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Adverse Childhood Experiences

OVERVIEW, RESPONSE STRATEGIES, AND INTEGRAL THEORY

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Researchers from the Centers for Disease Control and Prevention (CDC) have been involved in an ongoing collaboration with Kaiser Permanente's Department of Preventive Medicine, where they have designed a large and epidemiologically sound study exploring the role of "adverse childhood experiences" (ACEs) on social and health outcomes later in life. This research brings a distinct and compelling relationship between ACEs, health risk behaviors, and physical and mental health into awareness. This article outlines these research findings, pointing also to the role of ACEs in homelessness and criminal justice involvement and addressing service delivery implications. Integral Theory is used to explain ACEs as an underlying syndrome, and Integral Restorative Processes is presented as a useful and flexible intervention model to guide a comprehensive and effective response.

Introduction

Recent research by Kaiser Permanente and the Centers for Disease Control and Prevention (CDC) strongly implicates childhood traumas, or "adverse childhood experiences" (ACEs), in *the ten leading causes of death in the United States*. ACEs include physical violence and neglect, sexual abuse, and emotional and psychological trauma. ACEs are associated with a staggering number of adult health risk behaviors, psychosocial and substance abuse problems, and diseases.[1] History may well show that the discovery of the impact of ACEs on noninfectious causes of death was as powerful and revolutionary an insight as Louis Pasteur's once controversial theory that germs cause infectious disease. His ideas were slow to be adopted but are now universally accepted. Similarly, ACEs parallel what Pasteur offered—an underlying syndrome implicated in *noninfectious* causes of death. This is truly a remarkable discovery that is likely to change the way in which the field of medicine is viewed and practiced. The impact of ACEs is felt not only in health care but also in businesses because of employee absenteeism, in homelessness, and in the criminal justice system. ACEs likely cost untold millions of dollars a year.

Anda, one of the primary ACE researchers from the CDC, described how shocked and saddened he was to discover that ACEs are so distressingly common. The frequent strong and graded relationships between ACEs and a variety of medical conditions were also clear in the findings. The authors of the ACE study and other researchers provide a useful framework for conceptualizing the life course pathway of ACEs and suggest implications for public health responses. Their contribution is critical in terms of clarifying diagnosis. In their effort to both theoretically explain their work and offer a treatment model for a comprehensive response, the ACE study authors would benefit in learning of Integral Theory and the Integral Restorative Processes (IRP) model. Current treatment for leading causes of death generally is not informed by knowledge of the impact of ACEs and thus addresses aspects of ACE consequences in a piecemeal fashion. As a result, the underlying syndrome is not often taken into consideration.

This article will begin with a brief overview of Integral Theory, which is presented as uniquely capable of explaining the ACE results.[2] Next, the ACE literature is reviewed, outlining its

findings in regard to health risk behaviors, mental health and substance abuse problems, and medical problems. The role of ACEs in homelessness and the criminal justice system is also addressed, along with a discussion of the importance of a comprehensive and coordinated service response to ACEs. An Integral explanation of ACEs is then provided. Becker's Nobel-prize winning work offers a social economic perspective in understanding the interplay between personal choices and social interactions.[3] Numerous studies demonstrate that early childhood interventions provide high rates of return in human capital.[4] This also makes a powerful argument for comprehensively addressing ACEs. Finally, IRP is a model, derived from Integral Theory, which can appropriately respond to ACEs in a comprehensive and coordinated fashion that draws on what we know about how to support people in body, mind, and spirit within self, culture, and nature.

Integral Theory Overview

Integral Theory brings together the work of various developmental theorists, along with other research, such as Daniel Goleman's work on emotional intelligence and Howard Gardner's recognition of multiple intelligences.[5] These developmental lines move through stages of increasing structural complexity, and those stages cannot be skipped. Each new stage transcends and includes its predecessors. Each line of development involves an individual's increasing functional capacities in particular areas and contributes to a person's general altitude or overall stage of development. This development is all happening in the context of self, culture, and nature. In other words, development does not occur in a vacuum but involves interaction between the person and the collective environment—social, cultural, and ecological.

