Growing Up in New Zealand

Now We Are Twelve

Life in early adolescence

# Supplementary materials for Now We Are 12: *School Engagement of the Growing Up in New Zealand* cohort

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Growing Up in New Zealand

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## 1. Analytic Sample

To ensure that the findings of the school engagement report were most relevant to the New Zealand context, and to reflect experiences within the New Zealand education system, only those participants who reported they were living in New Zealand when the 12-year-old data collection wave took place were included in the analysis. Those who did not indicate which country they lived in were not included in the analytic sample.

From the participants in New Zealand ($n$ = 4,500; see Methodology report for more details), a total of 4,421 (98.2%) responded to all the school engagement items and therefore were the sample included in the analyses for this paper.

## 2. Methodology

Standard summary statistics were used to report the experiences of young people at age 12. Summary statistics are reported across sociodemographic groups, including ethnicity, gender, deprivation, and additional learning needs. To understand if statistically significant differences in responses to continuous variables were present across sociodemographic groups, a Welch's t-test was used to assess differences between two groups and an analysis of variance (ANOVA) test was used across more than two groups. For the Welch's t-test, the $p < .05$ indicated a significant difference between the mean scores across the two groups. For ANOVA, the F-statistic at $p < .05$ indicated a significant difference between the mean scores across more than two groups. The Tukey post-hoc test was then used to indicate which groups were significantly different from each other. Where the homogeneity of variance assumption inherent to ANOVA was violated (as indicated by the Levene's test), the Kruskal–Wallis and Games-Howell post-hoc tests were used to assess group differences instead.

Cohen's $d$ (1) is a statistical measure used to quantify the effect size of a difference between two groups. In the context of this report, Cohen's $d$ was used to determine the magnitude of difference in school engagement scores between groups of students from different sociodemographic backgrounds. By calculating Cohen's $d$, we were able to determine how large the difference was between groups in practical terms and provide readers with a clear and concise way to understand the size of difference in an interpretable manner (2).

## 3. School Engagement Question Items and Definitions

The operationalisation of school engagement for this topic includes the components of behavioural engagement, cognitive engagement and emotional engagement.

## Behavioural engagement

**Behavioural engagement** describes on-task behaviour in the classroom and considers whether ākonga (student/s) follow class rules. The items relating to behavioural engagement were taken from the **Following Class Rules** subscale of the Class Maps Survey (3), adapted from previous iterations, to ask ākonga their perception of their own behaviour in class. This scale asked the young people to think about whether they work quietly and calmly in class, follow class rules, pay attention, and behave as they are expected to.

This **Following Class Rules** subscale of the Class Maps Survey tool, developed by Doll et al (3), is readily available on the internet and free to use. This tool was developed over 10 years with multiple iterations to refine the questions and confirm the factor structure. This iteration of an earlier scale shifted the focus of the questions from the class wide perspective to focus on the individual. The Class Maps Survey has not yet been validated in the New Zealand context however, minor adaptions to the tool were made for use in the *Growing Up in New Zealand* 12-year data collection wave (DCW) to contextualise the language for the New Zealand context.

A behavioural engagement score was created by re-coding the response options to be on a 1-5 scale, then creating a mean score from across all six items.

## Cognitive engagement

**Cognitive engagement** describes how learners participate in and monitor their own schoolwork. The items relating to cognitive engagement assessed the strategies and attempts made by ākonga to learn material, seek explanations from teachers, and identify and improve on mistakes (4). The **Regulating** scale of the Goal Orientation and Learning Strategies Survey (GOALS-S) (4) was used to ask young people to reflect on their perceptions of their cognitive engagement in school, such as whether they ask for help, and whether they will try to learn something again later if they are confused.

