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REPORT

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Does adolescent academic achievement predict future parenting?

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Abstract

The effects of academic achievement may extend beyond economic success to influence social functioning, including future parenting. To evaluate whether adolescent academic achievement forecasts future parenting (both positive and negative) and the family home environment of parents. We used prospectively gathered intergenerational data from a population-based birth cohort born in 1972/1973 in Dunedin, New Zealand, including data from Generation 1 (parents of the birth cohort), the birth cohort (Generation 2; G2), and G2's children (Generation 3). Adolescent academic achievement in G2 was used to predict observed and reported parenting

outcomes when offspring (G3) were aged 3 years after controlling for a range of covariates, including G2's adolescent wellbeing, early childhood socioeconomic status (collected from G1), and G2's age at child's birth. We also evaluated 2-way interactions between academic achievement and G2 parent sex, G3 child behaviour, and G2 adolescent wellbeing. Greater G2 academic achievement, net of controls, predicted more positive and less negative parenting (for mothers only), and a more positive home environment. For the home environment outcome, the effect of adolescent academic achievement was moderated by wellbeing. Adolescent academic achievement may positively influence parenting behaviour and the quality of the home environment.

KEYWORDS
adolescent academic achievement, Dunedin study, longitudinal, parenting

1 | INTRODUCTION

The question of why parents parent the way they do has been a long-standing one among developmental scholars. Belsky's (1984) ecological model of the determinants of parenting underscored the role of contextual influences (i.e., work, social support, and intimate relations) and developmental ones (i.e., childrearing history, personal psychological resources, and child behaviour). Notably, most of the work informed by this framework, including Conger's (Conger & Elder, 1994) family-stress model, and McLoyd's (1998) review of the role of parenting in linking socioeconomic disadvantage with compromised child development, has focused on effects of *adversity* on parenting and parent–child relationships. This is clearly evident in the specific foci in Conger's framework on problematic childrearing history and parental psychological distress and in both his and McLoyd's emphasis on, respectively, job loss and poverty. While there are exceptions to the focus on adversity when studying the intergenerational transmission of parenting (Belsky et al., 2005, 2012), as well as the influence of psychological wellbeing (McAnally et al., 2021), research into positive developmental pathways remains rare. Here, we extend work addressing the influence of developmental strengths by testing the hypothesis that adolescent academic achievement forecasts more positive parenting of the next generation over and above the effects of adolescent psychological wellbeing and a host of other covariates, drawing on longitudinal data from a birth cohort study.

1.1 | Theoretical foundations

Theory and research increasingly underscores the importance of adopting a positive- or strengths-based approach to studying human behaviour (Lyubomirsky et al., 2005; Seligman & Csikszentmihalyi, 2001). This includes appreciation of the fact that wellbeing is more than the absence illness or problems, but is a complex and multifaceted outcome in its own right (Huppert, 2009). To better understand outcomes such as how development facilitates parenting, there

is a need to investigate potential positive pathways and their correlates, both within and across generations, as well as with regard to both men and women. Such research has potential implications for policy planning around supporting positive youth development with the aim of not only promoting healthy functioning across the adolescent years but also strengthening the fabric of society.

1.2 | Adolescent strengths

Adolescence is an influential period of development in the early life-course, with implications for health and wellbeing throughout the life-course (Viner et al., 2015). A key feature of adolescent development that fosters future wellbeing, broadly conceived, is education. For example, educational achievement confers a socioeconomic advantage on adults and, in so doing, fosters both the physical and psychosocial qualities of the home environment in which their own children grow up (Dearing & Taylor, 2007; Neppl et al., 2009).

One question that can be raised about this observation is whether predictive effects of academic achievement and psychosocial wellbeing have been effectively distinguished. This would seem especially important to consider in light of the fact that research on positive youth development indicates that these two constructs are positively correlated (Olsson et al., 2012). Wellbeing in adolescence encompasses a wide range of positive socioemotional factors, such as engagement with extracurricular activities and positive interpersonal relationships, as well as school engagement (Huppert, 2009; Olsson et al., 2012; Tomasik et al., 2019). Perhaps most obviously, school engagement (feeling safe, enjoying school) could account for at least some of the apparent impact of adolescent academic achievement on psychological strengths in adulthood.

