Growing Up in New Zealand

Now We Are Twelve

Life in early adolescence

Supplementary materials for

Young People's Experiences of Depression and Anxiety Symptoms

Authors: Benjamin D. Fletcher, Caroline Walker, Jane E. Cha, Denise Neumann, Sarah-Jane Paine, Annie Park, John Fenaughty, Amy L. Bird, Karen E. Waldie

Growing Up in New Zealand

University of Auckland Waipapa Taumata Rau New Zealand

uniservices IDEAS TO LIFE RANGAHAUA KIA WHAI HUA

1. Summary

This document describes technical information for the Young People's Experiences of Depression and Anxiety Symptoms Snapshot 7 of 9, written for the 12-year Data Collection Wave reporting in 2023.

2. Measures

Self-report measures play an important role in understanding the subjective experience of mental health outcomes that might not be obtainable from other sources (1, 2). The measures used in the 12Y data collection wave are outlined below.

2.1 How was diagnoses of depression and anxiety and engagement with mental health services measured?

Young people's diagnosis of depression or anxiety and their engagement with mental health services were reported by the participants' primary caregiver, usually their mother. Please note participants reported on experiences are for both public and private mental health services.

Mothers were asked:

1. **"Has [child's name] ever been diagnosed by a doctor with any of the following?"**

[Answer selected from multiple response options]

- Anxiety and/or depression.

2. **"In the past 12 months, has [child's name] had contact with any of the following services?**

[Answer selected from multiple response options]

- Mental health services (for example: psychologist, psychiatrist, specialist mental health nurse, specialist mental health community worker, counsellors, social worker).

Only participants that reported their child had contact with mental health services in the last 12 months were asked about the child's experiences with mental health services.

3. **"In the past 12 months, when [child's name] had contact with mental health services, they...? "**

(Choose one only):

- Received all they needed.
- Received some of what they needed.

- Did not receive what they needed at all.
- Don't know.

Only participants who reported their child “received some of what they needed” or “did not receive what they needed” were asked about barriers to engagement with mental health services.

4. **If [your child] was unable to receive these services or did not receive all the services they required from mental health services, what was the reason/s.**

(Choose all that apply — at least one) *

- Had no transport to get there.
- We weren't eligible.
- I couldn't find the time.
- I couldn’t get an appointment soon enough/at a suitable time.
- Lack of childcare.
- I have had a bad experience before with this service.
- I did not feel the service met my cultural needs.
- They were not accessible in my language.
- It wasn’t clear how to access the service/get an appointment.
- I was worried about what other people might think.
- Because of Covid-19/Lockdown.
- Other, please specify [Open ended text box provided].
- Don’t know.

2.2 How were depression symptoms measured?

The 10-item Center for Epidemiological Studies Depression Scale (CES-D-10) was used to measure young people’s depression at the 8 year, 10 year (COVID19 survey), and 12 year data collection waves (DCW). Table 1 shows the items used to measure depression symptoms.

Table 1. Question used to derive depression symptoms at 8 year, 10 year (COVID19 survey), and 12 year Data collection Waves (DCW) using the CES-D-10.

8Y DCW Variable	10Y DCW Variable †	12Y DCW variable	Question/items	Response options *
			How much you have felt this way during the past week?	
DS1_y8C	DS1_Y11LDC	DS1_y12C	I was bothered by things that usually don't bother me	0. Not at all 1. A little 2. Some 3. A lot
DS2_y8C	DS2_Y11LDC	DS2_y12C	I felt like I couldn't pay attention to what I was doing	
DS3_y8C	DS3_Y11LDC	DS3_y12C	I felt down and unhappy	
DS4_y8C	DS4_Y11LDC	DS4_y12C	I felt like I was too tired to do things	
DS5_y8C*	DS5_Y11LDC*	DS5_y12C*	I felt like something good was going to happen	
DS6_y8C	DS6_Y11LDC	DS6_y12C	I felt scared.	
DS7_y8C	DS7_Y11LDC	DS7_y12C	I didn't sleep as well as I usually sleep	
DS8_y8C*	DS8_Y11LDC*	DS8_y12C*	I was happy	
DS9_y8C	DS9_Y11LDC	DS9_y12C	I felt lonely, like I didn't have any friends	
DS10_y8C	DS10_Y11LDC	DS10_y12C	It was hard to get started doing things	

Note. † 10Y DCW was collected as part of the COVID19 data collection wave on a reduced sample size. * Items are reverse coded.

2.2.1 How is the CES-DC-10 derived?

The *Growing Up in New Zealand* study measured depression symptoms using the self-reported 10-item Centre for Epidemiologic Studies Depression Scale for Children (CES-DC-10) (3, 4). Young people were encouraged to answer and interpret the CES-DC-10 items without adult input. Participants rated items on a four-point scale ranging from 0 (Not at all) to 3 (A lot). Two items (happy and hopeful) are reverse-coded. All ten items are summed to create a depression score as a continuous variable ranging from 0 to 30, with higher scores indicative of greater depression symptoms.

2.2.2 How can the CES-DC-10 measure be used?

The CES-DC-10 is an acceptable tool for screening depression in adolescents, however this is not a diagnostic tool (3, 4). While cut-off scores exist for the CES-DC-10 to categorise high vs low

depression symptoms, these cut-offs have not been verified in a New Zealand sample. Hence, we have used the CES-DC-10 as a continuous variable.

We conducted psychometric confirmatory factor analysis and found that the CESD-C-10 is an acceptable tool using the Growing Up in New Zealand data, with invariance observed for ethnicity, gender, and deprivation at 12-years-old. However, only European, Māori, Pacific, and Asian ethnicities were assessed for invariance due to the limited number of participants in the MELAA and "Other" ethnic groups.

The data was not normally distributed (Figures 1 – 4), accordingly median scores are reported for completeness. Given the large sample size it was deemed acceptable to conduct linear regression analyses for this data (5).

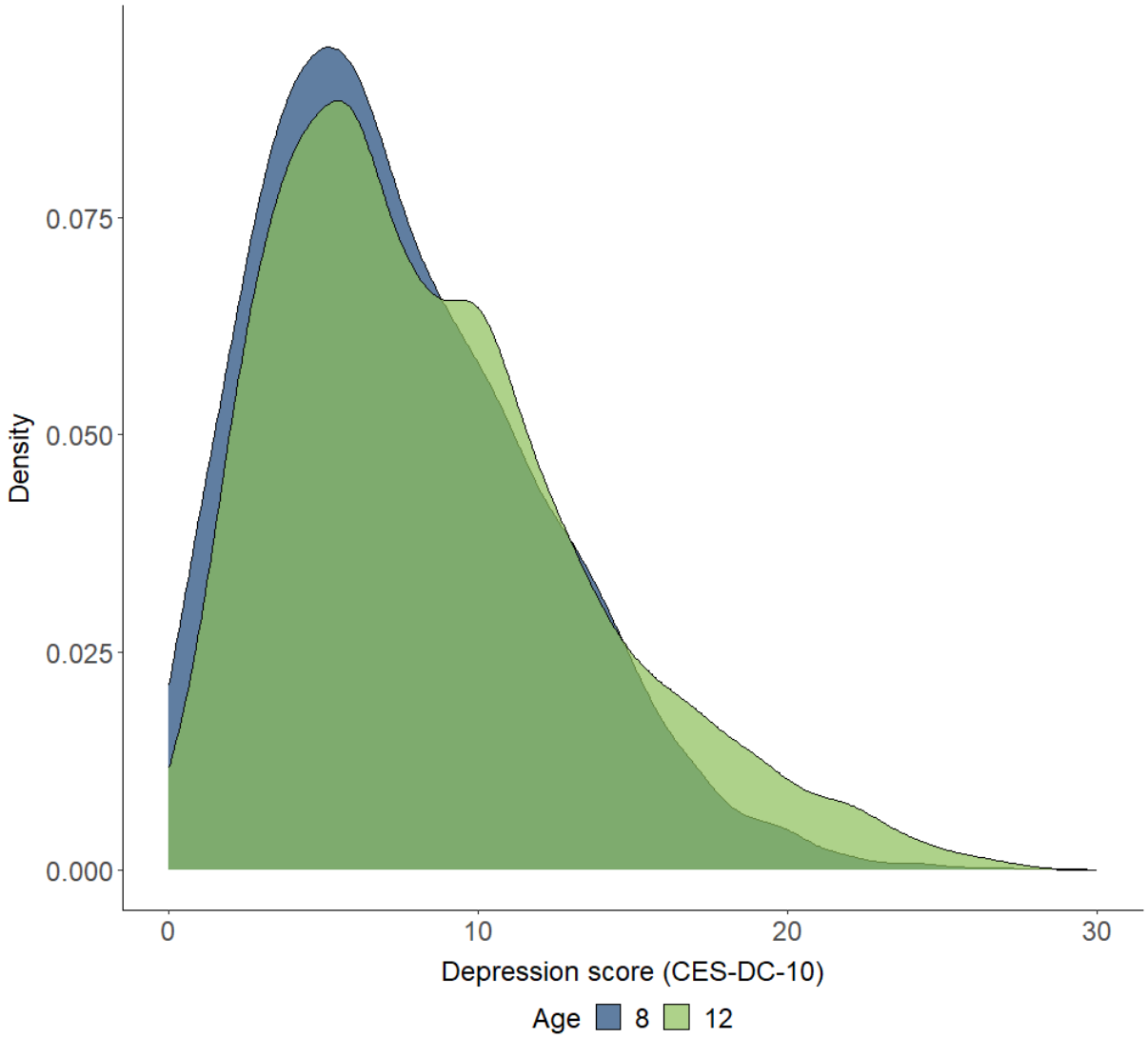


Figure 1. Distribution of depression scores over time. This figure shows the distribution of depression scores at age 8 (light blue) and age 12 (green). The x-axis represents depression scores, while the y-axis represents the density of individuals at each depression score level. Overall, the figure suggests that depression scores may have increased over time as the distribution of depression scores has shifted to the left, with more young people reporting higher depression symptoms.

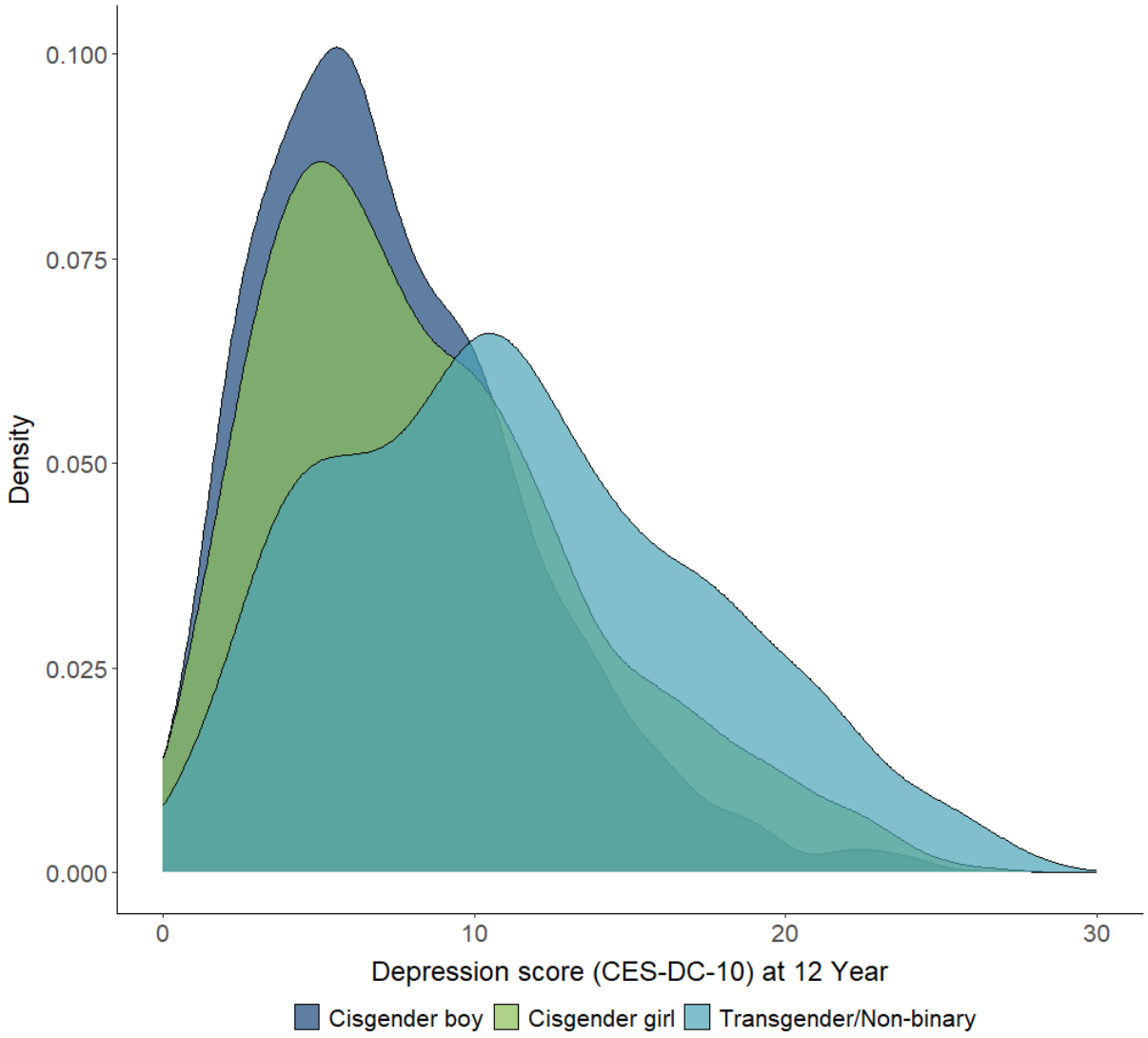


Figure 2. Distribution of depression scores (CES-DC-10) by gender at 12-years-old. This figure shows the distribution of depression scores for cisgender boys (dark blue (back)), cisgender girls (green (middle)), and transgender/non-binary young people (light blue (front)). The x-axis represents depression scores (range from 0 to 30), while the y-axis represents the density of individuals at each depression score level. Overall, the figure suggests that there may be differences in the distribution of depression scores by gender, as demonstrated by the density of depression scores being at the higher end of the scale for transgender or non-binary young people and marginally higher for cisgender girls compared to cisgender boys.

