

2019

**The prevalence and protective factors for resilience in adolescent  
Aboriginal Australians living in urban areas: a cross-sectional study**

Christian Young  
*University of Sydney*

Jonathan C. Craig  
*Flinders University*

Kathleen F. Clapham  
*University of Wollongong, kclapham@uow.edu.au*

Sandra Banks  
*Tharawal Aboriginal Corporation*

Anna Williamson  
*University of New South Wales*

Follow this and additional works at: <https://ro.uow.edu.au/ahsri>

---

## The prevalence and protective factors for resilience in adolescent Aboriginal Australians living in urban areas: a cross-sectional study

### Abstract

**Objectives:** To estimate the prevalence and determine protective factors for resilience in urban Aboriginal adolescents. **Methods:** Cross-sectional survey data was collected from 119 Aboriginal adolescents participating in the Study of Environment on Aboriginal Resilience and Child Health (SEARCH). Resilience was defined as having 'low-risk' Strengths and Difficulties Questionnaire scores on the total difficulties (range: 0-40) or the prosocial scale (range: 0-10). **Results:** Most adolescents scored in the low-risk range of the total difficulties (n=85, 73%) and prosocial scales (101, 86%). Family encouragement to attend school was associated with a 4.3-point reduction in total difficulties scores (95%CI, 0.22-8.3). Having someone to talk to if there was a problem and regular strenuous exercise were associated with higher scores on the prosocial behaviour scale, increasing scores by 1.2 (95%CI, 0.45-2.0) and 1.3 (95%CI, 0.26-2.3) points, respectively. **Conclusions:** Most adolescents in SEARCH displayed resilience. Resilience was associated with nurturing family environments, social support and regular exercise. **Implications for public health:** Our data accords with previous research that demonstrates resilience, but also a higher prevalence of emotional and behaviour problems among Aboriginal youth. Supporting Aboriginal young people to build resilience may promote better mental health outcomes leading to important public health benefits.

### Publication Details

C. Young, J. C. Craig, K. Clapham, S. Banks & A. Williamson, "The prevalence and protective factors for resilience in adolescent Aboriginal Australians living in urban areas: a cross-sectional study", *Australian and New Zealand Journal of Public Health* 43 1 (2019) 8-14.

# The prevalence and protective factors for resilience in adolescent Aboriginal Australians living in urban areas: a cross-sectional study

Christian Young,<sup>1,2</sup> Jonathan C. Craig,<sup>3</sup> Kathleen Clapham,<sup>4</sup> Sandra Banks,<sup>5</sup> Anna Williamson<sup>6</sup>

Adversities that occur during childhood can significantly impact upon the mental and physical health of young people, potentially leading to poorer health and social outcomes that continue into adulthood.<sup>1</sup> In particular, adolescence is a time of significant transition that can be challenging for many young people.<sup>2</sup> Aboriginal people face additional challenges during their adolescent years due to the effects of cultural marginalisation, discrimination and low socioeconomic environments.<sup>3</sup> Evidence suggests that these factors contribute to an increased risk of physical and mental health problems.<sup>4,5</sup> However, most Aboriginal young people are resilient; that is, they show positive outcomes despite the presence of adversity.<sup>6,7</sup> Identifying factors that are associated with resilience during adolescence may help inform programs with the potential to improve wellbeing outcomes for Aboriginal young people. Such programs may have positive flow-on effects throughout the lifespan.<sup>8</sup>

The Study of Environment on Aboriginal Resilience and Child Health (SEARCH) is a large-scale cohort study, the aims of which are to identify the determinants and trajectories of health in urban Aboriginal children and their caregivers.<sup>9</sup> Previous qualitative research indicated that SEARCH communities believed resilient Aboriginal children exhibited normative social

## Abstract

**Objectives:** To estimate the prevalence and determine protective factors for resilience in urban Aboriginal adolescents.

**Methods:** Cross-sectional survey data was collected from 119 Aboriginal adolescents participating in the Study of Environment on Aboriginal Resilience and Child Health (SEARCH). Resilience was defined as having 'low-risk' Strengths and Difficulties Questionnaire scores on the total difficulties (range: 0–40) or the prosocial scale (range: 0–10).

**Results:** Most adolescents scored in the low-risk range of the total difficulties ( $n=85$ , 73%) and prosocial scales (101, 86%). Family encouragement to attend school was associated with a 4.3-point reduction in total difficulties scores (95%CI, 0.22–8.3). Having someone to talk to if there was a problem and regular strenuous exercise were associated with higher scores on the prosocial behaviour scale, increasing scores by 1.2 (95%CI, 0.45–2.0) and 1.3 (95%CI, 0.26–2.3) points, respectively.

**Conclusions:** Most adolescents in SEARCH displayed resilience. Resilience was associated with nurturing family environments, social support and regular exercise.

**Implications for public health:** Our data accords with previous research that demonstrates resilience, but also a higher prevalence of emotional and behaviour problems among Aboriginal youth. Supporting Aboriginal young people to build resilience may promote better mental health outcomes leading to important public health benefits.

**Key words:** Aboriginal, resilience, mental health, adolescents

and emotional development, including maintaining prosocial relationships, despite the presence of challenging circumstances.<sup>7</sup> Aboriginal community members and health professionals believed resilience was built, in part, through the support available from within the family, schools and the wider community, an awareness of positive pathways, and the self-belief required to set and achieve desired goals. Suggested strategies to enhance resilience in Aboriginal

children and adolescents included: ensuring children were raised in stable, supportive families; increasing cultural knowledge; providing more youth activities in general; and encouraging more physical activity in particular, including participation in sporting and social groups.