1.3 | Hypotheses/questions

While research that assesses parenting behaviour or the quality of the home environment typically controls for education (Dearing & Taylor, 2007; Morawska et al., 2009), to the best of our knowledge, there is no work that simultaneously controls for adolescent wellbeing, especially when prospectively measured (i.e., well before parenting is studied). Thus, we test the hypothesis that, over above effects of adolescent wellbeing, greater adolescent academic achievement will predict more supportive parenting during children's early years. Because there are a number of other known correlates of parenting, such as childhood experience of disadvantage, age of parenting, concurrent behaviour of the child being parented and parent sex (Belsky et al., 2005, 2012; McAnally et al., 2021), we also take these into account when testing this hypothesis. We use data from the Dunedin Multidisciplinary Health and Development Study, which has followed a single birth cohort for decades. On a more exploratory basis, we further explore whether any effects of academic achievement are moderated by adolescent wellbeing, child behaviour, or parent sex.

2 | METHOD

2.1 | Participants and procedures

The Dunedin Multidisciplinary Health and Development Study (Dunedin Study) is a longitudinal study of a population-based birth cohort of 1037 people born in Dunedin NZ between 1 April 1972 and 31 March 1973 (Poulton et al., 2015). The participants reflect the ethnic mix of the South Island of New Zealand at the time they were born. More than 90% of participants identified themselves as New Zealand European. A feature of the Dunedin study is the high rate of follow-up at all phases of assessment: at age 45, 94% of the 997 living participants were

assessed. Each assessment phase of the research was approved by the appropriate ethics committee at the time. Participants (G2), and in earlier phases, their parents (Generation 1 [G1]), gave signed, informed consent for each assessment. However, the conditions surrounding consent mean that data sharing is not permitted.

The Parenting Study was initiated in 1994 to assess the parenting behaviours and attitudes of the Dunedin Study members (G2) with their first preschool-aged child/stepchild (Generation 3 [G3]) during a home visit (Belsky et al., 2005). The participants of the current study were 332 men and 363 women who ranged in age from 17.7 and 43.1 years (mean 29.9, SD = 5.6) at the time of their child's birth. They represented 98% of those parents eligible to participate in the parenting study (i.e., 695 Dunedin Study members (G2) who had become parents were assessed with their G3 child: the G3 child's other parent was not assessed as part of this protocol). Table 1 reports on the completeness of data for this group of participants.

2.2 | Measures

The parenting outcomes were measured when G3 offspring were 3 years of age. The childhood socioeconomic deprivation covariate was based on repeated measurements obtained at the time of the G2 parent's birth and when they were aged 3, 5 7, and 9 years, whereas those of adolescent wellbeing were based on measurements obtained when the G2 parent was 15 and years of age and that pertaining to child behaviour (G3) was obtained when their child was 3 years of age. The parent's sex is also a covariate.

2.2.1 | Predictor: Adolescent academic achievement (G2)

The main predictor, adolescent academic achievement, was measured when the G2 parents in the current study were 15 and 18 years of age. Four variables related to adolescent academic achievement were identified in previous work with this sample (Olsson et al., 2012). Reading at age 15 years was assessed by the Burt Word Reading Test (Scottish Council for Research in Education, 1976), with a maximum possible score of 110 (mean score 90.25). Total achievement at high school was assessed at age 18 on a 5-point scale: 1—no school qualification, 2—school certificate (awarded for passing first set of national external exams), 3—6th Form certificate (certificate awarded on passing 4 years secondary school), 4—University Entrance (external examinations in fourth year of secondary school) and 5—University Bursary/Scholarship (final secondary school examinations, primarily aimed at students intending to attend tertiary institutions). Regardless of the qualifications achieved, whether they had completed more than 3 years of secondary education was recorded (i.e., remained at school after the first set of national exams). At age 18, participants were asked to rate whether they believed they had done well at high school on a 5-point scale (where 1 = well below average, 3 = average and 5 = well above average).