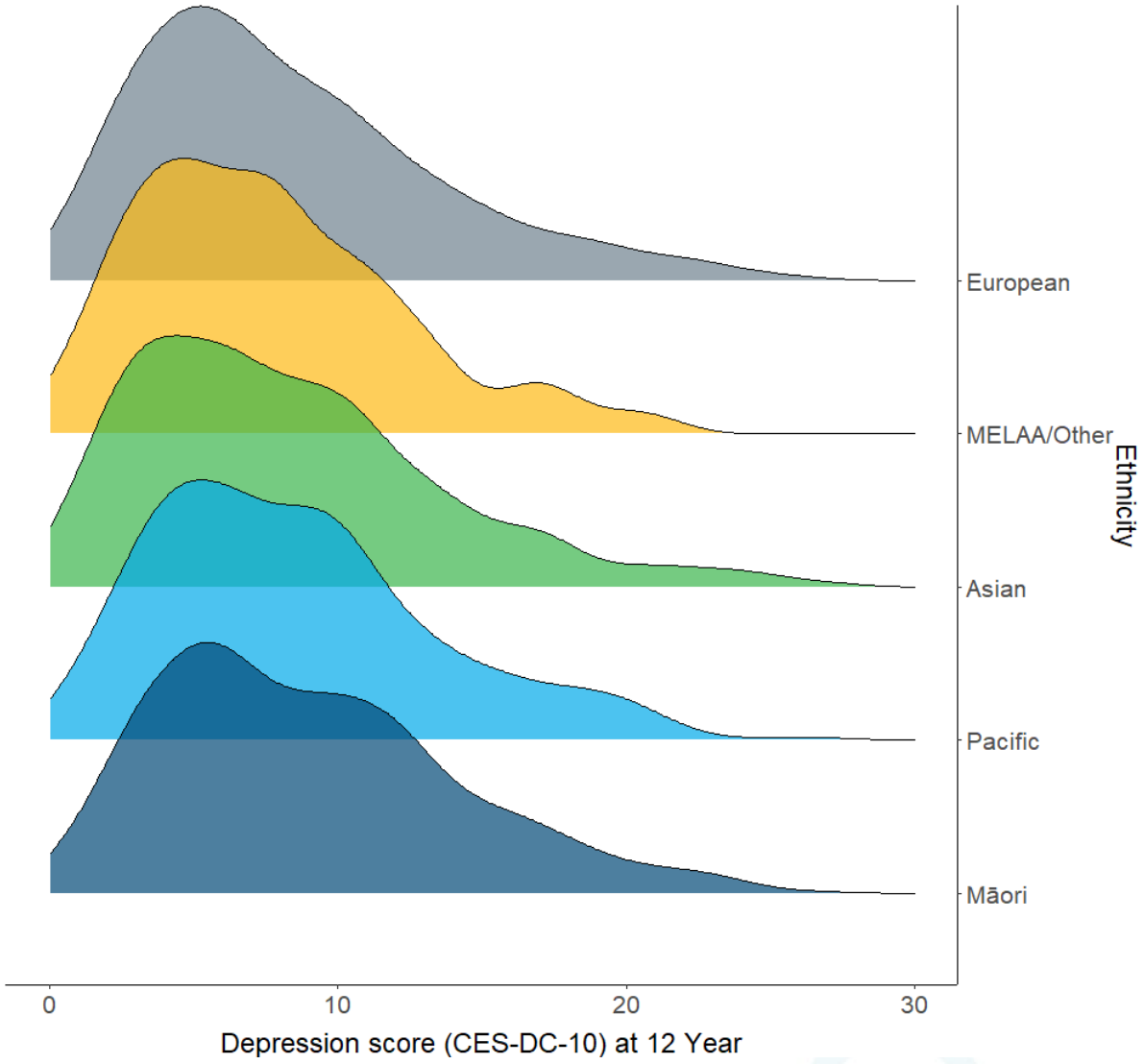


Figure 3. Distribution of depression scores by external prioritised ethnicity at 12-years-old. This figure shows the distribution of depression scores for Māori (dark blue), Pacific (light blue), Asian (green), MELAA and other (yellow), and European (grey) young people. The x-axis represents depression scores, while the y-axis represents the density of individuals at each depression score level. Overall, the figure suggests that the distribution of depression scores by ethnicity is similar. However, some ethnic groups appear to have a greater density of young people reporting higher depression scores.

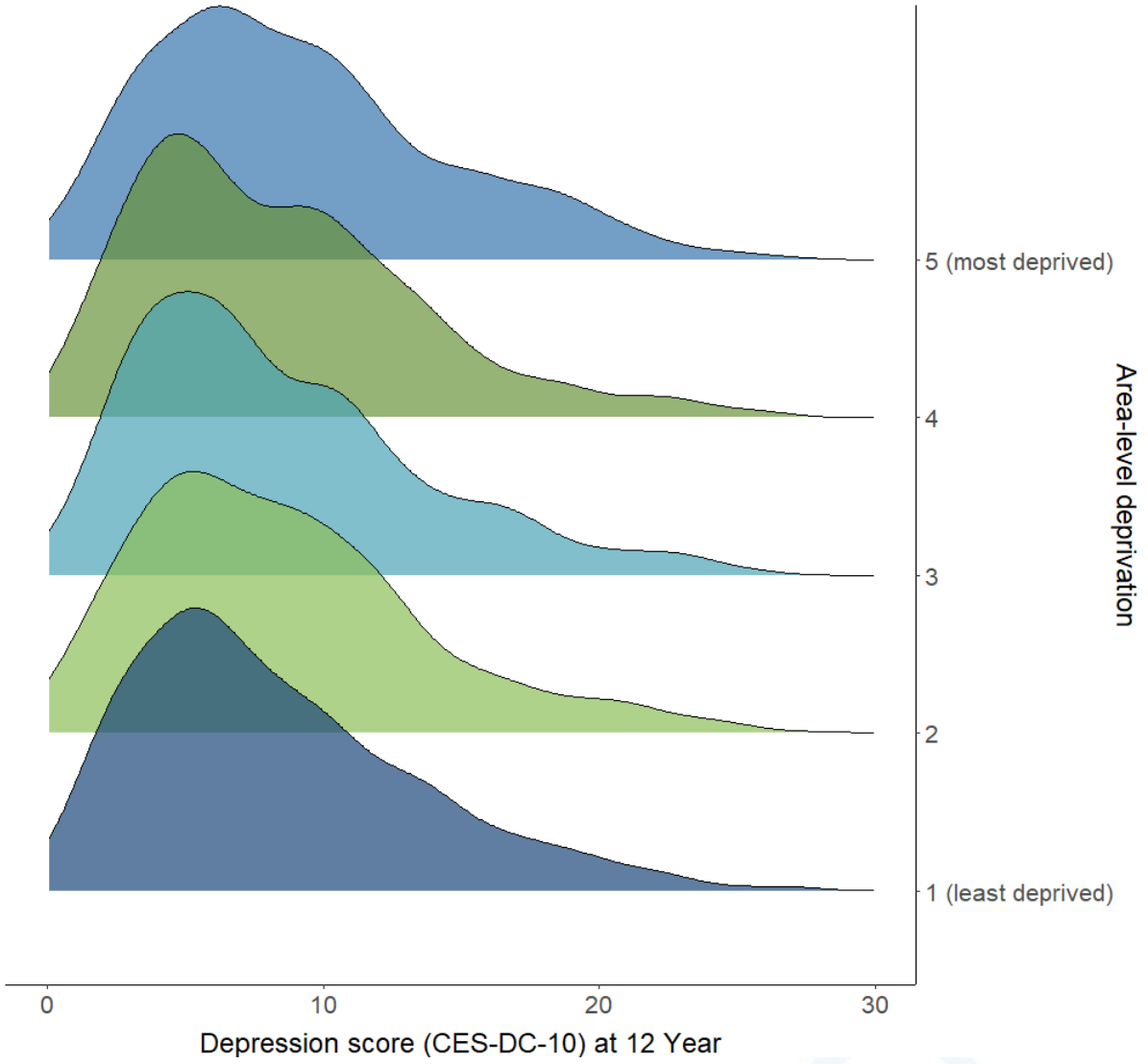


Figure 4. Distribution of depression scores by area-level deprivation at 12-years-old. This figure shows the distribution of depression scores for Quintile 5 (top; most deprived), Quintile 4, Quintile 3, Quintile 2, and Quintile 1 (bottom; least deprived). The x-axis represents depression scores, while the y-axis represents the density of individuals at each depression score level. Overall, the figure suggests that the distribution of depression scores by area-level deprivation is similar.

2.3 How were anxiety symptoms measured?

Anxiety symptoms were measured using the Patient-Reported Outcomes Measurement Information System (PROMIS) Paediatric Anxiety - Short Form 8a questionnaire (using Item Bank v2.0). This short form measure has 8-items assessing fear, anxious misery, hyperarousal, and somatic symptoms related to arousal (Table 2). Young people were encouraged to answer and interpret the PROMIS Paediatric Anxiety Short form items without adult input. Participants rated items on a five-point scale ranging from 1 (Never) to 5 (Almost always) (6).

For our youth population, the PROMIS paediatrics measures are particularly useful as it focuses on the development of item banks across several health domains (physical function, pain, fatigue, emotional distress, social role relationships, and asthma symptoms) for youths aged between 8 to 17. We used the same items to assess children's anxiety symptoms at age 8, 11, and again at 12. Repeating the same validated, reliable measure enables us to track the young people's anxiety symptoms over time.

Table 2. Questions used to derive anxiety symptoms at 8 year, 10 year, and 12 year Data collection Waves (DCW) using the PROMIS Paediatric Anxiety - Short Form 8a questionnaire.

8Y DCW Variable	10Y DCW Variable †	12Y DCW variable	Question/items	Response options *
			In the past 7 days how often were the following true...	
PAS1_y8C	PAS1_Y11LDC	PAS1_y12C	I felt scared	8Y and 12Y DCW (0-4): 0. Never 1. Almost Never 2. Sometimes 3. Often 4. Almost Always Covid19 lockdown survey (1-5): 1. Never 2. Almost Never 3. Sometimes 4. Often 5. Almost Always
PAS2_y8C	PAS2_Y11LDC	PAS2_y12C	I worried about what could happen to me	
PAS3_y8C	PAS3_Y11LDC	PAS3_y12C	I felt worried	
PAS4_y8C	PAS4_Y11LDC	PAS4_y12C	I felt like something awful might happen	
PAS5_y8C	PAS5_Y11LDC	PAS5_y12C	I worried when I went to bed at night	
PAS6_y8C ‡	PAS6_Y11LDC	PAS6_y12C	I felt nervous	
PAS7_y8C	PAS7_Y11LDC	PAS7_y12C	I worried when I was at home	
PAS8_y8C	PAS8_Y11LDC	PAS8_y12C	I got scared really easily	

Note. † 10Y DCW was collected as part of the COVID19 data collection wave on a reduced sample size. * Items were recoded from 0-4 to 1-5 for the 8Y and 12Y DCW's prior to deriving the anxiety score. ‡ Item was "I feel nervous" at 8Y DCW.

2.3.1 How is the PROMIS Paediatric Anxiety - Short Form 8a derived?

All eight items can be summed to create a continuous score in which higher raw scores indicate higher anxiety symptoms. T-scores were also calculated by converting the raw score into the T-score range according to the scoring guide by the PROMIS Health Organization (2016). T-scores range from 33.5 to 83.3. However, it is important to note that these T-scores are based on the US general population.

2.3.2 How can the PROMIS Paediatric Anxiety - Short Form 8a be used?

We conducted psychometric confirmatory factor analysis and found that the PROMIS Paediatric Anxiety - Short Form 8a is an acceptable tool using the *Growing Up in New Zealand* data, with invariance observed for ethnicity, gender, and deprivation at 12-years-old. However, only European, Māori, Pacific, and Asian ethnicities were assessed for invariance due to the limited number of participants in the MELAA and "Other" ethnic groups.

The data was not normally distributed (Figures 5 – 8), accordingly median scores are reported for completeness. Given the large sample size it was deemed acceptable to conduct linear regression analyses for this data (5).

