

adverse childhood experiences. understanding their effects

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In the 1990s a large US study found associations between adverse experiences in childhood and poor adult outcomes in physical, emotional and mental health.

This article explores some of the key findings from the seminal Adverse Childhood Experiences (ACE) studies, in conjunction with other research into the potential effects of adversity on tamariki and rangatahi. It is intended for those working with tamariki and rangatahi, or their whānau, to aid understanding about the possible impacts of adversity on those they support.

What is adversity?

Adversity is an umbrella term for a range of experiences that are serious or ongoing and likely to challenge children's coping. Actual definitions are varied.

However, some key elements are:

- Adversity refers to both a single serious event, and/or a series of events that continue over time.¹
- Experiences of adversity are those "associated with disruption, danger, and stress, which deviate from the normative and expected environment",² and that require major adaptation for most tamariki.
- This deviation can take two forms, both the "absence of expected inputs" (e.g. neglect), and "the presence of unexpected inputs"³ (e.g. abuse).

- Adversity can be both direct and indirect. Some forms of adversity affect tamariki directly, (e.g. physical abuse). Other forms of adversity affect children more indirectly, through impacting on their living environments, (e.g. conflict between parents).⁴
- Adversity doesn't cover every stressful experience that tamariki or rangatahi might encounter. For example, whilst moving to a new school might be stressful, a couple of such changes are a typical part of growing up.5
- Some definitions specify that adversity is beyond the typically expected experiences of childhood. However, others highlight that some types of adversity are reasonably common.⁶ For example, the ACE studies included parental separation (a relatively common occurrence) as one of their categories of adversity. (So just because something is relatively common does not mean it does not have a negative impact.)

- Felitti & Anda, 1997, Gest et al., 1999, and, McLaughlin, 2016, cited by Thompson et al., 2019, p. 87
- McLaughlin, 2016, p. 363 Hughes et al., 2017
- McLauahlin, 2016
- 5. 6. Felitti, 2009

McLaughlin, 2016 2

In general, the term adversity refers to the experiences or events a child has been exposed to; not to the effects these experiences may have had on the tamaiti.⁷ As we will see, having similar experiences can impact individuals very differently, and is also dependent on other factors in their lives.

It's important to note that while 'typically expected events,' may be expected from an adult perspective, they may still be very unexpected, stressful and potentially traumatic for a child (e.g. the death of a grandparent). In other words, children's development can be impacted by their experiences, whether or not these experiences fit a definition of adversity.

The ACE studies

The off-cited Adverse Childhood Experiences (ACE) studies looked at a broad range of early childhood stressors and their relationship to many and varied health and social problems across the life span.⁸ The studies were undertaken with members of Kaiser Permanente's San Diego Health Appraisal Clinic (a primary health care provider) who had completed standardised medical evaluations in 1995-96. Members were mailed the survey regarding childhood events, and the findings are based on more than 9500 responses.9

The initial ACE studies looked at seven categories of adversity:

- psychological, physical, or sexual abuse;
- violence against mother;
- living with household members who were
 - 0 substance abusers:
 - mentally ill or suicidal; or 0
 - ever imprisoned.10 0



Some of these ACEs involved direct harm to children (for example, abuse) while others had more indirect effects (for example, a parent in prison).¹¹ Participants were asked to answer a series of questions about experiences during the first 18 years of their life.

"Respondents were defined as exposed to a category if they responded 'yes' to 1 or more of the questions in that category."12 Over half of those surveyed reported at least one, and a guarter reported 2 or more categories of exposure. 6.2% reported 4 or more.13 (It's worth noting that those studied were disproportionately white and middle class.14)

A second wave of the study conducted in mid-1997 added some questions regarding:

- emotional and physical neglect, and also
- parental separation/divorce.

There were more than 8000 respondents in this wave of data.¹⁵ Two thirds of those surveyed reported at least one ACE.16

In this way, the term 'ACEs' came to represent a combined measure of childhood adversity.¹⁷ An 'ACE score' refers to the number of types of adversity an individual experienced prior to the age of 18 years. ACE scores range from zero, when none of the adversities studied had been experienced, to 7, (in the first wave of data), or 10 (in the second wave of the study).¹⁸

ACE scores reflect the number of different types of adversity an individual has experienced, but do not indicate the frequency or severity of their experiences, nor their effect on the child.¹⁹ For example, a person would score once for physical abuse, whether this was severe and ongoing through their childhood, or much less severe and occurring on one occasion.