2.2.2 | Outcomes: Parenting (G2 and G3)

Parenting data were obtained as close as possible to the third birthday of Dunedin Study members' first child during a home visit. The average age of the child at time of assessment was 39 months (SD 4.8; range 32–60 months). Parent–child interactions were filmed in three semi-structured situations lasting a total of 45 min (National Institute of Child Health and Human Development Early Child Care Research Network, 1999). The first, 'free play', involved setting out a standard and varied set of age-appropriate toys on the floor in a quiet area of the home for the parent and child to use in play. Parents were instructed to engage the child as s/he might if s/he had free time on his/her hands. The second, 'competing-task' situation involved the parent completing a questionnaire after being instructed to prevent the child from engaging with a new set of nearby toys in a see-through container while only having one

TABLE 1 Descriptive variables for measures in the models for 695 parenting study participants.

Variables	*N*	Mean	SD	Min	Max
Outcomes					
G2 positive parenting of G3	695	10.55	4.89	−3.67	20.00
G2 negative parenting of G3	695	2.94	1.24	2.00	11.33
G2 HOME scores	669	0.79	0.41	0	1
G2 parents' life-course variables[a]					
Contributors to academic achievement					
G2 Burt reading score (age 15)	665	82.66	13.56	27.27	100
G2 school success (self-reported age 18)	685	56.53	21.38	0	100
G2 highest qualification	666	66.81	47.12	0	100
G2 attended >3 years of high school	695	89.64	30.49	0	100
Contributors to adolescent wellbeing					
G2 self-reported strengths (age 15)	662	66.93	17.86	18.18	100
G1 reported strengths of G2 (age15)	656	77.44	16.91	0	100
G2 self-reported strengths (age 18)	648	64.77	17.42	4.54	100
G1 reported strengths of G2 (age 18)	589	60.06	12.60	0	81.13
G2 school attachment (age 15)	645	84.55	24.23	0	100
G2 having someone to talk to (age 15)	662	80.82	39.40	0	100
G2 attachment to G1 parents (age 15)	662	82.40	15.59	5.56	100
G2 attachment to peers (age 15)	655	79.50	15.18	23.08	100
G2 satisfaction with life (age 18)	642	75.75	18.21	0	100
G2 satisfaction with spare time (age 18)	643	78.64	18.88	0	100
G2 satisfaction with people (age 18)	642	80.06	17.68	33.33	100
G2 satisfaction with the future (age 18)	640	73.18	20.11	0	100
G2 participation in clubs (age 15)	663	8.41	14.53	0	100
G2 participation in clubs (age 18)	638	7.17	14.84	0	75
G2 participation in sports (age18)	638	7.61	11.08	0	100
Childhood socioeconomic disadvantage					
G1 SES at G2's birth	640	3.53	1.36	1	6
G1 SES when G2 was aged 3	611	3.77	1.61	1	6
G1 SES when G2 was aged 5	558	3.40	1.30	1	6
G1 SES when G2 was aged 9	583	3.22	1.28	1	6
Covariates concurrent with outcome variables					
G2 parent age at birth of G3 child	695	29.66	5.98	17.67	43.08
G3 child's behaviour[b]	695	−12.18	2.58	−18.67	−1.67
Composite variables (used as covariates)[c]					
G2 adolescent academic achievement	683	68.56	17.08	8.33	100
G2 adolescent wellbeing	671	56.17	10.25	17.75	100
G2 childhood socioeconomic disadvantage	692	3.52	1.14	1	6

[a]Adolescent academic achievement and wellbeing variables are transformed to proportion of maximum percentage (POMP) scores with a theoretical range of 0 to 100.
[b]Higher scores represent more negative behaviour.
[c]Composite variables represent the mean of the available contributing variables for each case and are used in the analyses.

