 60% for men than ACE=0
lifespan	6 and above	almost 20 years' shorter lifespan than ACE=0
heart disease	7 and above with no smoking, no drinking, no high cholesterol, no diabetes, & not overweight	360% higher probability of heart disease than ACE=0

Table 1

Not only have these researchers correlated childhood adversity with an increase in organic disease and mental disorders, they have now evidenced a causal-biological relation between specific adverse childhood events and an array of diseases (Anda et al., 2002; Anda et al., 2008; Anda et al., 2010; Anda, Felitti, Bremner, Walker, Whitfield, Perry, Dube, & Giles, 2006; Brown et al., 2010; Chapman et al., 2004; Corso, Edwards, Fang, & Mercy, 2008; Dong et al., 2004; Dube et al., 2009; Goodwin & Stein, 2004; Price et al., 2013; Shalev et al., 2013). Because Felitti and Anda

recognized and made known their research using ACE exposes only "the tip of the iceberg," other scientists have been researching how to screen for stressors not assessed via the ACE instrument (Walsh et al., 2014). A second instrument, the Childhood Trauma Questionnaire (CTQ) emerged from their work. Using the CTQ to screen individuals aged 12 and older, researchers have uncovered such childhood hurt or neglect as early medical trauma, family members repeatedly calling one "stupid," "ugly," "lazy," or such other parental or sibling unkindness as neglect, chronic teasing, blaming, shaming, and hazing damage the young brain, triggering organic chemical changes in its gray matter, resulting in later organic illness, disease, and mental disorders (Herringa, Birn, Ruttle, Burghy, Stodola, Davidson, & Essex, 2013; Walsh et al., 2014).

In addition, other scientists not searching for biological links between childhood adverse experiences and adult illness have stumbled upon medical events that result in devastating physiological and architectural changes in brain and body that reveal themselves as organic disease or mental disorders, particularly in adulthood. One example of such research concerns the now-taboo topic of childhood vaccines. Although some have posited childhood vaccinations cause autism and autism's high rates in the U.S. while others have consistently argued this link's impossibility,[7] more recently, researchers have begun examining the *97 vaccines* on the U.S.' current, childhood-vaccine schedule, looking at the original clinical work when creating the vaccines as well as current vaccines' components (Aaby, Henrik, Fisker, Rodrigues, & Benn, 2016; Anonymous, 2022; Centers for Disease Control and Prevention, 2023; Children's Health Defense Team, 2021).[8] Researchers investigating vaccinations on the childhood schedule have discovered: no one has ever tested against a placebo *any* of the *97* childhood vaccines, including the polio vaccine; no one has tested *any* of these vaccines in combination with each other despite medical personnel's administering them in combination; and no one has evaluated any of these vaccines to compare what their makers say they will do against what they actually do (Aaby et al., 2016; Anonymous, 2022; Children's Health Defense Team, 2021). Nevertheless, contemporary manufacturers dump multiple vaccine formulas together, giving them to infants and toddlers *en masse* (Centers for Disease Control and Prevention, 2023) while the pharmaceutical industry financially incentivizes physicians who get their patients to adhere precisely to the CDC's childhood vaccination schedule (Aaby et al., 2016; Anonymous, 2022; Children's Health Defense Team, 2021).[9] Moreover, after analyzing these childhood vaccine formulas, contemporary scientists have discovered they contain dangerous adjuvants. Any of several chemical substances added to vaccines to enhance the body's immune response to the vaccine's sugars or proteins, adjuvants include such unsafe elements as mercury, aluminum, and thimerosal (Anonymous, 2022; Children's Health Defense Team, 2021).

Although one knows mercury, for example, is bad for human brains and bodies, one may not immediately see the connection between childhood vaccines, their adjuvants, their being given en masse, and childhood adverse experiences resurfacing during adulthood as organic disease and mental disorder. One need only think of how one's own or others' children have responded to being at the hospital for their shots. While some children seem relatively unaffected, others fight and scream themselves into a frenzy, turn red from screaming and fighting, and sometimes turn blue from lack of air during their fights to flee. That is, these children's bodies click into fight-or-flight which in turn triggers their bodies' mechanisms for pushing substances through the blood–brain barrier. Thus, such adjuvants as mercury cross into the brain even as the child is kicking, screaming, and turning blue while parent and hospital staff hold the child down for the shot, sometimes continuing afterwards until the child is too weak to fight. In such cases, then, the child experiences trauma as an emotional event, anticipating, receiving, and following the physical shot, experiences the physical trauma of receiving the shot by fighting and trying to flee while held down, and then, undergoes the physical trauma of multiple antigens and, quite possibly, multiple different harmful adjuvants bombarding his/her brain and body. Because manufacturers have packaged multiple vaccines in a single shot and because, during the child's visit, the "medical professional" inoculating the child administers several different shots, each containing multiple vaccines, not only do multiple antigens flood the child's body but multiple adjuvants then cross the blood–brain barrier into the brain: one emotional plus three different physical traumatic events in one experience. If one follows the last 30–35 years' research on the physiological and neurobiological changes childhood adverse experiences cause, leading to adult-onset organic disease, one can only conclude such actions as I recount add contemporary childhood vaccinations to the adverse events that need researching in terms of their short- and long-term physiological and neurobiological ramifications.