The strengths of the study include its large sample and good access to health data. This enabled links to be seen between childhood experiences and objective data about diagnosis and treatment for many health outcomes.

Prevalence

ACEs are relatively common. The study by Felitti and colleagues found more than half those studied had experienced one or more ACE, and a guarter reported 2 or more ACEs.²⁰ Subsequent research, with a more socioeconomically diverse sample, found ACEs to be more prevalent with approximately 75% exposed to at least one.21

New Zealand data, from the Dunedin study, found approximately 65% exposed to at least one ACE, with 15% reporting four or more.22

> Exposure to adversity can have lasting and widespread effects on many aspects of health throughout life.

Adversity: Cumulative & interconnected

Research on ACEs has consistently found a dose-response relationship between ACE scores and health outcomes; in other words, as the ACE score i.e. the number of types of adverse experiences increased, the likelihood of poor health outcomes also increased.²³ The cumulative impact of multiple ACEs is greater than the impact of any individual

- McLaughlin, 2016 Anda, et al., 2010 7 8.
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- Felitti et al., 1998 Felitti et al., 1998 10.
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- 12. 13.
- Feiliti et al., 1998 Hughes et al., 2017 Feiliti et al., 1998, p. 248 Feiliti et al., 1998 Feiliti et al., 1998, cited by Hunt et al, 2017 Dong et al., 2005 14
- 15.
- Dong, Anda, et al., 2004 Felitti et al., 1998, cited by Bellis et al., 2019 16. 17.
- Dong, Anda, et al., 2004 Massetti et al., 2020
- 18. 19.
- 20. Felitti et al., 1998 21 Hunt et al., 2017
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- Reuben et al., 2016, cited by M. C. Walsh et al., 2019 23 Tourangeau & Yan, 2007, cited by Massetti et al., 2020

ACE on its own.²⁴ In other words, the effects of multiple adversities often compound.

Some types of ACE are highly connected to other types. For example, various forms of violence are frequently connected to household dysfunction, such as parental mental illness, substance use or involvement in crime. This makes each ACE in turn very powerful as they are so likely to be linked with a multitude of problems. On the other hand, adversities like death and divorce were less likely to occur alongside other ACEs.25

Wide ranging outcomes

Exposure to adversity can have lasting and widespread effects on many aspects of health throughout life. ACEs are associated with some of the "leading causes of the global burden of disease".²⁶ In the following section we explore examples of the range of these effects; this is not an exhaustive list. It is important to note that the methodology of the ACE studies, whilst showing associations between ACEs and health outcomes, does not enable causation to be established.

"Stressful or traumatic childhood experiences such as abuse, neglect, or forms of household dysfunction are a common pathway to social, emotional, and cognitive impairments that lead to increased risk of unhealthy behaviours, violence or re-victimization, disease, disability, and premature mortality."27

Health risk behaviours 1.

An analysis of multiple studies found that those with 4+ as an ACE score were more than 2x as likely to smoke or drink heavily and 6x as likely to have problem drinking than those with 0 ACEs.²⁸ It was suggested that risk behaviours such as smoking, over eating and physical inactivity may occur as ways for people to cope with the stresses they have experienced.29



Using data from over 5000 women the researchers studied the impact of early adversity on sexual risk behaviours in women. They found that each category of adversity was "associated with increases in the risk of early onset of intercourse, multiple sexual partners and self-perceived risk of AIDS."³⁰ Further, as the women's ACE score increased, so did the prevalence of sexual risk behaviour.

Physical health

Arguably, the most striking finding from the original ACE studies, and the many others since, is the link between experiencing childhood adversity and increased risk for a wide range of health issues in adulthood. This is striking because while most people understand the risk of longlasting emotional and social harm from childhood adversity, few realise the strong association between a difficult childhood and poor physical health.

A dose-response relationship was found between the ACE score and the risk of many health issues. These included - cancer, skeletal fractures, liver disease, ischemic heart disease, stroke and chronic lung disease. As the ACE score increased so did the risk of poor health outcomes.³¹ Two examples of these health issues, namely auto-immune disorders and ischemic heart disease, are discussed in more detail below.

The ACE scores were studied in relation to 21 auto-immune disorders including coeliac disease, rheumatoid arthritis, multiple sclerosis, insulin-dependent diabetes mellitus, and irritable bowel disease.³² These conditions disproportionately affect women, with approximately 80% of affected people being women.³³ Among the women studied, every increase in their ACE score was associated with 20% increased likelihood of being hospitalised for an auto-immune disorder.34

Using the ACE scores it was found that the risk of ischemic heart disease (IHD) was significantly increased among those exposed to any individual ACE, with the exception of marital discord.³⁵ Further, there was a graded relation whereby those with 7 or more ACEs were more than 3 times as likely to have IHD than those with no ACEs.