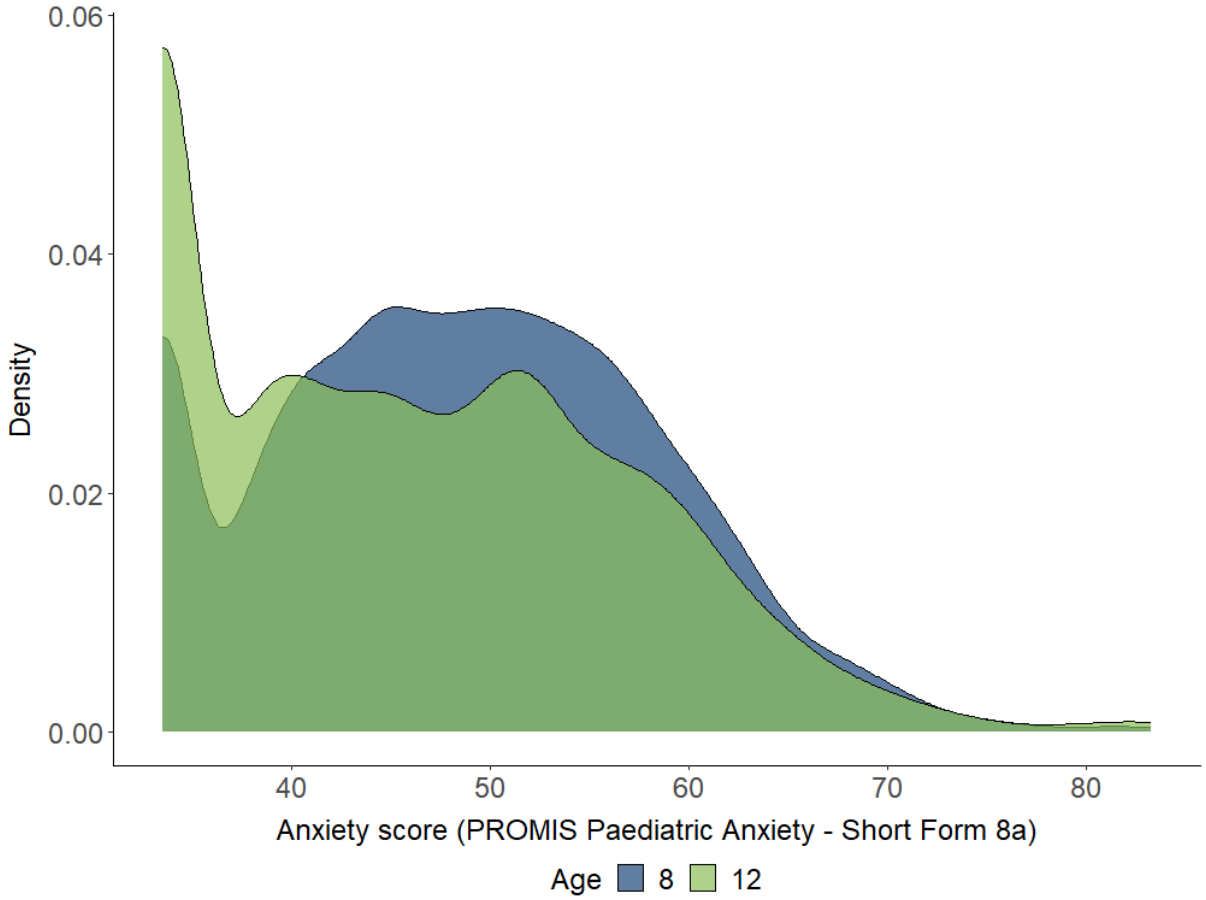


Figure 5. Distribution of anxiety scores over time. This figure shows the distribution of anxiety scores at age 8 (light blue) and age 12 (green). The x-axis represents depression scores, while the y-axis represents the density of individuals at each anxiety score level. Overall, the figure suggests that anxiety scores may have decreased over time as the distribution of anxiety scores has shifted to the right, with more young people reporting lower anxiety symptoms.

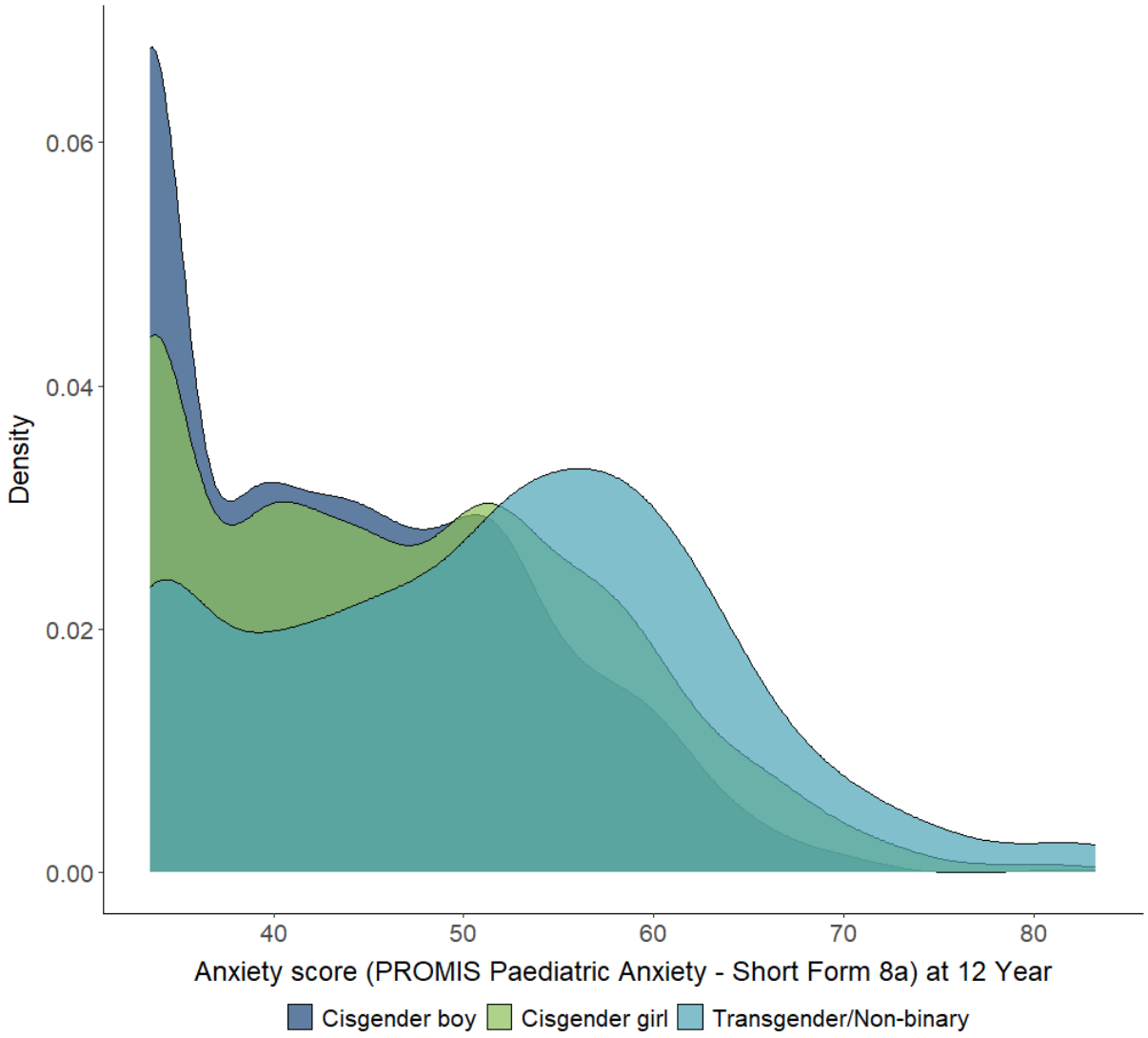


Figure 6. Distribution of anxiety scores by gender at 12-years-old. This figure shows the distribution of anxiety scores for cisgender boys (dark blue), cisgender girls (green), and transgender-non-binary young people (light blue). The x-axis represents anxiety scores, while the y-axis represents the density of individuals at each anxiety score level. Overall, the figure suggests that there may be differences in the distribution of anxiety scores by gender, as demonstrated by the density of anxiety scores being higher for transgender or non-binary young people and marginally higher for cisgender girls compared to cisgender boys.

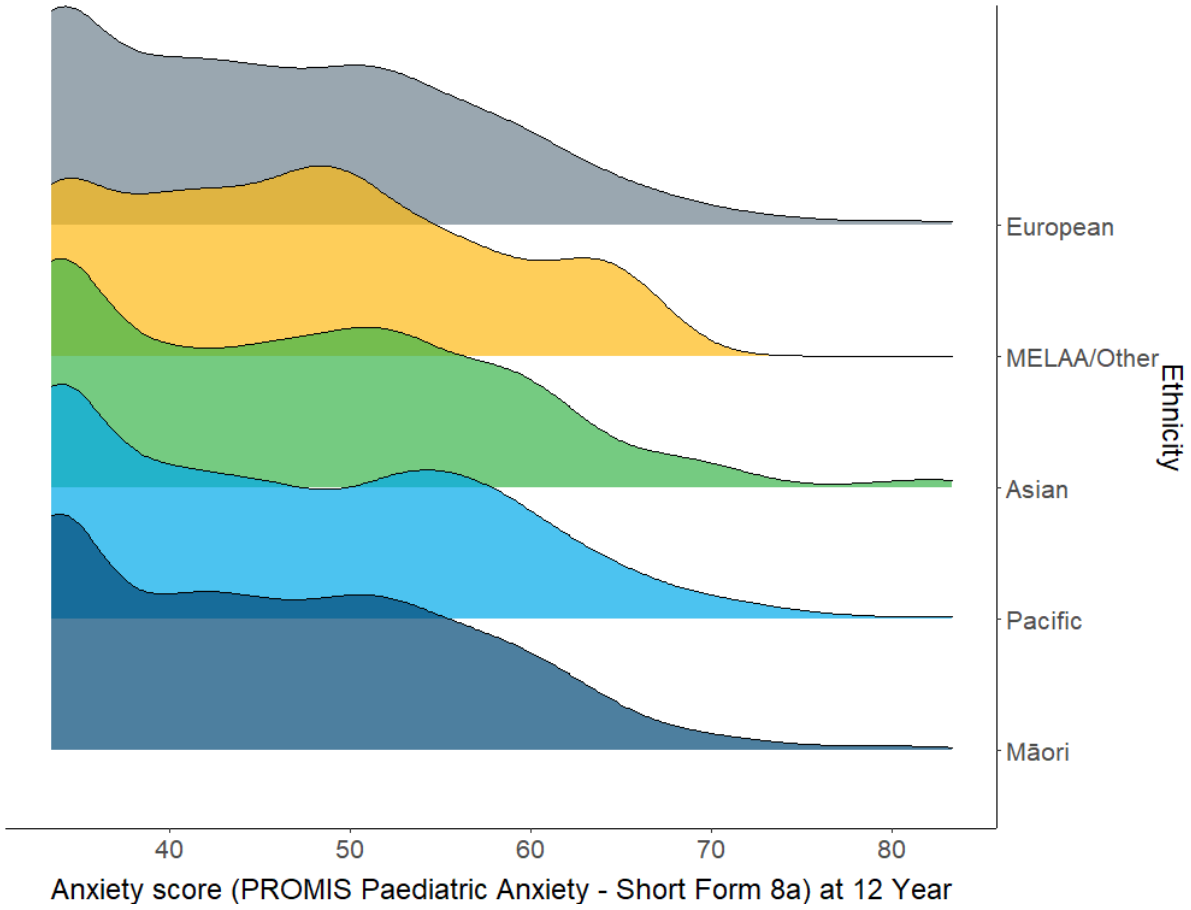


Figure 7. Distribution of anxiety scores by external prioritised ethnicity at 12-years-old. This figure shows the distribution of anxiety scores Māori (dark blue), Pacific (light blue), Asian (green), MELAA and other (yellow), and European (grey) young people. The x-axis represents anxiety scores, while the y-axis represents the density of individuals at each anxiety score level. Overall, the figure suggests that the distribution of anxiety scores by ethnicity is similar.