One's Sex, Childhood Adverse Experiences, and Physiological and Neurobiological Changes

I would be remiss if I did not mention the factor researchers name the most significant when determining how childhood trauma affects the body and brain's biology: one's sex. First, researchers repeatedly evidence girls undergo more adversity during childhood than boys (Dube et al., 2009). Second, doctors diagnose far more women with autoimmune diseases and such mental disorders as anxiety and depression than they do men (Dube et al., 2009). As early as Felitti and Anda's publishing their first study's findings, they noticed women are 50 percent more likely than men to have suffered adverse childhood experiences in five or more ACE categories (Felitti & Anda, 1998; 2014). In fact, according to these researchers, the

higher one's ACE Score, the greater chance the individual will suffer organic disease and physical and neural inflammation (Felitti & Anda, 1998; 2014). Researchers and hospitals' heads of medicine now assert U.S. women in midlife comprise the nations' "walking wounded" because women suffer so many more "ill-defined" health problems than men during midlife: more than 100 autoimmune diseases, chronic fatigue syndrome, fibromyalgia, back pain, migraines, chronic pain, hormonal disfunction, depression, and bowel disorders (Cooper, Bynum, & Somers, 2009; DeSantis, Baker, Back, Spratt, Ciolino, Moran-Santa Maria, Dipankar, & Brady, 2011; Dube et al., 2009; Felitti & Anda, 1998; 2010; 2014).

DeLisa Fairweather, Ph.D., Director, Translational Research for the Department of Cardiovascular Diseases, Mayo Clinic, specializes on women and sex differences in relation to inflammation, autoimmune disorders, cardiovascular disease, cancer, and lung disease (Mayo Clinic, 2023). Knowing stress worsens autoimmune symptoms, Fairweather (2009) surmised if an inflammatory condition were linked to childhood stress it would likely be autoimmune disease. She therefore joined Felitti, Anda, and the CDC team during their groundbreaking original Kaiser/CDC study on Adverse Childhood Experiences (1995; $n = 1700$), analyzing for only the 21 most-common autoimmune diseases in their data. Not only did she (Fairweather, 2009) and her co-researchers discover a disproportionate number of individuals hospitalized for autoimmune conditions who had endured childhood adverse events but noted a disproportionate number of those hospitalized were women. They rechecked their data multiple times because the number, particularly of women who had experienced childhood adverse events who also had an adult-onset autoimmune disease severe enough to be hospitalized, overwhelmed them. The higher an individual's ACE Score, the more likely the patient would be hospitalized for an autoimmune condition with women's hospitalization rates twice as high as men's (Dube et al., 2009). Women have a 20% higher probability of autoimmune disease per ACE Score category while men have a 10% probability of autoimmune disease per category (Dube et al., 2009). Because in the science literature one tends not to see the extreme relations researchers saw between the number of ACE categories and the increase in autoimmune disease, these researchers feared other scientists would not believe them (Dube et al., 2009; Cooper, Bynum, & Somers, 2009)![10]

Further, not only does one have a thrice-greater risk of developing additional autoimmune disorders once one has one, one third of adults experiencing adverse events before age 18 develop autoimmune disease within about 30 years, especially rheumatic autoimmune diseases, and 80% of that one third are women (AARDA, 2023; Cooper, Bynum, & Somers, 2009; Jacobson, Gange, Rose, & Graham, 1997).[11] Thus, if one has 100 individuals who experienced childhood trauma before age 18, one third

of those would develop autoimmune disease and 26.64 of those would be women (see Table 2). Also unexpected, for women who die before age 65, autoimmune disease places among the top 10 causes for those early deaths (AARDA, 2023; Cooper, Bynum, & Somers, 2009).

Autoimmune disease	Ratio of women to men
Antiphospholipid syndrome	9:1
Hashimoto's thyroiditis	10:1
lupus	9:1
Primary biliary cholangitis (previously, primary biliary cirrhosis)	9:1
Sjögren's syndrome	9:1

Table 2

Beyond women's adult-onset disease concerning girls' experiencing more adverse events in childhood than boys, females' physiological differences—their smaller hearts, lungs, and other organs, their hormone levels, and their hormonal responses to stress—contribute not only to a different response than boys during an adverse event, but some researchers point to data indicating girls' response results yield more serious ramifications for girls in later life than do boys' response results (Hamilton, Stange, Abramsom, & Alloy, 2015).[12] Researching sex differences in the brain, Professor of Neuroscience, Margaret McCarthy, Ph.D. (Bowers, Waddell, & McCarthy, 2010; McCarthy, 2017; McCarthy, Auger, Bale, De Vries, Dunn, Forger, Murray, Nugent, Schwarz, & Wilson, 2009), University of Maryland School of Medicine, hypothesizes women suffer more from autoimmune disease than men because girls undergo more adverse experiences, particularly during adolescence, because, she contends, they experience more interpersonal and other stressors than boys.

