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Unhappy Young Australian: A domain approach to explain life satisfaction change in children

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Australian happiness levels are known to decline between the age of 15 and 23 by almost 0.7 on a ten-point scale. To find out what happens before that age, we develop child-specific scales to measure the effect of personality and life satisfaction domains on childhood happiness. With an internet-based survey, we collect unique data from 9 to 14 year old Australian children. We find an even steeper happiness decline before the age of 14. Surprisingly, the 'environment' domain has no significant effect on childhood happiness, whilst the children's 'school' and 'interaction with friends' domains explain over 40% of the decline in childhood happiness. The decline in childhood happiness is steepest when the children transition from lower grade school to high school. As expected, extraverted children are happier, but unexpectedly, so are conscientious children. The paper ends with a discussion of the possibilities for promoting happiness maximising programmes in schools.

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Abstract

Australian happiness levels are known to decline between the age of 15 and 23 by almost 0.7 on a ten-point scale. To find out what happens before that age, we develop child-specific scales to measure the effect of personality and life satisfaction domains on childhood happiness. With an internet-based survey, we collect unique data from 9 to 14 year old Australian children. We find an even steeper happiness decline before the age of 14. Surprisingly, the ‘environment’ domain has no significant effect on childhood happiness, whilst the children’s ‘school’ and ‘interaction with friends’ domains explain over 40% of the decline in childhood happiness. The decline in childhood happiness is steepest when the children transition from lower grade school to high school. As expected, extraverted children are happier, but unexpectedly, so are conscientious children. The paper ends with a discussion of the possibilities for promoting happiness maximising programmes in schools.

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1. Introduction

The study of life satisfaction in adults has expanded to be a major area of research in the social sciences (Diener, 1984)¹. A review of twenty-nine studies by (Huebner (2004) supports the idea that life satisfaction is not just important to adults, it is also important for children as young as eight. However, examining childhood happiness can be impeded by the lack of data; the main socio-economic panel datasets we use to understand age-happiness profiles generally only contain information on adolescents and adults aged 15 years and older. This study extends our understanding of lifetime happiness to the young by collecting and analysing data from children. But first, let us revisit our current view of lifetime happiness.

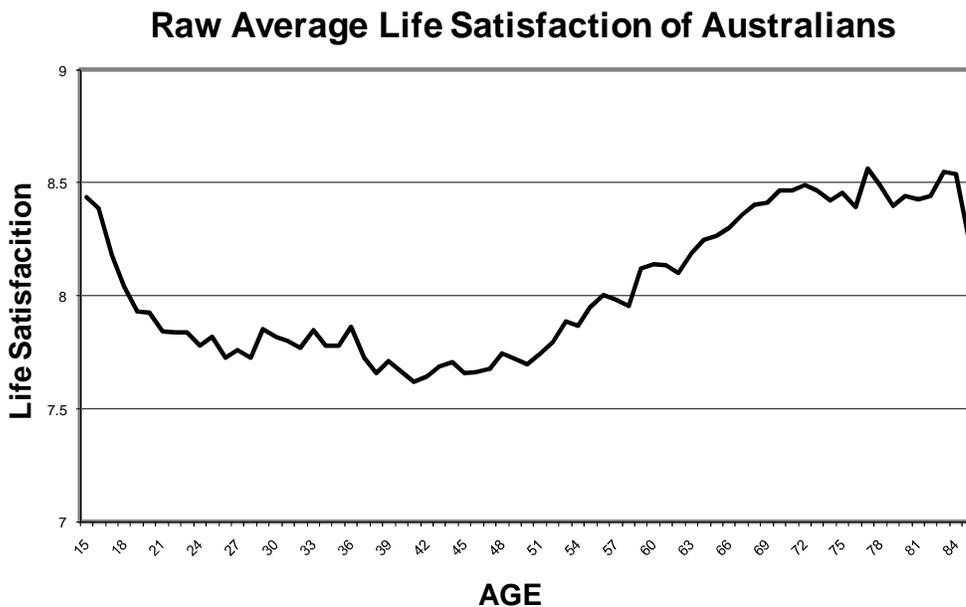


Figure 1: Average Life satisfaction at each age for 15 to 85 year old Australians in waves 2 to 8 of the Household Income and Labour Dynamics in Australia Survey (HILDA).

For Australia, Figure 1 shows a steep decline in the happiness profile just after the age of 15. Between the age of 15 and 23 years, there is a steep 0.72 decline in the happiness of young Australians. This steep decline is twice as big as the 0.36 happiness decline we see in 75 to 85 year-old Australians who are expected to be unhappy due to the declining incomes,

¹ For a recent general introduction to the economic literature on happiness, see Clark et al. (2008). For a list of earlier papers in the field of happiness, see Veenhoven's Database of Happiness (introduced in Veenhoven, 1994).

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failing health, or even the imminent onset of death². With their whole life ahead of them, why would the happiness of young Australians fall so steeply? And what precedes it? To answer these questions, we supplement the data from the Household Income and Labour Dynamics in Australia Survey (HILDA, 2008a) with unique data collected from Australian children.

The paper proceeds as follows. Section 2 provides a review of childhood happiness studies in the economics literature. In seeking to explain happiness change in children, Section 3 expands this economic literature review to reveal domain factors that school psychologists consider important to explaining changes in childhood happiness; Section 3 continues by explaining how a survey was developed to collect data from 9 to 14 year old Australians. Section 4 explains and describes the data, Section 5 extends our view of lifetime happiness and Section 6 re-examines the data with a model of Childhood Happiness. Section 7 details the regression results then applies a decomposition technique to further explain the main finding, that children get unhappier when they move from lower grade to high school. Finally, Section 8 discusses the findings and offers policy alternatives and research opportunities that could potentially improve the happiness of our children.

2. A Review of Childhood Happiness from the Economics Literature

Childhood happiness studies appear infrequently in the economics literature. Children have usually been considered in the context of the negative (Stutzer & Frey, 2006) (White, 2006) or positive (Tsang, 2003) effect they have on adult happiness. Studies of the German population considered the relationship between parents and their adult children's subjective well-being (Bruhin & Winkelmann, 2009), but they too were adult-centric studies. Tables 1 & 2 provide a summary of peer-reviewed 'EconLit' literature that examined adolescent or childhood happiness. Of the twelve studies, five examined childhood happiness and seven considered the happiness of adolescents.

² A similar steep decline can be seen in Australian, British and German populations. The happiness decline in 18 to 23 year olds is: 0.255 for Australians in the Household Income and Labour Dynamics in Australia Survey (HILDA); 0.266 for 18 to 23 year olds in the German Socioeconomic Panel (GSOEP) and; 0.255 for 18 to 23 year olds in the British Household Panel Survey (BHPS).

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Table 1a: Summary of happiness studies of the young from the economics literature (EconLit) identifying the study population as adolescents or children.

Author	Data source	Sample	Adolescent	Children	Research Question
(Ebner, 2008)	European Community Household Panel (ECHP)	years 1995 and 1999	☑		Influential determinants of young adults' housing decisions on the happiness of adolescents.
(Ulker, 2008)	Household, Income and Labour Dynamics in Australia Survey	Individuals aged 15 to 24 years. <i>N</i> = 6,013	☑		Factors that influence young Australians' mental health and life satisfaction, with an emphasis upon the role of family background.
(Lee & Oguzoglu, 2007)	Longitudinal Surveys of Australian Youth. (1997 - 2004)	5,865 Australian youths with a median age of 14. <i>N</i> = 26,146		☑	How the receipt of income support payments affects the well-being of youths.
(Dockery, 2005)	Longitudinal Surveys of Australian Youth.	8,567 individuals aged 16 to 19 years. <i>N</i> = 30,406	☑		Effect of education, labour market experience, and, employment on the happiness of young Australians.
(E. Scott Huebner, Valois, Paxton, & Drane, 2005)	Public middle school students in South Carolina, U.S.A.	School children, <i>N</i> = 2278		☑	Levels and demographic effects on their satisfaction with their overall lives as well as five specific domains (family, friends, self, school, and living environment) were assessed.
(Bassi & Delle Fave, 2004)	Italian high school students analysed in 1986 and 2000.	Participants aged between 15 to 18 years. <i>N</i> = 120	☑		Importance of providing adolescents with meaningful activities in order to foster their personal growth & well-being.
(Cheng & Furnham, 2004)	Senior pupils from three schools in the United Kingdom.	Adolescents aged 16 to 19 years. <i>N</i> = 90	☑		Relationship between school performance and self-rated happiness.