The aim of this study is to determine the prevalence and protective factors for resilience in adolescent Aboriginal people

1. Centre for Kidney Research, The Children's Hospital at Westmead, New South Wales

2. School of Public Health, The University of Sydney, New South Wales

3. College of Medicine and Public Health, Flinders University, South Australia

4. Australian Health Services Research Institute, University of Wollongong, New South Wales

5. Tharawal Aboriginal Corporation, New South Wales

6. The Sax Institute, New South Wales

**Correspondence to:** Mr Christian Young, The Children's Hospital at Westmead - Centre for Kidney Research, Sydney, New South Wales; e-mail: christian.young@sydney.edu.au

Submitted: June 2018; Revision requested: October 2018; Accepted: October 2018

The authors have stated they have no conflict of interest.

This is an open access article under the terms of the Creative Commons Attribution-NonCommercial-NoDerivs License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.

*Aust NZ J Public Health.* 2019; 43:8-14; doi: 10.1111/1753-6405.12853

living in urban settings. The results of this study will contribute towards an evidence base that may be used to develop programs to build resilience among Aboriginal young people.

## Methods

### *SEARCH - The Study of Environment on Aboriginal Resilience and Child Health*

A detailed description of the SEARCH study can be found in the published protocol.<sup>9</sup> SEARCH is a cohort study conducted in partnership with four Aboriginal Community Controlled Health Services (ACCHS) located in urban and large regional centres in NSW. Phase one data were collected from 2006 to 2012 and included more than 1,600 Aboriginal children (aged 0 to 17 years) and their caregivers. Caregivers of Aboriginal children were approached in partner Aboriginal Community Controlled Health Service waiting rooms by an Aboriginal research officer who explained the study and provided a Participant Information Sheet. Eligibility criteria for parents/caregivers included being over 16 years old and agreeing to provide contact information to facilitate follow-up interviews. Caregivers gave written consent for themselves and their children to participate. Adolescents (aged 12 to 17 years) were also provided with a Participant Information Sheet and were required to give their own written consent. Survey items covered demographic information and measured outcomes related to socioeconomic status, diet, exercise, substance use, injury, housing, neighbourhood factors, social and emotional wellbeing, psychological distress, and health service use. Caregivers completed separate surveys on their own health and that of their children. Adolescents were given the option of completing an adolescent-specific survey that included additional information relating to mental health, cultural knowledge, recreational activities, social support, drug and alcohol use, education, juvenile justice and sexual health. With the exception of the caregiver's household income, only data from the adolescent survey were used in this study. Ethics approval was obtained by the University of Sydney (8506) and the Aboriginal Health and Medical Research Council (586/06).

## Measures

### *Resilience*

Resilience is often measured in at-risk populations,<sup>10,11</sup> where group membership is considered to be in and of itself indicative of experiencing significant adversity, or by restricting quantitative analysis to participants who meet criteria for significant levels of adversity.<sup>6,12</sup> Given the well-documented adversities that the Aboriginal community are known to be disproportionately exposed to, such as racism and socioeconomic disadvantage,<sup>13,14</sup> all SEARCH adolescents were considered to have been exposed to significant adversity and were therefore included in the analysis. This method has been used previously with other Indigenous populations.<sup>15</sup> Based on previous SEARCH research,<sup>7</sup> we defined resilience as normative social and emotional wellbeing.

### *Protective factors*

The term 'protective factor' has been defined in different ways within the resilience research literature.<sup>16</sup> In the context of this study, protective factors are considered to be any variable that is associated with better social and emotional wellbeing outcomes. Five protective factors identified in previous qualitative research<sup>7</sup> were assessed using SEARCH survey questions. Each of these survey questions was originally adapted from the Western Australian Aboriginal Child Health Survey (WAACHS).<sup>4</sup> Categorical response options are detailed below. Participants could indicate if they were unsure, or did not wish to answer any question(s). Some response options with comparatively few responses ( $\leq 5$ ) were combined into a single group for subsequent analysis.

*Knowledge of Aboriginal culture* was measured by the question: 'How much do you know about Aboriginal culture and history?' Responses consisted of five categories: 'Nothing at all', 'A little', 'Some', 'Quite a lot' or 'A great deal'.

*Satisfaction with recreational activities* was measured by the question: 'Are you happy with what is available for you to do in your free time, like movies, disco, sports, and places to go?' Responses were grouped into four categories: 'Very unhappy/A little bit unhappy', 'Neither happy nor unhappy', 'A little bit happy' or 'Very happy'.

*Physical activity* was assessed by the question: 'Over the last 7 days have you exercised or

played sport or games that made you sweat and breathe hard (e.g. basketball, netball, football, riding a bike, running)?' Response options consisted of three categories: 'No', '1–2 times' or '3 or more times'.

*Family educational support* was measured by the question: 'How much encouragement do you get from your parents/family to attend school regularly?' Response options were grouped into three categories: 'None/A little/Some', 'Quite a lot' or 'Very much'.

*Social support* was measured by the question: 'If you had a problem, is there anyone you can talk to?' Response options were: 'Yes' or 'No'.

### *Demographic variables*

Information was also collected on participants' age, gender, which Aboriginal Community Controlled Health Service they attended and household income. Income was measured by asking caregivers to describe their household's income for the past two weeks from all sources (e.g. wages, Community Development Employment Programs, pensions and study allowances). Response options were grouped into five categories: '\$0–399', '\$400–\$599', '\$600–\$799', '\$800–\$1999' and '\$2000 and over'.

### *The Strengths and Difficulties Questionnaire*

Resilience was measured using the Strengths and Difficulties Questionnaire (SDQ).<sup>17</sup> The SDQ consists of 25 questions that assess five subscales related to childhood emotional and behavioural problems: emotional symptoms, conduct problems, hyperactivity, peer problems and prosocial behaviours. We used the following SDQ scores as proxies for resilience: the total difficulties score (the sum of the emotional symptoms, conduct problems, hyperactivity and peer problems subscales; range: 0 to 40; higher scores are indicative of more difficulties), and the prosocial score (range: 0 to 10; higher scores are indicative of more prosocial behaviour). In accordance with the SDQ scoring procedure for self-completed surveys, total difficulties scores were grouped into three categories: 'low-risk' (0 to 15), 'borderline' (16 to 19), and 'high-risk' (20 to 40).<sup>18</sup> Prosocial scores were similarly grouped: 'low-risk' (6 to 10), 'borderline' (5), and 'high-risk' (0 to 4). Scores in the high-risk range indicate substantial risk of clinically significant behavioural or emotional problems. The SDQ has been found to be an acceptable measure of Aboriginal children's social and emotional wellbeing,

and to demonstrate adequate reliability and validity.<sup>19,20</sup> SDQ subscales scores were only calculated for each participant if no more than two (of five) responses were missing per subscale.