> Children's behaviour and mental health can be negatively affected by experiences of adversity.

Mental health 3.

Globally, the "burden of disease related to mental illness" is growing and childhood is an important time in laying the foundations for later mental health.³⁶

For example, the ACE studies found that childhood adversity was associated with increased likelihood of experiencing hallucinations. This finding was independent of any substance abuse history. Those with an ACE score of 7 or more were five times more likely than those with an ACE score of 0 to report hallucinations.³⁷ In addition, those exposed to 4 or more ACE categories were at increased risk for depression, drug abuse, and alcoholism.³⁸

- Hunt et al., 2017 24.
- 25. 26. Kessler et al., 2010, cited by Massetti et al., 2020 Hughes et al., 2017, p. e365
- Anda et al., 2010, p. 95 27.
- 28. 29. 30. 31. Hughes et al., 2017 Dong, Giles, et al., 2004
- Hillis, Anda, Felitti, & Marchbanks, 2001, p. 210 Felitti et al., 1998
- 32. 33.
- Dube et al., 2009 Jacobsen et al., 1997, cited by Dube et al., 2009
- 34. 35. Dube et al., 2009 Dong, Giles, et al., 2004
- 36. Bellis et al., 2019, p. e525
- 37. 38. Whitfield et al., 2005 Felitti et al., 1998

In keeping with this, further studies have found that exposure to ACEs increases the likelihood of most types of mental illness.

Mood disorders, anxiety, substance dependence, psychosis, personality disorders, behavioural disorders and suicidal behaviour are all more likely amongst those exposed to ACEs.³⁹ The impact of ACEs on mental health can be seen across the lifespan, into old age.⁴⁰ This means that those who were exposed to ACEs are at increased risk of poorer mental health many decades later, suggesting that the "negative effects of childhood adversity do not become significantly weaker in later life."41

WHO's world mental health survey, of more than 51,000 adults from 21 countries⁴² found childhood adversity was strongly associated with all 20 disorders studied. Their findings suggest that elimination of childhood adversity would lead to an almost 30% reduction in all mental disorders.43

Work conducted by Teicher and colleagues has also found that children exposed to maltreatment are more likely to experience mental illness. In addition, they found that children who have been maltreated are likely to experience mental illness at younger ages, with greater severity, and respond less positively to treatment.44 Comorbidity, the presence of two or more conditions in the same person, is also more common amongst those who have been maltreated.



The original ACE study found a strong relationship between the ACE score and attempted suicide, with the risk being increased 2-5 times.⁴⁵ ACEs were found to account for approximately two-thirds of suicide attempts among the adults studied, which also indicated the long-term impact of these childhood experiences. Recent studies lend further weight to the link between ACEs and suicide attempts.

Childhood effects of adversity

The original ACE studies highlighted the connection between adversity in childhood and health outcomes well into adulthood, as the average age of study participants was 57 years⁴⁸ However, while these effects can be seen well into adulthood, this doesn't mean they begin then. Other studies indicate that the effects of adversity can be seen and experienced in childhood, sometimes quite early in childhood. Health, learning and behaviour can be affected. Some examples of these are described below.

Physical health concerns linked with ACEs include asthma, headaches, digestive conditions and poorer childhood health.⁴⁹ An ACE score of 4 or more has been associated with being overweight and obese.⁵⁰

ACEs have been associated with lower school attendance/ higher absenteeism, poorer academic skills, learning disorders and lower school achievement.⁵¹ When it comes to absenteeism, for example, those with 4 or more ACEs were approximately 6 times more likely to miss more than 20 days of school per year; even those with 2 or 3 ACEs had double the rate of school absenteeism.⁵²

Children's behaviour and mental health can be negatively affected by experiences of adversity. Examples include increases in anti-social and violent behaviour, internalising and externalising behaviour issues, and poorer childhood mental health amongst those who've experienced adversity.⁵³ Those with an ACE score of 4 or more were 33 times more likely to have learning or behaviour disorders than those with no ACEs.54

NZ research, from the Growing Up in NZ (GUiNZ) study, found higher levels of behaviour problems in children as young as 4.5 years amongst those exposed to adversity.55 By this age more than half the tamariki had been exposed to at least one ACE. Those exposed to ACEs also performed more poorly on tests indicating readiness for school, including counting, recognising letters and the ability to delay gratification, in a dose-response fashion.56

Protective factors

Despite the findings that exposure to ACEs increases the risk of a multitude of poor outcomes, a large subset of exposed children do not have poor health outcomes. This is because many factors can be protective against this risk.⁵⁷ The following section looks at some of these factors.

