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Home learning environment and parental characteristics of high- and low-achieving pupils in Ireland: Evidence from PIRLS 2021and TIMSS 2023

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Abstract

Home is where many children first engage in experiences that support the development of their educational skills. Understanding the role of the home learning environment and parental factors is therefore key for informing educational policies. This study examines factors associated with the achievement of 10- and 11-year-old pupils using data from two international large-scale assessments that took place in Ireland: PIRLS 2021 and TIMSS 2023. Pupils in the highest- and lowest-achieving quartiles in each study were compared across parental factors (education level and educational expectations) and home environment factors (socioeconomic status and early literacy and numeracy activities). Results showed that more high-achieving pupils had parents who reported attaining a higher education level. Across groups, parents' expectations for their children's education were generally similar to, or higher than, their own education level. Pupils from homes with higher socioeconomic status were more likely to be high-achieving. These findings contribute to the current research and emphasise the importance of the home learning environment and parental factors in shaping educational policy and strategies in Ireland.

Keywords: Home learning environment, parental characteristics, low achievement, high achievement, PIRLS, TIMSS

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It has long been recognised that parents and the home environment play a vital role in the development of children's skills in academic domains such as reading, mathematics, and science (O'Toole et al., 2019). Home is where many children first engage in activities and play that support the development of these skills before formal education begins (Benner et al., 2016; Lehrl et al., 2020). As children's first educators, parents can shape children's interest in learning and their engagement with education in many ways (O'Toole et al., 2019; Silinskas et al., 2020). Aspects of the home environment, such as parents' educational background and the frequency with which they engage in learning activities at home, help to create a child's first educational environment and lay the foundations for later attitudes towards learning and educational success (Boonk et al., 2018).

Examining these factors is particularly important for diverse learners, including children who are lower- and higher-achieving. Research suggests that these learners often have distinct needs and may require different forms of support to thrive academically (Pitsia, 2022; Pitsia et al., 2024). The long-term outcomes associated with low achievement can be restrictive, including lower educational attainment as well as lower income and socioeconomic status. By contrast, higher-achieving pupils are more likely to progress further in their education and achieve a higher occupational status. However, such positive outcomes are only possible if children who have the potential to be high achievers are recognised early and receive the support needed to move from potential to actual outcomes.

This paper is organised as follows: first, relevant research on parental factors and the home learning environment is reviewed. Next, the methods used to analyse the selected variables are described, followed by the presentation of the results. Finally, the findings are discussed in light of the existing literature, with particular attention to both high- and low-achieving pupils.

Literature Review

Parental characteristics

Parents' educational background

As parents are tasked with guiding their child's education and creating a learning environment at home, their own education has been found to be a key factor in this and has been found to have a significant and positive association with pupils' academic achievement (Hemmerechts et al., 2017). Pupils whose parents have a higher education level are more likely to attain a higher level of education themselves (Hidayatullah & Csíkos, 2024). Parental education is linked to pupils' achievement both directly and indirectly. Directly, parents with a higher education level may be more willing to support or engage actively in their child's learning (for example, by providing resources and

spending time reading or playing together), and may feel more confident in doing so (Silinskas et al., 2010). Indirectly, parents' education level may affect how they structure the home learning environment, and how they themselves view education. This can, in turn, shape how they interact with their child and support their educational progress (Davis-Kean, 2005).

Parents' educational expectations

In addition to education, parents' expectations for their child's education are an integral component of parental involvement in education that is positively associated with achievement (Fan & Chen, 2001; Gilleece, 2015; Kennedy & Shiel, 2022; Piccio et al., 2025; Smyth et al., 2010). Research suggests that high parental educational expectations can lead to more support in the form of resources or assistance, which can in turn foster an environment for high achievement (Davis-Kean, 2005). However, it is important that such support is provided with an open mind to how pupils are developing in their learning. Gilleece (2015) suggests that parents' expectations can be cyclical, with parents basing their expectations on children's current level of achievement and offering support in line with their child's perceived needs. Regularly evaluating their expectations would be advisable for parents, as their expectations can shape pupils' academic outcomes (Kennedy & Shiel, 2022). This is particularly relevant for children who are higher- or lower-achieving and require additional support. Parental educational expectations have been found to be important for children's outcomes independently of the parents' education level (Gilleece, 2015), or current socioeconomic status (Smyth et al., 2010; Tan, 2015). In fact, Smyth et al. (2010) reported that in Ireland many parents expected their child to achieve a third-level education, regardless of their own educational background. Yet, as Thomas and Strunk (2017) note, the direct role of parental expectations in children's outcomes is largely unexplained. Although these expectations can operate independently of other factors, they are still situated within the wider home learning context.