These mutual interactions are represented by the four quadrants, which are actually dimensions that an individual possesses, as well as perspectives from which development and events can be viewed. The "I" dimension-perspective or Upper-Left quadrant (UL) focuses on the interior of the individual self and developmental processes that the individual undergoes. The "I" is subjective, so understanding the "I" involves asking questions because it cannot be "seen." The "We" dimension-perspective or Lower-Left quadrant (LL) represents shared values and worldviews that play a role in cultural interactions, such as agreements about how "We" treat each other. The "We" is intersubjective—a culture is made up of mutual understanding (I + YOU = WE). The exterior of the individual includes the brain, the physical organism, and behaviors, all of which are represented by the "It" dimension-perspective or Upper-Right quadrant (UR). The social system and environment constitute the "Its" or Lower-Right quadrant (LR). The UR and LR quadrants are otherwise known as "nature" (including human productions that can be seen with the senses). These refer to objective and interobjective phenomena, respectively, or things that can be observed from a third-person perspective. As we can see in figure 1, the upper two quadrants are oriented to the individual, and the lower two quadrants are oriented to the collective. The Left-Hand quadrants are subjective/intersubjective and the Right-Hand quadrants are objective/interobjective. These four quadrants mutually interact with one another and evolve together, making overall development a four-quadrant affair.[6] Identifying these aspects of development becomes extremely useful in both understanding the ACE findings and fashioning a comprehensive response.

ACEs can have their origin in almost any quadrant, but they typically occur where human beings interact—they tend to be acts of violence institutionalized in the family system (LR) on a consistent basis. In addition to setting off repercussions in the other quadrants, the same LR actions (such as being part of a family system that involves physical abuse or witnessing trauma)

may affect people differently, depending upon what is going on in the other quadrants. Family meanings and cultural values (LL) related to these actions can actually be quite diverse. Individuals also have unique psychological strengths (UL) and behavioral coping strategies (UR) available to them. The extent to which ACE interventions occur in service systems (LR) may also vary among communities. These services, or lack of services, are both shaped by and influence cultural values (LL).

UPPER LEFT (I)	UPPER RIGHT (It)
• Levels and lines of development • Emotions, thoughts, and interior experiences	• Behaviors • Genetics • Physical organism • Physical health
LOWER LEFT (You/We)	**LOWER RIGHT (Its)**
Group values pertaining to: • Family • Community • Sub-culture • Larger culture	• Physical trauma, neglect, and abuse • Family relational system • Rules, guidelines, regulations, policies, and laws • School system • Health care system • Legal or other systems

Figure 1. The Four Quadrants

The Adverse Childhood Experiences (ACE) Study

Trauma includes a wide array of experiences that hurt a person's body or sense of self. Thus, trauma may impact people in a physical, emotional, sexual, or mental manner.[7] Typically, traumatic incidents have been studied separately, but new evidence suggests that ACEs are actually inter-related.[8] For example, there is a compelling relationship between the experience of child sexual abuse and other forms of ACEs: as the severity measure of the child sexual abuse increases, the strength of the relationship to various other ACEs increases.[9] Furthermore, as the rate of witnessing intimate partner violence in the home increases, the incidence of other types of ACEs also increases.[10] Studying more than one ACE permits an assessment of their correlation with social and health consequences.[11]

Researchers from the Centers for Disease Control (CDC) have been involved in an ongoing collaboration with Kaiser Permanente's Department of Preventive Medicine, where they have designed a large and epidemiologically sound research project exploring the effect of ACEs on adult health.[12] This study considers the constellation of abuse and household dysfunction, recognizing the inter-relatedness of different types of abuse as well as the general climate of the family and their impact upon adult health status. Adverse experiences that were assessed

included emotional abuse, physical abuse, sexual abuse, violence against the respondent's mother, living with substance abusing household members, living with mentally ill or suicidal household members, and living with household members who had ever been imprisoned. Thus, rather than simply looking at single traumatic incidents, people participating in the study could be given an ACE score, which was then correlated with health risk behaviors and medical problems.[13]

