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Posted Date: 22 July 2024

doi: 10.20944/preprints202407.1731.v1

Keywords: keyword 1; adverse childhood experiences 2; positive childhood experiences 3; mental health 4; social and emotional support 5; general health



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Article

Positive Childhood Experiences and Adult Mental, Relational and Physical Health in an Australian Sample: Associations across Adverse Childhood Experiences

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Abstract: (1) Background: Adverse childhood experiences (ACEs) and positive childhood experiences (PCEs) have potential to impact long-term health outcomes. Understanding these interrelationships can inform the development of interventions to promote societal health (2) Methods: D/PMH was defined as a diagnosis of depression and/or more than 14 days of poor mental health in the previous month. Those reporting poor physical health for more than 14 days in the previous month or categorising their physical health as 'fair' or 'poor' were deemed to have PG/PPH. Seven categorical questions based on subscales in the Child and Youth Resilience Measure-28 were used to define PCEs. (3) Results: Increased ACEs exposure use significantly associated with increased odds of D/PHM ($p < 0.001$), increased odds of PG/PHH ($p = 0.010$) and decreased odds of AR-SES ($p < 0.001$). Increased exposure to PCEs was significantly associated with decreased odds of D/PHM ($p < 0.001$), increased odds of PG/PHH ($p < 0.001$) and decreased odds of AR-SES ($p < 0.001$). For all outcomes, exposure to PCEs reduced the strength of the association between ACEs and outcomes. (4) Conclusions: A positive dose response between the number of ACEs and adult D/PMH, PG/PPH and lower AR-SES exists within the Australian population. PCEs weaken this association, demonstrating their mitigating potential. PCEs promoted adult outcomes, irrespective of ACEs.

Keywords: adverse childhood experiences; positive childhood experiences; mental health; social and emotional support; general health

1. Introduction

Understanding how childhood experiences impact adult health and wellbeing is crucial for developing effective interventions and promoting overall societal health. Research consistently demonstrates the significant influence of adverse early life experiences on long-term physical and mental health outcomes [1]. Conversely, positive childhood experiences (PCEs) have been shown to promote lifelong mental health [2], however, their impact on physical health is less understood. Understanding all these connections can assist policymakers, healthcare professionals, and communities to prioritise early intervention strategies, support systems, and preventive measures to mitigate the lasting effects of ACEs and promote healthier futures for individuals, families and communities.

1.1. Adverse Childhood Experiences

Childhood trauma is considered a public health concern [3], with experiences in early life increasingly recognised as important factors influencing adult health outcomes. Felitti et al. [1] were the first to identify associations between adverse childhood experiences (ACEs) and adult health

risks, and chronic disease in the United States (US). ACEs can include childhood abuse, neglect and household dysfunction. Childhood abuse could be emotional, physical, or sexual, neglect can be physical or emotional, while household dysfunction includes domestic violence, substance abuse, mental illness, and parental separation [1]. Research has demonstrated detrimental effects on adult physical and mental health, and increased engagement with risky behaviours (e.g. unprotected sex) due to exposure to ACEs in early life [4]. Compared to adults reporting fewer ACEs, individuals reporting the experience of four or more ACEs have been found more likely to be diagnosed with mental illness, including depression, anxiety, and posttraumatic stress disorder [2]. While much of the ACEs research has been undertaken in the US, Australian research has also reported a strong dose-response relationship between ACEs and adult mental and relational health [5]. Overall, individuals who have experienced significant adversities in early life are more likely to experience poor mental and relational health in adulthood.

1.2. Positive Childhood Experiences

In contrast to the negative impacts of ACEs, there is empirical evidence which demonstrates the benefits of positive childhood experiences (PCEs) within the family, school, and neighbourhood to adolescent mental health [6]. PCEs can include civic engagement, healthy relationships, and safe, stable, nurturing environments that support children's healthy growth and development [7]. PCEs have been found to predict significantly less adolescent substance consumption [8], and to be associated with lower chances of having two or more emotional and cognitive health problems as well as lower chances of suicidality [9]. Overall, all PCEs are associated with lower rates of poor mental health in adults [6,10].