The **Regulating** scale of the GOALS-S tool (4) is readily available on the internet and free to use. The GOALS-S regulating subscale only assesses one aspect of cognitive engagement, however, as scales for assessing cognitive engagement, in a short succinct manner, are hard to come by, this scale was chosen as the most appropriate assessment for the 12-year data collection wave. This scale was created for use in an Australian sample and was shown to be invariant across males and females but has not yet been validated within a New Zealand sample.

A cognitive engagement score was created for the 12-year reporting by taking a mean score from across all five items.

## Emotional engagement

**Emotional engagement** (also known as school satisfaction) refers to the degree to which ākonga are content with their schooling, considers their perceptions of the school environment, and asks them to reflect on their interpersonal relationships within this context (5). This conceptualisation does not include the concept of school belonging, which is also included in emotional school engagement. Students' perceptions of and satisfaction within their school environment have been found to influence student engagement, academic values, academic competence, social behaviours, and academic achievement (6-8). The **Student Personal Perception of Class Climate Scale** (SPPCC) (9) was utilised to ask about students' emotional engagement such as whether they look forward to going to school, and whether school is interesting. The SPPCC is a 6-item scale developed by Rowe and colleagues (9) and was based on an 8-item school satisfaction subscale which was developed by Huebner (10) as part of the Multidimensional Student's Life Satisfaction Scale (MSLSS).

The original school satisfaction subscale of the MSLSS, developed for students aged 8–13, asked participants to report their perceptions and experiences of their class environment. In this original study, the subscale was demonstrated to have good internal consistency (Cronbach alpha score of .83), and principal component analysis revealed all eight items to load onto the same component (10). This scale was initially developed for utility with a sample of young people within a south-eastern state of the United States of America, and it has since been validated in other countries such as Brazil (11) and Canada (12).

In 2010, Rowe and colleagues adapted the MSLSS School Satisfaction subscale for brevity to a 6-item version for the SPPCC (9). The six items with the highest factor loadings from the MSLSS were retained. The SPPCC was initially validated for use in a south-eastern state of the United States of America (9) and has since been validated for use in other contexts, including New Zealand (13).

Rubie-Davies and colleagues (13) assessed the school satisfaction subscale of the SPPCC with data obtained from an Aotearoa New Zealand sample of 1,924 students aged 7–12. Confirmatory factor analysis revealed all six items relating to school satisfaction to load onto one factor. Additionally, the authors found this subscale to represent the same conceptual framework for European, Māori, Pasifika and Asian students (configural invariance), and therefore concluded it was fit for use within the multicultural Aotearoa New Zealand (NZ) primary school population.

Given this evidence, this 6-item school satisfaction subscale was chosen for use with the diverse *Growing Up in New Zealand* cohort at the 12-year DCW. An emotional engagement score was created by re-coding the response options to be on a 1-5 scale, then creating a mean score from across all six items.

## Overall School Engagement

An overall school engagement mean score was created by summing the mean scores for the emotional, behavioural, and cognitive engagement scales, then dividing by three. The following table shows the wording of the items and the descriptive statistics for each item relating to school engagement.