17,000 Kaiser Permanente patients agreed to participate in this study, which yielded results surprising to the researchers. Not only are ACEs common, but they play a crucial role in shaping adult health status in the United States.[14] Among this middle-class population of Kaiser members, just over one half reported experiencing one or more of the ACE categories. About twenty-five percent reported exposure to two ACE categories, and one-sixteenth reported exposure to four ACE categories. Furthermore, an exposure to one ACE means a person was 80% more likely to have been exposed to another ACE.[15] Nearly one quarter of participants reported growing up with someone who abused alcohol. Twenty-eight percent of women and sixteen percent of men reported a history of sexual abuse.[16] This study exposes a distinct and compelling relationship between ACEs and adult physical and mental health, as well as the chief causes of death in this country.[17] It demonstrates a strong dose-response relationship between the number of ACEs and a variety of diseases, including liver disease, broken bones, chronic lung disease, cancer, and ischemic heart disease. Among people reporting four ACEs compared to those reporting no ACEs: health risks for suicide attempts, depression, and alcohol and other drug abuse increased four to twelve-fold; health risks for sexually transmitted disease, greater than 50 sexual partners, poor self-rated health, and smoking increased two to four-fold; and health risks for severe obesity and physical inactivity increased 1.4 to 1.6-fold.[18] Although ACEs are clearly widespread, they tend to be hidden and unacknowledged. Yet their impact continues to be overwhelming even fifty years later when they appear as mental illness, social malfunction, or organic disease. In fact, ACEs are determining the health and social well-being of this country.[19] This study strongly suggests that ACEs are actually the basis of a large segment of the mental and medical illness in the United States.[20]

Health Risk Behaviors

Research in the 1980s and early 1990s revealed that smoking, alcohol abuse, and sexual behaviors are among the risk factors for common diseases. This research also demonstrated that risk factors often clustered together rather than being randomly distributed across the population. The ACEs research was actually designed to address the gap in knowledge regarding the origins of these risk factors, exploring the influences preceding the development of risk behaviors (http://apps.nccd.cdc.gov). While it was apparent that the underlying causes of death are actually health behaviors and lifestyle dynamics, there was no understanding of the connection between childhood abuse and household dysfunction and health risk behavior and adult health status.[21] In fact, the ACE study found a powerful connection between the degree of childhood abuse or household dysfunction and numerous risk behaviors for several primary causes of morbidity and mortality in U.S. adults.[22]

The authors suggest that risk behaviors such as overeating, smoking, sexual behaviors, and alcohol or other drug abuse may actually be strategies people use to cope with the stress of ACEs. For example, smoking and use of alcohol and other drugs might work well in managing the expected anxiety, anger, and depression associated with ACEs, resulting in their chronic use.[23] Coping behaviors may also be seen as a response to the changes in the chemistry of the

developing brain that is impacted by the ACEs (www.cdc.gov). Thus, what are seen as public health *problems* are actually personal *solutions*.[24] Therefore, it is not surprising that well-intended preventive efforts are not likely to work when someone is faced with giving up their current solution for the more vague idea of promoting their long-term health.[25]

As ACE score increases, likelihood of current smoking increases.[26] In spite of public health efforts to stamp out smoking in California because of its clear connection to chief causes of death, smoking has continued with no additional reductions in smokers beyond initial successes.[27] It is also important to note that, despite social changes, the relationship between ACEs and smoking has been consistent across age groups throughout the twentieth century.[28]

Similarly, there has been little advancement in addressing the serious public health problem presented by intravenous drug use, which is the acknowledged origin of a number of serious diseases. There is a strong dose-response relationship between ACEs and intravenous drug use: as ACE scores increase, the percent of people who have injected drugs increases.[29] Remarking on the unique magnitude of these results, Felitti points out that a male child with an ACE score of 6 is 4,600% more likely to become an intravenous drug user than a male child with an ACE score of 0.[30] ACE scores can be credited with more than three-fourths of intravenous drug use by women, or two-thirds of men and women combined, according to population risk analysis (PAR). Notwithstanding differences in social customs and the availability of drugs over time, this PAR has remained steady in four age groupings with birth dates spanning a century.[31]

Infertility, vaginal cancer, cervical cancer, ectopic pregnancy, still birth, abortion, spontaneous abortion, chronic pelvic pain, sexually transmitted diseases, violence-related trauma, and death are among the numerous consequences of sexual risk behaviors in women. The infants born to these women are vulnerable to neurological damage, ocular infections, pneumonia, prematurity, low birth weight, and death. There is a strong relationship between all ACEs and the likelihood of having had thirty or more sexual partners, of seeing oneself as having AIDS risk, and having engaged in sexual intercourse by age 15. In this way, the study provides a connection between sexual risk behaviors and ACEs. The authors suggest that public health efforts are not likely to alter these risky behaviors without acknowledging that they might involve a search for the intimacy and affection that was not available to them in their childhood.[32] This is reinforced by the fact that the relationship between ACEs and multiple sex partners and sexually transmitted diseases has continued through four birth cohorts since 1900, despite social changes.[33]