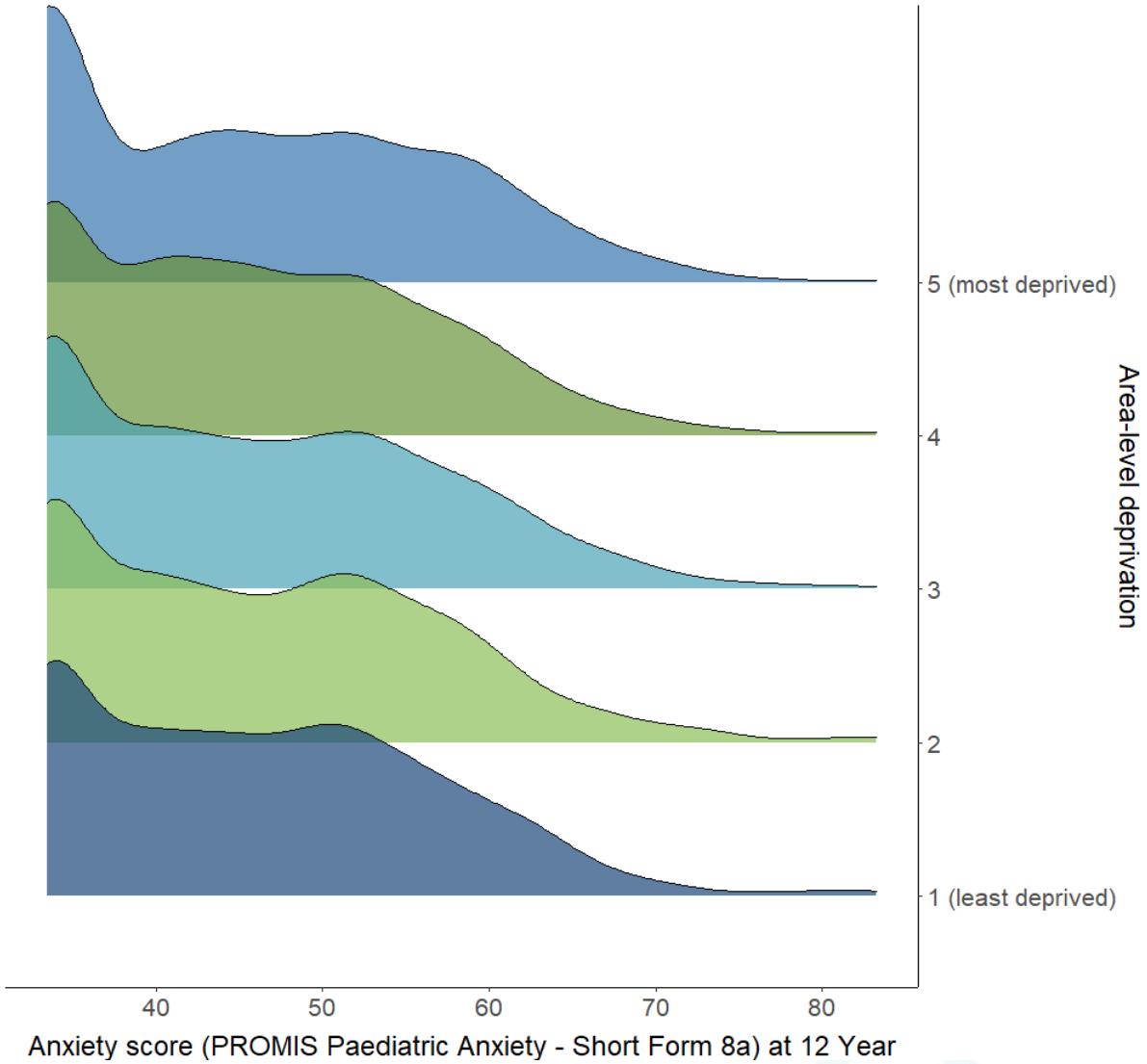


Figure 8. Distribution of anxiety scores by area-level deprivation at 12-years-old. This figure shows the distribution of anxiety scores for Quintile 5 (top; most deprived), Quintile 4, Quintile 3 (middle), Quintile 2, and Quintile 1 (bottom; least deprived). The x-axis represents anxiety scores, while the y-axis represents the density of individuals at each anxiety score level. Overall, the figure suggests that the distribution of anxiety scores by area-level deprivation is similar.

3. Analytic Sample

To ensure the results were the most relevant to the New Zealand context, only participants who reported that they were living in Aotearoa at the time of the survey were included in the analysis. Those who did not select which country they were living in (i.e., a NA response) were not included in the analytic sample.

From the participants in New Zealand (n = 4500), a total of 4437 (98.6%) completed the CES-DC-10 questionnaire and the PROMIS Paediatric Anxiety - Short Form 8a questionnaire at the 12-year Data collection wave. Missing cases (n = 63; 1.4%) were not included in the analyses and no imputation was conducted. A total of 4097 young people residing in New Zealand completed the CES-DC-10 and 4096 young people completed the PROMIS Paediatric Anxiety - Short Form 8a measures at both 8 years and 12 years old. All participants and were included in the case-wise deletion linear regression analyses assessing change over time.

4. Diagnosis of depression and anxiety and engagement with mental health services

Mothers reported that 5.3% (n = 227) of young people had been diagnosed by a doctor with depression or anxiety. Overall, 8.8% (n = 373) of the cohort's youth had contact with mental health services in the last 12 months. Of the young people diagnosed with depression or anxiety, over half (55.1%; n = 125) engaged with mental health services in the last 12 months. Of young people without a diagnosis of depression or anxiety, 6.1% (n = 244) engaged with mental health services in the last 12 months.

According to mothers' reports, over half (57.6%, n = 215) of young people who engaged with mental health services "received all they needed". Approximately one-third (31.1%; n = 116) "received some of what they needed", and 8.3% (n = 31) "did not receive what they needed at all". Only 2.9% (n = 11) of mothers reported they "don't know" if their child got the help they needed.[1]

The most reported barriers to engagement with mental health services included COVID-19 restrictions or lockdowns (33.3%, n = 49), not being able to get an appointment or the service was not accessible (29.3%, n = 43) or the child was not eligible (15.0%, n = 22). Other reasons included previous bad experiences with mental health services, unclear how to access services, the service did not meet their needs, not finding a therapist or counsellor they thought understood them and the cost

[1] Note: Engagement with mental health services in the last 12 months includes both public (free) and private (paid) mental health services.

of services being too high.[2] Barriers to engagement with mental health services were similar for individuals that had been diagnosed with depression or anxiety and individuals without a diagnosis.

5. Depression symptoms for young people at 12-years-old

Young people reported an average level of depression symptoms of 8.50 on a scale from 0 (no depression symptoms) to 30 (high depression symptoms).

- Transgender or non-binary young people reported the highest levels of depression symptoms, followed by cisgender girls and then cisgender boys (Figure 9A) at 12-years-old.
- Young people living in the most socioeconomically deprived neighbourhoods (NZ Deprivation Index quintile 5) reported the highest depression symptoms at 12-years. Young people living in the least deprived neighbourhoods (quintile 1) reported the lowest levels of depression symptoms (Figure 9B).
- Depression symptoms were patterned by ethnicity. Mean depression scores were higher for rangatahi Māori than for the Sole European group (Figure 9C).

[2] Note: Barriers to engagement with mental health services only includes young people who had any contact with mental health services and did not receive the help they needed (n = 147) – this does not include those who may need help but did not or could not reach out to mental health services.

Table 3. Descriptive statistics of depression scores for the total cohort and by young people's gender identity, ethnicity, and area-level deprivation.

	Mean score (SD)	Depression Score 95% CI	Median score
Total cohort (n = 4437)	*8.50 (5.18)*	*8.3 - 8.6*	*8*
Gender (*n* = 4437)			
Cisgender boy (*n* = 2031)	7.43 (4.39)	7.2 - 7.6	7
Cisgender girl (*n* = 1670)	8.50 (5.18)	8.3 - 8.7	7
Transgender/Non-binary (*n* = 736)	11.43 (5.98)	11.0 – 11.9	11
Area-level deprivation (*n* = 4354)			
Quintile 1 (low deprivation; *n* = 1063)	8.27 (5.15)	8.0 - 8.6	7
Quintile 2 (*n* = 988)	8.50 (5.17)	8.2 - 8.8	8
Quintile 3 (*n* = 857)	8.35 (5.17)	8.0 - 8.7	7
Quintile 4 (*n* = 726)	8.34 (5.07)	8.0 - 8.7	7
Quintile 5 (high deprivation; *n* = 774)	9.10 (5.30)	8.7 - 9.5	8
Total Response Ethnicity*			
Māori (*n* = 979)	8.97 (5.17)	8.6 - 9.3	8
Pacific (*n* = 728)	8.57 (4.98)	8.2 - 8.9	8
Asian (*n* = 646)	8.38 (5.38)	8.0 - 8.8	7
MELAA and other (*n* = 151)	7.68 (4.66)	6.9 - 8.4	7
Sole European (*n* = 2268)	8.31 (5.19)	8.1 - 8.5	7

Note. Depression scores were measured using the 10-item Centre for Epidemiologic Studies Depression Scale for Children, scores can range from 0 (no depression symptoms) to 30 (high depression symptoms).

* = Groups are not mutually exclusive. SD = Standard Deviation. 95% CI = 95% Confidence Interval.

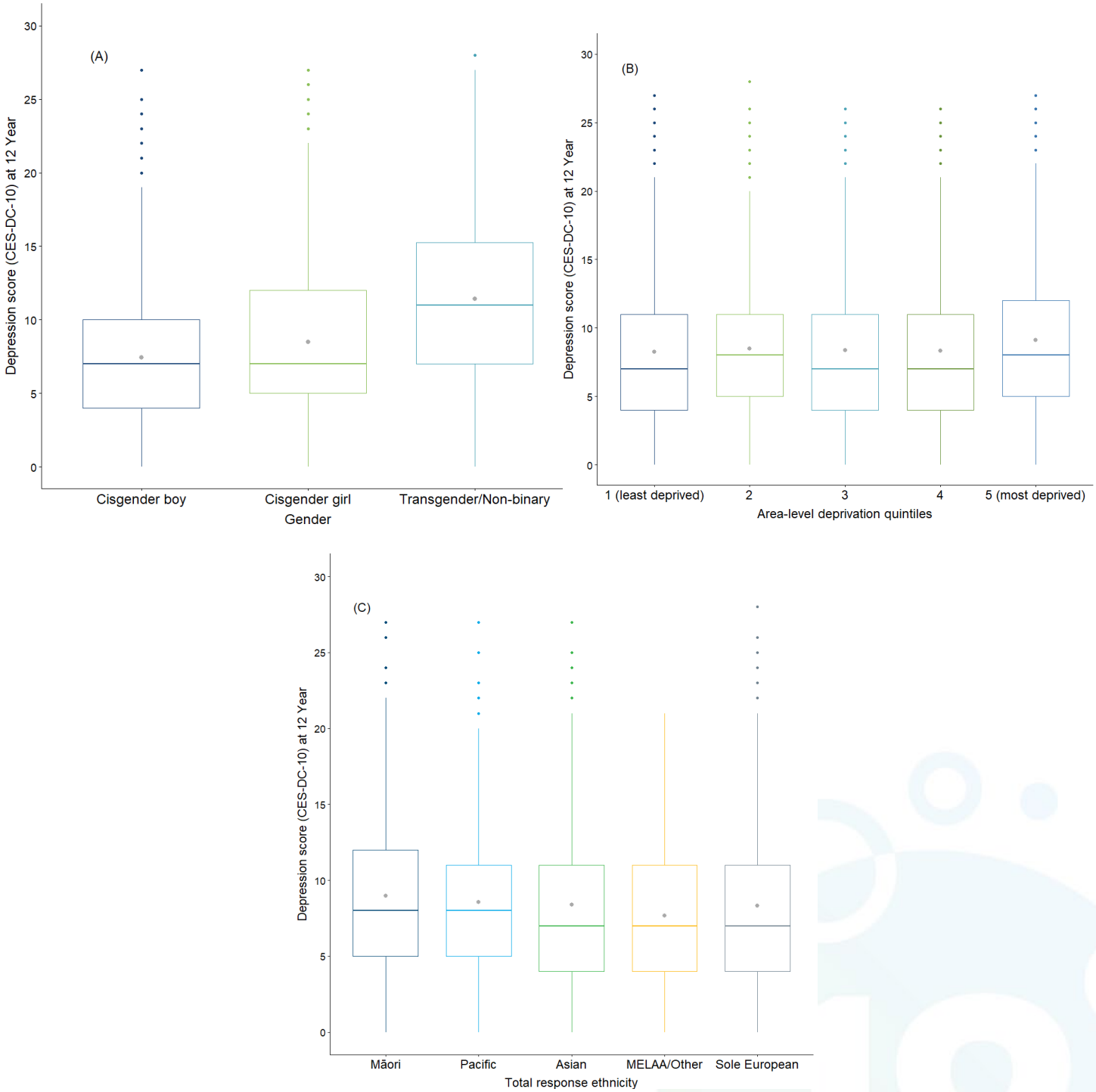


Figure 9. Boxplots of young people's depression scores by gender (A), area-level deprivation (B), and ethnicity (C). Participants who reported more than one ethnic group are counted once in each group reported, except for the "Sole European" group which includes those young people who only identified as European. The middle line represents the median value. The grey dot in the middle represents the mean value, and the ends of the box represent the 25th and 75th quartile, respectively. Coloured dots represent outliers for each group.

6. Anxiety symptoms for young people at 12-years-old

Young people reported an average level of anxiety symptoms of 46.0 on a scale from 33.50 (no anxiety symptoms) to 83.3 (high anxiety symptoms).

- Transgender or non-binary young people reported the highest levels of anxiety symptoms, followed by cisgender girls and then cisgender boys (Figure 10A).
- There were no differences in mean anxiety symptoms by socioeconomic deprivation (Figure 10B).
- There were no differences in mean anxiety symptoms by ethnicity (Figure 10C).

Table 4. Descriptive statistics of anxiety scores for the total cohort and by young people's gender identity, ethnicity, and area-level deprivation.