As well as looking at increased risk, the ACE study considered family strengths and their potentially protective effects against early initiation of sexual activity, adolescent pregnancy and its long-term psychosocial consequences among more than 4600 women. The family strengths included "family closeness, support, loyalty, protection, love, importance, and responsiveness to health needs".58

Each category of family strength was associated with a significant 30% to 40% decreased risk of adolescent pregnancy, and as the number of family strengths increased, the risk of adolescent pregnancy further decreased.⁵⁹ These family strengths were found to be especially protective against early initiation of sexual activity for women who had experienced abuse or family dysfunction. Those with high levels of family strength had approximately half the rate of teen pregnancy, compared with women who had one or no family strengths.⁶⁰

- 39. Jorm & Mulder, 2018
- Response t al., 2010, and, Raposo et al., 2014, cited by Jorm & Mulder, 2018 Raposo et al., 2014, p. 8 40.
- 41. 42. Kessler et al., 2010
- 43. Kessler et al., 2010
- 44. Teicher & Samson, 2013
- 45.
- Dube et al., 2001 Dube et al., 2001 46.
- 47 Choi et al., 2017
- Dube et al., 2001 48.
- 49 Bellis et al., 2018
- 50. Burke et al., 2011
- 51. Bellis et al., 2018; Burke et al., 2011: Jimenez et al., 2016, cited by M. C. Walsh et al., 2019
- Bellis et al., 2018 52.
- 53. Bellis et al., 2018; Hunt et al., 2017; Jimenez et al., 2016, cited by M. C. Walsh et al., 2019 54 Burke et al., 2011
- 55. Wallander et al., 2019
- M. C. Walsh et al., 2019
- 56. 57. Center on the Developing Child at Harvard University, 2015, cited by Bellis et al.,
- 2018 58
 - Hillis et al., 2010, p. 18 Hillis et al., 2010 59
 - 60. Hillis et al., 2010



A sense of connection to one's culture, traditions, or faith has been found to be protective against the risks posed by adversity.⁶¹ For example, a positive view of their own ethnic identity and greater access to Māori cultural traditions is linked with greater resilience and protective against poor outcomes among Māori.62

A recent study found that positive childhood experiences (PCEs) have a dose-response relationship to adult mental health, similar to that of ACEs. In other words, those with more of the positive experiences studied were more likely to enjoy good mental health in adulthood, despite the presence of ACEs.⁶³ The PCEs studied were: being able to talk to family about their feelings, feeling that family stood by them in difficult times, feeling safe & protected by an adult in their home, having had at least 2 non-parent adults who took a genuine interest in them, feeling supported by friends, a sense of belonging at high school, and enjoyed participating in community traditions.64

There is much support in the literature for the powerful role of nurturing caregiving, which can protect against the physiological effects of adversity on cortisol reactivity, inflammation and cell aging.65

Closer to home, analysis of the Growing Up in New Zealand data explored protective factors of children who were at risk of having a high ACE score, and yet experienced no ACEs by 4.5 years of age. Protective factors included the mother-partner relationship, family finances, parent health, community/neighbourhood factors, and the relationship between the parent and child. Of particular note was their finding regarding the significance of the mother-partner relationship.66

As has been pointed out, "it is crucial that alongside public discussion of ACEs there is at least as much emphasis on resilience and potential for change towards more positive trajectories."⁶⁷ There is a lot of "potential for recovery and resilience among children exposed to various forms of adversity."68

Where do poverty & racism fit?

ACEs are relatively common, and can occur across socioeconomic groups. However, some populations, including those growing up in poverty, are more likely to experience multiple adversities, than those whose family have sufficient resources.⁶⁹ Social and structural factors influence ACE exposure, which in turn intensify "inequities in health, social and economic outcomes across generations."70

Some studies include poverty as an adversity,⁷¹ whilst others see it as a risk factor, or macro-driver for many childhood adversities.⁷² Given poverty's link to increased ACE exposure, reducing poverty is likely to reduce the prevalence of ACEs.73

The association between family income and ACEs has also been found in Aotearoa. For example, the GUINZ data indicates that tamariki whose family income was \$20,000 or less experienced more than 3 times the number of ACES than did children whose family income exceeded \$150,000.74

> Connection to one's culture, traditions, or faith has been found to be protective against the risks posed by adversity.