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Table 2: Summary of childhood happiness studies from the economics literature (EconLit) identifying the study population as adolescents or children (continued)

Author	Data	Sample	Adolescents	Children	Research Question
(Duncan & Grazzani-Gavazzi, 2004)	Scottish and Italian young adults who completed daily event diaries.	1043 positive incidents collected from 157 students aged 18-32 years, $N = 1043$	☑		Cross-cultural study on positive emotion, well-being and happiness.
(Flouri, 2004)	British National Child Development Study	Longitudinal study of British children; aged 7-42 years $N = 17,000$		☑	Role of parenting in later-life subjective well-being.
(Csikszentmihalyi & Hunter, 2003)	Multi-year study of American youth from the Alfred P. Sloan Study of Youth and Social Development	6th, 8th, 10th and 12th grade primary school students from 33 United States elementary & secondary schools from 12 communities; ages 12 to 18 years, $N = 826$		☑	Proximal environmental factors, behaviours and habits that correlate with personal happiness.
(Fogle, Scott Huebner, & Laughlin, 2002)	Middle school students from public schools in mid-sized South-eastern United States cities	Children aged 10 to 15 years. $N = 160$		☑	Interrelationships among temperament, social self-efficacy, social competence, and life satisfaction.
(Blanchflower & Oswald, 1998)	Eurobarometer Surveys	Adolescent females & males 15 years and older. $N = 28,000$	☑		Rising life-satisfaction of the young between 1970 and 1990.

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Looking by study category in Tables 1 & 2, we see a variety of findings have been reported for the adolescents, but they usually concern the relationship between the adolescents and their family. Ebner's (2008) longitudinal study used the European Community Household Panel (ECHP) data to reveal that adolescents are happier when they make the decision to leave the family home. A study by Dockery (2005) used data from the (1997-2004) Longitudinal Surveys of Australian Youth and wave 1 (2000) of the HILDA and found evidence of declining levels of happiness in adolescents during periods of unemployment and the importance of the quality and type of work to the happiness of adolescents. Ulker (2008) also used the Australian HILDA data to reveal the importance of the role of family members in the well-being of Australian adolescents; adolescents are unhappy when their parents divorce. Bassi & Delle Fave's (2004) longitudinal study used an experience sampling method to examine how day-to-day activities affected adolescent happiness and revealed the importance of providing 15 to 18 year-old Italian high school students with meaningful leisure-orientated activities like the access to new technologies, social networks and the Internet for study from home. Cheng & Furnham (2004) also studied high school children and revealed the importance of school performance to the happiness of British schoolchildren aged 16 to 19 years.

Looking at the five happiness studies on children in Tables 1 & 2, Fogle, et al's (2002) cross-sectional study revealed a positive interrelationships between the personality trait of extraversion and social competence to the life satisfaction of children aged 10 to 15 years from public schools in mid-sized South-eastern United States cities. A positive attitude, confidence in own abilities and the skills to interact with your peer group were found to be important to childhood happiness. Also focussing on school children, Huebner, et al's (2005) cross-sectional study of public middle school students from South Carolina (U.S.A) proposed that family, friends, school and the environment in which children live and learn are important to childhood happiness. Lee & Oguzoglu's (2007) longitudinal study of Australian youths ventured outside the school environment and found that income support payments contributed to childhood happiness. Flouri's (2004) study focussed on the importance of family to childhood happiness. Using the GHQ-12 measure of mental and physical wellbeing, Flouri found that children who were insulated from psychological stress within the family domain were happier and those (7 year-old) children who were more involved with their mother were happier (as a 42-year-old) in adulthood.

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The results from these studies mirror many of the findings we see from the study of adult happiness, where adults with a job, sufficient income, and stable relationships tend to be happier. What we take from these child studies from the economics literature is the idea that school, interaction with friends, personality, and the environment are the important factors in childhood happiness. These are the variables and life satisfaction domains that we will use to examine changes in the happiness of Australian children.

3. Method

3.1 The HILDA data

In seeking to explain the effects of school, interaction with school friends and the environment on childhood happiness, we use two data sets³. The first data set is the 15 to 93 year-olds from waves 2 to 8 of the ‘Household, Income and Labour Dynamics in Australia’ Survey (HILDA)⁴. The second is our own data from younger children.

3.2 Collecting data from children

Collecting data from children is fraught with ethical, logistical and truthful self-reporting roadblocks. Per Gilman & Huebner (1997; 2000) and Haranin, Huebner, & Suldo (2007), we overcame these difficulties by incorporating the collecting procedures into the children’s normal teaching program. School teachers took their classes to the local railway station to visit a ‘Smart Train’⁵ with carriages containing university research displays; one of which explained happiness. Upon returning to school, the children were requested to complete an internet-based ‘Happiness’ survey. To encourage response teachers were

³ The HILDA data was extracted using the Add-On package PanelWhiz v3.0 (Nov 2010) for Stata. PanelWhiz was written by Dr. John P. Haisken-DeNew (john@panelwhiz.eu). The PanelWhiz generated DO file to retrieve the HILDA data used here and any Panelwhiz Plugins are available upon request. Any data or computational errors in this paper are my own. Haisken-DeNew and Hahn (2006) describes PanelWhiz in detail.

⁴ This paper uses unit record data from the Household, Income and Labour Dynamics in Australia (HILDA, 2008b). The HILDA Project was initiated and funded by the Australian Government Department of Families, Housing, Community Services and Indigenous Affairs (FaHCSIA) and is managed by the Melbourne Institute of Applied Economic and Social Research (MIAESR). The findings and views reported in this paper are those of the authors and should not be attributed to either FaHCSIA or the MIAESR. We thank FaHCSIA & the Melbourne Institute director, Professor Deborah Cobb-Clark, and her staff for making the data available.

⁵ More information about the ‘Smart Train’ can be found at: <http://www.train.qut.edu.au> .

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provided with ‘Happy Posters’ to hang on classroom walls and ‘Happy Teaching Guides’ with instructions on how the children could use their school computers to respond to our *Childhood Happiness Survey*⁶.

3.3 Developing a Happiness Survey suitable for Children

Asking children to respond to happiness surveys occurs infrequently in economics and the survey instruments that we generally use are targeted at individuals 15 years and older. In example, the SF-36 health questionnaire common to many socio-economic surveys is validated for use on individuals 15 years and older (Ware, 2009). However, even if a suitable health question was included in our survey, previous findings indicate that unless they have psychological issues, the majority of children would self-report with excellent health (Flouri, 2004). Evidence such as this indicated that we needed to develop a childhood happiness survey that takes into account the comprehension abilities of the children and the extent of their knowledge. To begin, we chose not to include a health question in our childhood happiness survey.