	Mean score (SD)	Anxiety Score 95% CI	Median score
Total cohort (n = 4437)	*46.03 (10.66)*	*46 - 46*	*44.9*
Gender (*n* = 4437)			
Cisgender boy (*n* = 2031)	43.75 (9.49)	43 - 44	43.0
Cisgender girl (*n* = 1670)	46.53 (10.61)	46 - 47	44.9
Transgender/Non-binary (*n* = 736)	51.22 (11.82)	50 - 52	52.5
Area-level deprivation (*n* = 4354)			
Quintile 1 (low deprivation; *n* = 1057)	46.06 (10.47)	45 - 47	44.9
Quintile 2 (*n* = 974)	46.06 (10.69)	45 - 47	44.9
Quintile 3 (*n* = 845)	46.06 (10.82)	45 - 47	44.9
Quintile 4 (*n* = 719)	45.94 (10.38)	45 - 47	44.9
Quintile 5 (high deprivation; *n* = 759)	46.06 (10.97)	45 - 47	44.9
Total Response Ethnicity*			
Māori (*n* = 968)	45.69 (10.58)	45 - 46	44.9
Pacific (*n* = 718)	45.94 (10.99)	45 - 47	44.9
Asian (*n* = 638)	46.43 (10.93)	46 - 47	45.8
MELAA and other (*n* = 150)	46.98 (10.58)	45 - 49	47.5
Sole European (*n* = 2244)	46.00 (10.52)	46 - 46	44.9

Note. Anxiety scores were measured using the 8-item the Patient-Reported Outcomes Measurement Information System (PROMIS) Paediatric Anxiety - Short Form 8a questionnaire, scores can range from 33.5 (no anxiety symptoms) to 83.3 (high anxiety symptoms).

* = Groups are not mutually exclusive. SD = Standard Deviation. 95% CI = 95% Confidence Interval.

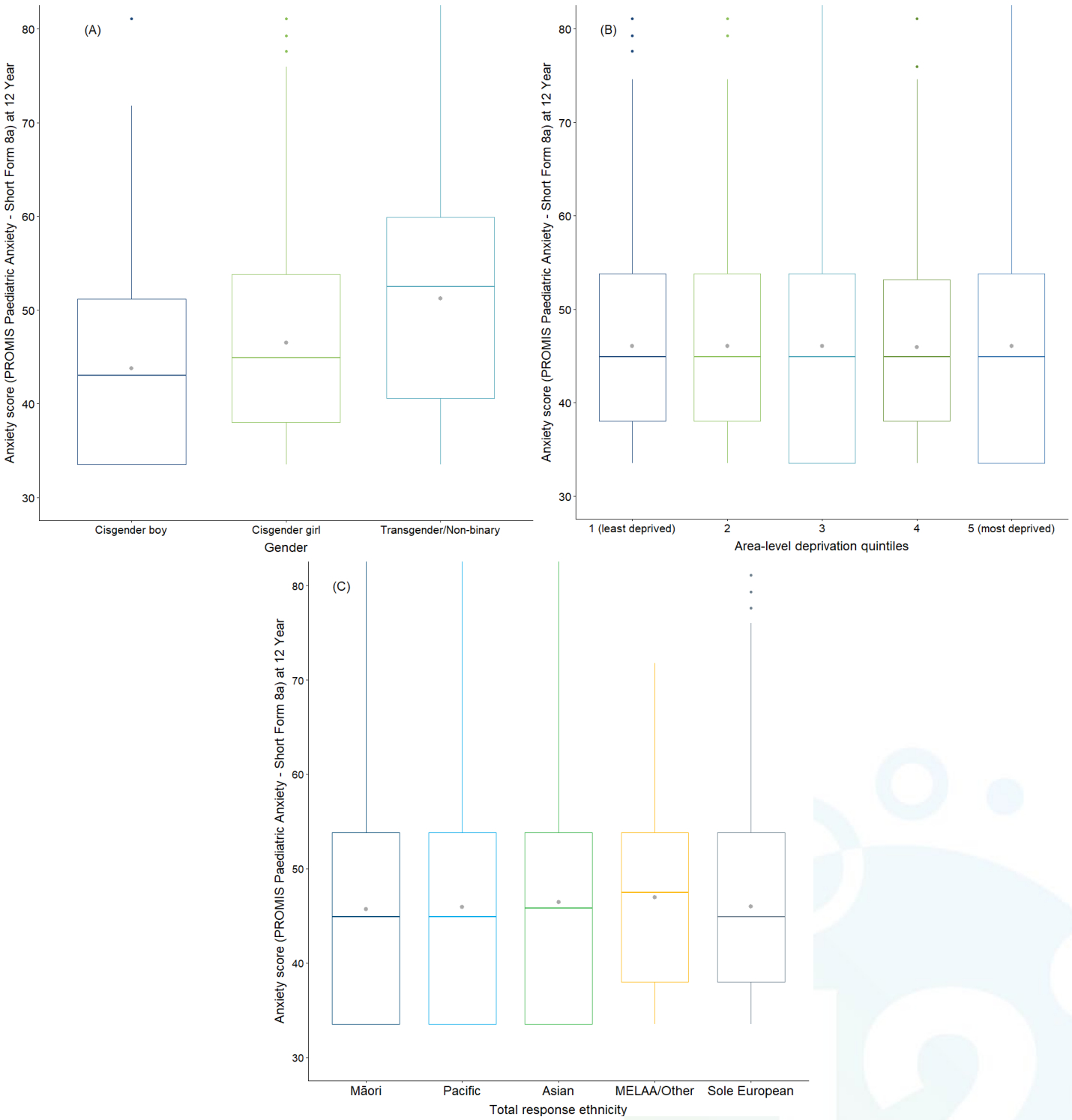


Figure 10. Boxplots of young people's anxiety scores by gender (A), area-level deprivation (B), and ethnicity (C). Participants who reported more than one ethnic group are counted once in each group reported, except for the "Sole European" group which includes those young people who only identified as European. The middle line represents the median value. The grey dot in the middle represents the mean value, and the ends of the box represent the 25th and 75th quartile, respectively. Coloured dots represent outliers for each group.

7. Change in young people's depression symptoms from 8 to 12-years-old.

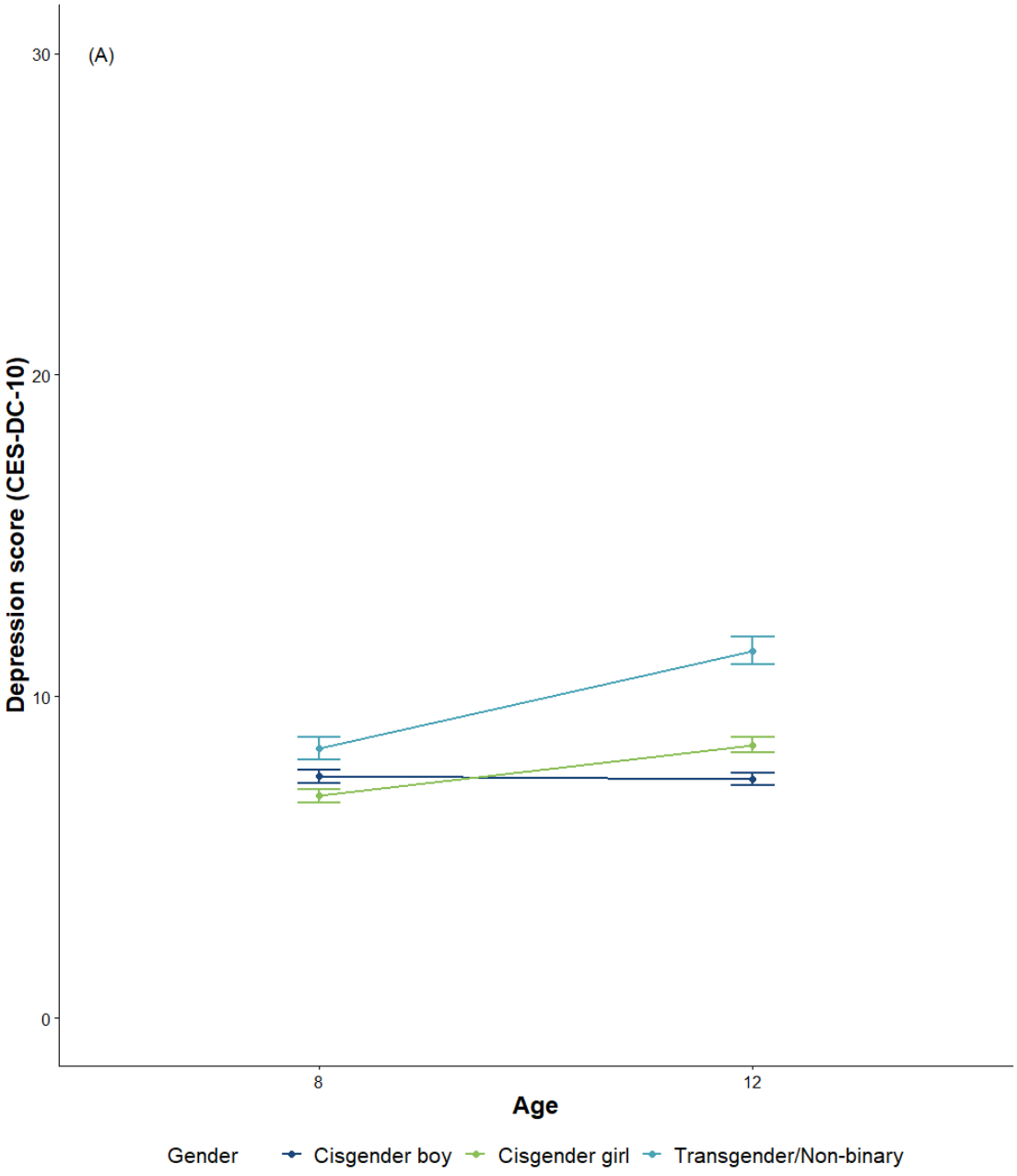
On average, young people reported a one-point increase in depression symptoms from 8 to 12 years old on a scale from 0 (no depression symptoms) to 30 (high depression symptoms). Higher depression symptoms at age eight were significantly associated with higher depression symptoms at age 12 (Table 5). Over half (52.4%; *n* = 2146) of young people had an increase in depression symptoms from 8 to 12-years-old.

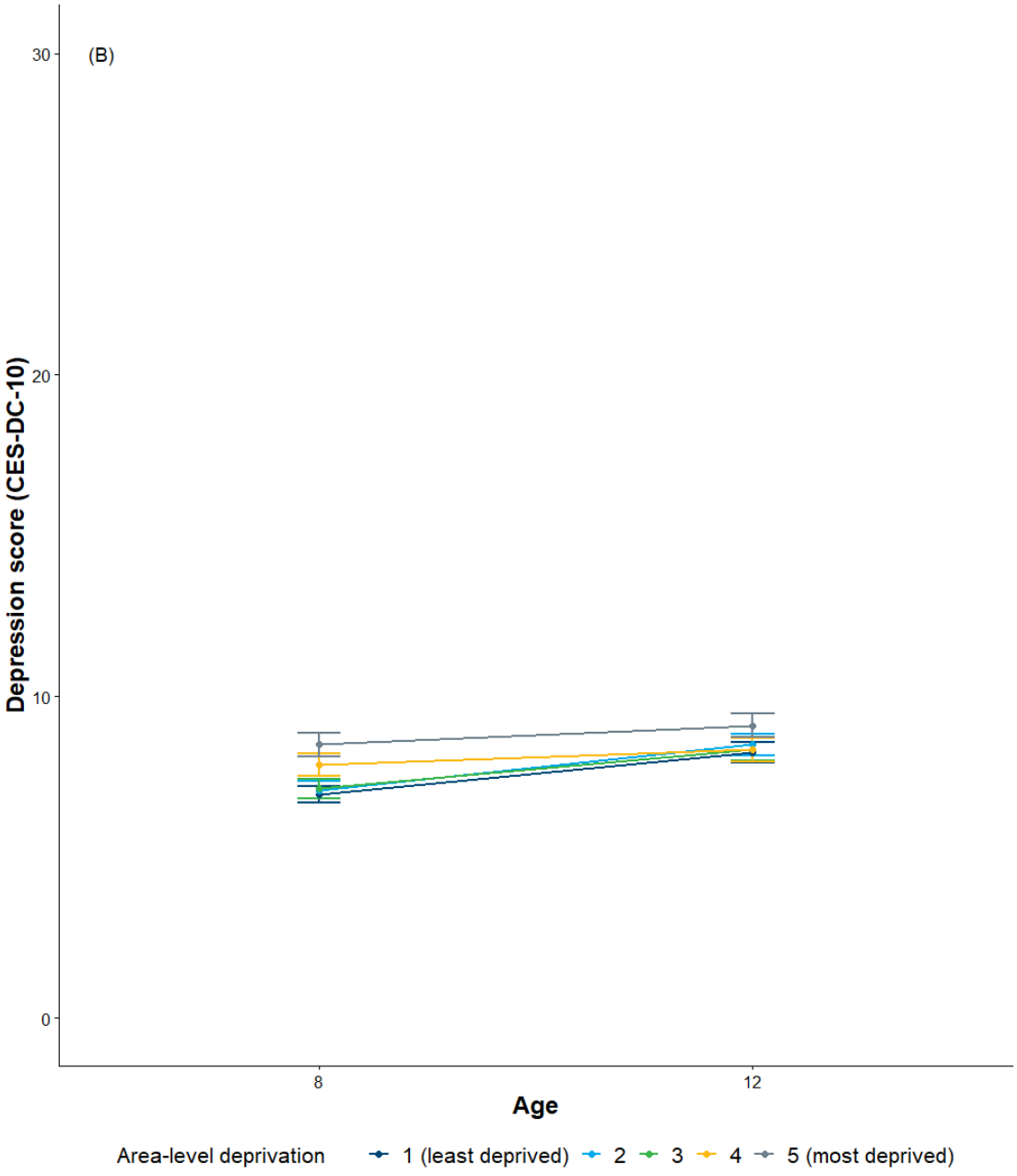
- Transgender or non-binary young people and cisgender girls reported significantly higher levels of depression symptoms than cisgender boys, after adjusting for depression symptoms at age 8 (Figure 3A).
- Young people experiencing the highest area-level deprivation had marginally higher depression symptoms compared to those experiencing the lowest area-level deprivation at 12 years of age, after adjusting for depression symptoms at age 8 (Figure 3B).
- Differences in depression symptoms between ethnic groups from age 8 to age 12 were small. Rangatahi Māori had marginally higher depression symptoms compared to Europeans at 12 years of age, after adjusting for depression symptoms at age 8 (Figure 3C).