Table 1: Individual item descriptive statistics for school engagement

| | *n* | *mean* | *SD* | *range* | *skew* | *kurtosis* |
|---|---|---|---|---|---|---|
| **Behavioural Engagement** - Response options: Never, Sometimes, Often, Almost always (this scale was stretched to range from 1–5 for interpretability) | | | | | | |
| I work quietly and calmly in class when I am supposed to. | 4421 | 3.73 | 1.10 | 1–5 | -0.31 | -0.96 |
| In class I listen carefully to my teacher. | 4421 | 3.88 | 1.02 | 1–5 | -0.41 | -0.80 |
| I follow the rules in class. | 4421 | 4.27 | 0.93 | 1–5 | -1.00 | 0.18 |
| In class I pay attention when I am supposed to. | 4421 | 3.94 | 1.02 | 1–5 | -0.48 | -0.77 |
| I do my work when I am supposed to in class. | 4421 | 4.18 | 0.95 | 1–5 | -0.82 | -0.24 |
| In class I behave well even when the teacher isn't watching. | 4421 | 3.84 | 1.07 | 1–5 | -0.48 | -0.68 |
| **Cognitive Engagement** – Response options: Strongly disagree, Disagree, Not sure, Agree, Strongly Agree. | | | | | | |
| If I don't understand my schoolwork, I ask the teacher to help me. | 4421 | 3.84 | 0.96 | 1–5 | -0.93 | 0.65 |
| If I am having trouble learning something at school, I ask for help. | 4421 | 3.94 | 0.89 | 1–5 | -1.00 | 1.14 |
| If I get confused about something at school, I go back and try to figure it out. | 4421 | 3.88 | 0.86 | 1–5 | -0.73 | 0.58 |
| If I don't understand something in school, I go back and try to learn it again. | 4421 | 3.73 | 0.92 | 1–5 | -0.58 | 0.10 |
| If I get confused about something at school, I try to work it out later. | 4421 | 3.57 | 0.98 | 1–5 | -0.54 | -0.12 |
| **Emotional Engagement / School Satisfaction** - Response options: Never, Sometimes, Often, Almost always (this scale was stretched to range from 1–5 for interpretability) | | | | | | |
| I look forward to school. | 4429 | 3.30 | 1.23 | 1–5 | -0.03 | -1.01 |
| I like school. | 4429 | 3.48 | 1.23 | 1–5 | -0.23 | -0.97 |
| School is interesting. | 4429 | 3.31 | 1.25 | 1–5 | -0.07 | -1.01 |
| I wish I didn't have school.* | 4429 | 3.75 | 1.13 | 1–5 | -0.87 | 0.39 |
| There are many things about school that I like. | 4429 | 3.66 | 1.17 | 1–5 | -0.37 | -0.84 |
| I enjoy school activities. | 4429 | 3.62 | 1.17 | 1–5 | -0.30 | -0.91 |

*Note:* *Item has been reverse coded.

# 4. Additional Learning Needs Questions and Definitions

The main caregiver was asked questions to identify whether young people have additional learning needs within the school context. Table 2 displays the items asked regarding the identification and classification of learning needs.

Table 2: Items asked to define learning needs

| Question | Answer options |
|---|---|
| Has {NAME} been identified as having a learning support need, disability, or as gifted and/or talented?<br>*SS126_y12Cm* | 1. Yes<br>0. No<br>99. Don't Know |
| ***If the parent answered yes to the above question, they were then asked...*** | |
| What is the reason that {NAME} has been identified as having a learning support need, disability, or as gifted and/or talented?<br>*SS127_y12Cm* | 1. Hearing impairment<br>2. Vision impairment<br>3. Physical disability<br>4. Speech or language impairment<br>5. Learning disability/intellectual disability<br>6. Specific learning disability (literacy)<br>7. Specific learning disability (numeracy)<br>8. Emotional or behavioural problems<br>9. Gifted and/or talented—Intellectual ability (exceptional ability in one or more learning area)<br>10. Gifted and/or talented—Other ability (e.g. culture-specific, creativity, visual and performing arts, social/leadership, physical/sport)<br>11. Poor understanding of English/ ESL<br>12. Autism Spectrum Disorder<br>13. Illness<br>14. Attention Deficit Hyperactivity Disorder (ADHD)<br>15. Extra subject specific support needed<br>97. Other (Please specify _____) |

Responses to the 'Other' option were upcoded and additional codes were identified:

16. Auditory Processing Disorder (ADP)

17. Specific Learning Disability (writing) – Dysgraphia

18. Dyspraxia / Developmental Coordination Disorder

During analysis for the learning needs questions some of these categories were combined (see below).

## Definitions used in the analyses for additional learning needs

Young people identified as having **no additional learning need** were those whose parents indicated that they had no additional learning need at school (if no for *SS126_y12Cm* response only).