Trauma and recovery psychiatrist, Bessel van der Kolk, M.D. (2014) even found female incest survivors have particular immune-cell proliferations that over-sensitize their immune systems to threats; these individuals' bodies would subsequently tend unnecessarily to defend themselves, even to attacking their own bodies' cells. Although McCarthy (2017) points to evidence that, once girls become women, they continue to be more stressed than males and van der Kolk (2014) detects particular immune-cell proliferations that over-sensitize incest survivors' immune systems to threats, neither seem to analyze and interpret their research in light of genetics, environmental toxins, and what reads as physicians and pharmaceutical-industry stakeholders' desire to pathologize everyone so to prescribe more medications. New genetic research, for example, continues to advance. UCLA's Itoh, Golden, Itoh, Matsukawa, Ren, Tse, Arnold, & Voskuhl (2019) revealed finding a "gene on the X chromosome [that] may help explain why more women than men develop multiple sclerosis and

other autoimmune diseases" (UCLA Health, 2019, n. p.). It seems many researchers are working to explain such mystery diseases as autoimmune disease, but no one has yet pooled research from across scientific disciplines to design studies that might reveal how different factors may predict, create a tendency toward, or cause disease.

Professor of Psychology, Louis Cozolino, Ph.D. (2014/2006), attachment researcher, Pepperdine University, asserts the nurtured, not the fittest, survive. When a child's brain does not receive the love it needs, it cannot grow and strengthen the neural interconnections the child needs to create loving, secure relationships. For example, the people who make the same relationship mistakes over and over again, do not have the neurobiological means to learn from those mistakes because they keep encountering the same neurobiological-interconnection problems they had the first time they failed (Cozolino, 2014/2006; Salvatore, Kuo, Steele, Simpson, & Collins, 2011). Neurobiological interconnections changed or halted during childhood; nothing has occurred to grow and strengthen the neurobiological interconnections childhood adverse experiences interrupted (Cozolino, 2014/2006; Salvatore, Kuo, Steele, Simpson, & Collins, 2011). Thus, although researchers maintain, in such cases as this relationship example, individuals may appear to have behavioral problems, they instead suffer from a neurobiological condition in which their underdeveloped neural interconnections make it impossible to make associations from which to learn from their mistakes (Cozolino, 2014/2006; Salvatore et al., 2011). They assert individuals can strengthen the neural interconnections whose development, strengthening, and growth childhood adverse experience(s) altered or halted (Cozolino, 2014/2006; Salvatore et al., 2011). While these scientists' findings help explain the seemingly unexplainable reason(s) some people keep repeating things not working for them, I caution, here again, against deficit thinking, judging, blaming, victimizing, or using such research to dismantle individuals' agency. One needs to take care, too, not to assume someone who makes the same mistakes repeatedly experienced childhood adverse events severe enough to alter or halt neurobiological interconnections.

Although many other researchers studying the link between childhood adverse experiences and adult organic disease and mental disorders have noted physiological changes in the brain, such neuropsychiatrists as Ryan Herringa, M.D., Ph.D. (Herringa et al., 2013; Herringa, Burghy, Stodola, Fox, Davidson, & Essex, 2016; Heyn, Keding, Ross, Cisler, Mumford, & Herringa, 2019), Associate Professor and Director of the Division of Child and Adolescent Psychiatry, University of Wisconsin, have specifically focused all their studies on the brain. As a result, these researchers not only see clear physiological and neurological changes (in part through MRI brain imaging) resulting from childhood adverse experiences but see how these

changes differ according to one's sex. Herringa and his team (Herringa et al., 2013; Herringa et al., 2016; Heyn et al., 2019) have collected data reflecting changes in the prefrontal cortex, the amygdala (fear and emotion center), the hippocampus, the communications among them, and the way they communicate to the rest of the body. They and other neuroscience researchers (Czerniawski & Guzowski, 2014; DeSantis et al., 2011; Heim, Bradley, Mletzko, Deveau, Musselman, Memeroff, Ressler, & Binder, 2009) evidence how mistreating children impairs children's brains' fear circuitry's regulatory capacity, their hippocampus, neuroendocrine function, and hypothalamic–pituitary–adrenal axis functioning, to name a few effects.