Males with high ACE scores are more likely to be involved in teenage pregnancies.[34] A positive correlation was found with each ACE score and impregnating a teenager.[35] In fact, the likelihood that a male will impregnate a teenage girl nearly doubles when they have been victims of sexual abuse at a younger age, if they were physically abused, or if they witnessed violence against their mother.[36] This relationship reaches across four age groupings throughout the twentieth century (even in the face of developments in the availability of contraception and abortion and changes in sexual mores). The authors suggest it is possible that effects of ACEs on growing children lead to shared emotional and behavioral consequences.[37]

Thus, all four quadrants are involved in ACEs and the development of health risk behaviors. When individual personal solutions become collective social problems, both the individual (upper quadrants) and collective (lower quadrants) must be considered together. Integrally informed policy interventions would aim to foster both exterior (Right-Hand quadrants) and interior (Left-Hand quadrants) developments.[38] Public health interventions that aim to address

behaviors while ignoring personal development and cultural meanings are likely to fall short of desired outcomes. Neither will policies calling for a belief in particular values lead to a reduction of health risk behaviors. Values are one line of development, and this development occurs in the context of all different kinds of family and cultural meanings as well as family systems and social institutions. Further, individual behaviors reflect development across many lines. People also have unique strengths and both personal and environmental coping resources available to them. If ACEs have interfered with healthy development, a belief in a particular set of values is not going to repair the damage.

Mental Health and Substance Abuse

ACEs create emotional and neurodevelopmental damage, harm school and social performance, and are common yet hidden and unacknowledged. Overeating, use of psychoactive materials, smoking tobacco, sexual promiscuity, and drinking alcohol are among the small number of ways that increasingly become available to adolescents as they seek relief. While these coping strategies have short-term emotional benefits, they also frequently present risks for disease and death in the long-term.[39] Both substance abuse and mental health issues are connected to ACEs.

"We find that addiction overwhelmingly implies prior adverse life experiences."[40] ACE score is correlated with drug initiation risk, problems connected to drug use, drug addiction, and use of drugs parenterally, across four age groupings over the past century.[41] There is a strong association between ACEs and alcoholism, and this remains consistent across birth cohorts since 1900.[42] ACEs are also implicated in smoking.[43] ACEs are more common among children with an alcoholic parent.[44] If mother, father, or both parents abused alcohol, a person was 2–13 times more likely to experience any other ACE category. The greatest chance of ACEs was among those with both parents abusing alcohol.[45] Regardless of parental alcoholism, one's risk of both adult alcoholism and depression increases as ACE score increases. ACEs, and the risk of multiple ACEs, are more common among households with an alcohol-abusing parent. It seems that the increased chances of ACEs in an alcoholic household largely contribute to depression among adult children of alcoholics.[46]

A person with an ACE score of 4 was found to be 460% more likely to experience depression and 1,220% more likely to attempt suicide than someone with an ACE score of 0.[47] As ACE scores increase, the likelihood of both recent and lifetime depressive disorders increases, pointing to a connection between ACEs and the experience of depression decades later.[48] Once again, this connection between ACE score and depression is consistent across four birth cohorts in the twentieth century.[49] There is also a strong graded relationship between ACE scores and the likelihood of reporting hallucinations, unconnected to alcohol or other drug use.[50] ACE scores have a dose-response relationship to the mental health scale of the Medical Outcomes Study 36-item Short-Form Health Survey. Mental health score decreases were more noticeable when there was an emotionally abusive family environment.[51] There is also a dose-response relationship between ACE scores and suicide attempts, which is consistent across four birth cohorts in the past century.[52]

Medical Problems

Understanding the relationship of ACEs to some of the health risk behaviors already mentioned leads to numerous public health implications. For example, HIV/AIDS and hepatitis C infection are associated with substance abuse problems.[53] Numerous medical consequences of sexual risk

behaviors have already been outlined.[54] Depression and anxiety in middle-aged men leads to three times the likelihood of fatal stroke, and stress may initiate arrhythmias among heart patients.[55]