'boring' one (with no movable parts) to play with. Finally, a 'teaching task' was administered in which the parent and child were required to work on a series of increasingly difficult puzzles, with the parent directed to provide whatever assistance the child was judged to need without doing the task for the child. Twenty-three participants in the parenting study did not have observational parenting data, either because they declined to have their parenting behaviour videotaped (see below) or because their child was too old for the video tasks (>60 months) at the time of assessment.

Parent behaviour was rated separately for each task from videos by coders who were unaware of all other information on the parent–child dyad. They applied ten 7-point scales (National Institute of Child Health and Human Development Early Child Care Research Network, 1999), six of which addressed parental behaviour (sensitive responsiveness, intrusiveness, detachment, stimulation of cognitive development, positive regard for the child, and negative regard for the child) and four of which addressed child behaviour (see below: covariates). Scores across the tasks were averaged and subject to data-reduction-oriented factor analysis, which yielded a 4-variable, positive-parenting factor (sensitivity, detachment [negative loading], cognitive stimulation and positive regard) and a 2-variable, negative-parenting factor (intrusiveness and negative regard). Due to the skewed data, scores for the negative parenting variable were log transformed.

As part of the home visit, the Home Observation for Measurement of the Environment (HOME; Caldwell & Bradley, 1984; Linver et al., 2004) was administered. This observed measure has six subscales: *Emotional and Verbal Responsivity of the Parent* (11 items); *Avoidance of Restriction and Punishment* (8 items); *Organization of the Physical and Temporal Environment* (6 items); *Provision of Appropriate Play Materials* (9 items); *Parental Involvement with the Child* (6 items); and *Opportunities for Variety in Daily Stimulation* (5 items). Scores on the HOME measure were dichotomised because mean scores were nearly at ceiling for 4 of the scales; only the second (restriction and punishment) and fifth (parental involvement) scales had mean scores that were at least 1 point below the maximum score for that scale. In the case of the HOME outcome, a group scoring in the top 80% was compared with the lowest scoring quintile. Data are missing on the HOME scale for 26 participants with observed parenting data who were not at their own house when participating (e.g., were interviewed with their child at a relative's house or at the Dunedin Study facilities).

2.2.3 | Covariates: Childhood socioeconomic disadvantage (G1), adolescent wellbeing (G2), and G3 child behaviour and parent (G2) sex

Childhood socioeconomic disadvantage of the parents (G2) was operationalized as the mean their own parents' (G1) occupational status at the time of G2's birth and when G2 was aged 3, 5 and 9. G1 parents' occupations were given a status-based code from one (professional) to six (unskilled labourer) based on the education and income level associated with that occupation in New Zealand (Elley & Irving, 1976). Parental (G1) occupation was recorded at each of the four time points and when two parental occupational codes were available at a given time point, the score closest to one (professional) was used. Higher scores on this measure equate to more socioeconomic disadvantage. Parent sex was also included as a covariate.

Adolescent social wellbeing was based on four constructs: (1) *Quality of social attachments* as indicated by attachment to (a) parents and (b) friends at age 15 years assessed with a shortened version of the Inventory of Parent and Peer Attachment (Armsden & Greenberg, 1987; Nada-Raja et al., 1992); (c) attachment to school assessed by a visual analogue scale of five concentric circles where adolescents were asked to imagine the circles represented everything taking place at their school and then rate "how far from the centre of things" they are (Elliott & Voss, 1974); and (d) at age 15, participants were also asked about having someone to talk to if they "had a problem or felt upset about something" (yes/no). (2) *Participation in clubs and groups* at age 15 and 18 years: participants were asked "Do you belong to any organized clubs or groups or activities outside school—for example, scouts,

gym, soccer, cricket, music, or ballet?" Responses were recorded verbatim (McGee et al., 2006) and classified as either participation in cultural and youth groups (ages 15 and 18), or participation in sporting groups (age 18).