There has been some criticism of ACE-awareness initiatives that focus narrowly on individual or whanau level factors, and do not address factors at the societal level. 75 Reducing poverty is an important element in reducing ACE exposure, with interventions such as income supplementation and housing showing effectiveness in ACE reduction.⁷⁶

Despite the richness of indigenous culture, members of indigenous communities are more likely to be living in poverty.77

Poverty is often entwined with racism and the ongoing impacts of colonisation in Aotearoa. These include the loss of land, language and cultural connection, not adequately accounted for in ACEs checklists.78

While the ACE studies consider parental imprisonment an indication of family dysfunction, racism at a societal level also plays a role in the greatly differing levels of imprisonment between those of different ethnicities.79

There are increasing calls for research to consider the impacts of sociopolitical systems and their impact on families.80

- Bellis et al., 2018; National Scientific Council on the Developing Child, 2015 61.
- Houkamau & Sibley, 2011; Muriwai et al., 2015 Bethell et al., 2019 62.
- 63. 64.
- Bethell et al., 2019 Berens et al., 2017 65.
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- M. C. Walsh et al., 2020 Lacey & Minnis, 2020, p. 122 67
- Leve & Cicchetti, 2016, p. 622 Lacey et al., 2020; Merrick et al., 2018 68.
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- 70. Merrick et al., 2018, p. E4 71
- Appleton et al., 2017, cited by Lacey et al., 2020 Lacey et al., 2020; Massetti et al., 2020 72.
- Liming, 2008, cited by Lacey & Minnis, 2020; D. Walsh et al., 2019 M. C. Walsh et al., 2019 73.
- 74.
- 75. 76. Fond et al., 2015, cited by Lacey & Minnis, 2020
- Lacev et al., 2020
- 77. World Bank, n.d., cited by Witherspoon et al., 2020 78
- Taonui, 2010, and, Ware et al., 2017, cited by Joy & Beddoe, 2019 Alexander, 2011, cited by Allen & Abresch, 2018
- 80 Witherspoon et al., 2020

Conclusions

The ACE studies increased awareness of "the detrimental impact of 'adversity' on physical health, mental health, social functioning, health risk behaviours, and life expectancy."⁸¹ These findings have since been replicated in many other countries.82

Key findings from the ACE studies include:

- ACE exposure is prevalent, with exposure to one or more ACE common
- Many ACEs are interconnected; exposure to one ACE is often associated with exposure to others as well
- ACEs operate cumulatively; in other words, as the number of ACEs increase, so does the likelihood of poor health outcomes
- The effects can be wide ranging, across many aspects of physical and mental health
- Associations between adversity during childhood can be seen across the lifespan, decades after the exposure

Other points to note:

- A limitation of the ACE studies is their focus on family level factors without consideration of the wider social or economic factors that influence them. It's important to understand the possible impact of family level factors on child outcomes but not at the expense of factors at other levels
- Positive experiences, notably nurturing relationships with committed adults, support resilience in the face of exposure to adversity, and reduce the risk of poor outcomes⁸³
- "Care should be taken that the messages from ACEs research are not communicated in a deterministic way. Crucially, risk at the population level does not imply that an individual is going to have negative future outcomes"⁸⁴
- Exposure to ACEs, even multiple ones, does not "mean that poor outcomes are inevitable"85
- The impact of adversity is felt not only by the exposed individual, but also the wider community⁸⁶

As with any research, the ACE studies do not provide all the answers. They do provide a strong indication of the potentially lasting effects of adversity, reinforcing the need to both reduce exposure to them, and provide timely, effective supports for those who have been affected.

Glossary of Māori words

Tamaiti - child Tamariki- children Rangatahi -youth, younger generation

If you found this article useful, here are others that may be of interest

Family Violence: children get hurt https://brainwave.org.nz/ article/family-violence-children-get-hurt/

The experience of poverty for infants and young children https://brainwave.org.nz/article/the-experience-of-povertyfor-infants-and-young-children/

Risk & protective factors in child development https:// brainwave.org.nz/article/risk-and-protective-factors-inchild-development/

- 81. Hambrick et al., 2019, p. 1
- Hughes et al., 2017 Bethell et al., 2019; Lacey & Minnis, 2020 82.
- 83. 84.
- Lacey & Minnis, 2020, p. 122 Lacey & Minnis, 2020, p. 122 Massetti et al., 2020 85
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