1.3. Impacts of Positive Childhood Experiences on Adverse Childhood Experiences

There is emerging evidence that PCEs have a mitigating effect on the negative impact of ACEs on adult mental health. Indeed, Sege and Browne [7] argue one way to mitigate the negative impact of ACEs, is to actively promote PCEs, rather than merely reduce exposure to ACEs. Studies in the US have found when PCEs co-occur with ACEs, the incidence of subsequent negative adult cognitive and emotional health issues is lower [11]. For example, in a sample of 101 American pregnant women, Narayan et al. [12] found that irrespective of ACEs status, PCEs were associated with decreased post-traumatic stress disorder and fewer stressful life events. Further, in a study of 250 American adults, Crandall et al. [13] reported that PCEs improved a variety of mental and physical health indicators and largely countered the negative effects of ACEs on adult health.

Drawing on the Healthy Outcomes from Positive Experiences (HOPE) framework, Bethel et al. [2] specifically investigated the mitigating potential of PCEs on adult mental health using data from n=6,188 participants of the 2015 Wisconsin Behavioral Risk Factor Survey. The HOPE framework provides a theoretical basis as to how PCEs may facilitate children's healthy development [7]. Within this framework PCEs are categorised as: 1) nurturing, supportive relationships, 2) safe, stable, and equitable environments, 3) social engagement and connectedness, and 4) opportunities for emotional growth. In their study, Bethell, Jones [2] assessed adults reported ACEs and PCEs, as they relate to emotional and interpersonal relationships, and after accounting for ACEs found PCEs to be associated with lower rates of depression and poor mental health as well as greater social and emotional support in adults.

Recently, Guo, O'Connor [14] analysed data from the Longitudinal Study of Australian Children (LSAC) to represent the 3 primary HOPE-PCEs categories across 4 inter-related PCEs constructs, which included: 1) positive parenting, 2) trusting and supportive relationships, 3) supportive neighbourhood and home learning environments, and 4) social engagement and enjoyment. Based on their sample of 10,000 children, they found that these four specific PCEs constructs correlated with fewer reported mental health difficulties in adolescence, suggesting PCEs have mitigating potential in the Australian adolescent population.

1.4. The Current Study

Both ACEs and PCEs have been reported to influence children's development and adult mental health [15]. However, the extent to which PCEs can mitigate the deleterious effects of ACEs has not yet been fully realized [16], nor has it been extensively investigated in the Australian population. Therefore, the present study aimed to evaluate the long-term influences of ACEs and PCEs, as they relate to emotional and interpersonal relationships, on adult depression and poor mental health (D/PMH), poor general and/or poor physical health (PG/PPH), and adult reported social and emotional support (AR-SES) in an Australian sample. The study also explored the mitigating potential of PCEs on outcomes associated with ACEs. Based on previous research, we hypothesised that 1) exposure to ACEs would be associated with more D/PMH and more PG/PPH and lower AR-SES, 2) exposure to PCEs would be associated with positive adult mental health, and 3) exposure to PCEs will partially mitigate negative outcomes associated with ACEs

2. Materials and Methods

Participants were recruited via an online survey posted on social media between June and October 2022. To be eligible for inclusion, respondents were to be over 18 years of age and living in Australia at the time of the study.

The survey consisted of four main sections collecting data on: participant demographics, Positive Childhood Experiences (PCEs), Adverse Childhood Experiences (ACEs), and adult outcomes. There were seven demographic questions, seven questions regarding PCEs, 11 questions regarding ACEs, and five questions related to adult outcomes. One of these related to adult social and emotional support, two related to adult mental health and two related to general / physical health. The demographic questions related to age, gender, country of birth, Aboriginal and Torres Strait Islander status, education, marital status, and annual income. The PCEs, ACEs and adult outcome questions related to mental health and social and emotional support were the same as those previously used by Bethell, Jones [2] in a sample from the US. The questions related to general and physical health were modelled on the mental health questions used by Bethell et al.[2].

Seven categorical questions based on the four subscales in the Child and Youth Resilience Measure-28 [17] were used to assess participants' PCEs. Respondents were asked to report how often or how much as a child (0-18 years old) they: [2] felt able to talk to their family about feelings; [9] felt their family stood by them during difficult times; [12] enjoyed participating in community traditions; (4) felt a sense of belonging in high school; [18] felt supported by friends; [9] had at least two non-parent adults who took genuine interest in them; and [1] felt safe and protected by an adult in their home. Using a 5-point Likert scale, their responses could be "very often", "often", "sometimes", "rarely", or "never". Respondents were considered to have had the PCE if they responded, "very often" or "often". A breakdown of these question responses by outcome is available in appendices A-C.