### Statistical analysis

We analysed the association of the socio-demographic variables and the protective factors with the outcome resilience, as measured by SDQ scores, using bivariate and multivariable logistic regression models. Results for the SDQ total difficulties and prosocial scores are presented separately. Initially, each covariate was associated with resilience using a bivariate linear model. Variables in the bivariate model were screened and those presenting at  $p < 0.2$  were considered candidates for the multivariable analysis (omnibus tests were used for variables with more than two categories). The final multivariable model included all covariates significant in the bivariate models as well as potential confounders, namely, age, gender, ACCHS location and household income. Variables were entered simultaneously. To account for correlations between children within the same family the logistic regression models were conducted within the Generalised Estimating Equations (GEE) framework using an independent covariance structure. Change in SDQ scores (unstandardized beta coefficients) and the 95% confidence intervals were examined. Throughout the analysis, a cut-off of 0.05 was used to indicate statistical significance.

## Results

### Participant characteristics

Of the 241 adolescents who participated in SEARCH, 120 (50%) completed an adolescent survey (data for the remaining 121 participants were provided by their caregivers only). One participant did not provide sufficient SDQ data to calculate a total difficulties or a prosocial score. Therefore, 119 participants were included in the analysis. No statistically significant differences in age ( $t=0.16$ ,  $p=0.88$ ), gender ( $\chi^2=0.02$ ,  $p=0.90$ ) or household income ( $\chi^2=3.15$ ,  $p=0.53$ ) were detected between those who provided self-report data (and are thus included in the current study) and those who did not. Of the included adolescents, three participants did not provide sufficient data to calculate a total difficulties score; one participant did not provide sufficient data to calculate a prosocial score.

Most adolescents were aged 12 to 15 ( $n=98$ , 83%), were living with their biological parent (99, 83%) and currently attending school (102, 87%), with 62 (52%) female. Almost half (41, 47%) of the adolescents whose parents provided household income data (87, 73%) lived in houses where the total household income was reported to be less than \$400 per week. Most adolescents exercised or played sport 'three or more' times in the last week (64, 60%), were 'very happy' with local youth recreational activities (63, 57%), had someone

to talk to if there was a problem (105, 91%), had 'some' knowledge of Aboriginal culture (47, 40%), and believed their family encouraged them 'very much' to attend school (57, 50%).

A higher proportion of participants who indicated they had someone to talk to if they had a problem scored in the low-risk/ borderline total difficulties category than those in the high-risk category (93% versus 61%). Similarly, a higher proportion of

**Table 1: Participant characteristics.**

Variable (n, %)	Low-risk/ borderline total difficulties score (0-19) n=98	High-risk total difficulties score (20-40) n=18	Total <sup>a</sup> n=119	$p^b$
<b>Gender</b>				
Female	51 (52)	10 (56)	62 (52)	0.80
<b>Age</b>				
12-13	44 (45)	9 (50)	53 (45)	0.39
14-15	35 (36)	8 (44)	45 (38)	
16-17	19 (19)	1 (6)	21 (18)	
<b>Relationship to carer</b>				
Parent	83 (85)	13 (72)	99 (83)	0.16
Step parent	2 (2)	2 (11)	4 (3)	
Foster parent	2 (2)	1 (6)	3 (3)	
Other relative	11 (11)	2 (11)	13 (11)	
<b>Still attending school</b>				
Yes	85 (87)	16 (89)	102 (86)	1.00
<b>Fortnightly household income</b>				
\$0-\$399	8 (11)	1 (7)	11 (13)	0.79
\$400-\$599	13 (19)	2 (13)	15 (17)	
\$600-\$799	11 (16)	4 (27)	15 (17)	
\$800-\$1999	33 (47)	8 (53)	41 (47)	
\$2000+	5 (7)	0 (0)	5 (6)	
<b>Knowledge of ATSI culture</b>				
None	11 (11)	3 (17)	14 (12)	0.75
A little	21 (22)	3 (17)	25 (21)	
Some	41 (42)	6 (33)	47 (40)	
Quite a lot	18 (19)	4 (22)	22 (19)	
A great deal	6 (6)	2 (11)	9 (8)	
<b>Exercise in past week</b>				
No	20 (22)	4 (27)	25 (23)	0.59
1-2 times	17 (19)	1 (7)	18 (17)	
3 or more times	53 (59)	10 (67)	64 (60)	
<b>Satisfaction with youth activities</b>				
Very unhappy/a little bit unhappy	7 (7)	4 (29)	12 (11)	0.015
Neutral	8 (9)	2 (14)	10 (9)	
A little bit happy	24 (26)	0 (0)	26 (23)	
Very happy	55 (59)	8 (57)	63 (57)	
<b>Family encouragement to attend school</b>				
None/a little/some	13 (14)	4 (24)	17 (15)	0.45
Quite a lot	33 (34)	6 (35)	41 (36)	
Very much	50 (52)	7 (41)	57 (50)	
<b>Someone to talk to if there was a problem</b>				
Yes	91 (93)	11 (61)	105 (91)	0.028
<i>Notes:</i>				
<i>ATSI: Aboriginal or Torres Strait Islander</i>				
<i>a: Three participants did not provide total difficulties scores, therefore numbers may not add up to totals</i>				
<i>b: p values from Fisher's exact test statistics, %s are based on available (non-missing) data</i>				

participants who held favourable attitudes towards the youth activities available to them (as indicated by being 'a little bit happy' or 'very happy' with activities) scored in the low-risk/borderline total difficulties category than those in the high-risk category (85% versus 57%).