(3) *Self-perceived competencies* were assessed at age 15 and 18 years using the Strengths scale completed by the adolescent participant (22 items) and the parent/significant other (18 items) (Williams & McGee, 1991). The scale was developed from Dunedin Study data collected during childhood and early adolescence and administered at ages 15 and 18. It included yes/somewhat/no answers to items like being "confident" and "good with pets and animals". (4) *Life satisfaction* at age 18 as indicated by (a) satisfaction for life as a whole; (b) satisfaction with activities engaged with in spare time; (c) getting on with people; and (d) happiness with the future, each scored on a 4-point Likert scale ranging from 1 = "very unhappy" to 4 = "very happy".

2.3 | Analyses

Standardization: Three of the constructs used in the analyses were comprised of multiple variables at different ages of assessment: (a) adolescent academic achievement (four items/variables across ages 15 and 18, (b) adolescent wellbeing (15 items/variables at ages 15 and 18) and (c) childhood socioeconomic disadvantage (four variables; averaged from birth to age 9. In order to standardize the adolescent academic achievement and wellbeing variables, each scale or item that contributed to the construct was calculated as the Proportion of Maximum Percentage which rescales scores to between zero and 100, with 100 equating to the maximum possible score on each scale (POMP; Cohen et al., 1999). Mean POMP score across all items of each of the two constructs were used as predictor variables (see Table 1). Higher POMP scores indicated higher academic achievement and greater wellbeing, whereas higher scores on the childhood disadvantage measure indicated greater socioeconomic disadvantage.

A series of hierarchical linear regression (for continuous outcomes) and logistic regression (for the binary HOME outcome) analyses were used. After entering covariates, including adolescent psychological wellbeing (model 1), adolescent academic achievement was entered in a second step to determine whether it added significantly to the prediction of the dependent parenting outcome (model 2). Whereas step 2 tested the primary hypothesis, a series of 3 additional steps (a, b, c) addressed the empirical questions of whether academic achievement interacted with sex of the parent, child's behaviour and parent's adolescent wellbeing in predicting each of the parenting outcomes. All analyses were completed in Stata 16.1 (StataCorp, 1985-2019).

3 | RESULTS

Table 1 contains means (SD) for the outcome variables and covariant (both concurrent and composite) variables used in the models for parenting and HOME score groupings (upper four quintiles vs. lowest 20%). Note that very little negative parenting and child negativity were observed in the video-taped parenting tasks.

As can be seen in Table 2, net of all covariates, higher adolescent academic achievement predicted more positive and less negative parenting adding 1% to the variance accounted for both outcomes over and above that accounted for by covariates (see Model 2 for both outcomes). Turning to the tests of the 2-way interactions, neither parent sex (Model 3a), child behaviour (Model 3b) nor adolescent wellbeing (Model 3c) moderated the effect of adolescent achievement for positive parenting. However, for negative parenting, the results proved different with regard to the moderating effect of parent sex (Model 3a). Specifically, when the sample was separated by sex, adolescent academic achievement was associated with less negative parenting in women (Model 2 academic achievement $\beta = -0.18$, $p = 0.001$) and contributed significantly to the explanatory power of the model ($p = 0.001$, $R^2 = 0.23$). Among men, this association was not statistically significant ($\beta = -0.09$, $p = 0.165$) and Model 2 did not account for significantly more variance in the outcome than Model 1 ($p = 0.165$ for the change in R^2 for Model 2). Associations between

TABLE 2 Summary of hierarchical linear regression analysis for variables predicting positive and negative parenting ($n = 665$).