A problem also arises when asking children to respond to income questions. Researchers have long been concerned with inaccuracies in how adults report their income (Moore, Stinson, & Welniak, 2000). With evidence that adults misreport income, we could hardly expect children to know what mum or dad earns. However, children do understand the concept of money, it’s what they swap with others to get what they want (Leiser & Beth Halachmi, 2006). While we didn’t ask the child about the family’s income, we considered it reasonable to expect that children would be able to gauge how well off their family was relative to their friend’s family. We asked the children: “*Would you say that your family is; wealthier; the same; poorer than others in the neighbourhood*”.

While there was evidence that we should not ask children questions about health and income, if we were to compare the children’s happiness with those 15-years and older in socioeconomic surveys we ideally needed to have the children respond to the same happiness

⁶ After the three-week survey response period, the Queensland Government, Department of Tourism, Regional Development and Industry randomly selected a student who received an individual prize of an Apple iPod and their school received \$1000 to spend on science resources.

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question as adults. This is the *Global Life Satisfaction* question (Cummins, 1996; Fordyce, 1988; Wessman & Ricks, 1966) that seeks to measure the aggregate utility or overall wellbeing arising from all the good and bad things that occur throughout our lives:

All things considered in your life, how happy would you say you are usually?

We were initially concerned whether this question was suitable for children; special scales like the Students' Life Satisfaction Scale (Huebner, 1991b) are often used to measure the life satisfaction of children. To overcome this concern, we pre-tested our happiness question on 9 to 14 year-old children; we asked them to verbally explain what it meant. The responses of the children generally said that the question⁷ asked them how happy they were and when they were happy they smiled a lot. This is a response consistent with findings in the literature; those who smile more often are happier (Nettle, 2005). Based on this evidence, we decided that the question was suitable for children⁸.

While we were of the opinion that the happiness question was suitable for children, questions about employment, years of education, relationship status, and life event shocks are not really relevant to young children who have not yet entered the labour force; are not ready for personal relationships, and; are still completing their schooling. The exclusion of so many of these variables leaves us with little to explain childhood happiness. However, the psychology and school psychology literatures provide us with a theoretical foundation for the development of surveys to measure variables that affect childhood happiness.

⁷ In the HILDA survey of adolescents and adults, the happiness question is scaled 0-10. Six is the optimal scale size when questioning 8 to 14 year olds and the response options should be anchored (Borgers & Joop 2005, p.26). We chose a 5-point Likert scale (very unhappy, unhappy, neither happy nor unhappy, happy, very happy); it is more easily rescaled 0-10.

⁸ The Longitudinal Surveys of Australian Youth similarly surveys children & youth on 'satisfaction with life overall' (Nguyen, 2011). as does the Longitudinal Surveys of Australian Children (LSAC, 2012).

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3.3.1 Personality

Similar to adult happiness studies (Lischetzke & Eid, 2006; Wilson, 1967), the personality traits of agreeableness, conscientiousness, extraversion, emotional stability and openness to experience have been found to have an effect on the happiness of young people (Fogle, et al., 2002; Hampson, Goldberg, Vogt, & Dubanoski, 2006). However, the self-report Big-5 personality (Goldberg, 1990) questionnaires in socio-economic surveys are suitable for adults and adolescents as young as 12 years (Muris, Meesters, & Diederer, 2005); not the 9 to 11 year olds that form part of our target population.

Barbaranelli, Caprara, Rabasca, & Pastorelli (2003) provide us with a questionnaire capable of measuring the Big-5 personality factors in youths aged 8 years and above; the Big Five Questionnaire for Children (BFQ-C). Their analysis revealed a high positive correlation between the BFC-Q scale completed by the children and their parent's assessment of their child's personality using the adult Big-5 questionnaire. In support of its use, del Barrio, Carrasco, & Holgado (2006) successfully used the of the BFQ-C scale to assess the personality of eight to twelve year old school children. More recently, the study of 13 to 14 year olds by Barbaranelli, Fida, Di Giunta, & Caprara (2008) used multi-trait methods and confirmatory factor analysis to assess the validity of the BFQ-C and found convergent validity was supported for all five personality factors.

The problem is that the BFQ-C scale has sixty five questions, twelve questions per personality trait; in our opinion far too many questions for young children⁹. Using BFQ-C psychometric property/correlation results from the study of (Muris, et al., 2005), we constructed a short-form Big Five Questionnaire for Children (S-BFQ-C) by choosing six questions per personality trait¹⁰. Subsequent to data collection, factor and Chronbach's alpha analysis confirmed our chosen six questions per personality trait exhibited acceptable levels of convergence and scale reliability (Appendix A, Table 3).

⁹ In middle childhood, children get bored and fail to complete surveys with too many questions, they also require literally worded questions that they can understand (de Leeuw, Borgers, & Smits, 2004, p.411- 413).

¹⁰ The HILDA socio-economic panel surveys adults with 5 to 8 questions per personality trait.

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3.2.2 The life satisfaction domain measures

The school psychology literature reveals other factors that are considered to have an effect on childhood happiness. The meta-analysis of life satisfaction research with children and adolescents by Gilman & Huebner (2003) provides a summary of childhood happiness-affecting variables. Their list includes some of the socio-economic variables that economists usually incorporate into their models of individual happiness (age, gender) and their list also includes life satisfaction domains.

Huebner (1991a), Natvig, Albrektsen, & Qvarnstram (2003), Seligson, Huebner, & Valois (2005) and Suldo, Riley, & Shaffer (2006) provide theoretical directions that identify domains considered to correlate with childhood happiness; *school environment*, *interaction with friends*, and, the *natural environment* life satisfaction domains¹¹. The wording of the survey questions we developed for each domain was based on this theory. For example, because sharing, friendly, communicative children who like to interact with their peers are happier (McCullough et al. 2000); the questions; *I make friends easily*, *I like to talk to others*, *I like to help my classmates*, and, *I like to share with others* were included for the *interaction with friends* life satisfaction domain. Also, forgiveness has been found to be positively associated with childhood life satisfaction (Gilman & Huebner, 2003; McCullough, Huebner, & Laughlin, 2000), so, *I am forgiving* was included in the *interaction with friends* life satisfaction domain questions.

When it comes to the school environment life satisfaction domain, children like to make friends at school and their satisfaction with school is positively associated with participation in structured extracurricular activities, they like to understand what their teacher is trying to teach them, they like to help and sharing their learning with classmates and children gain satisfaction from high academic achievement (Huebner, Gilman, & Laughlin, 1999). The questions in Appendix A, Table 4 are phrased to reflect the theory of what makes children happy in their school environment. Results from principal factor analysis and a

¹¹ To include the family domain one must question children on family-sensitive matters; for ethical reasons we chose not to pursue this line of questioning.

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Cronbach's alpha test revealed that all three life satisfaction domain factors offered a high level of internal consistency and reliability (Appendix B, Table 4).¹²

In addition to the life satisfaction domain questions, the children were asked questions about their *natural environment*. We asked the children: *if they were engaged in discussions on their natural environment; if they were aware of environmental problems; what they were doing about them; whether it was an acceptable behaviour to pollute their river or a river in a neighbouring state, and; the importance of animals and plants in their live*. These questions were coded as dummy variables and summed to form the *natural environment* life satisfaction domain factor; where 1 is lowest level of concern for the natural environment and 13 the highest level of concern for the natural environment. We also included a number of *fun* questions (on magic & handedness) to encourage the children to respond to our internet-based childhood happiness survey; see the *natural environment* and *fun* questions in Appendix C, Table 8.

4. The 'Smart Train' data

Of the three hundred and eighty nine children who responded to the internet-based 'Happiness' survey 327 visited the 'Smart Train' at one of twenty-five regional railway stations and 62 at the urban railway station (the state capital of Brisbane). There were 217 female and 172 male children (44%) respondents with an average age of 11.76 years. Twelve per cent of the children self-reported as left-handed, a few percent more than the expected 10% (Johnston, Nicholls, Shah, & Shields, 2009) and 47% reported a ring finger longer than their index finger; an indicator of the higher testosterone levels typical of males.