**SDQ frequency distribution**

Figure 1 and Figure 2 show the frequency distribution of total difficulties and prosocial scores, by gender. Of the participants who provided total difficulties scores, 85 (73%) were in the low-risk range, 13 (11%) were borderline, and 18 (16%) were in the high-risk range. Of the participants who provided prosocial scores, 101 (86%) were in the low-risk range, 7 (6%) were borderline, and 10 (8%) were in the high-risk range.

**Regression models**

Figure 3 and Figure 4 show the results from the bivariate and multiple regression models predicting total difficulties and prosocial scores, respectively. The forest plots display the difference in SDQ scores (unstandardized beta coefficients, *b*) for each level of the independent variable, compared to a reference category, and 95% confidence intervals. Household income levels were not significant in the total difficulties or the prosocial bivariate models (omnibus statistics:  $\chi^2=6.2, p=0.18$ , and  $\chi^2=0.79, p=0.94$ , respectively) and thus are not displayed.

**Total difficulties scale**

In the bivariate model, two protective factors were significant at  $p<0.2$ , 'family encouragement to attend school' (omnibus

statistic:  $\chi^2=5.72, p=0.05$ ), and 'someone to talk to if there was a problem' ( $\chi^2=2.99, p=0.08$ ). In the final model controlling for age, gender, ACCHS location, household income and independent variables previously significant at  $p<0.2$ , family educational support was independently associated with a decrease in total difficulties scores. Adolescents who indicated that their families 'very much' encouraged them to attend school scored 4.3 less points on the total difficulties scale than those who indicated they received 'none/a little/some' encouragement from their family (95%CI, 0.22-8.3,  $p=0.039$ ).

**Prosocial scale**

In the bivariate model, three protective factors were significant at  $p<0.2$ , 'exercise in the past week', (omnibus statistic:  $\chi^2=3.29, p=0.19$ ), 'family encouragement to attend school' ( $\chi^2=5.55, p=0.06$ ) and 'someone to talk to if there was a problem' ( $\chi^2=5.33, p=0.021$ ). In the final, multivariable, model, adolescents who exercised or played sport strenuously 1–2, or 3 or more times per week had higher prosocial scores than those who did not exercise or play sport (difference in SDQ scores: 1.3, 95%CI, 0.26-2.3,  $p=0.014$ ; and 1.2, 95%CI, 0.35-2.1,  $p=0.006$ , respectively). Adolescents who had someone to talk to if there was a problem scored, on average, 1.2 points higher on the prosocial scale than adolescents who did not have someone to talk to (95%CI, 0.45-2.0,  $p=0.002$ ). Compared to females, male adolescents scored, on average, 0.9 points lower on the prosocial scale (95%CI, 0.19-1.6,  $p=0.013$ ).

Figure 1: Frequency distribution of SDQ total difficulties scores.

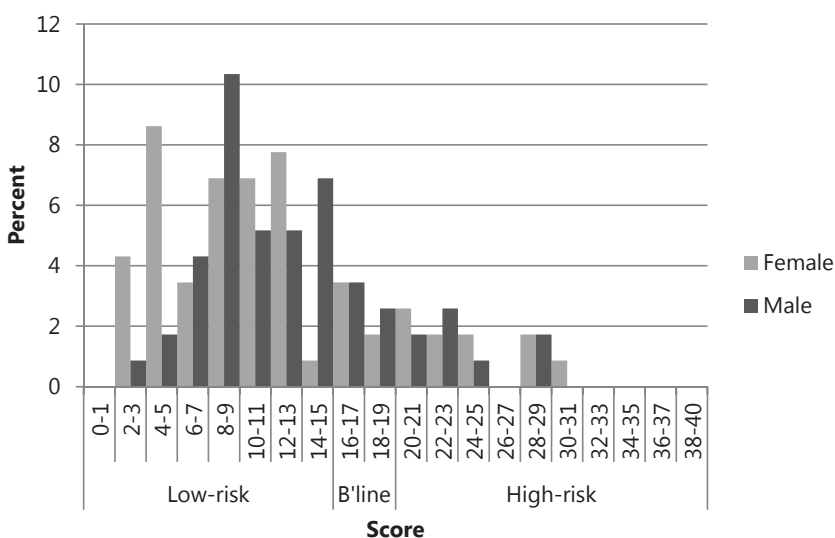
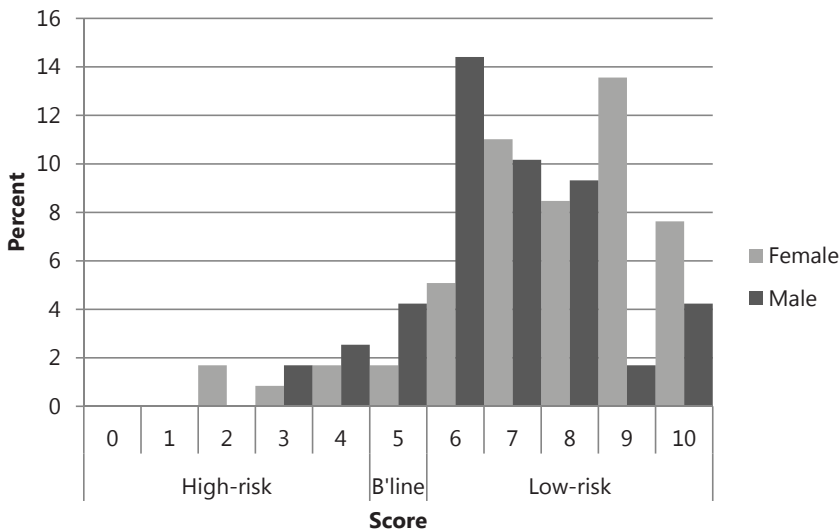


Figure 2: Frequency distribution of SDQ prosocial scores.