Such researchers as Hilary P. Blumberg, M.D. (2011, 2022a, 2022b), John and Hope Furth Professor of Psychiatric Neuroscience, Yale School of Medicine,[13] has not only found brain changes that differ according to type of childhood adverse experience but, like Herringa, differences according to an individual's sex. For example, she found girls' gray matter volume decreases in regions regulating emotions and depression while boys' gray matter volume decreases in the brain area controlling impulses and behaviors (Blumberg, 2011, 2022a, 2022b). Blumberg hypothesizes these children's adverse experiences causing brain changes that differ by sex may account for girls' developing more mood disorders than boys while boys develop more impulse-control disorders than girls.[14] Although teachers regularly interact with girls and boys struggling with these disorders, they probably spend more time and energy with boys because children battling impulse control disorders disrupt classroom activities. Too often, as long as the student does not disturb the teacher or other students, teachers pay little attention, so girls with mood disorders become silent bodies occupying space or invisible altogether while teachers have boys suspended, sent to special education rooms, or labeled "at risk" and pathologized. Either way, these children do not find healing paths in schools but more often than not undergo more adverse experiences. If one believes researchers contributing to the thousands of studies over the last 30–35 years on the biological effects childhood adverse experiences have on adult-onset disease and mental disorders, children's adverse experiences in schools would increase children's brains and bodies' physiological and neurobiological changes and magnify the probability they would suffer from adult-onset illnesses their childhood adverse experiences activated.

Children in Schools, Children in Teachers' Care

Once knowing the results these researchers posit on even the most basic level, one may not only wonder why adverse events affect children so powerfully, when western society has so long touted children to be resilient, to "bounce right back," but feel most of us—64% score one or higher on the ACE—are doomed to be small-brained, sick, anxious, fear-ridden, and depressed during our shortened lifespans. One might easily panic

when remembering harsh words to one's children or students, thinking one's abrasive words have damaged these children for the rest of their lives. Psychiatrists reassure that few live their lives without uttering words they regret, especially in contemporary society where stress relentlessly beats one down. Emphasizing words occasionally spouted in anger or frustration when one is tired and stressed do not traumatize children so much their bodies express their childhood wounds as adult organic diseases, psychiatrists advise adults apologize to the children in their care, admit their wrongdoing, and commit to doing better. Unfortunately, many parents, educators, teacher educators, and future teachers think apologizing, admitting to being wrong, and committing to doing better undermine their authority. Having taught in public-school classrooms filled with children from many different backgrounds, I have only experienced positive responses from students when I say I am sorry, admit my mistake, acknowledge having misjudged something pedagogically, and ask if they will move forward with me. As an educator, I know I cannot prevent children from experiencing adversities occurring outside schools, but I can prevent or at least curtail the adverse events a child faces when in school and take ownership for my own misdeeds.

As an aside and for clarity, "the teacher gave me homework," "the teacher corrected my pronunciation," "the teacher put me in a group I didn't want to be in," "the teacher made me revise my essay," "the teacher wants me to come in for help in math," "the teacher made me help put away the art supplies," or other such common grievances students have are not the kind of adverse events to which researchers refer. If the teacher repeatedly humiliates, shames, or derides students when correcting them, grouping them with others, asking for revisions, asking a student to come for help, among other similar actions, then the event can change to adversity that triggers biological change. Making oneself do such things as homework or essay revisions one does not want to do is the kind of "adversity" one might say is good for one's learning to live and function well in the world.

Scientists have not merely researched to discover the physiological correlations between childhood adverse events and adult illness but investigated how adults who experienced childhood adverse events may heal their brains and bodies. These researchers contend one's body can produce new neurons, grow and strengthen neural connections, grow new gray and white brain matter, strengthen telomeres to rebuild DNA, shorten hormonal stress responses, calm inflammation, heal one's immune system, etc. Having read some of the now thousands of published studies on how childhood adverse experiences trigger physiological changes in children that ultimately lead to adulthood organic disease and mental disorders, I also know educators can instigate children's recoveries, so the children in their care may not only begin to heal in the present but begin managing

how adverse events affect them when such events continue to occur. If what researchers say about the body's ability to produce new neurons, grow and strengthen neural connections, strengthen telomeres to rebuild DNA, shorten hormonal stress responses, calm inflammation, and heal one's immune system, among other abilities, is correct, then children's managing how they react to adverse events, particularly as they work to navigate adversity in their lives while recovering from previous events, means they are simultaneously growing new neurons, creating new gray and white brain matter, regenerating their damaged DNA and immune systems, and protecting their brains and bodies from new damage.