Table 5. Regression results for depression symptoms at 12-years-old by key demographic variables adjusting for depression symptoms at 8-years-old.

	Depression Regression coefficients by demographics adjusting for depression scores at 8 years old		
	Estimate (95% CI)	***p value***	***Adjusted R2***
Total cohort (*n* = 4097)	0.24 (0.21 – 0.28)	<0.001	0.04
Gender (*n* = 4097)			
Cisgender boy	Reference group	-	0.11
Cisgender girl	1.27 (0.94 – 1.60)	<0.001	-
Transgender/Non-binary	3.96 (3.53 – 4.40)	<0.001	-
Area-level deprivation (*n* = 4024)			
Quintile 1 (low deprivation)	Reference group	-	0.04
Quintile 2	0.25 (-0.20 – 0.71)	0.271	-
Quintile 3	0.08 (-0.39 – 0.55)	0.738	-
Quintile 4	-0.06 (-0.56 – 0.45)	0.827	-
Quintile 5 (high deprivation)	0.50 (-0.01 – 1.01)	0.055	-
Externally Prioritised Ethnicity (*n* = 3992)			
Māori	0.37 (-0.03 – 0.77)	0.073	-
Pacific	-0.05 (-0.60 – 0.50)	0.857	-
Asian	0.03 (-0.47 – 0.52)	0.917	-
MELAA and other	-0.73 (-1.82 – 0.37)	0.194	-
Sole European	Reference group	-	0.04

Note. Depression scores were measured using the 10-item Centre for Epidemiologic Studies Depression Scale for Children, scores can range from 0 (no depression symptoms) to 30 (high depression symptoms). 95% CI = 95% Confidence Interval.





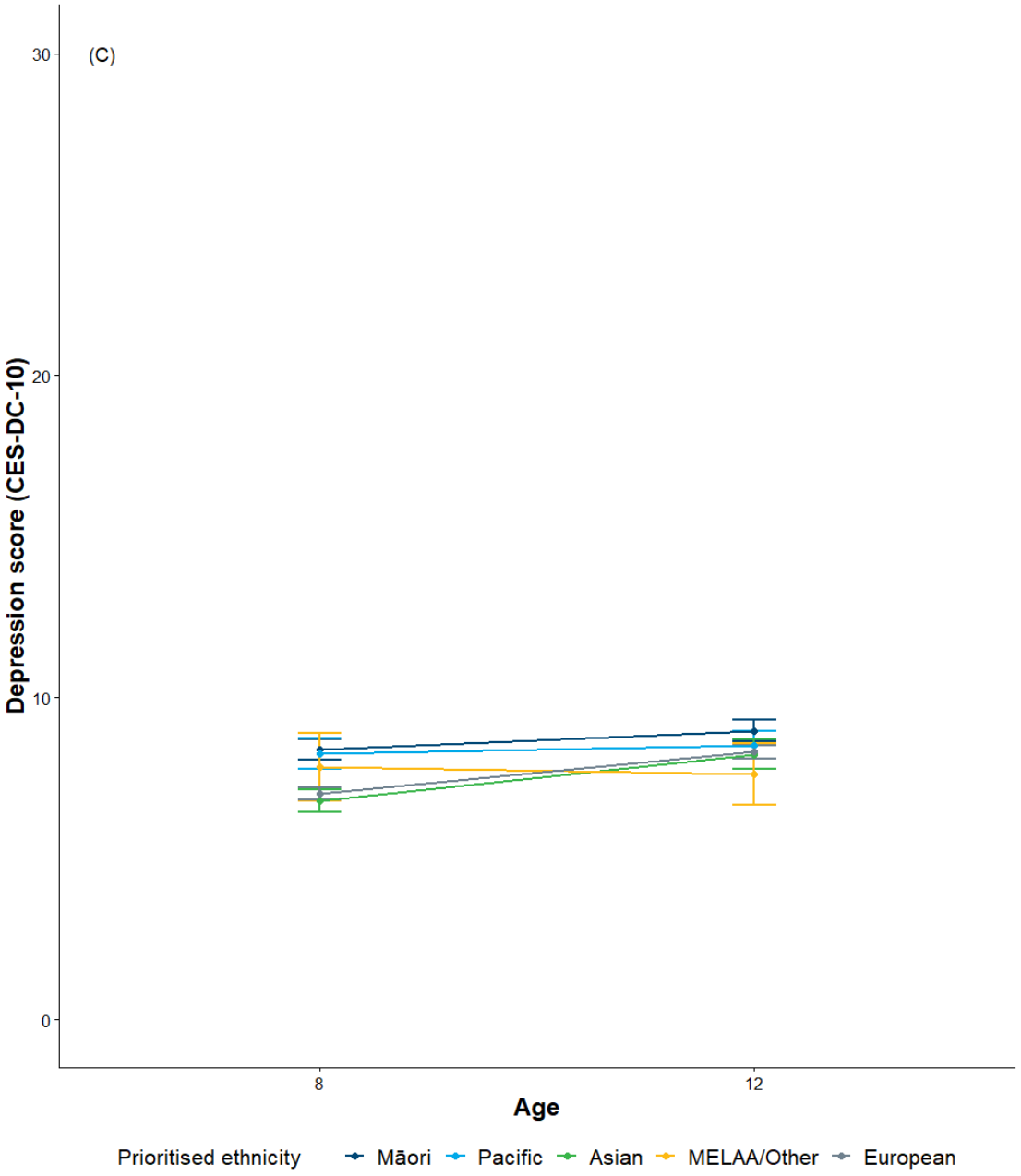


Figure 11. Young people's change in depression symptoms from age 8 to age 12 by gender (A), area-level deprivation (B), and ethnicity (C), and with 95% confidence intervals.

Note. Total response ethnicity was prioritised to create exclusive categories for statistical analysis. The Ministry of health protocol originally developed by Statistics New Zealand was used to allocate each participant to a single Level 1 ethnicity.

8. Change in young people's anxiety symptoms from 8 to 12-years-old

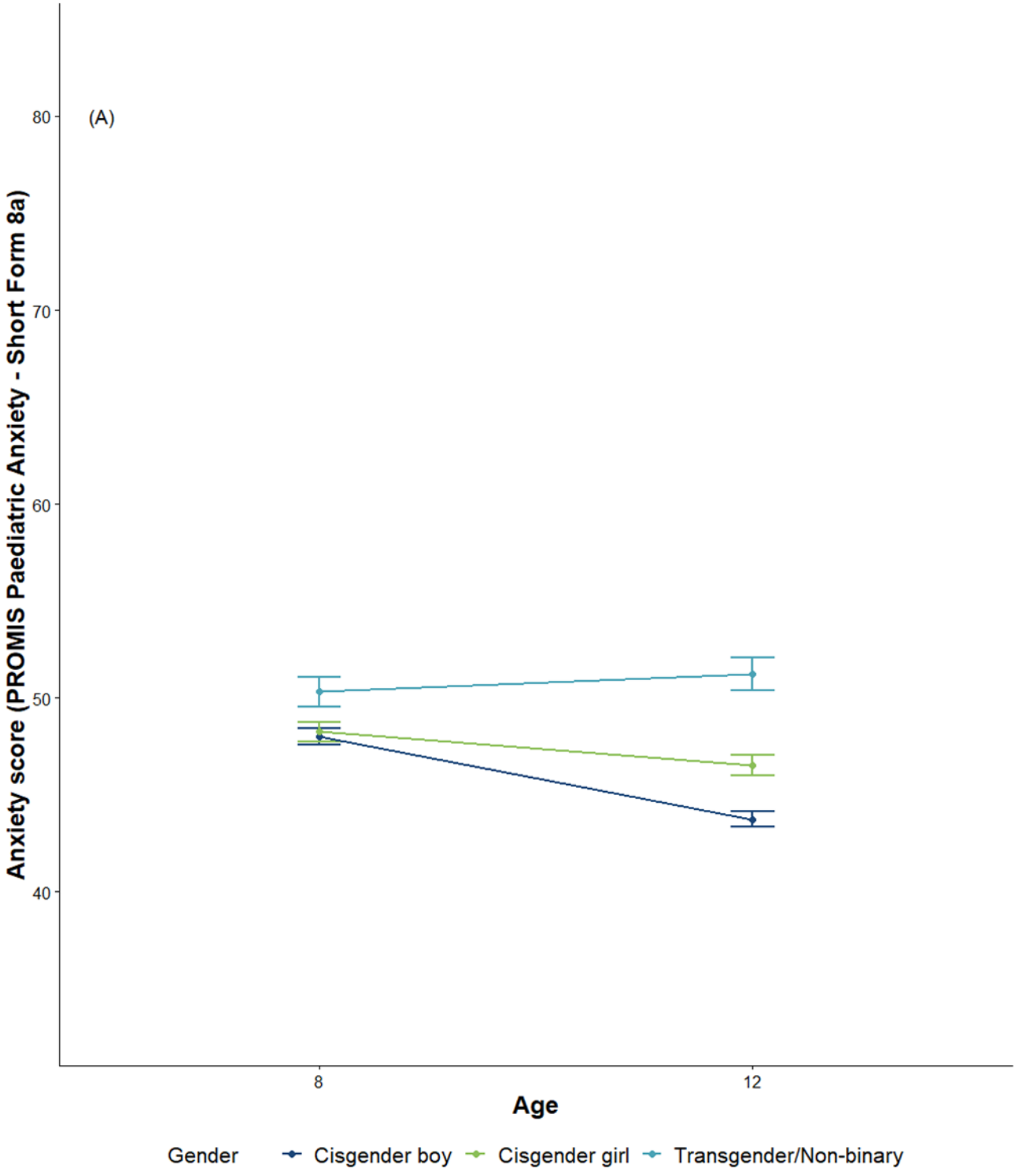
On average, young people had a 2.4-point decrease in anxiety scores from 8 years old to 12. However, higher anxiety symptoms at age 8 were significantly associated with higher anxiety symptoms at age 12 (Table 6). While most young people reported a decrease in anxiety symptoms, 37.2% (n = 1535) reported an increase in anxiety symptoms.

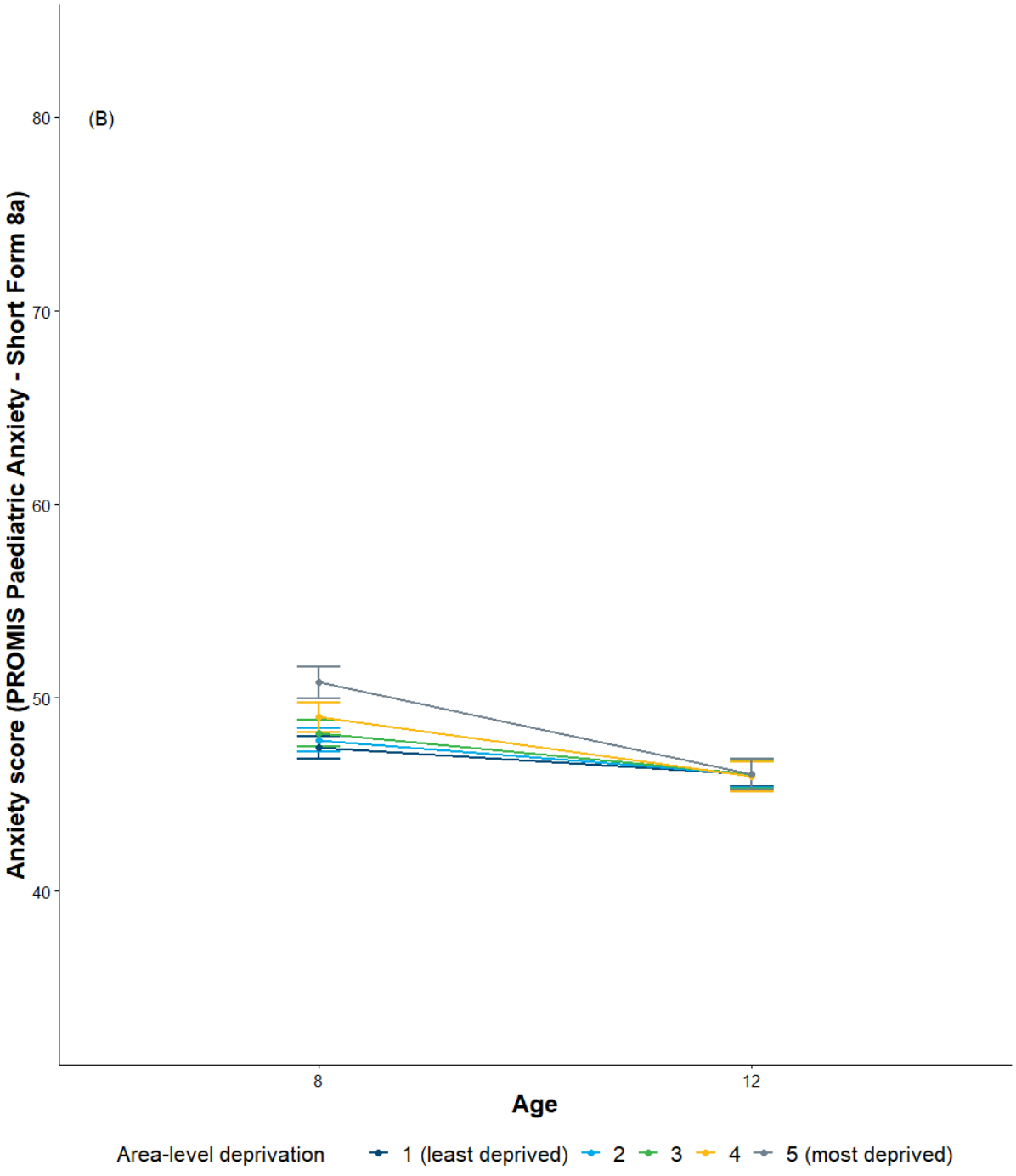
- Transgender or non-binary young people reported an increase in anxiety symptoms from 8 to 12-years-old. Transgender or non-binary and cisgender girls had significantly higher levels of anxiety symptoms compared to cisgender boys at age 12 when adjusting for anxiety symptoms at eight years of age (Figure 12A).
- No differences were observed for anxiety symptoms when comparing area-level deprivation quintiles (Figure 12B).
- Differences in anxiety symptoms between ethnic groups were small, and these differences tended to become less pronounced over time. Over time, rangatahi Māori and Pacific young people had a marginal decrease in anxiety symptoms compared to Europeans who reported the lowest level of anxiety symptoms at 8 year and similar levels to rangatahi Māori at 12 year (Figure 12C).