**Sensory impairment** included those young people whose parents reported that they had a learning need due to a hearing or vision impairment (combined if yes for *SS127_1_y12Cm* or *SS127_2_y12Cm*).

**Speech and/or language impairment** included those young people whose parents reported that they had a learning need due to a speech and/or language impairment (*SS127_4_y12Cm*).

**Learning disability/intellectual disability** included those young people whose parents reported that they had a learning need due to a learning disability/intellectual disability (*SS127_5_y12Cm*).

**Specific learning disability** included those young people whose parents reported that they had a learning need due to a specific learning disability (literacy, previously known as dyslexia), specific learning disability (numeracy, previously known as dyscalculia), specific learning disability (writing, previously known as dysgraphia), developmental coordination disorder (also known as dyspraxia) and/or auditory processing disorder (APD) (combined if yes for *SS127_6_y12Cm*, *SS127_7_y12Cm, or upcoded to yes for SS127_16_y12Cm, SS127_17_y12Cm, SS127_18_y12Cm*).

**Emotional or behavioural problems** included those young people whose parents reported that they had a learning need due to emotional or behavioural problems (*SS127_8_y12Cm*).

**Gifted and Talented** included those young people whose parents reported that they had a learning need due to being gifted and/or talented with an exceptional ability in one or more learning area (e.g., intellectual ability, culture-specific, creativity, visual and performing arts, social/leadership, physical/sport) combined if yes for *SS127_9_y12Cm or SS127_10_y12Cm*).

**Autism** included those young people whose parents reported that they had a learning need due to autism spectrum disorder (*SS127_12_y12Cm*).

**Attention Deficit Hyperactivity Disorder** included those young people whose parents reported that they had a learning need due to Attention Deficit Hyperactivity Disorder (ADHD) (*SS127_14_y12Cm*).

**Extra subject specific support** included those young people whose parents reported that they had a learning need as extra subject specific support was needed (*SS127_15_y12Cm*).

**Other** included those young people whose parents reported that they had a learning need due to a physical disability, poor understanding of English and/or was an English speaker of other languages (ESOL), illness or any other learning need not previously described (combined if yes for *SS127_3_y12Cm, SS127_11_y12Cm, SS127_13_y12Cm, or SS127_97s_code_y12Cm = 1*).

## 5. Student-Teacher Relationship

Positive student-teacher relationships have powerful implications for student success. When relationships are warm, caring, and teachers believe students can succeed, young people can experience increased motivation, engagement in learning, and enjoy more positive learning experiences (14). In this asymmetrical relationship, the teacher holds greater power yet this relationship has lasting impacts on students outcomes academically (15-16) behaviourally (16), and socially (15). Murray and Malmgren (15) found that improving the student-teacher relationship in high school had a positive impact on adolescent academic achievement, lending itself to possibilities in longitudinal research if this construct were measured again.

For the child scale, 7-items were utilised from the Class Maps Survey *My Teacher* subscale (3). As documented by Doll and colleagues (3) this tool was developed and refined over a period of 10 years with multiple reiterations to refine the questions and confirm the factor structure. The most recent iteration of the ClassMaps Survey (3) was tested in two middle-sized urban primary schools in the United States. It has not been validated in the NZ context. An additional item ("expects me to do my best") was added to capture this additional component of the student-teacher relationship. The Student-teacher relationship score was created by summing responses across all eight items, then creating a mean score by dividing by eight.

Table 3: Items about student-teacher relationship included in the child questionnaire.

| Question | Answer Options |
|---|---|
| ***My teacher...*** | |
| listens carefully to me when I talk. | |
| helps me when I need help. | |
| respects me. | 0. Never |
| likes having me in their class. | 1. Sometimes |
| makes it fun to be in their class. | 2. Often |
| thinks I do a good job in their class. | 3. Almost always |
| is fair to me. | |
| expects me to do my best. | |

## 6. Academic Efficacy Question Items and Derivation

Academic efficacy refers to students' perceptions of their ability to do their class work. Perceptions about oneself as a learner have been found to influence how a student regulates their learning and is a significant predictor of academic achievement (17).