In their practices, many therapists have long used paths to healing scientists and therapists studying adverse childhood experiences and adult-onset health issues now suggest; other healing practices they advocate may have long histories, but those advising their use may not have done so in relation to childhood adverse experiences. Although researchers have identified 12 steps to healing one can take on one's own, I only touch upon those one can easily incorporate into public school curricula and daily routines with children of all ages. First, Dr. Felitti has made the ACE Questionnaire available to everyone online, reasoning easy access will help dispel feelings of shame and secrecy concerning one's childhood adverse experiences.[15] Taking the ACE Questionnaire and finding one's ACE Score can be a first step to healing because it makes one aware. Felitti also wants individuals to ask themselves about their childhood adverse experiences after they take the ACE: How old was one when the event(s) occurred or began? Might adverse events have occurred one does not recall? What relationship existed between or among individuals involved in the adverse event? Did one receive support from one's caregivers? Dr. Felitti then asks patients to reveal their individual findings to someone they trust in case those to whom they disclose these findings have further insights. Felitti maintains merely telling another person something adverse occurred when one was small sets one on the path to physical improvement (Felitti paraphrased in Nakazawa, 2015, pp. 151–152).

Step 2 involves another survey instrument, the Resilience Questionnaire.[16] Researchers, physicians, therapists, and pediatricians joined in developing the 14-item Resilience Questionnaire (http://ACEsTooHigh.com). Journalist Jane Stevens, founder of ACEsConnection.com and ACEsTooHigh.com maintains one's resilience score helps one understand the things that assisted one's childhood self through adversity and spurs one consciously to incorporate more resilience skills into their adult lives.[17] Having laid the foundation for healing by beginning to process one's childhood adverse events via the two questionnaires, one moves to speak the truth about one's early life by "writing-to-heal," step 3. Although therapists have used "writing-to-heal" for a long time, Bernie Siegel, M.D. (Siegel & August, 2003) has introduced this healing technique to groups of

high-school students using such prompts (paraphrased) as "Write a letter to yourself in which you tell why you love yourself" or, more controversial for public-school teachers and more shocking, "Write a letter to yourself telling why you want to end your life." After the second prompt, Siegel separated the high-school students' two groups of letters, showing students the letters for why they should kill themselves was twice as high as the pile of letters about loving themselves (Siegel paraphrased in Nakazawa, 2015, pp. 157, 258). Siegel recalls this demonstration caused the teens to realize they are not alone in how they feel and as a result resolve to start creating their own lives for themselves (Siegal paraphrased in Nakazawa, 2015, pp. 158, 258).

Asking students to write for 15–30 minutes for 3–5 consecutive days, Professor Emeritus of Psychology, James Pennebaker, Ph.D. (1997), The University of Texas at Austin, has created standard instructions for college students he would assign to an experimental group.

> For the next 3 days, I would like for you to write about your very deepest thoughts and feelings about an extremely important emotional issue that has affected you and your life. In your writing, I'd like you to really let go and explore your very deepest emotions and thoughts. You might tie your topic to your relationships with others, including parents, lovers, friends, or relatives; to forget your past, your present, or your future; or [tie your topic] to who you have been, who you would like to be, or who you are now. You may write about the same general issues or experiences on all the days of writing or on different topics each day. All of your writing will be completely confidential. Don't worry about spelling, sentence structure, or grammar. The only rule is that once you begin writing, continue to do so until your time is up. (Pennebaker, 1997)

Pennebaker (1997) observes that when he has students write-to-heal, their grades go up. Even if students immediately destroy what they write, when they write about emotional upheavals, they go to doctors less and tests on their immune systems show immune-function improvement (Pennebaker, 1997). Simply writing about one's secrets positively affects people's health even when they are struggling with life-threatening disease (Pennebaker, 1997).

Writing is not the only mechanism therapists have long used to help individuals heal. In emails and personal conversations with Nakazawa (2015, p. 258), Siegel relates how he uses not merely writing-to-heal but drawing-to-heal (step 4), often asking his patients to draw anything that comes to mind. Just as students often need help knowing what to draw, Siegel encourages his patients by suggesting they may draw an outdoor scene, their families, or anything else that comes to mind (Siegel

paraphrased in Nakazawa 2015, p. 160). Although Siegel asks patients to put away their drawings, the next day he asks them to analyze them as if they are interpreting a dream and then asks if their dream analysis provides any insights. Sometimes patients draw things that prompt Siegel to ask such questions as, "What happened when you were 13?" Siegel reports once the individual reveals the adverse experience, that patient begins to feel physical pain relief. While research continues on both writing- and drawing-to-heal, researchers do not yet understand how unmasking adverse experiences leads to healing (Nakazawa, 2015, p. 160).