There is a graded relationship between ACE scores and risk of ischemic heart disease, and every ACE category but one increased IHD risk.[56] Teen pregnancy increases as ACE score increases. Many of the negative long-term reported psychosocial outcomes of teen pregnancy (uncontrollable anger, high stress, serious family, job, and financial problems) appear to be due to ACEs rather than the teen pregnancy itself. Fetal death risk also increases as ACE score increases.[57] As the number and severity of each ACE increases, the risk of obesity also increases.[58] Risk of liver disease is increased by the presence of each of the ACEs, and there is a strong correlation between risk behaviors for liver disease and ACEs.[59] A graded relationship between ACEs and cancer, chronic lung disease, and skeletal fractures has also been discovered.[60]

Homelessness

There is also a relationship between the behaviors of homeless adults and ACEs, and ACEs constitute high risk for homelessness.[61] In fact, study after study demonstrates that ACEs predict homelessness.[62] Previous studies have indicated that both mental illness and substance abuse problems are more common among homeless people than the general population.[63] ACEs have already been connected to substance abuse and mental illness.[64] Even non-homeless people with either substance abuse problems or mental illness are less likely to hold a job.[65] In addition to finding that substance abuse problems are anteceded by ACEs, Tam and colleagues report that homeless adults who abuse substances are less likely to experience long-term participation in the job market.[66] While ACEs are connected to social service utilization among homeless adults, substance abusing homeless adults avoided service usage.[67] It has been suggested that service responses to child abuse and neglect hold an opportunity for addressing ACEs before they lead to more serious problems, including substance abuse and homelessness.[68]

The Criminal Justice Connection

As previously discussed, ACEs are implicated in substance abuse problems. It therefore also becomes important to note that the complex relationship between crime and substance abuse has been thoroughly recorded.[69] Many people with substance abuse problems become involved in the criminal justice system in some way.[70] At the same time, the number of people behind bars in the United States has increased at an unprecedented rate since 1972, with two million Americans currently incarcerated.[71] Approximately three fourths of incarcerated people suffer from substance use disorders, and the number of people with substance use disorders either currently or previously involved with the criminal justice system has also increased.[72] The criminal justice system is further challenged by the number of incarcerated individuals diagnosed with Hepatitis C, a medical problem that is also associated with substance abuse and mental health problems, as well as the elevated concentration of prisoners with behavioral risk factors for HIV infection that contributes to increased rates of HIV/AIDS among the prison population.[73] The National Institute on Drug Abuse (NIDA) has stated that most of the people in our prisons and jails have substance abuse problems serious enough to warrant treatment.[74] Recognizing the fact that substance abuse treatment can decrease recidivism to criminal behavior but that very few incarcerated people with substance abuse disorders are actually receiving any substance abuse treatment, NIDA has published a research-based guide to *Principles of Treatment for Criminal-Justice Involved Drug*

Abusers.[75] Since ACEs are implicated in substance abuse, which is in turn implicated in crime, it seems that a comprehensive response to ACEs would be likely to have an impact upon the crime rate and the number of people imprisoned in this country.

Recommended ACE Response Strategies

> Because child abuse and household dysfunction are common and have long-term effects that are highly disruptive to workers' health and well-being, these adverse childhood experiences merit serious attention from the business community, labor leaders, the everyday practitioners of medicine, and government agencies.[76]

The ACE study authors point out that primary prevention is tied to changes in society that could support and enhance home environments and family life.[77] Public health responses and interventions addressing health risk behaviors are therefore likely to be more effective if ACEs are acknowledged and addressed through both prevention and treatment efforts.[78]

Since the likelihood is higher that other ACEs occur when a child witnesses domestic violence toward their mother, the children of women being helped through domestic violence issues should also be screened for other ACEs. Additionally, their increased likelihood of depression and substance abuse based on witnessing this domestic violence needs to be addressed.[79] Thus, education on ACEs would need to take place across numerous professions and service systems.

Dube and colleagues state that pediatricians would ideally play a role in psychosocial and substance abuse assessment, including screening for family discord and abuse.[80] The ACE studies point to the importance of supporting physicians in addressing underlying ACEs in addition to disease symptoms, which are often tertiary consequences of the ACEs.[81] Thus, routine screening for ACEs must occur early on in medical settings.[82] This also speaks to the importance of strong connections across professions as well as service linkage mechanisms. Anda and colleagues suggest that addressing ACEs in these ways thereby requires a shift to a biopsychosocial approach, as defined by the World Health Organization.[83] Yet, while the biopsychosocial model presents many important pieces to the puzzle of health, it does not actually *integrate* them. This is another area where Integral Theory makes an important contribution, offering a coherent framework for how all four quadrants interact and influence each other as personal and social growth and development takes place.