Eleven questions were posed to measure participant ACEs based on their recollections of childhood experiences of physical or emotional abuse or neglect, sexual abuse, and household dysfunctions such as substance abuse, parental incarceration, and divorce. These 11 items included five dichotomous questions regarding household dysfunction, and six questions regarding childhood abuse, which included some frequency information (Never, once, more than once). For all questions participants were able to select, 'Don't know/Not sure' or 'Refused'. Participants were considered to have experienced the adverse event if they responded 'Yes', 'Once' or 'More than once'. The three questions related to sexual abuse were accumulated to be considered as one ACE score. Similarly, the two items related to alcohol and substance abuse were combined and presented as a single ACEs item.

To determine the level of adult reported social and emotional support (AR-SES), participants were asked a standardised single item, which was "How often do you get the social and emotional support you need?". Participants rated their experience by selecting one out of five choices, including "always", "usually", "sometimes", "rarely", and "never", and were considered to have good AR-SES if they answered "always" or "usually".

Two questions assessed participants' mental health. The first question asked; "Now thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health not good?". A response or score of 14 days or higher was considered an indicator of poor mental health. The second question asked; "Has a physician or other health professional ever told you that you have a depressive disorder, including depression, major depression, dysthymia, or minor depression?". Both questions were independently considered indicators of depression and/or poor mental health (D/PMH).

Two questions assessed participants' physical health. Firstly, participants were asked to rate their general health by responding to the question "Would you say that in general your health is?" with one of the following five options, "excellent", "very good", "good", "fair" or "poor". The second question asked; "Now thinking about your physical health, which includes physical illness and injury, for how many days during the past 30 days was your physical health not good?". A response or score of 14 days or higher was considered an indicator of poor physical health, as was a response of "fair" or "poor" to the general health question. Both questions were independently considered indicators of poor general or poor physical health (PG/PPH).

Data Analysis

Prior to analysis, the seven PCEs items were coded and scored. Responses of "often" and "very often" were allocated a 1, while responses of "sometimes", "rarely", and "never" were allocated a 0. A cumulated PCEs score of 0 to 7 was constructed based these values. Similarly, the eleven ACEs items were coded, combined, into eight items (as noted above), then summed to form an ACEs cumulative score ranging from 0 to 8. Subsequently, PCEs cumulative scores were categorised into groups of 0 to 2 (low), 3 to 5 (moderate), and 6 to 7 (high) PCEs, and ACEs cumulative scores were categorised into groups of 0, 1 (low), 2 to 3 (moderate), and 4 to 8 (high) ACEs.

Initial analysis of ACE's, PCE's, demographic characteristics and outcome variables were completed using statistical tests for ordered and binary data types as appropriate. These included Spearman's rho (S.rho), Chi Squared test of independence, Mann Whiteny-U (MW-U), and Kruskal Wallis (KW) tests. Secondary analysis assessing association between three or more measures were completed using the logistic regression procedure within SPSS 27.0.0.0.

3. Results

3.1. Demographic Analysis and Prevalence of Study Outcomes by PCEs

This section may be divided by subheadings. It should provide a concise and precise description of the experimental results, their interpretation, as well as the experimental conclusions that can be drawn.

A total of n=622 individuals consented and completed the survey (87% of the 714 who launched the survey). Most of the respondents were women (93%) born in Australia (83%), many were married or in a de facto relationship (64%) and had a bachelor's degree or higher education level (66%). The median reported income was between \$50,000 and \$75,000. Just under five percent of respondents identified as Aboriginal and/or Torres Strait Islander (Supplementary Table S1).

Approximately 47% of respondents had a low PCEs score (0 to 2), while 34% had moderate scores (3 or 4), and 18% had a high PCEs score (6+). Almost 40% of respondents reported having 4 or more ACEs, 38% reported having moderate ACEs (2 or 3), and 13% reported having 1 ACE. Only 10% reported having no ACEs in their childhood. No significant associations were seen between the number of PCEs or ACEs experienced and any of the measured demographic variables (see Supplementary Table S1). A Spearman rank test was used to assess the relationship between ACEs and PCEs categories. The assessment found a strong negative relationship ($\rho = -0.45$, $p < 0.001$) between them indicating that those who experienced more PCEs were likely to experience fewer ACEs and vice versa (Table 1).

Table 1. Associations between Adverse and Positive Childhood Experiences.

		Total		Positive Childhood Experiences category						S.rho p	
				Low (0-2)		Moderate (3-5)		High (6-7)			
		n	%	n	%	n	%	n	%		
ACE category	0 ACEs	64	10.3	9	3.1	23	10.7	32	27.8	-0.45	<0.001
	1 ACE	81	13.0	18	6.1	37	17.3	26	22.6		
	2-3 ACEs	234	37.6	95	32.4	94	43.9	45	39.1		
	4-8 ACEs	243	39.1	171	58.4	60	28.0	12	10.4		

ACEs: Adverse Childhood Experiences, PCEs: Positive Childhood Experiences, S. rho: Spearman's rho correlation.