The Patterns of Adaptive Learning Scale (PALS), Academic Efficacy subscale (18) asks students to reflect on how effectively they believe they can learn when faced with challenges. These items tap into the core of academic efficacy by asking students to think about how they perceive their own ability to understand and complete the classwork given to them.

Each subscale of the PALS has been approved for individual use. The Academic Efficacy subscale asks five questions related to students' perceptions of their own competence to complete their class work. Students were asked to respond based on a 5-point Likert-type scale (0-not at all true; 2-somewhat true; 4-Very true). The adaptions for this scale used in the 12-year DCW were based on previous NZ adaptions to PALS (19-20). The academic efficacy score was created by summing responses across all five items, then creating a mean score by dividing by five.

Table 4: Patterns of Adaptive Learning – Academic Efficacy subscale questions included in the child questionnaire.

| Question | Answer options |
|---|---|
| ***Thinking about your schoolwork, how often are the following statements true for you?*** | |
| I'm sure that I can master the skills taught in school this year. | 0. Not at all true<br>1.<br>2. Somewhat true<br>3.<br>4. Very true |
| I'm sure that I can work out how to do the most difficult schoolwork. | |
| I'm sure that I can do almost all the work in school if I don't give up. | |
| Even if the work is hard, I'm sure that I can learn it. | |
| I'm sure that I can do even the hardest work in school this year. | |

# 7. Academic Buoyancy Question Items and Derivation

Martin and Marsh (21) explain academic buoyancy as the ability of individuals to deal with normal everyday setbacks that are part of everyday life. The term academic buoyancy applies to a wider population than academic resilience which typically refers to students' ability to excel academically despite facing adversity (21) and therefore is appropriate for use with the whole *Growing Up in New Zealand* cohort.

The tool utilised in the 12-year DCW to assess academic resiliency was described and validated by Martin and Marsh (2008) (21). It utilises a 7-point Likert scale (1-strongly disagree to 7-strongly agree) asked students to reflect on their approach to challenges they may face at school on any given day. This tool was validated with 598 Australian high school students in Years 8 and 10, following on from earlier testing and refinement of the tool. The mean age of students in the validation study was 14.3 years, slightly older than the current cohort. To use this scale within the 12-year DCW, permission was granted by Professor Martin (author) on 20.10.2020 through email correspondence.

This tool has demonstrated reliability and invariance as a function of age, ethnicity, and gender, with an approximately normal distribution, and significant associations with numerous educational outcomes (21-23). To our knowledge, this scale has not before been used in the NZ context. The academic buoyancy score was created by summing responses across all four items, then creating a mean score by dividing by four.

Table 5: Academic buoyancy questions in the child questionnaire

| Question | Answer options |
|---|---|
| ***Please rate yourself on the following day-to-day challenges you may experience at school.*** | |
| I don't let schoolwork stress get on top of me. | 1. Strongly disagree<br>2. Disagree<br>3. Somewhat disagree<br>4. Neutral<br>5. Somewhat agree<br>6. Agree<br>7. Strongly agree |
| I'm good at dealing with setbacks at school (e.g. bad marks, negative feedback on my work). | |
| I think I'm good at dealing with schoolwork pressures. | |
| I don't let a bad mark affect my confidence. | |

## 8. Cultural Involvement Question Items and Derivation

A young person's cultural involvement can relate to opportunities, within and outside the school environment, to belong to and participate in activities related to their own culture. This construct relates closely to a young person's sense of belonging and cultural identity. A binary cultural involvement variable was derived where young people who had participated in any of the activities in Table 6 were coded as 1 (cultural involvement) and 0 if they did not do any of the activities (no involvement).