4.1 Male children from regional areas are less happy

Average life satisfaction for our 9 to 14 year old sample is a very high 9.0; 14% higher than the 7.91 we see in 15 to 23 year-olds in the HILDA and 12% higher than the average of 8.07 for the complete HILDA sample. Average happiness for female children in our sample (9.31) was 8% higher than for male children (8.60). There was no significant

¹² First order confirmatory factor analysis was also conducted using Lisrel 8.80; results are available from the authors.

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difference (*ANOVA: $F_{388, 0.05} = 0.06, p = 0.81$*) between the happiness of urban (*mean = 9.01*) and regional (*mean = 8.94*) children, nor between the happiness of urban males and females nor urban and regional females (*ANOVA: $F_{388, 0.05} = 0.86, p = 0.43$*). However, the happiness of regional males was significantly different and much lower than for all other gender/urban/regional categories (*ANOVA: $F_{388, 0.05} = 4.35, p = 0.005$; mean regional males = 8.28*). Why this is the case we don't know, perhaps this is genetic or maybe male children are more aware of the higher youth unemployment levels in regional Australia.

4.2 Australian children show more concern for the environment than adults

The children have a high awareness of environmental issues such as climate change (68%), and; water restrictions (59%), but, a much lower awareness of native animals dying out (42%); declining fish stocks (21%), and; land salinity (16%) (Appendix B, Table 5). Climate change (47%) and water restrictions (15%) were seen as the worst problems, with urban children showing more concern about climate change than regional children (61% versus 44%). We expected that regional children would show a higher awareness and concern for climate change and water restrictions, because the 2001-2010 drought had such a severe negative economic effect on Australia's rural and agricultural communities (SoE, 2011). This was not the case, regional children show less awareness and concern for the environment¹³. Perhaps the reason for this arises from the attitudes of their parents. In Australia, more than twice as many urban dwellers (58%) are of the opinion that humans are causing climate change; versus just 27% for primary producers in regional areas (Donnelly, Mercer, Dickson, & Wu, 2009, p.5).

While the parents of regional children may be in climate change denial, this attitude may not persist into the next generation. Based on their self-reported environmental-related behaviours, the attitudes of regional children appear to be very different. While half the regional children reported that they had discussed climate change within the family, 68% of them had started a conversation about the environment. The children are probably discussing the environment more among themselves and in class than with their families.

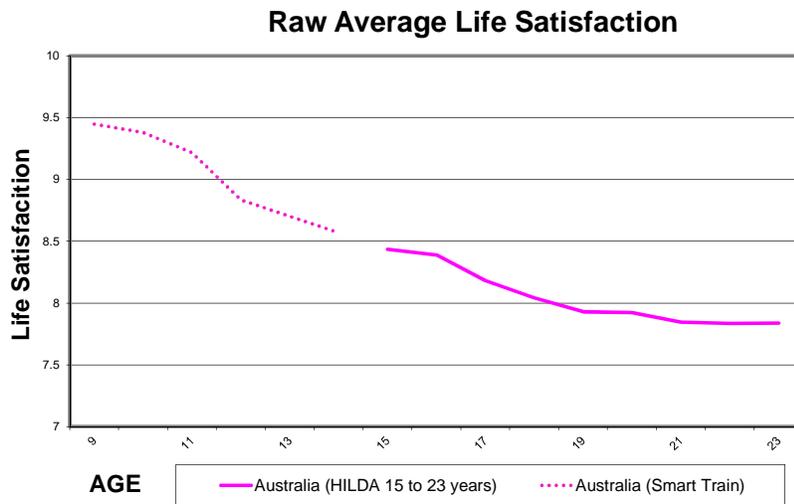
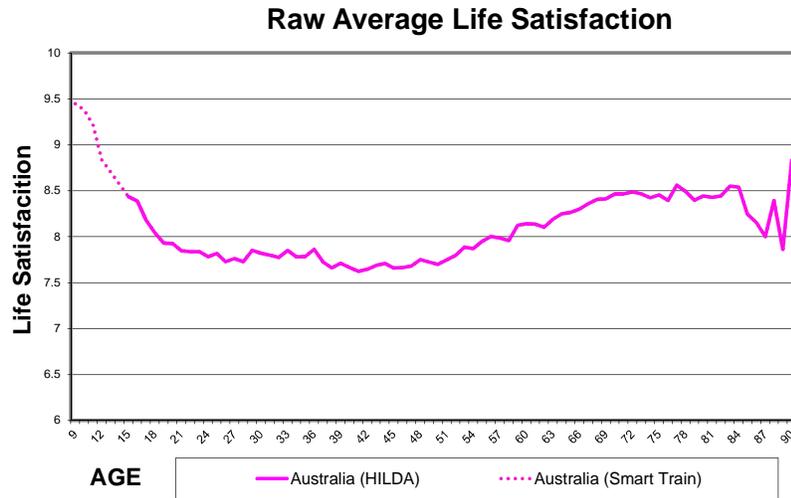
¹³ Overall, regional children showed less concern for the environment; the average of the Natural Environment Life Satisfaction Domain factor for urban children was 14% higher than for regional children (Appendix A, Table 5).

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The children are not just showing more concern for the natural environment, they are acting on that concern. Fifty-nine per cent of the children are engaging in recycling and sixty-five per cent have tried to reduce their water consumption, and, the numbers are even higher for urban children (Appendix A, Table 5); more urban children (81%) than regional children (62%) had tried to reduce their water consumption, and a similar urban-rural difference held for engaging in recycling (73% versus 57%). The children are also showing concern about the poor environmental behaviour of others; 98% of the children said it was wrong to pollute a river, even if that river was in another state (99%). Based on these results, Australia's next generation does appear to show more concern for climate change and the natural environment than their parents; 68% versus 53% (ABS, 2010).

5. Analysis - Extending our view of happiness over a lifetime

Moving on from the environment, we extend our current view of happiness over the lifetime, by appending the average happiness of the 9 to 14 year-olds from our ‘Smart Train’ sample to the graph of average happiness for the 15 to 93 year-old Australians from the HILDA (Figures 2a & 2b).



Figures 2(a) & (b): Average Life Satisfaction for 9 to 14 year old Australian children in the ‘Smart Train’ data and 15 to 93 year-old Australians in the 2002-2008 HILDA panel data¹⁴

¹⁴ There is a structural break between in the view of average happiness shown in Figures 2a & b. Responses to the (1-5) scaled Smart Train happiness question were doubled to equate to the (0-10) scale of the happiness question in the HILDA.

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The first thing we notice in Figure (2a) is that the steep happiness fall we previously saw in 15 to 23 year-olds extends back to 9 year-old children. To the 7.2% (-0.73 unit) decline in the happiness of 15 to 23 year-old Australians in the HILDA¹⁵ (solid line in Figure 2a & b), we see a further 9.3% decline (9.44 to 8.56, -0.88 units) in the happiness of Australian children aged 9 to 14 years¹⁶ (dotted line in Figure 2a & b). The total fall in happiness from age 9 to age 23 is 16.5% (- 1.61 units). This is more than twice the 7.8% decline than we see in very old Australians (aged 85 to 93 years) whose happiness we expect to decline due to failing health and the imminent onset of death. So, why does the happiness of Australian children fall so dramatically? To answer this and other questions, we focus on those ages where most of the happiness decline occurs, the 9 to 14 year-old cohort in our ‘Smart Train’ sample, and we examine it with a model of childhood happiness.