3.2. Primary Outcomes

Depression and Poor Mental Health: More than half of the sample reported depression and/or poor mental health. This analysis found that having fewer PCEs is associated with increased odds of having D/PMH ($p<0.001$). When compared to persons with a high number of PCEs, persons with moderate PCEs have 3 times higher odds of reporting D/PMH, and persons with low PCEs have 6.2 times higher odds of having D/PMH (Table 2).

Similarly, analysis found having a greater number of ACEs to be strongly associated with increased odds of having D/PMH ($p<0.001$). Compared to persons with no ACEs, those with low and moderate number of ACEs have 23% higher and 86% higher odds of experiencing D/PMH. Furthermore, persons with a high number of ACEs have 3.5 times higher odds of having D/PMH than those with no ACEs.

No demographic factors were found to be significantly associated with rates of D/PMH.

Poor general/poor physical health: Nearly one third of the sample reported experiencing poor general and/or physical health. The factors associated with PG/PPH are similar to those associated with D/PMH. Persons with fewer PCEs were found to have significantly higher odds of having PG/PPH ($p<0.001$). Compared to persons with a high number of PCEs, those with moderate PCEs have 2.7 times higher odds of experiencing PG/PPH, and persons with low PCEs have 4 times higher odds.

ACEs were also strongly associated with PG/PPH ($p=0.010$). Compared to those with no ACEs, persons with one ACE have odds of experience PG/PPH which is 72% higher. Furthermore, those with moderate and high ACEs have 2- and 2.8 times higher odds of having PG/PPH (respectively).

In addition to these key factors, income is also shown to influence physical health, with persons with income under \$50,000 showing increased odds of having PG/PPH ($p=0.021$) (Table 2).

Being well supported (AR-SES): Approximately half of the sample reported having sufficient social and emotional support. Analysis found that having more PCEs is associated with increased odds of being well supported emotionally and socially as an adult ($p<0.001$). Compared to persons with low PCEs, persons having moderate PCEs have 2.3 times the odds and persons with high PCEs have 8.4 times the odds of being well supported.

Similarly, having fewer ACEs is associated with increased odds of being well supported ($p<0.001$). Compared to persons with high ACEs, those with moderate ACEs have 27% higher odds of being well supported. Furthermore, persons with zero or one ACE have odds of being well supported that are 2.4 and 2.5 times higher respectively (Table 2).

Additionally, those persons identifying as Aboriginal or Torres Strait islander showed decreased odds of being well supported ($p=0.037$).

Table 2. Prevalence and Odds Ratios of Depression, Poor health and Good social-emotional support by Positive Childhood Experiences and Demographic Variables.