Table 6: Cultural involvement questions in the child questionnaire

| Question |
|---|
| ***Thinking about the past year, which of the following activities do you do, or have you done regularly (about once a week)?*** |
| Māori dance styles (e.g. kapa haka) |
| Pasifika dance styles (e.g. Ma'ulu'ulu) |
| Asian dance styles |
| Manu Kōrero, Pasifika speech competitions |
| Waka ama, rowing, mau rakau |
| Weaving, Raranga |
| Sculpture, carving |
| Waiata/choir |
| Kapa haka |

## 9. Parental Involvement in Learning Items and Derivation

Parental involvement in learning has been found to impact directly on student engagement and indirectly on academic achievement (24). The items used for this variable were developed in house, aiming to capture the interest of parents in their child's learning. The parental involvement in learning score was created by summing responses across all three items, then creating a mean score by dividing by three.

Table 7: Parental involvement in learning questions included in the parent questionnaire

| Question | Answer options |
|---|---|
| ***How often do you do the following with {NAME}?*** | |
| Talk about what {NAME} is learning in school | 0. Never/almost never<br>1. Once a week<br>2. Several times a week<br>3. Once a day<br>4. Several time a day |
| Talk about or help {NAME} with their homework | |
| Talk with {NAME} about what happens at school | |

## 10. Multiple Regression Modelling

Multiple regression modelling is a statistical technique that helps to explain how multiple factors are related to an outcome of interest. We used multiple regression modelling to explore the association between multiple factors at the individual-, family-, and school- level to understand how these different factors contributed to school engagement (see Table 8). By including multiple factors in the model, we accounted for the complex relationships that exist between these factors, to better understand the outcome of school engagement. The derivation of other variables used in this modelling is available in the supplementary material attached to the Material Hardship, Disability, Mental Health, and the Relationships snapshots.

Table 8: Coefficients of multiple regression model predicting school engagement

| | Model 1 | | Model 2 | |
|---|---|---|---|---|
| | ***Estimate*** | ***p*** | ***Estimate*** | ***p*** |
| (Intercept) | 3.73 | *** | 3.80 | *** |
| Student-Teacher Relationship | 0.28 | *** | 0.26 | *** |
| Parental involvement in learning | 0.04 | *** | 0.03 | *** |
| Quality of Life | 0.09 | *** | 0.08 | *** |
| Depression Symptoms | -0.09 | *** | -0.10 | *** |
| Parent-child relationship [a] | -0.04 | *** | -0.05 | *** |
| Academic Buoyancy | 0.05 | *** | 0.06 | *** |
| Symptoms of Anxiety | 0.08 | *** | 0.07 | *** |
| Academic Efficacy | 0.19 | *** | 0.20 | *** |
| Cultural Involvement *(ref. no involvement)* | 0.10 | *** | 0.08 | *** |
| **Covariates** | | | | |
| *Gender (ref. Cisgender girl)* | | | | |
| Cisgender boy | | | -0.17 | *** |
| Transgender/Non-binary/Unsure | | | -0.03 | ns |
| *Ethnicity (ref. European)* | | | | |
| Māori | | | -0.05 | ** |
| Pacific | | | 0.04 | ns |
| Asian | | | 0.11 | *** |
| Other | | | 0.03 | ns |
| *Material Hardship (ref. no/little hardship)* | | | | |
| Material Hardship | | | -0.01 | ns |
| Severe material hardship | | | 0.09 | * |
| Learning needs *(ref. no learning need)* | | | 0.02 | ns |
| Multiple R-squared: | 0.60 | | 0.61 | |
| Adjusted R-squared: | 0.60 | | 0.61 | |

Note: [a] The parent-child relationship scale is interpreted as a lower score indicating a better relationship therefore a negative score indicates a positive relationship with school engagement. This relationship has been shown in the image of the model. * indicates significant at $p < .05$, ** at $p < .01$, and *** at $p < .001$.

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