6. Analysis of ‘Smart Train’ data with the Model of Childhood Happiness

5.1 The model of childhood happiness

The model (1) takes the form:

$$LS_{it} = C + \beta_1 X_{it} + \beta_2 S_{it} + \beta_3 F_{it} + \beta_4 N_{it} + Z_i + \varepsilon_{it} \quad (1)$$

where

LS_{it}	Individual life satisfaction (happiness)
C	Constant
X_{it}	individual demographics (wealth, religion)
S_{it}	<i>School environment</i> life satisfaction domain factor
F_{it}	<i>Interaction with friends</i> life satisfaction domain factor
N_{it}	<i>Natural Environment</i> life satisfaction domain factor
Z_i	Individual fixed effects (personality, gender)
ε_{it}	error term

¹⁵ Average life satisfaction for 15-year-olds in the HILDA data are: females, 8.35, and; males, 8.52.

¹⁶ Average life satisfaction for 14-year-olds in the Smart Train data are: females, 8.8, and; males, 8.17.

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Childhood happiness (LS_{it}) is a function of a constant (C), time-variant socio-economic variables specific to the individual (X_{it}) and individual fixed effects (Z_i). A child's happiness is affected by the *school environment* (S_{it}), *interaction with friends* (F_{it}) and *natural environment* (N_{it}) life satisfaction domains, with unobservables manifest in the usual error term (ε_{it}).

7. Results from the Model of Childhood Happiness

Regression results for each specification are shown in Tables 5, 6, 7 of Appendix C. Looking at Table 5, specification 1a, we see that girls are happier (+0.7) than boys and attending religious services more often is related to an increase (+0.1) in the happiness (this is much the same as what we see in adults). The children get unhappier as they progress through the school system, from grade 4 to 9 (we will look at this in more detail later). Unlike adults, wealth has a non-significant effect on childhood happiness. This is understandable because children rely on their parent's income to sustain their wellbeing.

Adding personality (Table 5, specification 1b.), we see some expected results and an unexpected result. As expected, extraverted children are happier and neurotics (those low on emotional stability) are less happy. The unexpected result is for conscientiousness. For adults in the Australian socio-economic panel data (HILDA), conscientiousness has a significant negative effect on the overall happiness (-1.40 , t -value = 2.22). For the 9 to 14 year olds in the 'Smart Train' data we get an opposite effect (0.072 , t -value 2.85). Unlike adults, Australian children who exhibit conscientious behaviours (orderly, systematic, efficient, neat, organised, and efficient) are happier (this may be because school children often receive short-term rewards from their teacher for such conscientious behaviours).

However, recall in specification 1a we saw that happiness decreased as the children progressed through the school system, from grade 4 to 9. The school environment was one of the life satisfaction domain factors that Gilman & Huebner (2003) proposed as having a major effect on childhood happiness; our results support their proposition.

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Looking at the regression results for specification 2c in Table 6 Appendix B, we can see that the effect from *natural environment* domain factor¹⁷ is non-significant, but, as expected, the *interaction with friends* and *school environment* domains both have a significant effect on childhood happiness. While the happiness effect from these two domain factors is positive, the happiness of the children is actually declining due to the decline in the magnitude of these domain factors as the children move from one grade to the next. Between grade 5 and grade 10 the average for the *interaction with friends* domain declines from 4.21 in grade 5 to 3.92 in grade 8 then rises to 4.08 by the end of grade 10. The average of the *school environment* domain drops from 3.97 in grade 4 to 5 and continues to drop all the way to 3.24 in grade 10. As the children move from one grade to the next higher, their school environment and interaction with friends deteriorates, so, the children progressively become less happy. We can see the effects from these life satisfaction domain factors in more detail with a decomposition that takes the form:

$$(y^{\text{grade } 4} - y^{\text{grade } 10}) = \sum_{\substack{k=1, \\ l=5}}^{k, \\ l=9} ((\bar{X}_{k,l+1} - \bar{X}_{k,l}) * \beta_k) + c$$

where the childhood life satisfaction domain factors are:

$$k \left\{ \begin{array}{l} \text{School environment } (S_{it}) \\ \text{Interaction with friends } (F_{it}) \\ \text{Natural environment } (N_{it}) \end{array} \right.$$

and the school grade transition is from a lower (l)
to the next higher school grade ($l + 1$):

$$l, l+1 \left\{ \begin{array}{l} l \text{ to } l+1 \\ 4 \text{ to } 5 \\ 5 \text{ to } 6 \\ 6 \text{ to } 7 \\ 7 \text{ to } 8 \\ 8 \text{ to } 9 \\ 9 \text{ to } 10 \end{array} \right.$$

¹⁷ If we look at the effect from the individual ‘natural environment’ questions in Table 7, we see that only one environment question (q17) had a significant effect on happiness. Children who perceived their family as wealthier than their friend’s families are more likely to discuss environmental issues within their family (q17 was strongly positively correlated with wealth).

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On average, the childhood happiness change between school grades 4 to 10 ($y^{grade4} - y^{grade10}$) is a function of the sum of the product of the change in the average of each life satisfaction domain from one grade to the next times its beta coefficient; $(\bar{X}_{k,l+1} - \bar{X}_{k,l}) * \beta$.

Figure 3 shows the predicted changes in childhood happiness as children move through the state school system (grades 4 to 7) then transfer to high school (grades 8 to 10).

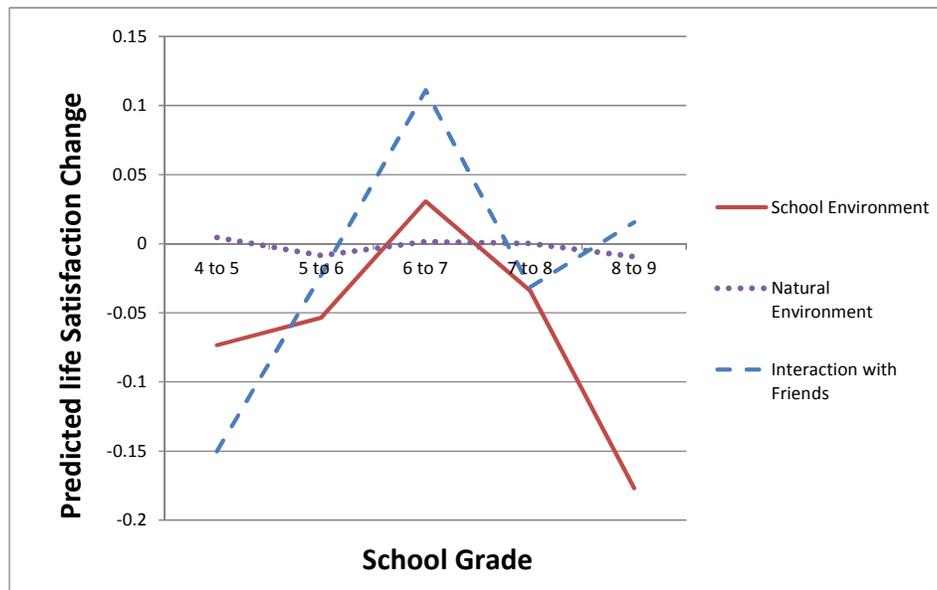


Figure 3: The predicted changes in childhood happiness from each domain factor as the children move up in school grade

Looking at Figure 3 we see the negligible childhood happiness change arising from the non-significant *natural environment* domain factor (dotted line), less than a 0.012 happiness unit decline (-0.1%). However, the predicted happiness change from the other two factors is both significant and large; the *school environment* and *interaction with friends* domains account for 44% (-0.39) of the -0.88 unit fall in childhood happiness for 9 to 14 year-old Australians we saw in the raw data depicted in Figure 2.