**Discussion**

Most adolescents demonstrated resilience, with 85 (73%) scoring in the low-risk range of the SDQ total difficulties scale, and 101 (86%) scoring in the low-risk range of the prosocial scale. Greater resilience was independently associated with family encouragement to attend school regularly, having someone to talk to if there was a problem, and engaging in strenuous exercise or sport on a weekly basis. While most participants were considered resilient, 16% were at high risk of clinically significant behavioural and emotional problems. This proportion is less than that found among adolescents (12 to 17 years) in the WAACHS (20.5%), a population representative survey of Aboriginal

adolescents,<sup>4</sup> but is greater than that found in a recent population-based sample of Australian 11 to 17 year olds (10.2%).<sup>21</sup> While these results are consistent with literature that finds Aboriginal children experience more behavioural problems than non-Aboriginal children,<sup>22,23</sup> considering the adversities Aboriginal communities are known to face, the high proportion of resilient participants identified in this study highlights the strength of Aboriginal adolescents. Further, given that most adolescents indicated they had someone to talk to if they had a problem (91%), or believed they were encouraged 'quite a lot' or 'very much' to attend school regularly (86%), the results of this study are positive and highlight the supportive environments found among these urban Aboriginal families and communities.

Previous qualitative research with SEARCH Aboriginal communities has indicated that education and supportive familial and social environments are important for developing resilience in children.<sup>7</sup> The quantitative data presented here aligns with these findings, as well as with other quantitative evidence that associates social support with resilience.<sup>6,24-27</sup> While the link between school attendance and educational achievement has been investigated among the Aboriginal population,<sup>28</sup> there has been less research investigating familial encouragement to attend school and emotional or behavioural outcomes. Encouragement to attend school may increase school connectedness, which has been previously associated with a reduction in risk taking behaviour in adolescents.<sup>29</sup> It is also plausible that greater school attendance increases resilience through regular socialisation with peers.<sup>30</sup> Familial environments that encourage adolescents to regularly attend school may also be indicative of other factors that build resilience, including nurturing parenting and family cohesion. The importance of a cohesive family environment and positive parenting behaviours in promoting good mental health is well established.<sup>31-33</sup> Among Aboriginal populations, the WAACHS found that higher-quality parenting was strongly related to less clinically significant emotional and behavioural problems in children.<sup>34</sup> Similarly, a recent literature review found robust evidence linking the mental health and resilience of Indigenous children living in developed countries with positive family cohesion, including family support and positive parenting styles.<sup>5</sup>

Together, this evidence indicates that the quality of the familial environment that Aboriginal adolescents are raised in appears an important predictor of resilience. The lack of a significant association between income and resilience suggests that supportive environments may be more important than socioeconomic factors for Aboriginal adolescents.

The results support an association between resilience and regular physical activity. Research has shown that regular exercise and

sporting involvement is beneficial for the mental health of adolescents and children.<sup>35,36</sup> In the current study, the lack of an apparent dose-response effect suggests that engaging in any weekly sport or exercise may be a protective factor for adolescents. While the direction of causality cannot be ascertained (i.e. it is possible that prosocial children are more likely to take up sports or participate in exercise programs), sporting and exercise programs offer benefits that could plausibly build resilience, including increased health

Figure 3: Difference in SDQ scores: total difficulties sub-scale.

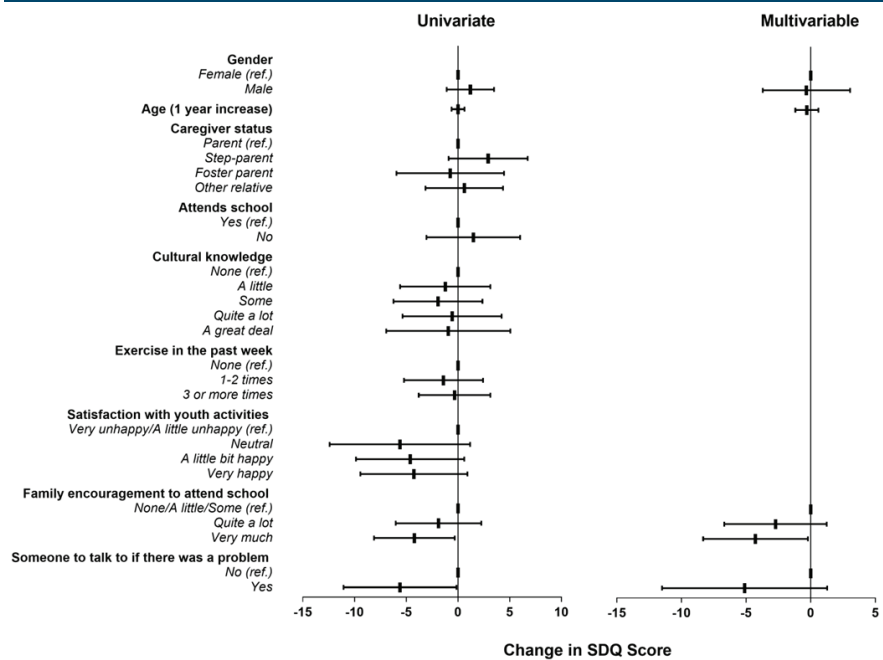
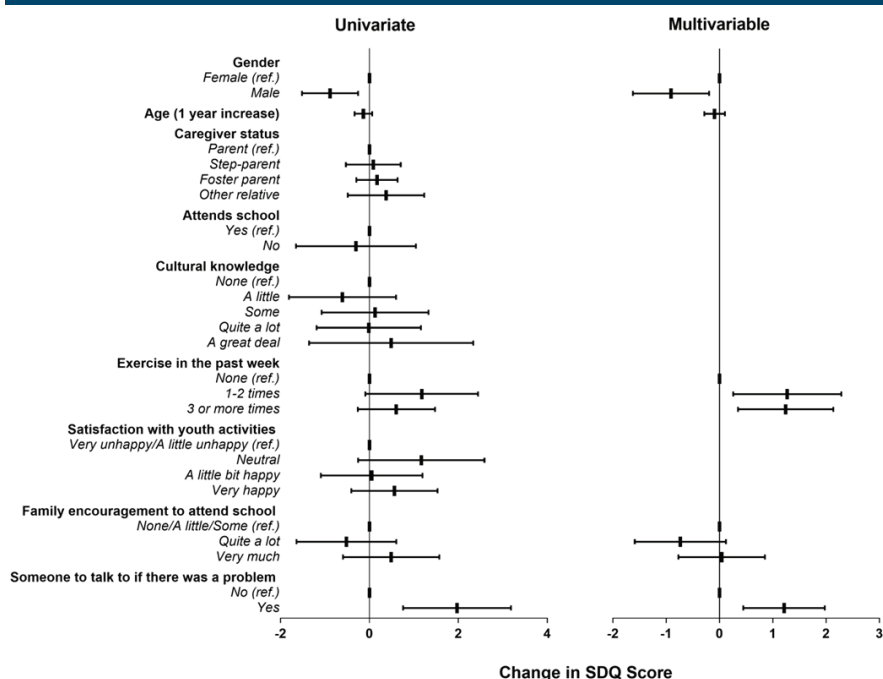