Researchers, physicians, and therapists name the fifth step to healing the best for brain repair, for it is a neurally inspired, behavioral intervention assisting in brain change: mindfulness meditation (Davidson, 2012; Kaliman, Alvarez-López, & Cosín-Tomás, 2014). Scientists have repeatedly demonstrated mindfulness meditation helps one evaluate options, make appropriate decisions, regulate emotions, relieve fearfulness, and respond flexibly to others; it increases one's self-awareness and ability to self-reflect and empathize by setting into motion an underlying mechanism for regulating and reducing pain (Magyari, 2015). Becoming aware of one's breath and bodily sensations activates this mechanism (Kerr, Sacchet, Lazar, Moore, & Jones, 2013). Because researchers use brain scans as one data source, they are able to show how brains of those having experienced childhood adverse events have lost or never developed interconnectivity in the brain and how the interconnectivity improves through mindfulness meditation (Kaliman, Alvarez-López, & Cosín-Tomás, 2014). These scientists also monitor physical changes reducing individuals' stress responses and inflammatory hormone levels (Kaliman, Alvarez-López, & Cosín-Tomás, 2014). The participants in such studies report progress in learning to calm their minds. Thus, although they may continue to experience stress and produce inflammatory hormones, they have learned ways to calm themselves, so their inflammatory hormones reduce more rapidly after an adverse event than they did previously. That is, researchers find one's hormone production rebounds more quickly, so, importantly, inflammatory hormones bathe one's bodies and minds for shorter periods (Kaliman, Alvarez-López, & Cosín-Tomás, 2014). Thus, mindfulness meditation seems to have a similar effect for humans as animals' intense shaking after surviving a fight–flight or freeze event. As a result, those learning to calm their minds have less physical and neural inflammation and therefore reduce their physical disease, anxiety, and depression while increasing their physical and emotional well-being (Kaliman, Alvarez-López, & Cosín-Tomás, 2014).

Dr. Herringa (Herringa et al., 2013; Herringa et al., 2016) demonstrates mindfulness meditation strengthens the same brain circuits in children that it does in adults having had adverse childhood experiences: "When kids practice mindfulness[,] they may strengthen the same circuits of

the brain weakened by early adversity and childhood trauma—including [circuits in and between] the frontal lobe and the hippocampus" (Herringa quoted in Nakazawa, 2015, p. 161). Thus, children who learn how to meditate when in schools may use that meditation not only as a coping tool but to strengthen their brains' circuits; yet, personnel in so few schools consider incorporating meditation—or other tools for self-healing—into the curriculum: "…meditation may help repopulate the brain with gray matter—and [repopulate] the neurons that may have been pruned… years ago. These are stunning health benefits from a very simple practice" through which one frees oneself from negative inflammatory responses (Herringa quoted in Nakazawa, 2015, p. 161).

In passing, I'd like to mention three other steps researchers have identified as helpful to healing that one can also easily incorporate in school settings: moving meditation (step 6), three types of bodywork (step 10), and compassion meditation (step 8). Moving meditation includes both *tai chi* and *quigong*. Many people find measured, careful, slow, movements over 45 minutes help calm their inner voices and clear their minds, creating a kind of recuperative inner space, enabling them to see more clearly and therefore better manage their insecurities, fears, and stress. Some individuals relate they feel less defensive, blame others less, are able to release the past, and become more compassionate than before their learning and practicing moving meditation (Nakazawa, 2015, pp. 169–170). Such other ways of moving the body as yoga, trauma release exercises, and bodywork (step 10) contribute to healing the body because these kinds of bodywork release stored, physical and muscular tension caused from chronic fight–flight or freeze mechanisms firing during one's life (Cohen, Wintering, Tolles, Townsend, Farrar, Galantino, & Newberg, 2009). Releasing muscular tension tames one's inflammatory responses (Cohen et al., 2009). While *tai chi* and *quigong* also help release muscular tension, these practices' slow, measured movements move one into meditation and its brain-healing effects. As father of U.S. philosophy of education, John Dewey (1916), repeatedly advises, one should neither create nor sustain schools separating mind from body in curriculum, teaching, and learning.[18] For Dewey creating, enforcing, and sustaining such binaries, such false separations of the whole, is an evil business impeding the child's growth and preventing wholeness. Just as teaching the mind while excluding the body and emotions makes a person neither whole nor educated, healing the brain while excluding the body does not lend itself to full recovery from childhood adverse experiences. One can easily incorporate one or more body-moving exercises into the school day.

Mind–body-medicine researcher, Professor Charles Raison, M.D., University of Arizona College of Medicine, conducts research into neither mindfulness meditation nor moving meditation but compassion meditation (step 8) and its effects. Metta or loving-kindness meditation is the most

well-known form of compassion meditation (Pace, Negi, Dodson-Lavelle, Ozawa-de Silva, Reddy, Cole, Danese, Craighead, & Raison, 2013). This research team conducted a 6-week study in which adolescents participated in compassion-meditation training (Pace et al., 2013). At the end of the 6-week program, the teenagers' inflammatory markers were lower than at the beginning of the program (Pace et al., 2013). Perhaps more astonishing, high-security prison inmates who learned and practiced compassion meditation showed a 20% or more decrease in violence (Pace et al., 2013). Thus, if children learn to meditate when in school, they might not only lower their inflammatory markers, become less violent, and prevent adult-onset organic disease and mental disorders but more easily learn to meditate and be more likely to sustain practicing it than those who begin in adulthood, for children are mentally more flexible than adults and have not yet constructed some of the obstacles adults encounter when learning to meditate. Common obstacles adults face when learning to meditate include: constant distractions, difficulties releasing themselves from racing thoughts, guilty feelings when not entrenching themselves in work (Puritan work ethic), and, having built their lives around the ego—always wanting to do something—their agitation.