Examining how each factor affects childhood happiness as the children progress through the school system, we see that the predicted change in childhood happiness arising from the *interaction with friends* domain (Figure 3 dashed line) is -0.15 units as the children

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transition from grades 4 to 5; the predicted happiness change is almost zero (-0.02) as the children move from grades 5 to 6, and; there is an even smaller predicted positive change (+0.011) as the children transition through the last grades (6 to 7) in the lower grade school. By grade seven the children have most probably shared the same classroom/playground friendships for their entire seven years at the lower grade school. The children would know their friends well and derive considerable life satisfaction by interacting with them on a daily basis. However, such friendships are often broken when the children move to high school.

Australian children are often not sent to their local high school but enrolled in public or private high schools that may be many kilometres from the lower grade school that a child attended. We can see the negative effect on the children's happiness when they are separated from their lower grade friends when they move to high school (Figure 3, dashed line). There is a predicted -0.03 unit decrease in childhood happiness as the children move from lower grade school (grade 7) to grade 8 in high school. The resilience and adaptability of children can be seen in the predicted positive happiness change during the children's first year at high school. The children make new friends, perhaps they are lucky enough to also have many of their old friends at their new school, either way, their happiness is predicted to increase by +0.02 units. While the predicted happiness change arising from the *interaction with friends* domain varies as the children move through the school system, the predicted happiness change arising from the *school environment* domain factor is much larger and mostly negative.

By far the largest predicted negative change in childhood happiness (-0.31) comes from the school environment. Between grades 4 and 5 the *school environment* domain factor accounts for a -0.07 unit decline in childhood happiness. This is the same as the net happiness decline arising from the *interaction with friends* domain between all grades (4 to 10), and, the happiness decline arising from the school environment just gets worse as the children transition through the school system. From grades 5 to 6 we see a -0.054 decline; a slight positive (+0.03) improvement between grades (6 to 7) of the lower grade school, but, the happiness decline accelerates when the children move to high school. In high school grades 8 to 9, the children's happiness declines -0.034 and the happiness decline is four-times bigger (-0.17) when children move up to the next high school grade (9 to 10).

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To put the size of the decline from the *school environment* domain factor in perspective, it accounts for -0.3 (77%) of the predicted net happiness decline (-0.39) arising from the *school environment* and *interaction with friends* domain factors. Together, the negative effect on the happiness of Australian children arising from the *school environment* and *interaction with friends* life satisfaction domain factors is bigger than the (-0.38) happiness decline we see in old, (85 to 90 year-old) Australians who we expect to be unhappy due to their worsening health and imminent demise.

8. Discussion

This paper contributed to our understanding of lifetime happiness by extending our view of happiness back to childhood. After developing scales to measure individual characteristics, personality and the life satisfaction domain factors proposed by school psychologists, an Internet-based happiness survey was developed to collect data from 9 to 14-year-old children. Analysis of the collected data with a model of childhood happiness revealed something startling. During their transition from lower school grade and high school system, we saw a steep decline in the happiness of children. What really surprised us was that this steep decline was much bigger than the happiness decline we see in old people. A policy opportunity arises from this finding: how can we help our children to be happier as they progress through the school system? To begin, improving the children's *natural environment* is probably not the way to go because the *natural environment* was found to have a non-significant effect on childhood happiness. Perhaps one approach would be to encourage conscientious behaviour in children.

In happiness studies of Australians, conscientiousness has been found to have a negative effect on adult happiness; we found that conscientiousness has a positive effect on the happiness of Australian children. There could be many reasons why conscientious has the opposite relationship with the happiness of Australian children than for Australian adults. The most obvious reason is that conscientious, hardworking children should be more likely to complete their work and achieve higher grades. Academic achievement has been found to make children happier (Huebner, 1991). Another reason could be the regimented and

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procedural nature of the Australian state school system. At lower grade levels (1 to 9), the school curriculum dictates the children's behaviour; the children have little scope for planning what they do at school. The children are told to be tidy (orderly, neat) and the teacher sets the deadlines (goals) for work completion (systematic, efficient). To encourage conscientious behaviours in grade school children, teachers often reward children (e.g. a gold star to attach to their good work).

Such positive reward recognition has been found to motivate children in the classroom and encourage them to work harder (Docan, 2006; Haywood, Kuespert, Madecky, & Nor, 2008; Shiller, O'Flynn, Reineke, Sonsteng, & Gartrell, 2008). An ordered and rewarding life could also relieve the children from the stress of planning the pursuit and attainment of their life goals (McKnight, Huebner, & Suldo, 2002), at least at school. Conscientious children have been found to experience less victimization, better interaction with friends, and higher peer acceptance even after controlling for personality (Jensen-Campbell & Malcolm, 2007). In a planned and rewarding grade school system that rewards children who complete their work; it is reasonable to expect that children should achieve better school grades and be happier. However, while a conscientiousness-encouraging policy might be initially effective with young children, '*it is inappropriate to assume that the same relationship exists between external rewards (in the) long-term*' Hidi & Harackiewicz, 2000, p.159). Therefore, the ongoing provision of rewards to motivate and increase conscientious behaviours may not be an effective lifetime happiness increasing policy because the positive effect from rewards reduces over time, and, the positive effect of conscientiousness on happiness dissipates as children mature into adulthood. The positive effect from conscientious-promoting policy for children may not be cost effective because the effect may not contribute to the child's well-being in adulthood.

Perhaps a more persistent lifetime happiness increasing policy would be to focus on another finding that emerged from this and other studies (Diener, Sandvik, Pavot, & Fujita, 1992; Lischetzke & Eid, 2006), the positive effect of extraversion on childhood happiness; a positive effect that persists into adulthood. This finding from our study could avail us of a more cost effective and persistent foundation for a lifetime happiness maximising policy because extraverted behaviour increases the happiness of both children and adults. The

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question is what type of policy could be used to encourage extraverted behaviours? It is not like we can change an individual's personality.

It is generally agreed that personality is formed early in our life (Robert R McCrae et al., 2002), then remains fixed over our lifetime (Robert R. McCrae, Costa, Mroczek, & Little, 2006). A finding from the study of (Lischetzke & Eid, 2006) provides us with the hint of a flanking strategy that could be used to overcome the immovable impediment that personality is unchangeable over time; they found that extraverts have better mood regulation. We could teach the children how to maintain a more positive attitude in their day-to-day lives; but how?

One way to teach the children how to maintain a more positive attitude in their day-to-day lives is through behaviour modification, or learning through reinforcement. Operant and reinforcement theory takes the view that learning is dependent upon the environment (McShane & Travaglione, 2003). With behaviour modification theory, thinking is not considered part of the learning process but an intermediate step between behaviour and the environment. Our experience with the environment teaches us to alter how we behave so that we maximise positive and minimise adverse consequences (Miltenberger, 1997). A law of cause and effect is enacted whereby an operant behaviour will be repeated dependent upon how behaviour is reinforced. Positive reinforcement is provided for preferred behaviours and negative reinforcement for non-preferred behaviours (Connellan, 1978). With children, the behaviour modification process could manifest as positive-reinforcing praise when the child exhibits extraverted behaviours like being more assertive and participative in class or when the children share their thoughts and experiences with others. Negative reinforcement (sometimes called avoidance learning) would involve not criticising children when they do not exhibit extraverted behaviours. By withholding criticism, children are more likely to repeat the extraverted behaviours for which they received praise. Behaviour modification would not change the personality of the schoolchildren; it could provide positive feedback that incentivized the schoolchildren to behave in happiness-maximising ways.