Additional responses proposed by ACE study authors include programs that prevent and treat the family issues that give rise to ACEs.[84] Examples of this are early public health nurse home visits to high-risk families and youth development programs with aspects addressing ACEs.[85] Felitti also suggests the media could be mobilized as a resource to facilitate education on parenting skills.[86]

The Centers for Disease Control (CDC) does report that there will be an attempt to develop programs responsive to ACEs by drawing on some of the family-based interventions previously utilized by Kaiser Permanente (www.cdc.gov). Kaiser Permanente has already funded a "Healthy Steps" program that includes experts on psychosocial and developmental aspects of parenthood and childhood on the pediatric team, developing strong relationships with families of children ages birth to 3 years through home and office visits as well as a telephone advice line.[87]

Comprehensive approaches are critical in carrying out secondary prevention of ACE effects that are also supportive of primary prevention efforts. Clearly, opportunities for ACE assessment cut across fields of practice as well as service delivery systems. A high degree of communication among preventive medicine and public health, emergency medicine, pediatrics, social work, nursing, internal medicine, family practice, and other providers are critical to an effective response. Additionally, professionals need training to support their recognition of the ways in which psychosocial and medical problems are connected across the lifespan. For example, health promotion and disease prevention programs already in place may be able to increase their effectiveness by acknowledging ACEs and the role they play.[88] Employers and HMOs, who want to promote the health and functioning of the workforce as well as reduce costs associated with avoiding underlying ACEs, are also important partners in bringing awareness to ACEs and effectively responding to them.[89]

Additional Service Delivery Implications

For many people, health, mental health, substance abuse treatment, social service, educational settings, and even the criminal justice system, can potentially become an important access point to address ACEs. On the other hand, if this access is impeded, it is possible that problems could worsen and lead to greater costs, both for the individual and society. We already know that problems in service delivery can contribute to relapse and exacerbation of health problems among substance abusers, and society bears a greater cost with unproductive service delivery systems.[90] Terms such as interprofessional practice, collaboratives, coalitions, service integration, integrated care, and interdisciplinary, multidisciplinary, interagency, and interorganizational collaboration are increasingly appearing in the professional literature to describe ways of working together and addressing gaps to improve the delivery of services.[91] Their goals are to improve access, reduce costs, and address the family as a service unit.[92] Service integration has contributed to increasing utilization of medical care by substance abuse patients, treatment retention and housing stability among homeless people, and positive outcomes for dually diagnosed people.[93]

An Integral Explanation

It becomes clear that the traditional medical establishment has focused primarily on the physical dimension, or the UR quadrant. ACEs occur primarily through LR behavioral interactions in family systems, and these interactions are taking place within the LL context of family meanings and contributing to family culture. The family culture is in turn influenced by (and influencing) the sub-culture and larger culture, which may include social taboos against discussing ACEs and even victim blaming. Further, LR social violence, including economic dysfunction, ecological toxicity, war, and other acts of violence influence families and have repercussions in all quadrants. ACEs can significantly impact development in the UL quadrant and contribute to health risk behaviors and even organic disease in the UR quadrant. Public health responses in the LR quadrant that focus only on UR behaviors are not as effective as they would be if they also took into account the UL and LL quadrants. Increasingly, physicians are now being called on to take a biopsychosocial perspective rather than limiting their work solely to the UR quadrant, or disease-oriented medical model, and Integral Theory is useful in providing a coherent way to integrate the pieces of the biopsychosocial puzzle.[94]

Figure 2 depicts the ACE impact within the quadrants. As noted above, ACEs are most often viewed as the outcome of LR behavioral interactions in family systems. In the LL quadrant, a

family culture that requires denial of feelings and social taboos in the larger culture work together to keep ACE experiences hidden. A cultural belief in "rugged individualism" may contribute to shortages of help and even blaming the victim. Meanwhile, the developing self in the UL quadrant attempts to cope with overwhelming and often invalidated feelings. Various defense mechanisms may begin to occur within the self. People may engage in certain UR behaviors (substance abuse, sexual acting out, etc.) in an attempt to cope, and these may become health risks. It has also been suggested that the developing brain is impacted by the traumatic incident, and abuse of substances can also lead to changes in brain chemistry. Both short and long-term medical problems are also outcomes of ACEs. Institutions, such as healthcare and other treatment, social service, and educational systems in the LR quadrant may or may not respond to ACEs. Public health policies shape the type and extent of response.