	Positive parenting		Negative parenting	
	Model 1	Model 2	Model 1	Model 2
Variable	Standardized β	Standardized β	Standardized β	Standardized β
G2 adolescent wellbeing	0.16***	0.13**	−0.09*	−0.06
G2 sex	−0.09**	−0.08*	−0.09*	−0.11**
Average SES from G2's birth to age 9	−0.13***	−0.08*	0.16***	0.11**
G3 behaviour	−0.31***	−0.31***	0.27***	0.27***
G2's age at G3's birth	0.12**	0.09*	−0.13***	−0.10**
G2 adolescent academic achievement		0.13**		−0.13**
R^2	0.20	0.21	0.18	0.19
F for change in R^2	33.19***	10.03**	28.47***	10.20**

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

TABLE 3 Summary of hierarchical logistic regression analysis for variables predicting higher home scores ($n = 636$).

	Model 1			Model 2		
Variable	OR	95% CI		OR	95% CI	
G2 adolescent wellbeing	1.04**	1.02	1.06	1.03**	1.01	1.06
G2 sex	0.68	0.43	1.09	0.75	0.46	1.21
Average SES from G2's birth to age 9	0.77*	0.61	0.96	0.85	0.67	1.08
G2 positive parenting	1.07**	1.02	1.13	1.07**	1.02	1.12
G2 negative parenting	0.36**	0.17	0.74	0.37**	0.18	0.77
G2's age at G3's birth	1.14***	1.09	1.19	1.12***	1.08	1.17
G2 adolescent academic achievement				1.02**	1.00	1.03
Pseudo R^2	0.21			0.22		
Wald χ^2	100.19***			6.85*		

*$p < 0.05$.**$p < 0.01$.***$p < 0.001$.

negative parenting and academic achievement were not moderated by child behaviour (Model 3b) or adolescent wellbeing (Model 3c).

Higher adolescent academic achievement also predicted greater likelihood of a top 20% HOME score, adding 1% of variance over and above covariates (Model 2, Table 3). Turning to the 2-way interactions, neither parent sex (Model 3a) nor child behaviour (Model 3b) moderated the effect of adolescent academic achievement for this outcome, but adolescent wellbeing did (Model 3c, $p = 0.001$). Figure 1 plots the slope of adolescent academic achievement against +1.0 and −1.0 SDs of adolescent wellbeing. Figure 1 indicates that for those with lower wellbeing in adolescence, increasing academic achievement did not have a significant influence on the probability of having higher HOME scores. In contrast, among those with higher wellbeing in adolescence, increasing academic achievement also increased the probability of higher HOME scores.

Finally, with regard to the covariates, higher adolescent wellbeing, higher childhood SES, being older at the time of G3s birth, and more positive child behaviour were all associated with more positive and less negative parenting,