Table 6. Regression results for anxiety symptoms at 12-years-old by key demographic variables adjusting for anxiety symptoms at 8-years-old.

	Anxiety Regression coefficients by demographic adjusting for anxiety scores at 8 years old		
	Estimate (95% CI)	***p value***	***Adjusted R2***
Total cohort (*n* = 4096)	0.25 (0.22 - 0.29)	<0.001	0.05
Gender (*n* = 4096)			
Cisgender boy	Reference group	-	0.11
Cisgender girl	2.70 (2.01 – 3.38)	<0.001	-
Transgender/Non-binary	7.06 (6.17 – 7.96)	<0.001	-
Area-level deprivation (*n* = 4023)			
Quintile 1 (low deprivation)	Reference group	-	0.05
Quintile 2	0.06 (-0.87 – 1.00)	0.892	-
Quintile 3	-0.09 (-1.06 - 0.87)	0.851	-
Quintile 4	-0.43 (-1.46 - 0.60)	0.410	-
Quintile 5 (high deprivation)	-0.57 (-1.61 – 0.47)	0.284	-
Externally Prioritised Ethnicity (*n* = 3991)			
Māori	-0.76 (-1.58 - 0.07)	0.072	-
Pacific	-0.97 (-2.10 - 0.17)	0.095	-
Asian	0.23 (-0.78 – 1.24)	0.660	-
MELAA and other	0.76 (-1.49 – 3.00)	0.509	-
Sole European	Reference group	-	0.05

Note. Anxiety scores were measured using the 8-item the Patient-Reported Outcomes Measurement Information System (PROMIS) Paediatric Anxiety - Short Form 8a questionnaire, scores can range from 33.5 (no anxiety symptoms) to 83.3 (high anxiety symptoms). 95% CI = 95% Confidence Interval.





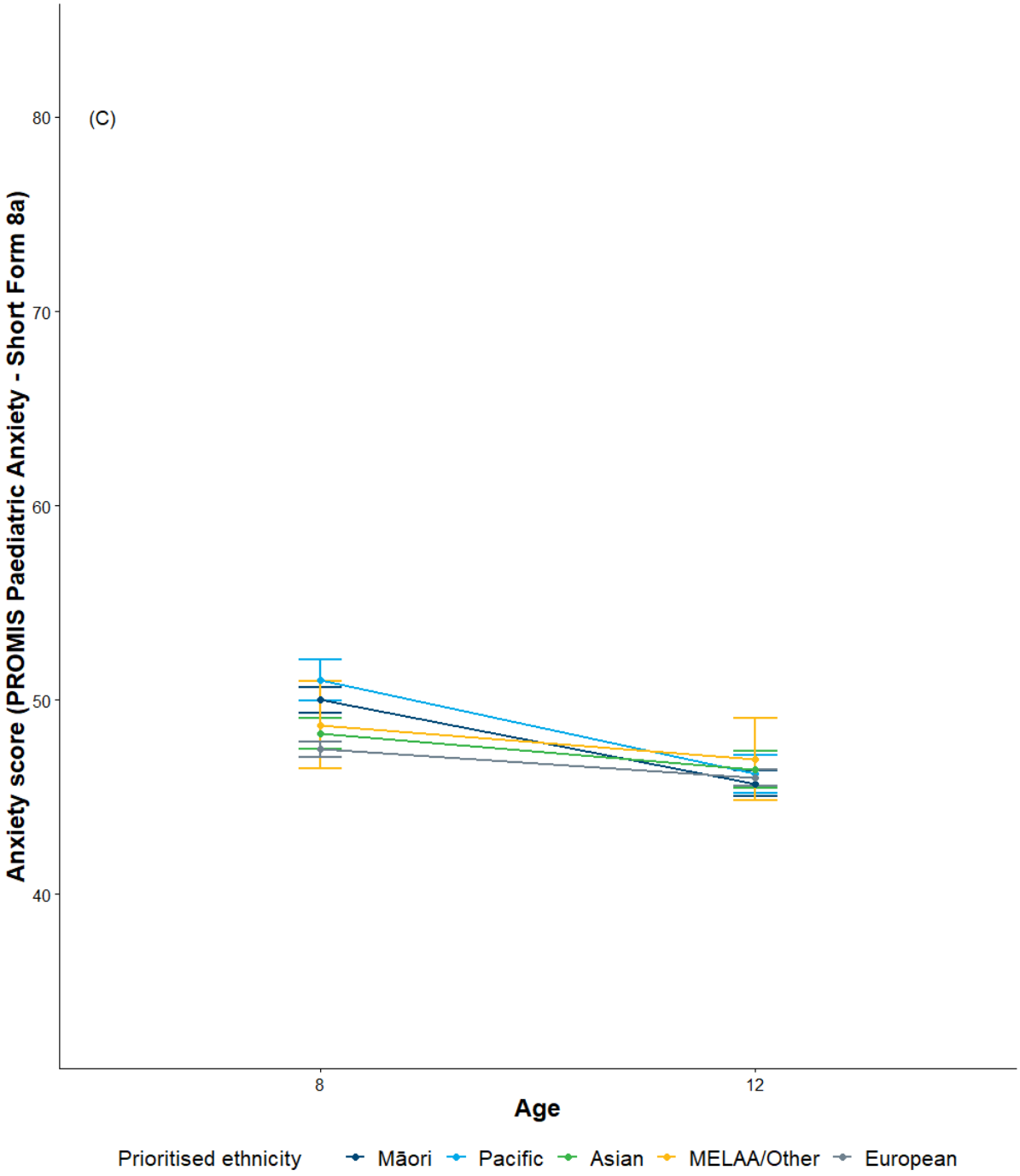


Figure 12. Young people's change in anxiety symptoms from age 8 to age 12 by gender (A), and area-level deprivation (B), and ethnicity (C) with 95% confidence intervals.

Note. Total response ethnicity was prioritised to create exclusive categories for statistical analysis. The Ministry of health protocol originally developed by Statistics New Zealand was used to allocate each participant to a single Level 1 ethnicity.

9. Factors associated with depression symptoms and anxiety symptoms at 12-years-old

Factors that were hypothesised to be associated with depression or anxiety symptoms were selected based on the literature. These included child demographic factors (child gender, ethnicity,

age, 8 year depression score or anxiety score, respectively), socioeconomic factors (DEP17 total score, area-level deprivation), household factors (household structure, residential mobility), relationship factors (child-peer relationship score, child-parent relationship score, bullying score) and mother factors (maternal perceived stress, depression symptoms, age, education). Although many of these factors were significantly associated with depression and anxiety symptoms individually (at the univariate level), when modelled together (in a multivariate model), some variables were no longer significant predictors (see Tables 7 - 10). For depression symptoms at 12 years old, the multivariate model explained 36.6% of the total variability (Table 8) with demographic factors (e.g., gender) and relationship factors explaining the largest amount of variation. For anxiety symptoms at 12 years old, the multivariate model explained 24.3% of the total variability (Table 10) with demographic factors (e.g., gender) and relationship factors explaining the largest amount of variation. Statistical analyses were performed using RStudio (version 2022.12.0+353). Alpha was set at 0.05 for all tests of statistical significance.

Child mental health factors. Higher **depression symptoms** at 8 years old were significantly associated with higher depression symptoms at 12 years old, which remained when adjusting for other factors. Similarly, higher **anxiety symptoms** at 8 years old were significantly associated with higher anxiety symptoms at 12 years old, which remained when adjusting for other factors. See above for information on how depression and anxiety symptoms were measured.

Child demographic factors. **Gender** was associated with depression and anxiety symptoms at 12 years old. Cisgender girls or transgender or non-binary young people had higher scores than those who identified as cisgender boys. These associations remained when adjusting for other factors. **Ethnicity** was also significantly associated with depression symptoms at the univariate level (Table 7), but not for anxiety symptoms (Table 9). Young people who identify as Māori had higher depression scores than those who identify as European, but this was not statistically significant after adjusting for other factors in the multivariate model. **Age** was not significantly associated with depression or anxiety symptoms, thus was not included in multivariate models. For information on gender and externally prioritised ethnicity, please see NWA12: Methodology and NWA12: Who are we? Snapshot 1 of 9.

Socioeconomic factors. Greater deprivation (measured using the **DEP-17** score, which measures individual deprivation) was associated with greater (worse) depression and anxiety symptoms. For information on the DEP-17 index please see NWA12: Methodology and NWA12: Material hardship snapshot 2 of 9. Higher **area-level deprivation** (quintile 5) was associated with greater depression symptoms compared to low area-level deprivation (quintile 1). For information on the New Zealand Deprivation Index (NZDep) please see NWA12: Methodology.

Household factors. Young people living in a sole-parent, or an extended family **household structure** reported greater depression and anxiety symptoms than those living in a two-parent only household. Young people who had experienced **residential mobility** in their lives typically had higher depression scores than those who did not. However, residential mobility was not statistically significant after adjusting for other factors in the multivariate model. For information on household structure, please see NWA12: Housing and homelessness snapshot 4 of 9.

Relationship factors. Stronger **child-peer relationship** and **child-parent relationship** scores (where lower scores indicate more supportive/stronger relationships) were associated with lower depression and anxiety symptoms and remained significant in the multivariate model. For information on child-peer and child-parent relationships, please see NWA12: Young People's Relationships snapshot 9 of 9.

Being **bullied** was a strong predictor of greater depression and anxiety symptoms, even when adjusting for other factors. Bullying was measured using the 10-item Forms of Bullying Scale (FBS) victimisation questionnaire (FBS-V), which is a self-reported measure of how often the young person was bullied during the last school term (including cyber bulling) (7). Young people rated questions on a Likert-type scale from 1 ('This did not happen to me') to 5 ('Several times a week or more') on items related to being teased, physical bullying, name calling, rumours, property destruction, social isolation and more. A composite mean score was calculated which ranges from 1 to 5, with higher scores indicating a greater prevalence of experiencing bullying.

Mother factors. Mothers' depression symptoms were associated with higher depression symptoms for young people, which remained significant after adjusting for other factors in the multivariate model. However, this was not the case for anxiety symptoms, in which it was no longer a significant predictor of young people's anxiety when adjusting for other factors. Mother's depression symptoms was measured using the 9-item Patient Health Questionnaire (PHQ-9) (8). Items are rated on a four-point Likert-type scale 1 (Not at all) to 4 (Nearly every day). The total score is determined by summing all items, giving a range from 0 to 27. Higher scores indicate greater depression symptoms.

Maternal perceived stress was associated with higher depression and anxiety symptoms for young people in the univariate models. However, it was not statistically significant after adjusting for other factors in the multivariate model. Maternal perceived stress was measured using the 10-item Perceived Stress Scale (9). Items are rated on a five-point Likert-type scale 0 (Never) to 4 (Very often). Four positively worded items are reverse-coded and the total score is determined by summing all items, giving a range from 0 to 40. Higher scores indicate greater perceived stress.

Table 7. Univariate regression analysis for depression symptoms at 12 years old.