Whether what researchers are advancing is correct or not, children's learning to meditate in schools should help lower their stress and anxiety and improve their well-being. If researchers are correct about the biological changes accompanying adverse childhood experiences that later manifest themselves as adult-onset disease and mental disorders and if they are correct that one's brain and body can recover from adverse childhood experiences in part through meditation, then children's meditating in schools should at least help prevent adult-onset disease and mental disorders. Pairing meditation with bodywork means helping school children de-stress, soothe, and heal body and mind in the present if not preventing future illness. One has nothing to lose!

I do not want anyone to think self-healing practices alone will necessarily restore a person's brain and body health. Some adults may be able to self-heal without other interventions; some school children may make significant physiological and neurobiological changes because they write- and draw-to-heal, meditate, do bodywork, and perhaps learn and practice other healing steps in school. However, other individuals may be unable to heal themselves without professional help. School district administrators must, then, hire psychologists who specialize in working with children and with children having had adverse experiences. Those specialists must be able to mentor teachers and remind them not to exceed their limits in working with children who have experienced adverse events but refer them to the psychologist.

Using the now-standard excuse that the state, district, or school does not have funding to finance psychologists specializing in working with

children who have experienced adverse events rings hollow, especially because treating the children experiencing adversity once they become adults enduring organic disease and mental disorders costs far more money, time, and suffering than would hiring qualified psychologists for school-aged children. The number of sufferers and the cost of their healthcare would make any economy stagger and even collapse. Fortunately, some "communities are working together to change organizations and systems to replace blame–shame–punishment rules and policies [such as those in public schools] with understanding–nurturing–solutions and approaches" (Stevens, founder ACEsConnection.com and PACEsConnection.com quoted in Nakazawa, 2015, pp. 233–234).

> Although much of the reason for…[making institutional change] is economic—it can save a city hundreds of millions of dollars in reduced costs for health care and social services—it also helps people and their communities to become healthier and happier places to live. (Stevens quoted in Nakazawa, 2015, p. 234)

Indeed, close to 30 states including Iowa, Maine, Vermont, Washington, and Wisconsin have been collecting Adverse Childhood Experiences data purposefully to develop state health programs whose professionals will address children's and family's problems (ACEtoHigh.com). Although public schools are often the last to receive funding for health services, public-school administrators and teachers may certainly ask their schools' PTAs to bring mindfulness-meditation, moving-meditation, and bodywork training to teachers and students alike, to hire experts to help teachers tailor writing- and drawing-to-heal prompts appropriate to the children they teach. If necessary, principals might solicit assistance from state-level grant experts to hire psychologists until they can get "hard money" to fund these experts all schools need.

Public-school administrators and teachers, teacher and school-administrator educators, and future school administrators and teachers need to be more than simply aware that much research exists pointing to the strong possibility that even seemingly small adverse events in a child's life may cause physiological and neurobiological changes in body and brain. They should be aware such changes affect a child's social interactions and receptiveness to learning and a child's ability to function and learn in a classroom setting. Even if one needs more data evidencing the biological relation between childhood adverse experiences and adult-onset organic disease and mental disorders to consider the correlations adequately evidenced, one knows, nevertheless, many school children daily experience adversity—lack of food, poor shelter, an alcoholic or drug-addicted parent. Children may be living without a parent, living in foster care, being passed among relatives, living in a violent neighborhood, experiencing domestic violence, among other common childhood adversities in the U.S. Aware

so many children face physical and emotional challenges, administrators and educators must act, first learning and practicing self-healing and stress-reducing activities for themselves, for few would not benefit at least from reducing stress. Properly to meet their in loco parentis charge, administrators and educators must next learn how to recognize a child in need, learn ways to communicate to all children in their care that the teacher values and cares about them, ensure no child in their care experiences adverse events at school, and bring healing practices into public schools where children spend nearly half their waking hours.

Although many factors contribute to one's childhood and adulthood physical and mental health and well-being, educators cannot always recognize these factors, act to change them, or act to counteract their damaging effects on the children in their care. With little training, educators can learn to recognize a child in need and can incorporate healing activities into the curriculum and their daily routines with students. Healing activities do not "take away from instructional time." They are part of instructional time; they ready students for teaching–learning in content, concepts, and skills, so they are meaningful and of value to students. One's students may remember little to nothing from *Macbeth*, little to no chemistry, calculus, or history, but their bodies and brains' biology will forever remember healing because it changes their futures: "In my beginning is my end" (Eliot, 1943). Changing the beginning through healing opens infinite possibilities for creating oneself, embracing life's wonders, living life well, and changing one's end.