Population Characteristics	Prevalence of D/PMH (n=622)		P Value	Odds Ratio (95% CI)	Prevalence of PG/PPH	P Value	Odds Ratio (95% CI)	Prevalence of AR-SES	P Value	Odds Ratio (95% CI)		
	n	%			n	%		n	%			
All Respondents	365	58.7	-	-	204	32.8	-	-	322	51.8	-	
Positive childhood experiences (PCEs)												
0-2 PCEs reported	212	72.4		6.24 (3.88-10.03)	119	40.6		3.94 (2.24-6.94)	106	36.2	1 [Reference]	
3-5 PCEs reported	119	55.6	<.001	2.98 (1.84-4.84)	68	31.8	<.001	2.69 (1.49-4.84)	121	56.5	<.001	2.30 (1.60-3.29)
6-7 PCEs reported	34	29.6		1 [Reference]	17	14.8		1 [Reference]	95	82.6		8.38 (4.89-14.35)
Adverse childhood experiences (ACEs)												
No ACEs reported	26	40.6		1 [Reference]	12	18.8		1 [Reference]	42	65.6		2.39 (1.34-4.24)
1 ACE reported	37	45.7	<.001	1.23 (0.63-2.39)	23	28.4	0.010	1.72 (0.78-3.79)	54	66.7	<.001	2.50 (1.48-4.23)
2-3 ACEs reported	131	56		1.86 (1.06-3.26)	74	31.6		2.00 (1.05-3.98)	118	50.4		1.27 (0.89-1.82)
4-8 ACEs reported	171	70.4		3.47 (1.96-6.14)	95	39.1		2.78 (1.41-5.48)	108	51.8		1 [Reference]
Age, years												
18-34	98	58.3		1 [Reference]	52	31.0		1 [Reference]	89	53.0		1 [Reference]
35-44	104	60.8		1.11 (0.72-1.71)	61	35.7		1.24 (0.79-1.95)	90	52.6		0.99 (0.64-1.51)
45-54	96	56.8	0.96	0.94 (0.61-1.45)	56	33.1	0.85	1.11 (0.70-1.75)	89	52.7	0.88	0.99 (0.64-1.52)
55-64	52	59.1		1.03 (0.61-1.74)	26	29.5		0.94 (0.53-1.64)	41	46.6		0.77 (0.46-1.30)
65 or older	15	57.7		0.97 (0.42-2.25)	9	34.6		1.18 (0.49-2.82)	13	50.0		0.89 (0.39-2.03)
Sex												
Female	336	58.1		1 [Reference]	187	32.4		1 [Reference]	300	51.9		1 [Reference]
Male	24	68.6	0.46	1.57 (0.76-3.27)	12	34.3	0.36	1.09 (0.53-2.24)	18	51.4	0.91	0.98 (0.50-1.94)
Non-binary	5	55.6		0.90 (0.24-3.39)	5	55.6		2.61 (0.69-9.85)	4	44.4		0.74 (0.20-2.79)
ATSI												
Yes	17	56.7	0.82	0.92 (0.44-1.92)	10	33.3	0.95	1.03 (0.47-2.23)	10	33.3	0.037	0.45 (0.21-0.98)
No	348	58.8		1 [Reference]	194	32.8		1 [Reference]	312	52.7		1 [Reference]
Education level												
Year 12 or less	49	62.8		1.75 (0.98-3.14)	26	33.3		0.84 (0.46-1.53)	35	44.9		0.90 (0.51-1.60)
TAFE or trade	86	64.2	0.086	1.85 (1.11-3.07)	50	37.3	0.21	1.00 (0.60-1.67)	72	53.7	0.33	1.29 (0.78-2.11)
Bachelor Degree	172	58.9		1.48 (0.97-2.28)	84	28.8		0.68 (0.43-1.07)	159	54.5		1.32 (0.86-2.03)
Advanced Degree	58	49.2		1 [Reference]	44	37.3		1 [Reference]	56	47.5		1 [Reference]
Income												
Under \$50,000	136	62.4		1.47 (0.96-2.24)	89	40.8		1.73 (1.10-2.70)	109	50		0.84 (0.55-1.27)
\$50,000 - \$74,999	78	59.5	0.36	1.30 (0.81-2.10)	37	28.2	0.021	0.98 (0.58-1.66)	72	55	0.62	1.02 (0.64-1.64)
\$75,000 - \$99,999	73	57.9		1.22 (0.75-1.97)	36	28.6		1.00 (0.59-1.69)	61	48.4		0.79 (0.49-1.27)
Over \$100,000	78	53.1		1 [Reference]	42	28.6		1 [Reference]	80	54.4		1 [Reference]

3.3. Associations between PCEs and Outcomes for Each Level of ACE

In line with the methods used by Bethell et al.[2], to test the robustness of the associations between PCEs and outcome measures each outcome was analysed across the range of ACEs exposure levels while adjusting for the demographic variables of age, education and income. No adjustment was made for gender or Aboriginality as this would reduce the power to detect statistically significant changes due to the imbalance and small sample sizes in some groups.

Depression and Poor Mental Health: At all levels of ACE exposure, the odds of having D/PMH were higher for persons with fewer PCEs (Table 3). The difference in the odds of having D/PHM was statistically significant for groups with no ACEs and for moderate ACEs. For persons with no ACEs, the odds of having D/PMH were 5 times higher if moderate PCEs were reported and 60 times higher

if low PCEs were reported compared to those with a high number of PCEs. Thus, an individual is much more likely to have D/PMH as an adult if they didn’t have a positive relational environment during childhood, even if they did not have any adverse experiences. Similarly for persons with low ACEs, the odds of having D/PMH was 4.5 times higher if moderate PCEs were reported and 7.7 times higher if low PCEs were reported (Table 3).

Table 3. Prevalence of Depression and Poor health by Adverse and Positive Childhood Experience Categories.