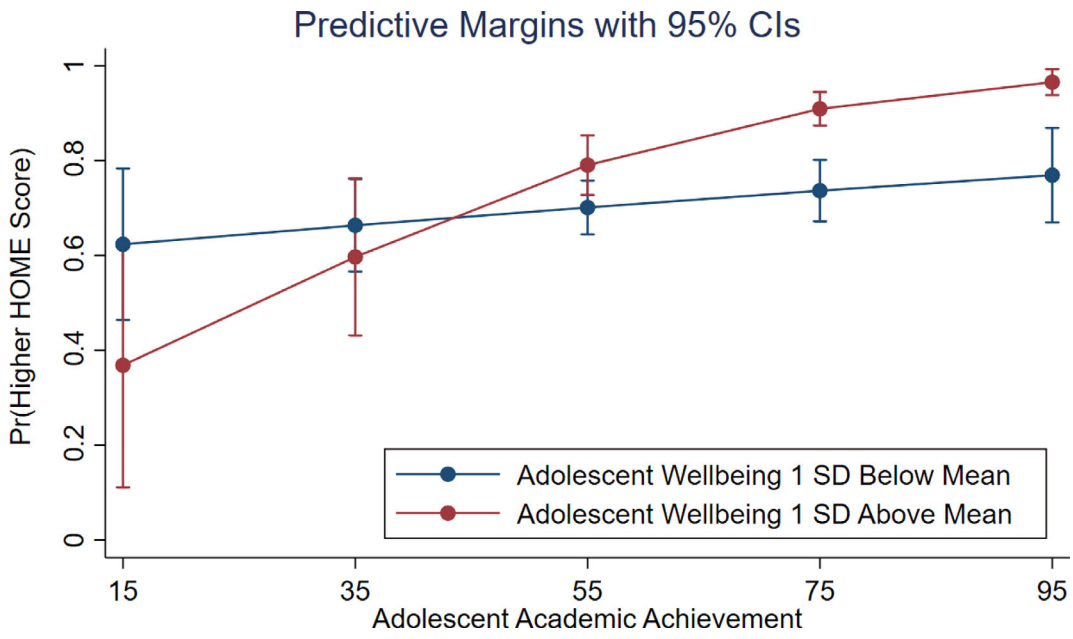

FIGURE 1 Adolescent wellbeing (±1 SD of the mean) plotted as a function of adolescent academic achievement in relation to the probability of having a higher Home Observation for Measurement of the Environment score.

while being female was associated with both more positive and more negative parenting (see Table 2). With regard to HOME scores, higher wellbeing scores, more positive and less negative parenting, and older age of parenting were all associated with a greater likelihood of higher HOME scores (Model 1, Table 3). Higher childhood SES also predicted higher HOME scores, but not once adolescent academic achievement was added to the model (Model 2, Table 3).

4 | DISCUSSION

The findings indicate that higher adolescent academic achievement forecasts more positive and less negative parenting of three-year old children as well as a more positive home environment. This association is independent of other well-established predictors of parenting, such as adolescent wellbeing, the experience of childhood disadvantage, age of parent, and the concurrent behaviour of the child being parented. It is noteworthy that the predictive power of adolescent achievement emerged in the case of both mothers and fathers for positive parenting, although adolescent academic achievement was not associated with fathers' negative parenting.

The effect sizes were modest, such that, for example, a small in increase in academic achievement (of 1% in POMP score) was associated with a 2% increase in the odds of having a high HOME score. It is important to appreciate that these effect sizes are not dissimilar to those of adolescent wellbeing in the current study and to those of many other putative life-course influences on parenting (e.g., Chen, Chen et al., 2008; McAnally et al., 2021; Morawska et al., 2009). Furthermore, at a population level, even small effect sizes can have an important influence on wellbeing, especially when considering complex outcomes such as parenting where the influence of positive effects may also accrue over time (Götz et al., 2021).

While the findings of the current inquiry proved broadly similar to previous research linking more education to more positive parenting and home environments (e.g., Dearing & Taylor, 2007; Morawska et al., 2009), the novelty of this research should not be ignored. Here, we are referring not just to controls for concurrent child behaviour in

the prediction of observed parenting (in videotapes), but perhaps more significantly, for adolescent wellbeing—which was itself positively and significantly correlated with academic achievement, as anticipated ($r = 0.32$). Thus, both academic achievement and wellbeing have independent and positive consequences for future parenting (Altaras Dimitrijević et al., 2018; McAnally et al., 2021).

As in previous work with this sample (Belsky et al., 2012), these childhood and adolescent behaviours and experiences captured more variance in mothers' parenting than fathers' parenting. It is possible that the method of assessing parenting behaviour and the timing of assessments are less effective in capturing the variation in fathers' parenting. Indeed, perhaps mothers manifest more positive and less negative behaviour because they are more likely than fathers to participate in the kinds of activities that we created to observe parenting. We do not know whether achievement effects in the case of fathers might have proven stronger had other interactional activities been observed (e.g., a competitive game) or had observations been made when children were older and when many fathers tend to be more involved with their offspring.

Improving school bonding may improve the academic performance of adolescents (Tomasik et al., 2019). Our findings indicate that wellbeing in adolescence (which includes attachment to school independently of academic achievement) also supports more supportive parenting. The conclusion from this and other work is that interventions to improve education outcomes among secondary school students would appear to have positive effects throughout the life course, but that efforts should include socioemotional as well as academic competence (Aldridge et al., 2019; Tomasik et al., 2019).