UPPER LEFT (I)	UPPER RIGHT (It)
• ACE impact on developing self (overwhelming feelings, activation of defense mechanisms, etc.)	• Health risk behaviors (substance abuse, sexual, and other risk-taking) • Medical problems (both short and long-term) • Changes in developing brain
LOWER LEFT (You/We)	**LOWER RIGHT (Its)**
• Family meanings • Cultural values • Social taboos • Victim blaming • "Rugged individualism"	• Family relational systems/ACEs • Social violence • Health, mental health, and substance abuse services • Social service, school, and criminal justice systems • Public health policy responses

Figure 2. Quadrant Feedback Loops

All quadrants are mutually interacting with one another, so feedback loops can also be pictured. For example, many of the risky behaviors that grow out of an attempt to cope with the traumatized self may, in turn, contribute to adverse experiences for others (e.g., the person who begins to use alcohol as a coping strategy and ends up becoming an alcoholic parent, the intravenous drug user who begins stealing to support the habit). Meanwhile, the lack of adequate cultural understanding in the LL and institutional response in the LR contributes to the development of substance abuse and mental health problems in traumatized individuals with few alternatives, setting off another cycle through the quadrants. This can lead one to question just how much of the pain and confusion and sickness in our society is actually a result of our continuing abuse and neglect of our children?

Social Influences and Personal Choices

Becker is a Nobel-prize winning economist whose analysis model operates on the principle that the behaviors of individuals and collectives are actually optimizing and rational rather than irrational.[95] Becker and Murphy include the effects of the social environment when considering personal decision-making, presenting a way to analyze the direct effects of social interactions on personal behavior.[96] They provide numerous examples of the persistent impact of social forces on behavior and demonstrate how to include these social forces into the economic analysis of behavior.

While social forces have to do with other people's behaviors, habits are built through the behavior of past "selves." Social forces and habits reinforce one another and both contribute to people's choices and behaviors. Behavior may change in relation to shifts in the social environment, and some behaviors are geared toward changing the environment. On one hand, choices are limited because individual behaviors are partially governed by the behavior of others. On the other hand, personal decisions play an important role in determining social structure. The social environment itself is an accumulation of behavioral interactions.[97] Thus, Becker is looking at non-market goods in economic ways. An Integral perspective points out that individual personal preferences and choices have to do with Left-Hand quadrant values that are co-arising with selection pressures in LR social interactions. Hence, Becker is articulating the way in which all interior values have a Lower-Right functional fit, which can be viewed from an economic perspective.

This economic analysis has been found useful in examining a wide range of social issues, uniting the economists' emphasis on rational choice with social scientists' recognition of the determining influence of social structure.[98] One example of the interplay of social forces and personal behavior and habits is the development of addiction. Drug use, drinking, and smoking often begin in adolescence, a time marked by peer pressure. It has been suggested that strong peer pressure may actually play a role in the development of addiction.[99] Becker has also found that one's human capital, including education, explains types of criminal behaviors committed by people. These criminal activities are viewed as rational in ambiguous situations.[100]

The notion of human capital development, or the production of abilities and skills, is important in understanding ACEs interventions and explains why addressing ACEs is profitable. Numerous studies of early intervention programs with disadvantaged children already demonstrate significant benefit-cost ratios. These interventions have been found effective in enriching the environments of children and promoting learning, demonstrating stable effects on motivation and learning in children. Further, one study showed a return of $5.70 for every dollar spent on a child by the time the child became an adult aged 27, and $8.70 when projected into the rest of their lives. The cost savings in crime reduction is also notable. It is because each new developmental stage begins with the skills gained in the previous stage that the return on investment in young people is so high. Furthermore, the costs of later investments are reduced by early investments in younger children. Families and other systems play a very strong role in human capital development in addition to schools.[101]

Integral Restorative Processes

Integral Restorative Processes (IRP) is a model based on Wilber's Integral Theory that serves as an effective response to ACEs by recognizing that all four quadrants need to be addressed.