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Endnotes

1 Please see http://www.wholint/violence__injury__prevention/violence/activities/adverse__childhood__experiences/en/; https://acestoohigh.com/got-your-ace-score/; and http://www.acesconnection.com

2 Felitti's epiphany concerning the connection between childhood adversity and adult illness occurred when working with obesity patients in a weight-loss program. The patients were losing at a better pace than expected but then began dropping out of the program. Consequently, Felitti began interviewing his patients individually, wanting to understand why they were dropping out when they were succeeding at their self-identified goal—weight loss. Of 186 "drop-

out" patients interviewed, Felitti learned 55% had experienced sexual abuse. He concluded major weight loss posed a threat to those individuals because they used their weight as protection against potential aggressors. They literally could "throw their weight around" if necessary. Guarding against bias, Felitti asked 5 colleagues to interview the next 100 patients. The result was the same. Presenting his findings at a 1990 obesity study conference where the audience attacked him led to his research with Anda and the CDC and led his thinking beyond childhood adversity obese individuals may have experienced to discovering if childhood trauma might contribute to other kinds of adult health concerns (Felitti, 2010, pp. 24–30; Nakazawa, 2015, p. 242).

[3] Nakazawa quotes Dr. Felitti from his email to her February 2, 2015. In this email, Felitti explains the backstory of his interest and research into childhood adverse events and their relation to adult illness, disease, and mental disorders. For more details, please see Nakazawa, 2015, p. 242, #12.

[4] Although 5 questions are "personal," ultimately, all 10 questions address family disfunction.

[5] Dr. Felitti has made the ACE Questionnaire available online. One can find the instrument along with information about the ACE study and current articles concerning the biological link between childhood adverse experiences and adult organic disease and mental disorders.

[6] For a quick, accessible refresher, please see Lisa Chen's "How to Interpret and Calculate 'X Times More Likely' Statistics" in *Towards Data Science*, July 7, 2020, https://towardsdatascience.com/how-to-interpret-and-calculate-x-times-more-likely-statistics-daf538a9e0f4

[7] One in 36 eight-year-olds are diagnosed with autism in the U.S. as of March 22, 2023 (CDC, 2023).

[8] The more recent interest in and research on childhood vaccines beyond possible links to autism may well stem from the fact that world-renowned physicians and researchers have raised questions about the safety and efficacy of the COVID-19 inoculation and its boosters, questions that spurred scientists to investigate childhood vaccines beginning with their origins.

[9] Some physicians with children have been willing to reveal they want their children vaccinated but don't believe giving so many vaccinations at once can be healthful for their children. These physicians get the vaccinations separated—something not everyone can afford and even physicians may no longer be able to orchestrate.

[10] Not only are U.S. researchers consistently seeing the childhood–adverse experiences, adult–autoimmune disease relation, but

researchers' findings globally evidence this striking correspondence (Nakazawa, 2015, p. 99).

[11] Rheumatic autoimmune diseases include such conditions as lupus, rheumatoid arthritis, and Sjögren's syndrome.

[12] Playing particularly significant roles are the hormones estrogen (a catch-all for multiple hormones and produced in the adrenal gland and ovaries) and glucocorticoids, including cortisol. For a reader-friendly explanation of the physiology involved, please see Nakazawa, 2015, pp. 97–104.

[13] In addition to being Professor of Psychiatry of the Child Study Center, and of Radiology and Biomedical Imaging, Dr. Blumberg is Director of the Mood Disorders Research Program.

[14] For more on the unique ways girls' brains are particularly susceptible, please see Nakazawa, 2015, pp. 104–110. For the genetic link between girls' childhood adversity and adult depression, please see Nakazawa, 2015, 104–113.

[15] Please see footnote 1.

[16] Although psychologists Mark Rains and Kate McClinn developed the 14-point instrument, a group of health advocates, pediatricians, early-childhood service providers, and psychologists at Southern Kennebec Healthy Start in Augusta, Maine worked on the instrument in 2006. Rains and McClinn updated the group's work, arriving at the 14 items for the instrument and decided how to score it in February 2013. The group in Maine did not create the Resilience Questionnaire for research purposes but for parenting education. For The Resilience Questionnaire, please see https://acestoohigh.com/got-your-ace-score/ (Nakazawa, 2015, p. 257).

[17] Please see PACEs Connection and the article on that site, "How Dr. Vincent Felitti, Co-Author of the Ace Study, and Jane Stevens, Founder and Publisher of *PACEs Connection*, Crossed Paths to Accelerate a Movement." https://www.pacesconnection.com/blog/how-dr-vincent-felitti-co-author-of-the-ace-study-and-jane-stevens-founder-and-publisher-of-paces-connection-crossed-paths-to-accelerate-a-movement-1

[18] Throughout his work, Dewey speaks against binaries.

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