Figure 4: Difference in SDQ scores: prosocial sub-scale.



and fitness, opportunities to socialise and improved self-esteem.<sup>30</sup>

For Aboriginal people, connection to culture has been identified as an important determinant of health and resilience in qualitative studies that have explored this association.<sup>7,37,38</sup> In this study the relationship between cultural knowledge and resilience was assessed, with no significant association observed. A recent review noted that while identification with, and knowledge of, Indigenous culture was related to children's good mental health, this association was inconsistent,<sup>5</sup> potentially due to the diverse array of methods used to measure this construct. Given the importance of cultural factors as determinants of health and wellbeing for Aboriginal people<sup>39,40</sup> a deeper understanding of the relationship between cultural knowledge and resilience in urban Aboriginal adolescents is suggested as a potential area for further research.

Mental health disorders (including substance use disorders) are estimated to account for 14% of the gap in disease burden between Aboriginal and non-Aboriginal people.<sup>41</sup> Aboriginal young people experience high levels of adversity and are thus particularly vulnerable to mental health problems and youth suicide.<sup>3-5,42</sup> Consequently, the ability to be resilient has been identified as a 'necessary ability' for Aboriginal adolescents to maintain good mental health.<sup>7</sup> Given that childhood resilience is associated with better mental health in both the short- and long-term,<sup>12</sup> and the well-established links between physical and mental health,<sup>43,44</sup> the results of this study have implications for public health, including strategies to enhance resilience in Aboriginal youth. Importantly, addressing issues that prevent some Aboriginal families from providing support and educational encouragement has the potential to increase resilience in Aboriginal adolescents.<sup>45</sup> Programs that can provide social support, including scholastic encouragement, for children who do not receive this help at home or from extended family or friends are also likely to increase resilience in at-risk Aboriginal youths. Similarly, the provision of physical/sporting programs tailored to Aboriginal young people may offer experiences and challenges that foster greater self-efficacy and self-esteem that can lead to resilience.<sup>7,46</sup> Holistic programs that can combine all these factors, potentially including sporting activities with regular counselling and educational

services may have the greatest chance of increasing adolescents' resilience.<sup>47</sup> Programs that are long-term, sustainable and run by Aboriginal people, and that are designed with close consultation and leadership from the Aboriginal community, are more likely to be successful.<sup>48-50</sup> However, while such programs can provide important and effective services, without addressing the widespread social inequalities that exist between Aboriginal and non-Aboriginal people it is likely that longstanding disparities in mental and physical health outcomes will persist.<sup>51,52</sup> Meeting this challenge is likely to require major changes in policy and commitment from successive Australian governments.

### Limitations

Adversity, a necessary requirement for defining resilience,<sup>16</sup> was not explicitly measured in this study. However, the impact of racial discrimination and poverty are known to constitute ongoing challenges for Aboriginal people.<sup>13</sup> For example, we note that almost half the household incomes reported in this study fall below the 2013-14 poverty line in Australia for a single adult (\$426 per week after tax, or 50% of the median income).<sup>53</sup> As all data were collected via a single survey this research may be vulnerable to common method bias,<sup>54</sup> including socially desirable responses.<sup>55</sup> While the SEARCH survey consists of multiple health and environmental factors prioritised by the Aboriginal community, not all potential protective factors elicited in the original qualitative study were included in the survey, and therefore could not be assessed. This includes cultural connection, a widely recognised component of Aboriginal social and emotional wellbeing.<sup>56</sup> While children's knowledge of their Aboriginal culture was measured, connection to culture is a complex construct that cannot be inferred from this one survey item. Caution is advised when interpreting the proportions in this study given the relatively small sample size. Furthermore, our sample may not be representative of Aboriginal adolescents living in urban and regional areas of NSW. However, evidence suggests that within-study associations obtained from cohort studies with low response rates or unrepresentative samples are generalisable to study populations.<sup>57</sup> This study was cross-sectional and therefore bidirectional effects are possible, and causality cannot be inferred. Upon completion of phase two SEARCH data

collection, opportunities to investigate casual pathways are likely to become available.

Aboriginal adolescents face challenges over and above those that non-Aboriginal children face during the transition from childhood to adulthood. Despite these adversities, most adolescents participating in SEARCH are resilient. Resilience is associated with supportive relationships among family and peers, and physical activity. Given the current health disparities between Aboriginal and non-Aboriginal people, concerted efforts to ensure support is available for adolescents who are at risk of emotional and behavioural problems is likely to increase adolescent resilience.

### Acknowledgements

The authors would like to thank the Aboriginal Community Controlled Health Services and all the community members who participated in SEARCH.