Depression and poor mental health (D/PMH)					Poor general or poor physical health (PG/PPH)					Well supported (AR-SES)				
Categories by PCEs and ACEs	Prevalence		P value	Odds Ratio adj. for demographics	Prevalence		P value	Odds Ratio adj. for demographics	Prevalence		P value	Odds Ratio adj. for demographics		
	n	%			n	%			n	%				
No ACEs														
Low PCEs	7	77.8	0.014	60.13 (3.21-1125.9)*	2	22.2	0.012	0.98 (0.07-14.45)	4	44.4	0.149	1 [Reference]		
Moderate PCEs	11	47.8		4.98 (1.10-22.47)*	6	26.1		3.30 (0.29-37.74)	12	52.2		1.12 (0.15-8.54)		
High PCEs	8	25.0		1 [Reference]	4	12.5		1 [Reference]	26	81.3		5.56 (0.81-38.30)		
One ACE														
Low PCEs	12	66.7	0.217	5.24 (1.20-22.79)*	10	55.6	0.087	9.07 (1.75-46.96)*	6	33.3	0.045	1 [Reference]		
Moderate PCEs	17	45.9		1.80 (0.55-5.86)	10	27.0		3.40 (0.74-15.57)	25	67.6		4.47 (1.16-17.31)*		
High PCEs	8	30.8		1 [Reference]	3	11.5		1 [Reference]	23	88.5		17.95 (3.33-96.72)*		
Moderate ACEs														
Low PCEs	65	68.4	< 0.001	7.72 (3.27-18.25)*	39	41.1	0.004	7.04 (2.39-20.76)*	35	36.8	0.001	1 [Reference]		
Moderate PCEs	55	58.5		4.50 (1.93-10.46)*	30	31.9		5.00 (1.67-14.98)*	47	50.0		2.01 (1.09-3.71)*		
High PCEs	11	24.4		1 [Reference]	5	11.1		1 [Reference]	36	80.0		7.56 (3.14-18.24)*		
High ACEs														
Low PCEs	128	74.9	0.065	2.57 (0.72-9.20)	68	39.8	0.773	0.94 (0.27-3.19)	61	35.7	0.002	1 [Reference]		
Moderate PCEs	36	60.0		1.12 (0.29-4.26)	22	36.7		0.83 (0.22-3.05)	37	61.7		3.06 (1.63-5.75)*		
High PCEs	7	58.3		1 [Reference]	5	41.7		1 [Reference]	10	83.3		10.01 (2.04-49.01)*		

Category is statistically different to reference category (alpha = 0.05). Abbreviations: ACEs: Adverse Childhood Experiences, PCEs: Positive Childhood Experiences, D/PMH: Depression or poor mental health, PG/PPH: Poor general / poor physical health, adj.: adjusted.

Poor General and/or Poor Physical Health: The association seen between PG/PPH varies with the level of ACEs exposure. For persons with no ACEs and persons with high ACEs, there is no significant difference in the rates of PG/PPH between those with low versus those with high PCEs. However, for those with a low and moderate number of ACEs, there is a relationship between PG/PPH and PCE exposure with those with a higher number of PCEs reporting better general / physical health (Table 3).

Adult Reported Social and Emotional Support: At all levels of ACE exposure, the odds of having good social and emotional support as an adult were higher for persons with more positive experiences in childhood. The difference in the odds of being well supported was statistically significant for all groups with at least one ACE. For persons with one ACE, the odds of being well supported was 5 times higher for persons with moderate PCEs, and 18 times higher for high PCEs compared to persons with low PCEs. Similarly for persons with low ACEs, the odds of being well supported was 2 times higher if moderate PCEs were reported and 7.6 times higher if high PCEs compared to those reporting low PCEs. For the group with high ACEs, again, those who experienced more PCEs had a statistically greater chance of being well supported than those who experienced low PCEs (Table 3).

3.4. Do Positive Childhood Experiences Mitigate the Effect of Adverse Childhood Experiences?

Finally, the mitigating effect of PCEs was assessed. For all outcomes, exposure to PCEs reduced the strength of the association between ACEs and outcomes, confirming that PCEs may mitigate the effects of ACEs (Table 4).

For D/PMH, the unadjusted analysis shows that those with moderate and high ACEs have significantly higher odds of having D/PMH than those with no ACEs (Table 4), however, after adjustment for PCEs, these associations no longer reach statistical significance; instead, the strongest predictors of D/PMH are having low or moderate PCEs compared to having a high number of PCEs.