Although existing treatment approaches address the effects of ACEs on a piecemeal basis (i.e., separate substance abuse treatment, medical treatment, etc.), the approaches are deficient in that they do not recognize the underlying impact/cause/syndrome (ACEs) and do not provide a comprehensive response. IRP is a model that takes the bigger picture into consideration and can guide transdisciplinary, multidisciplinary, or interdisciplinary team responses and coordination in addressing ACEs. When using an IRP intervention with ACEs, Integral Theory offers a comprehensive understanding of the situation, allowing one to then decide which two or three "hotspots" are the most crucial and can be addressed within practical limits. This model guides us in touching base with all of the quadrants, or dimension-perspectives, in responding to ACEs. It allows room for a variety of therapeutic modalities known to be effective in working with trauma and addressing health risk behaviors and medical problems. At the same time, we are guided to work with the family, community, sub-culture, or larger culture in terms of increasing awareness and consciously considering how "We" treat each other, as well as actively strengthening social networks. Advocacy in regard to social policies, laws, and public health responses to ACEs will also influence cultural mores and enhance our capacity to effectively respond to ACEs. It is likely that IRP responses to ACEs will begin to look like "communities of care" guided by an integrally informed team, each with expertise in a particular area who see that role within the context of an AQAL ("all-quadrant, all-level") perspective. Figure 3 represents an IRP response in the quadrants.

UPPER LEFT (I)	UPPER RIGHT (It)
• Use of various therapeutic modalities effective with trauma	• Medical and psychiatric care • Substance abuse treatment • Behavioral work
LOWER LEFT (You/We)	**LOWER RIGHT (Its)**
• Relationship counseling • Family strengthening • Group work • Self-help groups	• Family systems therapy • Community organizing • Policy advocacy • Service delivery rearrangements • Media/educational campaigns

Figure 3. IRP Response to ACEs

Mapping the quadrants also helps in assessing current resources and considering where to begin the most effective use of these resources. For example, long-term individual psychotherapy can be expensive, and a mobilization of resources in other areas will also interact with the individual's UL quadrant. Therefore, emphasis might initially be placed on efforts in the LL and LR quadrants as a beginning phase. In other words, we could start by increasing awareness of the problem, educating professionals, engaging in policy advocacy, and putting efforts toward the development of caring communities. The hope is that the UR medical, behavioral, and substance abuse interventions currently in place are likely to become increasingly inclusive and collaborative as professionals are educated in ACEs and the IRP response. Meanwhile,

innovative short-term and self-help methods for working with trauma can be utilized and evaluated (e.g., EMDR, EFT, yoga, etc.) as a way of directing efforts toward the UL quadrant. Of course, another approach in terms of quadrant emphasis might be taken; the main point is recognition of development from an all-quadrant perspective. IRP is a flexible model that can be easily understood and adapted by a variety of professionals and lay persons alike. Its comprehensiveness is expected to both improve treatment effectiveness and make it a much more cost-effective treatment model than piecemeal, one-quadrant interventions.

Conclusion

This article has reviewed the powerful implications of the ACE study literature. ACEs are strongly connected to health risk behaviors, psychosocial and substance abuse problems, and a wide range of organic diseases. This in turn plays a role in workforce functioning and participation as well as homelessness and involvement in the criminal justice system. ACE findings are bound to change the face of medical care, expanding the boundaries of professions as they work together to address root causes of presenting concerns. Partial and exclusive treatment approaches can give way to a more Integral response to the underlying syndrome. Integral Theory is used to explain the underlying syndrome that has been discovered. Becker's research not only supports an understanding of the interplay between personal choice and behavior and social interactions and structure from the LR social economic perspective, but also highlights the importance of investments in human capital.[102] The high rates of human capital return on numerous early intervention programs make a powerful argument for the profitability of addressing and preventing ACEs.[103] Integral Restorative Processes (IRP) has been presented as a useful and flexible intervention model. This model guides us in addressing developmental impacts of ACEs from multiple perspectives for a truly comprehensive response. An understanding of ACEs as an underlying syndrome along with a vigorous IRP response has the potential to reduce and eliminate many noninfectious causes of illness and death in the United States.

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