### References

1. Kessler RC, McLaughlin KA, Green JG, et al. Childhood adversities and adult psychopathology in the WHO World Mental Health Surveys. *Br J Psychiatry*. 2010;197:378-85.
2. Patton GC, Viner R. Pubertal transitions in health. *Lancet*. 2007;369:1130-9.
3. Marmot M, Friel S, Bell R, Houweling TA, Taylor S. Closing the gap in a generation: Health equity through action on the social determinants of health. *Lancet*. 2008;372:1661-9.
4. Blair EM, Zubrick SR, Cox AH. The Western Australian Aboriginal Child Health Survey: Findings to date on adolescents. *Med J Aust*. 2005;183:433-5.
5. Young C, Hanson C, Craig JC, Clapham K, Williamson A. Psychosocial factors associated with the mental health of indigenous children living in high income countries: A systematic review. *Int J Equity Health*. 2017;16:153.
6. Hopkins KD, Zubrick SR, Taylor CL. Resilience amongst Australian aboriginal youth: An ecological analysis of factors associated with psychosocial functioning in high and low family risk contexts. *PLoS One*. 2014;9(7):e102820.
7. Young C, Tong A, Nixon J, et al. Perspectives on childhood resilience among the Aboriginal community: An interview study. *Aust NZ J Public Health*. 2017;41(4):405-10.
8. Masten AS. *Ordinary Magic: Resilience in Development*. New York (NY): Guilford Publications; 2015.
9. The SEARCH Investigators. The Study of Environment on Aboriginal Resilience and Child Health (SEARCH): Study Protocol. *BMC Public Health*. 2010;10:287.
10. Beard J, Biemba G, Brooks MI, et al. Children of female sex workers and drug users: A review of vulnerability, resilience and family-centred models of care. *J Int AIDS Soc*. 2010;13:56.
11. Hammen C. Risk and protective factors for children of depressed parents. In: Luthar SS, editor. *Resilience and Vulnerability: Adaptation in the Context of Childhood Adversities*. Cambridge (UK): Cambridge University Press; 2003. p. 50-75.
12. Werner EE. Risk, resilience, and recovery: Perspectives from the Kauai Longitudinal Study. *Dev Psychopathol*. 1993;5:503-15.
13. Larson A, Gillies M, Howard PJ, Coffin J. It's enough to make you sick: The impact of racism on the health of Aboriginal Australians. *Aust N Z J Public Health*. 2007;31:322-9.