Strengths of this research include prospective data collection from a population-based cohort with consistently high follow-up rates for over 45 years and a high rate of G2 participation from parents with three-year olds. Two different approaches to measuring parenting were used and both included observational data. Finally, a set of covariates relevant to parenting were included to assess effects of achievement after discounting their predictive power. We further note that due to the longitudinal nature of the data collected, we were able to use prospective measures as well as measures that were averaged over significant parts of the life-course. This is particularly important in the case of SES where measures of socioeconomic status may be less stable at certain points of the life-course (e.g., when starting a family) than they are on average across the life-course. Furthermore, given that age of parenting and SES are associated (younger parents typically report lower SES), having prospective measures of SES helps removes some of the confounding present in these associations.

In a similar vein, although some members of the DS cohort had children young, the vast majority had completed secondary school by the time they became parents. Thus adolescent academic achievement serves as a predictor of parenting without confounding (for example) delays in parenting due to undertaking apprenticeships or tertiary education with age of parenting. Secondary school education is also more standardized than post-secondary educational opportunities so, in this respect, may better capture variation within a population in a different way than measuring the quantity of education undertaken across the life-course does. It is also likely that success at school predicts future success, although whether it is personal perception of success or objective academic success that drives this is unclear (both contributed to the current measure of academic achievement). It should be noted that previous research with this sample (Olsson et al., 2012) found that adolescent academic achievement was a weaker contributor to adulthood happiness than adolescent wellbeing, but both independently contributed to this outcome. It may be that positive development in adolescence across a variety of domains has additive positive effects on outcomes in adulthood, including parenting.

Limitations to the research include the fact that the regional population that families were drawn from have a lower proportion of Māori and other ethnicities than the wider New Zealand population; nevertheless, they are comparable to many other OECD populations where people of European descent form a majority. A small number ($n = 24$) of participants in the parenting study were excluded from analyses due to missing variables. Another limitation was that the sample had very high HOME scores, indicating that this measure may lack sufficient sensitivity to adequately assess differences among households (Dearing & Taylor, 2007). It is also probable that other factors, including executive function and personality, play a role in determining parenting, although such factors are also

likely to be associated with the determinants used in the present work. Despite these limitations, data spanning up to 45 years were available for over 600 parents, with similar numbers of mothers and fathers making this one of the most long-term and comprehensive studies of the antecedents of parenting behaviour to date.

5 | CONCLUSIONS

In conclusion, we found that greater adolescent academic achievement predicted more positive and less negative parenting, and the provision of a more developmentally supportive home environment. These associations are independent of many known predictors/correlates of parenting. This illustrates the key importance adolescence as a developmental period and highlights that positive development across multiple domains during this critical period should be a focus of further research. Adolescence also represents a time when interventions to promote wellbeing and maintain school success and engagement could be implemented at a population level through schools. Our findings add to growing evidence that such interventions may have long-term beneficial effects, not just for the adolescents themselves, but also for their adult lives and for their future children.

AUTHOR CONTRIBUTIONS

H. M. McAnally: Conceptualization; formal analysis; writing – original draft; writing – review and editing. **E. Iosua:** Formal analysis; writing – review and editing. **J. Belsky:** Conceptualization; formal analysis; writing – original draft; writing – review and editing. **J. L. Sligo:** Data curation; investigation; methodology; writing – review and editing. **P. Letcher:** Formal analysis; writing – review and editing. **C. J. Greenwood:** Formal analysis; writing – review and editing. **E. Spry:** Writing – review and editing. **K. C. Thomson:** Writing – review and editing. **J. A. Macdonald:** Writing – review and editing. **A. E. Bolton:** Writing – review and editing. **C. A. Olsson:** Funding acquisition; writing – review and editing. **R. J. Hancox:** Funding acquisition; supervision; writing – original draft; writing – review and editing.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT

However, the conditions surrounding consent mean that data sharing is not permitted.

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