For PG/PPH, the results are similar. The unadjusted analysis shows that those with moderate and high ACEs have significantly higher odds of having PG/PPH than those with no ACEs, however, after adjustment for PCEs, these associations no longer reach statistical significance. Instead, the significant predictor of PG/PPH are having low or moderate PCEs compared to having a high number of PCEs.

Having good social and emotional support as an adult is also more strongly affected by PCEs than by ACEs. After adjustment for PCEs, the number of ACEs reported is no longer a statistically significant predictor of AR-SES. Instead, the key predictor is having more moderate or high PCEs, compared to having a low number of PCEs.

These results clearly demonstrate that adverse childhood experiences (ACEs) are a key predictor of depression and poor mental health (D/PMH), poor general and poor physical health (PG/PPH) and low social and emotional support (AR-SES) in adulthood. However, these associations are reduced, or mitigated, by the number of positive childhood experiences (PCEs) in an individual’s childhood. Moreover, the number of PCEs is the stronger indicator of these outcomes, with more PCEs resulting in better mental, physical, and relational health irrespective of the number of ACEs.

Table 4. Association between ACEs and adult outcomes before and after adjustment for PCEs.

Unadjusted			Adjusted for PCEs		
Variables included in regression	P Value	Odds Ratio (95% CI)	P Value	Odds Ratio (95% CI)	
Depression or poor mental health					
no ACEs	< 0.001	1 [Reference]	< 0.001	1 [Reference]	
low ACE		1.23 (0.63-2.39)		0.99 (0.49-1.98)	
moderate ACEs		1.86 (1.06-3.26)*		1.21 (0.66-2.20)	
high ACEs		3.47 (1.96-6.14)*		1.66 (0.88-3.13)	
low PCEs	0.010	2.00 (1.01-3.98)*		5.01 (2.99-8.39)*	
moderate PCEs				2.72 (1.66-4.47)*	
high PCEs				1 [Reference]	
Poor physical or general health					
no ACEs	0.010	1 [Reference]	< 0.001	1 [Reference]	
low ACE		1.72 (0.78-3.79)		1.46 (0.65-3.29)	
moderate ACEs		2.00 (1.01-3.98)*		1.45 (0.71-2.96)	
high ACEs		2.78 (1.41-5.84)*		1.65 (0.80-3.42)	
low PCEs	0.010	2.00 (1.01-3.98)*		3.42 (1.86-6.27)*	
moderate PCEs				2.48 (1.36-4.53)*	
high PCEs				1 [Reference]	
Well supported (AR-SES)					
no ACEs	< 0.001	2.39 (1.34-4.24)*	< 0.001	0.91 (0.47-1.75)	
low ACE		2.50 (1.48-4.23)*		1.31 (0.73-2.33)	
moderate ACEs		1.27 (0.89-1.82)		0.84 (0.57-1.25)	

high ACEs	1 [Reference]	1 [Reference]
low PCEs		1 [Reference]
moderate PCEs		2.30 (1.57-3.36)*
high PCEs		8.40 (4.69-15.06)*

* Category is significantly different to reference category, alpha = 0.05).

4. Discussion

The aim of the present study was to evaluate associations between PCEs (as they relate to emotional and interpersonal relationships), adult depression and/or poor mental health (D/PMH), poor general and/or poor physical health (PG/PPH) and adult-reported social and emotional support (AR-SES) after accounting for exposure to ACEs, within an Australian sample. As hypothesised, ACEs were found to be associated with higher levels of D/PMH, higher levels of PG/PPH and lower AR-SES. PCEs were associated with positive adult outcomes and demonstrated a dose-response association with D/PMH, PG/PPH and AR-SES. Overall, results suggest that in an Australian sample, regardless of the number of ACEs, PCEs significantly promote better physical health and mental wellbeing in adults.

4.1. Childhood Experiences and Depression/Poor Mental Health (D/PMH)

The initial results demonstrated associations between childhood experiences on adult-reported D/PMH. Evidently, the higher numbers of ACEs lead to higher odds of facing D/PMH in adulthood. This has been reported in previous research [2,20,21]. Our study demonstrates ACEs have a strong negative relationship with PCEs, which emphasises that higher PCEs scores are strongly correlated with lower prevalence of depression and poor adult mental health. These findings are also consistent with what has been reported throughout the literature [2,9,22]. For example, in the study by Narayan, Rivera [12], persons who reported only 5 of 10 total measured PCEs were at an increased risk for poor mental health. These findings are consistent with a similar US study by Bethell, Jones [2] and suggest the mitigating potential of PCEs is influenced by the number an individual experiences. Our study extends this understanding as when investigating the combined effect of ACEs and PCEs, PCEs were found to be more predictive of D/PMH.