14. Atkinson J. *Trauma Trails, Recreating Song Lines: The Transgenerational Effects of Trauma in Indigenous Australia*. Melbourne (AUST): Spinifex Press; 2002.
15. Stumblingbear-Riddle G, Romans JS. Resilience among urban America Indian adolescents: Exploration into the role of culture, self-esteem, subjective well-being, and social support. *Am Indian Alsk Native Ment Health Res*. 2012;19:1-19.
16. Rutter M. Psychosocial resilience and protective mechanisms. *Am J Orthopsychiatry*. 1987;57:316.
17. Goodman R. The Strengths and Difficulties Questionnaire: A research note. *J Child Psychol Psychiatry*. 1997;38:581-6.
18. Goodman R. *Secondary Scoring the SDQ for Age 4-17* [Internet]. London (UK): Youthinmind; 2015 [cited 2017 Nov 15]. Available from: <http://www.sdqinfo.org/py/sdqinfo/c0.py>
19. Williamson A, Redman S, Dadds M, et al. Acceptability of an emotional and behavioural screening tool for children in Aboriginal Community Controlled Health Services in urban NSW. *Aust N Z J Psychiatry*. 2010;44:894-900.
20. Williamson A, McElduff P, Dadds M, et al. The construct validity of the Strengths and Difficulties Questionnaire for Aboriginal children living in urban New South Wales, Australia. *Aust Psychol*. 2014;49:163-70.
21. Lawrence D, Johnson S, Hafekost J, et al. *The Mental Health of Children and Adolescents: Report on the Second Australian Child and Adolescent Survey of Mental Health and Wellbeing*. Canberra (AUST): Australian Department of Health; 2015.
22. Jorm AF, Bourchier SJ, Cvetkovski S, Stewart G. Mental health of Indigenous Australians: A review of findings from community surveys. *Med J Aust*. 2012;196:118-21.
23. Williamson A, D'Este C, Clapham K, et al. What are the factors associated with good mental health among Aboriginal children in urban New South Wales, Australia? Phase I findings from the Study of Environment on Aboriginal Resilience and Child Health (SEARCH). *BMJ Open*. 2016;6:e011182.
24. Pinkerton J, Dolan P. Family support, social capital, resilience and adolescent coping. *Child Fam Soc Work*. 2007;12:219-28.
25. Luthar SS, Cicchetti D, Becker B. The construct of resilience: A critical evaluation and guidelines for future work. *Child Dev*. 2000;71:543-62.
26. Masten AS. (1994). Resilience in individual development: Successful adaptation despite risk and adversity. In: Wang MC, Gordon EW, editors. *Educational Resilience in Inner-city America: Challenges and Prospects*. Hillsdale (NJ): Lawrence Erlbaum Associates; 1994. p. 3-25.
27. Orthner DK, Jones-Sanpei H, Williamson S. The resilience and strengths of low-income families. *Fam Relat*. 2004;53:159-67.
28. Ladwig JG, Luke A. Does improving school level attendance lead to improved school level achievement? An empirical study of indigenous educational policy in Australia. *Aust Educ Res*. 2014;41:171-94.
29. Chapman RL, Buckley L, Sheehan MC, Shochet IM, Romaniuk M. The impact of school connectedness on violent behavior, transport risk-taking behavior, and associated injuries in adolescence. *J Sch Psychol*. 2011;49:399-410.
30. Kickett-Tucker CS. How Aboriginal peer interactions in upper primary school sport support Aboriginal identity. *Aust J Indig Educ*. 2008;37:138-51.
31. Fergusson DM, Horwood JL. The Christchurch Health and Development Study: Review of findings on child and adolescent mental health. *Aust N Z J Psychiatry*. 2001;35:287-96.
32. Bayer JK, Ukoumunne OC, Lucas N, Wake M, Scalzo K, Nicholson JM. Risk factors for childhood mental health symptoms: National longitudinal study of Australian children. *Pediatrics*. 2011;128(4):e865-79.
33. Fatori D, Bordin IA, Curto BM, De Paula CS. Influence of psychosocial risk factors on the trajectory of mental health problems from childhood to adolescence: A longitudinal study. *BMC Psychiatry*. 2013;13:1.
34. Zubrick S, Silburn S, Lawrence D, Mitrou F, Dalby R, Blair E. *The Western Australian Aboriginal Child Health Survey: The Social and Emotional Wellbeing of Aboriginal Children and Young People*. Perth (AUST): Curtin University of Technology and Telethon Institute for Child Health Research; 2005.
35. Biddle S, Asare M. (2011) Physical activity and mental health in children and adolescents: A review of reviews. *Br J Sports Med*. 2011;45(11):886-95.
36. Dalton B, Wilson R, Evans JR, Cochrane S. Australian Indigenous youth's participation in sport and associated health outcomes: Empirical analysis and implications. *Sport Manag Rev*. 2015;18:57-68.
37. Williamson AB, Raphael B, Redman S, Daniels J, Eades SJ, Mayers N. Emerging themes in Aboriginal child and adolescent mental health: Findings from a qualitative study in Sydney, New South Wales. *Med J Aust*. 2010;192:603.
38. McLennan V. Family and community resilience in an Australian Indigenous community. *Aust Indig Health Bull* [Online]. 2015;15(3).
39. National Empowerment Project. *Cultural, Social and Emotional Wellbeing Program Evaluation 2014-2017* [Internet]. Perth (AUST): University of Western Australia; 2017 [cited 2016 Dec 12]. Available from: <http://www.nationalempowermentproject.org.au/>
40. Kickett-Tucker CS. Moorn (Black)? Djardak (White)? How come I don't fit in Mum? Exploring the racial identity of Australian Aboriginal children and youth. *Health Sociol Rev*. 2009;18:119-36.
41. Mission Australia and Black Dog Institute. *Youth Mental Health Report: Youth Survey 2012-16*. Sydney (AUST): Mission Australia; 2017.
42. Australian Bureau of Statistics. *3309.0 - Suicides, Australia, 2010* [Internet]. Canberra (AUST): ABS; 2012 [cited 2018 Feb 1]. Available from: <http://www.abs.gov.au/ausstats/abs@.nsw/Latestproducts/3309.0Main%20Features12010?opendocument&tabname=Summary&prodno=3309.0&issue=2010&num=&view>
43. Surtees P, Wainwright N, Luben R, Wareham N, Bingham S, Khaw K-T. Psychological distress, major depressive disorder, and risk of stroke. *Neurology*. 2008;70:788-94.
44. Larson A, Gillies M, Howard PJ, Coffin J. It's enough to make you sick: The impact of racism on the health of Aboriginal Australians. *Aust N Z J Public Health*. 2007;31:322-9.
45. Tsey K, Whiteside M, Haswell-Elkins M, Bainbridge R, Cadet-James Y, Wilson A. Empowerment and indigenous Australian health: A synthesis of findings from Family Wellbeing Formative Research. *Health Soc Care Community*. 2010;18:169-79.
46. Avenir R. *Youth Development for Young Indigenous Australians: A Discussion Paper*. Adelaide (AUST): Office of Employment and Youth (Ausyouth); 2003.
47. Mentoring Indigenous Young People: The Tribal Warrior Program [online]. *Judic Off Bull*. 2011 [cited 2018 Feb 1]. 23(1) 5-6. Available from: <https://search.informit.com.au/documentSummary;dn=750667494227462;res=IE LHSS>
48. Kylie Lee K, Kylie Lee K, Conigrave KM, et al. Evaluation of a community-driven preventive youth initiative in Arnhem Land, Northern Territory, Australia. *Drug Alcohol Rev*. 2008;27:75-82.
49. Young C, Tong A, Gunasekera H, et al. Health professional and community perspectives on reducing barriers to accessing specialist health care in metropolitan Aboriginal communities: A semi-structured interview study. *J Paediatr Child Health*. 2017;53(3):277-282.
50. Peralta LR, Cinelli RL. An evaluation of an Australian Aboriginal controlled-community organization's remote sports-based programme: A qualitative investigation. *Sport Soc*. 2016;19:973-89.
51. Booth AL, Carroll N. *The Health Status of Indigenous and Non-Indigenous Australians*. Discussion Paper No. 486. Canberra (AUST): Australian National University Centre for Economic Policy Research; 2005.
52. Marmot M. Social determinants and the health of Indigenous Australians. *Med J Aust*. 2011;194:512-3.
53. Social Policy Research Centre. *Poverty in Australia* [Internet]. Strawberry Hills (AUST): Australian Council of Social Service; 2016 [cited 2018 Feb 1]. Available from: <https://www.acoss.org.au/wp-content/uploads/2016/10/Poverty-in-Australia-2016.pdf>
54. Podsakoff PM, MacKenzie SB, Lee J-Y, Podsakoff NP. Common method biases in behavioral research: A critical review of the literature and recommended remedies. *J Appl Psychol*. 2003;88:879.
55. Van de Mortel TF. Faking it: Social desirability response bias in self-report research. *Aust J Adv Nurs*. 2008;25:40.
56. Dudgeon P, Walker R, Scrine C, Shepherd C, Calma T, Ring I. *Effective Strategies to Strengthen the Mental Health and Wellbeing of Aboriginal and Torres Strait Islander People*. Issues Paper No. 12. Canberra (AUST): Australian Institute of Health and Welfare; 2014.
57. Mealing N, Banks E, Jorm L, Steel D, Clements M, Rogers K. Investigation of relative risk estimates from studies of the same population with contrasting response rates and designs. *BMC Med Res Methodol*. 2010;10(26). <https://doi.org/10.1186/1471-2288-10-26>.