Characteristic	N	Beta	95% CI[1]	p-value	q-value[2]
Depression score at 8 year	4,097	0.24	0.21, 0.28	**<0.001**	**<0.001**
Childs age	4,437	0.04	-0.01, 0.08	0.13	0.2
Gender					
Cisgender boy	2,031	—	—		
Cisgender girl	1,670	1.1	0.75, 1.4	**<0.001**	**<0.001**
Transgender/Non-binary	736	4.0	3.6, 4.4	**<0.001**	**<0.001**
Externally prioritised ethnicity					
European	2,244	—	—		
Māori	968	0.66	0.27, 1.1	**<0.001**	**0.002**
Pacific	484	0.21	-0.29, 0.72	0.4	0.5
Asian	534	-0.07	-0.56, 0.41	0.8	0.8
MELAA/Other	90	-0.69	-1.8, 0.40	0.2	0.3
Area-level deprivation (Mother report)					
1 (least deprived)	1,057	—	—		
2	974	0.24	-0.21, 0.69	0.3	0.4
3	845	0.09	-0.38, 0.56	0.7	0.8
4	719	0.08	-0.41, 0.57	0.8	0.8
5 (most deprived)	759	0.84	0.36, 1.3	**<0.001**	**0.001**
Material hardship	3792	0.17	0.11, 0.24	**<0.001**	**<0.001**
Household structure					
Two or more parents	3,259	—	—		
Sole parent	558	0.95	0.49, 1.4	**<0.001**	**<0.001**
Parent(s) living with extended family	495	0.82	0.33, 1.3	**<0.001**	**0.002**
Parent(s) living with non-kin	80	1.9	0.75, 3.0	**0.001**	**0.002**
Residential Mobility (since 8 year)					
No moves	2,331	—	—		
Moved one time	1,094	0.46	0.09, 0.83	**0.015**	**0.025**
Moved two times	470	0.64	0.12, 1.1	**0.015**	**0.025**
Moved three times	233	0.30	-0.39, 1.0	0.4	0.5
Moved four or more times	171	0.46	-0.35, 1.3	0.3	0.4
Child peer relationship	3,726	-0.25	-0.28, -0.22	**<0.001**	**<0.001**
Parent child relationship	4,177	-0.48	-0.52, -0.45	**<0.001**	**<0.001**
Bullying	4,435	4.7	4.5, 5.0	**<0.001**	**<0.001**
Mother's age during pregnancy	4,436	0.00	-0.03, 0.02	0.8	0.8
Mothers' education					
Bachelor's degree	1,189	—	—		
No secondary school qualification	209	1.3	0.51, 2.0	**0.001**	**0.002**
Secondary school/NCEA 11	891	0.24	-0.21, 0.69	0.3	0.4
Diploma/Trade Certificate/NCEA 5-6	1,289	0.42	0.01, 0.83	**0.042**	0.061
Higher degree	847	-0.03	-0.49, 0.42	0.9	0.9
Maternal perceived stress	4,060	0.07	0.04, 0.09	**<0.001**	**<0.001**
Mother depression	4,280	0.14	0.10, 0.18	**<0.001**	**<0.001**

Note. [1] CI = Confidence Interval, [2] False discovery rate correction for multiple testing.

Table 8. Multivariate regression analysis for depression symptoms at 12 years old (*n* = 2581).

Characteristic	*N*	*Beta*	*95% CI'*	*p-value*
Depression score at 8 year	2,581	0.13	0.09, 0.17	**<0.001**
Gender				
Cisgender boy	1,148	—	—	
Cisgender girl	1,043	0.99	0.64, 1.3	**<0.001**
Transgender/Non-binary	390	2.0	1.5, 2.5	**<0.001**
Externally prioritised ethnicity				
European	1,524	—	—	
Māori	540	0.11	-0.32, 0.54	0.6
Pacific	197	0.34	-0.31, 1.0	0.3
Asian	267	-0.29	-0.83, 0.25	0.3
MELAA/Other	53	-1.1	-2.2, -0.01	**0.049**
Areal-level deprivation (Mother report)				
1 (least deprived)	721	—	—	
2	607	-0.15	-0.59, 0.29	0.5
3	554	-0.54	-0.99, -0.08	**0.021**
4	406	-0.18	-0.68, 0.33	0.5
5 (most deprived)	293	-0.53	-1.1, 0.08	0.087
Material Hardship	2,581	-0.06	-0.14, 0.03	0.2
Household structure				
Two or more parents	2,025	—	—	
Sole parent	280	0.13	-0.40, 0.65	0.6
Parent(s) living with extended family	230	0.08	-0.50, 0.66	0.8
Parent(s) living with non-kin	46	0.93	-0.27, 2.1	0.13
Residential Mobility (since 8 year)				
No move	1,507	—	—	
Moved one time	669	0.16	-0.21, 0.54	0.4
Moved two times	226	0.21	-0.37, 0.79	0.5
Moved three times	98	-0.05	-0.89, 0.80	>0.9
Moved four or more times	81	0.11	-0.81, 1.0	0.8
Child-Peer relationship	2,581	-0.10	-0.13, -0.07	**<0.001**
Parent-child relationship	2,581	-0.29	-0.33, -0.25	**<0.001**
Bullying	2,581	3.7	3.3, 4.0	**<0.001**
Mothers Education				
Bachelor's degree	782	—	—	
No secondary school qualification	62	1.6	0.45, 2.7	**0.006**
Secondary school/NCEA 11	457	-0.04	-0.52, 0.44	0.9
Diploma/Trade Certificate/NCEA 5-6	693	0.07	-0.36, 0.50	0.7
Higher degree	587	0.30	-0.14, 0.74	0.2
Maternal Perceived Stress	2,581	0.02	-0.01, 0.05	0.2
Mother's depression symptoms	2,581	0.06	0.01, 0.10	**0.016**

Model Statistics			
R²	0.372	*Log-likelihood*	-7,260
Adjusted R²	0.366	*AIC*	14,580
Sigma	4.05	*BIC*	14,756
Statistic (p-value)	54.0 (<0.001)	*Deviance*	41,929
df (Residual df)	28 (2,552)		

Note. [1] CI = Confidence Interval

Table 9. Univariate regression analysis for anxiety symptoms at 12 years old.

Characteristic	N	Beta	95% CI[1]	p-value	q-value[2]
Anxiety score at 8 years old	4,096	0.25	0.22, 0.29	<0.001	<0.001
Childs age	4,437	-0.03	-0.13, 0.07	0.5	0.7
Gender					
Cisgender boy	2,031	—	—		
Cisgender girl	1,670	2.8	2.1, 3.5	**<0.001**	**<0.001**
Transgender/Non-binary	736	7.5	6.6, 8.3	**<0.001**	**<0.001**
Externally prioritised ethnicity					
European	2,244	—	—		
Māori	968	-0.30	-1.1, 0.50	0.5	0.7
Pacific	484	0.20	-0.85, 1.2	0.7	>0.9
Asian	534	0.41	-0.60, 1.4	0.4	0.7
MELAA/Other	90	0.95	-1.3, 3.2	0.4	0.7
Area-level deprivation (Mother report)					
1 (least deprived)	1,057	—	—		
2	974	0.01	-0.92, 0.94	>0.9	>0.9
3	845	0.00	-0.96, 0.97	>0.9	>0.9
4	719	-0.12	-1.1, 0.89	0.8	>0.9
5 (most deprived)	759	0.01	-0.98, 1.0	>0.9	>0.9
Material hardship	3792	0.01			
Household structure					
Two or more parents	3,259	—	—		
Sole parent	558	0.61	-0.35, 1.6	0.2	0.4
Parent(s) living with extended family	495	1.3	0.30, 2.3	**0.011**	**0.036**
Parent(s) living with non-kin	80	2.5	0.17, 4.9	**0.036**	0.11
Residential Mobility (since 8 year)					
No moves	2,331	—	—		
Moved one time	1,094	0.59	-0.17, 1.4	0.13	0.3
Moved two times	470	0.13	-0.93, 1.2	0.8	>0.9
Moved three times	233	0.30	-1.1, 1.7	0.7	0.9
Moved four or more times	171	0.40	-1.2, 2.1	0.6	0.8
Child peer relationship	3,726	-0.30	-0.35, -0.24	**<0.001**	**<0.001**
Parent child relationship	4,177	-0.69	-0.76, -0.62	**<0.001**	**<0.001**
Bullying	4,435	8.3	7.7, 8.8	**<0.001**	**<0.001**
Mother's age during pregnancy	4,436	0.05	0.00, 0.11	0.057	0.15

Mothers' education					
Bachelor's degree	1,189	—	—		
No secondary school qualification	209	-0.62	-2.2, 0.94	0.4	0.7
Secondary school/NCEA 11	891	-0.24	-1.2, 0.69	0.6	0.8
Diploma/Trade Certificate/NCEA 5-6	1,289	-0.47	-1.3, 0.37	0.3	0.5
Higher degree	847	-0.71	-1.7, 0.23	0.14	0.3
Maternal perceived stress	4,060	0.08	0.03, 0.13	**0.003**	**0.012**
Mother depression symptoms	4,280	0.17	0.09, 0.24	**<0.001**	**<0.001**

Note. [1] CI = Confidence Interval, [2] False discovery rate correction for multiple testing.

Table 10. Multivariate regression analysis for anxiety symptoms at 12 years old.

Characteristic	N	Beta	95% CI[1]	p-value
Anxiety Score at 8 year	2,864	0.19	0.15, 0.22	**<0.001**
Gender				
Cisgender boy	1,265	—	—	
Cisgender girl	1,149	2.2	1.5, 3.0	**<0.001**
Transgender/Non-binary	450	3.8	2.7, 4.8	**<0.001**
Externally prioritised ethnicity				
European	1,622	—	—	
Māori	599	-0.73	-1.6, 0.17	0.11
Pacific	258	-0.71	-2.0, 0.62	0.3
Asian	320	-0.08	-1.2, 1.1	0.9
MELAA/Other	65	0.56	-1.7, 2.8	0.6
Area-level deprivation (Mother report)				
1 (least deprived)	769	—	—	
2	653	-0.42	-1.4, 0.54	0.4
3	611	-0.64	-1.6, 0.34	0.2
4	465	-0.29	-1.4, 0.79	0.6
5 (most deprived)	366	-0.75	-2.0, 0.50	0.2
Household structure				
Two or more parents	2,215	—	—	
Sole parent	325	0.10	-0.99, 1.2	0.9
Parent(s) living with extended family	271	0.27	-0.93, 1.5	0.7
Parent(s) living with non-kin	53	0.67	-1.8, 3.2	0.6
Child-peer relationship	2,864	-0.09	-0.15, -0.03	0.004
Parent-child relationship	2,864	-0.45	-0.54, -0.36	<0.001
Bullying	2,864	6.1	5.3, 6.8	<0.001
Maternal perceived stress	2,864	0.01	-0.05, 0.07	0.8
Mothers' depression symptoms	2,864	0.06	-0.03, 0.15	0.2

Model Statistics	
R^2	0.248
Adjusted R^2	0.243
Sigma	9.18
Statistic	49.4
p-value	<0.001
df	19
Log-likelihood	-10,403
AIC	20,848
BIC	20,973
Deviance	239,585
Residual df	2,844
n	2,864

Note. [1] CI = Confidence Interval

References

1. Chorpita BF, Yim L, Moffitt C, Umemoto LA, Francis SE. Assessment of symptoms of DSM-IV anxiety and depression in children: A revised child anxiety and depression scale. Behaviour research and therapy. 2000;38(8):835-55.

2. Strauss CC. Anxiety disorders of childhood and adolescence. School Psychology Review. 1990;19(2):142-57.

3. Andresen EM, Malmgren JA, Carter WB, Patrick DL. Screening for depression in well older adults: Evaluation of a short form of the CES-D. American journal of preventive medicine. 1994;10(2):77-84.

4. Bradley KL, Bagnell AL, Brannen CL. Factorial validity of the Center for Epidemiological Studies Depression 10 in adolescents. Issues Ment Health Nurs. 2010;31(6):408-12.

5. Lumley T, Diehr P, Emerson S, Chen L. The importance of the normality assumption in large public health data sets. Annual review of public health. 2002;23(1):151-69.

6. Irwin DE, Stucky B, Langer MM, Thissen D, DeWitt EM, Lai J-S, et al. An item response analysis of the pediatric PROMIS anxiety and depressive symptoms scales. Quality of Life Research. 2010;19(4):595-607.

7. Shaw T, Dooley JJ, Cross D, Zubrick SR, Waters S. The Forms of Bullying Scale (FBS): validity and reliability estimates for a measure of bullying victimization and perpetration in adolescence. Psychological assessment. 2013;25(4):1045.

8. Kroenke K, Spitzer RL, Williams JB. The PHQ-9: validity of a brief depression severity measure. Journal of general internal medicine. 2001;16(9):606-13.

9. Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. Journal of health and social behavior. 1983:385-96.

Acknowledgements

We would like to recognise the invaluable contribution to this report of our policy reviewers and collaborators. The authors would specifically like to thank, The Ministry of Social Development (MSD) and Manatū Hauora Ministry of Health who engaged with us throughout the development and production of this report. We also need to acknowledge the advice and support received from our University of Auckland colleagues including, Jenna Gawn and Emma Marks.

Suggested citation:

Fletcher, B.D., Walker, C., Cha, J.E., Neumann, D., Paine, SJ., Park, A., Fenaughty, J., Bird, A.L., & Waldie, K.E. (2023). Now We Are 12: Young People's Experiences of Depression and Anxiety Symptoms. Snapshot 7. Auckland: Growing Up in New Zealand. Available from: https://www.growingup.co.nz

For further information, please contact researchgrowingup@auckland.ac.nz