There is a long history of the successful use of behaviour modification in the classroom. Dua (1970) investigated the effectiveness of behavioural orientated therapy programs used to treat introversion and extraversion in the classroom and found that a behavioural modification

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program was more effective than a re-education program in inducing attitudinal change in students. In 1978, Wolraich, Drummond, Salomon, O'Brien, & Sivage found that behaviour modification assisted with the classroom behaviour and academic performance of 6 to 9 year olds. Behaviour modification has also been successfully applied to treat psychotic children (Meyers & Craighead, 1979), and, to help disabled children learn (Routh, 1979). Lowenstein (1983) took shy 9 to 16 year old students and used behavioural modification therapy to increase extraverted behaviours. In doing so, he improved the student's reading, spelling and math outcomes. However, the use of behavioural modification with children is controversial. As far back as 1986, Boivin, Sewell, & Scott questioned whether behavioural modification was an ethically appropriate procedure for children.

In spite of this criticism, behavioural modification continues to be used. In 2000, Eddy, Reid, & Fetrow used behavioural modification to reduce youth delinquency and violence in the classroom. Behaviour modification has been used by parents to reduce the amount of time their children spend viewing television (Jason & Fries, 2004). It has been used to increase school attendance and improve behaviour in school cafeterias (Fabiano et al., 2008). More generally, it has also been used on students with extreme behavioural problems arising from conditions such as ADHD; Attention Deficit Hyperactivity Disorder (Waxmonsky et al., 2008). Recently, Nelson (2010) explored classroom participation in the presence of a token economy. He found that undergraduate students participated more when they received bonus points (rewards) and extraverted students participated more than non-extraverted students. Behavioural modification programs that sought to increase extraverted behaviours have been shown to improve classroom behaviour and educational outcomes in school children and young adults.

A cursory search of Australia's state-based education curriculums did not reveal the general use of similar behavioural modification programs in Australia's publicly-funded State school system. This is not to say that behavioural modification is not on the agenda of Australia's departments of education; the 2011 School-wide Positive Behaviour Support conference was scheduled to discuss how to apply behavioural modification methods to children with ADHD (Riffel, 2011). One wonders whether the ethical issues have forced behavioural modification off the general teaching agenda or whether the method is now only considered appropriate for use on children with extreme behavioural problems. With

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evidence from this study that children with extraverted behaviours are happier, one wonders whether it is time to put behavioural modification for schoolchildren back on the research agenda.

Recently, an Australian study by Seligman, Ernst, Gillham, Reivich, & Linkins, 2009 sought to do this. Drawing on *positive education* methods from *positive psychology* (Martin Seligman, 2011), a team of researchers undertook a field study that sought to teach skills that increase resilience, positive emotion, engagement and meaning, to the entire Geelong Grammar School (an elite private school). The school's curriculum was changed to include the development of these (extraverted-related) skills and the staff instructed on how to teach the *positive education* curriculum. At the time of publishing their journal article, the authors had no systematic data to report, but were of the impression that the project '*was enormously successful*' (Seligman, et al., 2009, p.304). Based on experience from their previous studies, they expected the *positive education* programme at Geelong Grammar would increase the student's well-being (happiness) and learning because '*More well-being is synergistic with better learning*' (Seligman, et al., 2009, p.294).

The authors based this expectation of success on results from their longitudinal study of 347 year 9 students funded by the US Department of Education. Incorporating positive psychology methods into the school curriculum, the study found an increase in the learning strengths of students; reduced their depression, anxiety and adjustment disorders; improved their social skills and cooperation with family, and; overall produced positive and reliable improvements in the students' well-being (Seligman, et al., 2009, p.297-302). While the results from this US study are mooted to be positive, the data, analyses and outcomes from the positive education programme at the Geelong Grammar School¹⁸ (Martin Seligman, 2011; Topsfield, 2011) are yet to revealed. If the findings from these studies are supportive, then positive education programmes in schools may be one way to reduce the decline in the happiness of young Australians.

However, before economists could recommend such a policy, we need to be convinced that positive education programmes really do improve educational and other outcomes. In the absence of results data and its suitable analysis, we cannot recommend the application of

¹⁸ Or the similar study like the one at St Peter's College Adelaide (StPeter's, 2012).

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scarce education expenditures to positive or any other education programmes. Perhaps a more immediate way to arrest the steep decline in the happiness of children as they progress through the school system is to just change the schooling system, but how.

An obvious and simpler change could be to keep the children together throughout their years at school. Children would make friends in grade one and continue to interact with the same friends all the way to the end of high school (grade 12). Integrated schooling systems where lower grade and high schools are combined on the same campus are common among Australian private schools and to a lesser extent in religious (often catholic) schools but are less common at the schools most of our children attend, the state-funded public schools. Due to anonymity requirements, we don't know what type of school system the students in our Smart Train data came from; perhaps another study could build on this one by examining whether the happiness decline arising from the school environment domain is similarly evident in schooling systems with or without combined campuses.

Perhaps the finding from such a study would be that the happiness decline arising from the school environment domain is similarly evident independent of whether the grade or high schools share the same campus. The decline in childhood happiness arising from the school environment may be a curriculum issue; disconnects between lower grade and high school curriculums may be negatively affecting the students' preparedness for high school. Or, maybe the curriculum is fine but what the children learned in lower grade school ill-prepares them for high school? Whatever, the cause, children get unhappy when they go to high school and this decline in happiness is much larger than what our children will experience when they get old and sick. Based on our predictions, if one or more of the above (or other) policies can solve this problem we could potentially much improve the happiness of our children.

9. Conclusion

Of course, while it is easy to say 'just keep the children together throughout their schooling', there may be many other factors that could potentially hinder such a policy. For a start, parental biases may result in the children just being sent to "the high school I went to". Do parents need educating on the importance of school selection to their child's happiness? Maybe our children would be happier if we incentivized parents to send their children to a

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school where they could stay with the same friends for the whole 12 years of school? Would the children's educational or lifetime outcomes be maximised from such a decision? Perhaps we should better integrate lower and high school curriculums, or, just addend positive education programmes to the existing curriculum? As economists we cannot answer these questions with any certainty, but are of the opinion that such questions provide the opportunity for educationalist and economists to work together to make our children happier.

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Appendix A:

Table 3: The six questions per personality trait included in the Childhood Happiness Survey (questions selected from the 65 questions in the BFQ-C scale (Muris, et al., 2005), p.1762), Table 1)

Personality Trait	Questions	Scale Reliability*
Extroversion	I make friends easily I do many things so I don't get bored I like to talk to others I say what I think I like to joke I like to meet with other people	.64
Agreeableness	I trust others I share my things with other people I understand when others need my help I am kind to those who I dislike If a classmate has some difficulty I help her/him If someone hurts me I forgive them	.73
Conscientiousness	I keep my school things neat and tidy During class I concentrate on the things I do I play only after I finish my homework I work hard at the things I do When I start to do something, I have to finish it at all costs When I finish my homework, I check it many times to see if I did it correctly	.78
Emotional stability	I am often sad I get nervous over silly things I worry about things I get offended easily I cry often I am impatient	.78
Openness to Experience	When the teacher explains something, I understand immediately I am able to solve mathematical problems I understand most things immediately I like scientific TV shows I easily learn what I study at school I know many things	.78

* Cronbach's Alpha values of 0.6 to 0.8 are considered acceptable; greater than 0.8 are good.