4.2. Childhood Experiences and Poor General/Poor Physical Health (PG/PPH)

The results indicate that moderate to high levels of ACEs are associated with poor PG/PPH in adulthood. This is consistent with studies in the US which report correlations between moderate and high levels of ACEs and poor physical health [23,24]. The finding that PCEs can mitigate ACEs negative impact on PG/PPH has also been previously identified [19]. However, our finding that PCEs, in and of themselves, are stronger predictors of PG/PPH is new and warrants further investigation.

4.3. Childhood Experiences, Adult-Reported Social and Emotional Support (AR-SES)

The second hypothesis was partly confirmed by a strong association between childhood experiences and AR-SES. Respondents reporting high numbers of ACEs reported low rates of receiving sufficient social and emotional support. In contrast, respondents who reported high numbers of PCEs reported receiving the social and emotional support they needed. Previous research by [25] also identified social and emotional support to have a mitigating influence on ACEs impact on adult mental health outcomes. Similarly, the study by Brinker and Cheruvu [26] specifically found social and emotional support to be a protective factor against depression among adults who experienced ACEs.

4.4. Strengths and Limitations

A considerable strength of this study is adding to growing evidence regarding the influence of PCEs' on adult outcomes. This field of research is relatively new, with the current study the first of its kind undertaken with an Australian sample. Additionally, the data analysed was from a nationalised sample of more than 600 adults in Australia. The scales and items utilised in this study to measure the effects of PCEs, ACEs, D/PMH, and AR-SES have confirmed reliability and validity, and have been similarly applied in previous studies in other developed countries, resulting in equivalent outcomes [2,12].

A notable limitation is that the sample was predominantly female, potentially impacting the generalizability of the results. Additionally, there may be bias in the reporting of PCEs. For example, feelings of guilt, shame, embarrassment, and the desire to portray oneself in a positive light can affect responses on questions about parenting [5]. Furthermore, there is evidence that adults with depression may also report PCEs with bias [18]. Like the study by Bethell, Jones (1), the PCEs items used in this research focused on positive emotional and social experiences in interpersonal relationships. Therefore, other types of PCEs, such as healthy school and community environments [19], need further exploration and development as additional measures of PCEs. Finally, this cross-sectional design relied on individual recall, which may have influenced reporting.

To reduce the impact of these limitations, there are several implications of future research. A greater sample size with diversity of locations, ethnicities, cultures, and genders in future studies will be crucial. It would also be useful to replicate the current findings in specific Australian population groups such as Aboriginal and/or Torres Strait Islanders or persons from culturally and linguistically diverse backgrounds. Future studies should consider employing a longitudinal design that does not rely on individual recall of childhood experiences.

5. Conclusions

Overall, study results confirm that there is a positive dose response between the number of adverse childhood experiences and adult D/PMH, PG/PPH and lower AR-SES, within the Australian population. In addition, it demonstrates that exposure to positive childhood experiences weakens this association, demonstrating the mitigating potential of positive childhood experiences. Moreover, this study found PCEs to be the strongest indicator of these adult outcomes, irrespective of ACEs. This adds to the growing body of evidence suggesting PCEs have lifelong effects on individuals' health and wellbeing.

Supplementary Materials:

Author Contributions: Conceptualization, Stacy Blythe, Nicole Peel and Lynn Kemp; methodology, Stacy Blythe, Nicole Peel and Lynn Kemp.; software, Emma Elcombe and Thu Huynh.; validation, Stacy Blythe, Emma Elcombe and Thu Huynh.; formal analysis, Stacy Blythe, Emma Elcombe, Nicole Peel and Thu Huynh.; investigation, Thu Huynh, Stacy Blythe and Nicole Peel.; writing—original draft preparation, Stacy Blythe, Emma Elcombe, Nicole Peel and Thu Huynh.; writing—review and editing, Stacy Blythe, Emma Elcombe, Nicole Peel, Thu Huynh and Lynn Kemp.; supervision, Stacy Blythe and Nicole Peel.; project administration, Stacy Blythe and Nicole Peel. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki, and approved by the Institutional Review Board (or Ethics Committee) of Western Sydney University (protocol code H14898 and approved June 2022).".

Informed Consent Statement: Written informed consent has been obtained from the patient(s) to publish this paper if applicable.

Data Availability Statement: The raw data supporting the conclusions of this article will be made available by the authors on request.

Conflicts of Interest: The authors declare no conflicts of interest.

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