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Table 4: Survey questions for the ‘school environment’ and ‘interaction with friends’ life satisfaction domain factors

Life Satisfaction Domain	Survey Question
School environment ¹ (schoolenv)	When the teacher explains something, I understand immediately I do many things so I don't get bored During class I concentrate on the things I do I play only after I finish my homework I understand most things immediately I work hard at the things I do If a classmate has some difficulty I help her/him When I start to do something, I have to finish it at all costs I easily learn what I study at school
Interaction with friends ² (friends)	I make friends easily I trust others I share my things with other people I like to talk to others I understand when others need my help I am kind to those who I dislike I like to meet with other people If someone hurts me I forgive them

¹ Cronbach's alpha scale reliability coefficient: 0.8559

² Cronbach's alpha scale reliability coefficient: 0.7638

Appendix B: Descriptive Statistics

Table 3: Descriptive Statistics; N=389

	Mean	s.d.
gender (female=1)	0.56	0.44
age (years)	11.76	1.04
urban resident (urban=1)	0.16	0.37
Personality Factors (scaled 0-30)		
extraversion	24.70	3.63
agreeableness	23.71	4.07
conscientiousness	21.85	5.23
emotional stability	16.68	4.06
openness to experience	21.80	5.05
Life Satisfaction Domain Factors		
School environment (scaled 1-5)	3.71	0.74
Interaction with friends (scaled 1-5)	4.05	0.62
Natural environment (scaled 1-13)	7.44	2.23

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Table 5: Summary of the children's responses to the environmental questions

	Urban	Rural	All
Which of the following environmental problems have you noticed?			
Climate change	74%	64%	65%
Water restrictions	90%	53%	59%
Native animals dying out	56%	39%	42%
Declining fish stocks	27%	20%	21%
Land salinity	24%	14%	16%
Which of these problems do you think is the worst?			
Climate change	61%	44%	47%
Water restrictions	21%	14%	15%
Native animals dying out	10%	29%	26%
Declining fish stocks	0%	6%	5%
Land salinity	8%	5%	5%
Loss of native fauna	0%	0%	2%
None of the above	0%	2%	0%
Relevance of plants and animals to the children			
Are animals an important part of your life?	90%	94%	93%
Are plants an important part of your life?	85%	81%	82%
The children's engagement in the environmental debate (yes = 1)			
Have you ever started a conversation about the environment?	73%	68%	68%
Does your family talk about the environment?	52%	50%	50%
Things that the children had done over the past 12 months to help the environment (yes = 1)			
Tried to reduce water consumption	81%	62%	65%
Have decided for environmental reasons to reuse or recycle something rather than throw it away	73%	57%	59%
Attended a meeting or signed a letter or petition aimed at protecting nature or the environment?	6%	9%	8%
None of the above	10%	14%	14%
Children's attitudes to pollution (yes = 1)			
Let's say that in your neighbourhood everyone throws their garbage in the river; would that be all right?	0%	2%	2%
Let's say that in New South Wales (the state next to the children's home state), a whole neighbourhood throws its garbage in the river. Do you think it is all right for them to throw their garbage in the river?	0%	1%	1%
Do you think that throwing garbage in the river is harmful to the birds that live around the river?	92%	93%	93%
Natural Environment Life Satisfaction Domain factor (0: lowest awareness of the environment to highest: 13)			
	8.48	7.45	7.44
<i>N</i>	62	327	389

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Appendix C: Regression results

Table 6: The determinants of Life Satisfaction for children aged 9 to 14 years in the Smart Train dataset; OLS regression, $N = 389$

Variable:	1a. Demographics		1b. Demographics Personality		2a. School environment		2b. School environment Interaction with Friends	
	coefficient	t-value	coefficient	t-value	coefficient	t-value	coefficient	t-value
q1: Where did you visit the Smart Train?	-0.022	1.72	-0.013	1.05				
q2: female =1	0.632	3.44	0.645	3.51				
q4: school grade (age proxy)	-0.160	1.84	-0.125	1.52				
q5: relative wealth	0.052	0.26	-0.066	0.34				
q9: religious service attendance	0.092	2.72	0.050	1.50				
Personality Factors								
extraversion,			0.129	4.54				
agreeableness			-0.049	1.50				
conscientiousness			0.066	2.85				
emotional stability			-0.089	4.17				
openness to experience			0.003	0.14				
Life Satisfaction Domain Factors								
School environment factor (schoolenv)					0.665	5.56	0.390	2.66
Interaction with friends factor (friends)							0.561	3.17
Natural environment factor (natenv)								
constant	8.097	10.54	6.981	6.39	5.715	12.63	4.457	7.45
R^2	0.063		0.1969		0.0739		0.0974	
Adjusted R^2			0.1757				0.0927	

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Table 7: The determinants of Life Satisfaction for children aged 9 to 14 years in the Smart Train dataset; OLS regression, $N = 389$

Variable:	2c.		2d.		2e.		3a.	
	School environment		Natural environment		Demographics		Demographics Personality	
	School environment	Interaction with Friends	Natural environment	Interaction with Friends	School environment	Interaction with Friends	School environment	Interaction with Friends
	coefficient	t-value	coefficient	t-value	coefficient	t-value	coefficient	t-value
q1: Where did you visit the Smart Train?					0.010	0.79	0.011	0.95
q2: female =1					0.484	2.66	0.637	3.46
q4: school grade					-0.135	1.59	-0.118	1.43
q5: relative wealth					0.021	0.11	-0.080	0.41
q9: religious service attendance					0.052	1.50	0.048	1.40
Personality factors								
extraversion							0.095	2.08
agreeableness							-0.112	1.44
conscientiousness							0.030	0.61
emotional stability							-0.087	4.02
openness to experience							-0.024	0.63
Life Satisfaction Domain Factors								
School environment factor (schoolenv)	0.382	2.54			0.378	2.46	0.439	0.84
Interaction with friends factor (friends)	0.557	3.11			0.421	2.22	0.466	0.82
Natural environment factor (natenv)	0.010	0.23	0.101	2.45	-0.003	0.07	0.032	0.75
constant	4.434	7.30	7.429	23.24	5.333	5.71	6.257	6.26
R^2	0.0975		0.0153		0.1251		0.2001	
Adjusted R^2	0.0905		0.0127		0.1067		0.1724	

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Table 8: Other determinants of Life Satisfaction for the children aged 9 to 14 years in the cross-sectional Smart Train dataset; OLS regression, $N = 389$

Variable:	coefficient	t-value
q1: Where did you visit the Smart Train?	-0.018	1.31
q2: female =1	0.733	3.40
q4: school year (age proxy)	-0.166	1.63
q5: relative wealth	0.111	0.48
q9: religious service attendance	0.091	2.30
Fun Questions:		
q6: good luck charms do bring good luck (1 definitely not true to 5 definitely true)	-0.107	0.83
q7: Do you have a lucky charm such as a mascot or a talisman? (yes = 1)	0.129	0.52
q8: Do you believe that a lucky charm can protect or help you? (1 definitely not true to 5 definitely true)	-0.032	0.25
q10: Some fortune tellers really can foresee the future (1 definitely not true to 5 definitely true)	0.053	0.53
q11: Is there someone who cannot be seen by others watching over you? (yes = 1)	0.032	0.12
Natural Environment:		
q15: Are animals an important part of your life? (yes = 1)	0.534	1.23
q16: Are plants an important part of your life? (yes = 1)	-0.089	0.30
q17: Does your family talk about the environment much? (yes = 1)	0.396	1.78
q18: Have you ever started a conversation about nature or the environment? (yes = 1)	0.034	0.14
q22: Let's say that in your neighbourhood everyone throws their garbage in the river; would that be all right? (no = 1)	-0.579	0.68
q23: Let's say that in New South Wales, a whole neighbourhood throws its garbage in the river. Do you think it is all right or not all right for them to throw their garbage in the river? (no = 1)	1.029	0.92
q24: Do you think that throwing garbage in the river is harmful to the birds that live around the river? (yes = 1)	-0.467	1.13
Handedness:		
q63: What hand do you write with? (left = 1)	-0.177	0.56
q64: Which finger is longer? (1 my ring finger is longer; 2 my ring and index fingers are the same length; 3 my index finger is longer)	-0.032	0.27
constant	6.723	2.75
R^2	0.089	
$Adjusted R^2$	0.042	

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