Home environment

Socioeconomic status

Family socioeconomic status is a significant contributor to achievement, with many studies suggesting that it has a positive relationship with achievement in subjects such as mathematics, reading, and science (Delaney et al., 2023; McHugh et al., 2024; Organisation for Economic Co-operation and Development [OECD], 2018; Piccio et al., 2025; Pitsia, 2022). Generally, family socioeconomic status can be measured by a number of factors, such as income, social class, and occupation, as well as resources in the home.[1] Family socioeconomic status has been found to be such a strong predictor of achievement that their association remains evident even when other aspects of

1 International bodies such as the International Association for the Evaluation of Educational Achievement (IEA) and the OECD measure levels of parental education, occupation, and home resources/possessions (e.g., books in the home) to determine family socioeconomic status in their international assessments (Mullis et al., 2023; OECD, 2023).

a child's life are accounted for (Pitsia, 2022). Yet, although the relationship of family socioeconomic status with achievement has been found to be very strong, strategies aimed to narrow any existing achievement gaps for children at different socioeconomic levels have been difficult to realise (Kennedy & Shiel, 2022).

Educational support in early years

Children's academic outcomes have also been shown to be strongly associated with their and their parents' involvement in early educational activities (Hoover-Dempsey et al., 2001; Sénéchal, 2006; Sénéchal & LeFerve, 2002). Studies have suggested that engaging in educational activities (e.g., reading together, playing word games, or playing with counting toys) (Mullis et al., 2023), can create a strong foundation of understanding and increase positive learning outcomes in the future (Manolitsis et al., 2013; Meinck et al., 2018). Such foundations give pupils a certain level of knowledge when they start school (Clerkin & Gilligan, 2018; Cui et al., 2021; Hwang, 2020; van Tonder et al., 2019), which can reduce the likelihood of lower achievement (Crespo et al., 2019). These early interactions can also be beneficial for parents, as they can then adapt their guidance once they have observed how their child learns. This flexibility can continue into formal education, with parents adapting to pupils' academic levels, and being able to offer support at home when they need it (Silinskas et al., 2010). This, in turn, is a great advantage to children who are either struggling to achieve, or striving to reach their potential.

Low- and high-achieving pupils

Pupils in Ireland have, internationally, performed very well overall in assessments of literacy and achieve above average scores for mathematics and science (Clerkin & Delaney, 2025). Although this positive performance is commendable, pupil achievement in these subjects can be seen in a different light when examined in terms of internationally agreed benchmarks (i.e., levels of proficiency). In Ireland, there is a growing gap in pupil outcomes at the upper and lower tails of the distribution in subjects such as mathematics and science, according to the most recent TIMSS assessment in 2023 (McHugh et al., 2024). Significant increases were found in the percentage of pupils attaining the higher benchmarks, while there were significant declines in pupils reaching the lower benchmarks (the minimal level of proficiency) (McHugh et al., 2024). Although the improvement in pupil performance at the higher proficiency level is welcome, the broadening gap between higher- and lower-achieving groups is cause for concern. In literacy, Ireland has among the highest proportions of pupils reaching the highest benchmarks of all participating countries, with this proportion increasing over time (Delaney et al., 2023). Although this trend is encouraging, the focus for policymakers nationally should be to ensure that more pupils reach the higher levels of achievement, while supporting those at risk of remaining at lower proficiency.

Previous studies on achievement have used these international benchmarks to categorise pupils into groups. Another approach is to examine achievement by quartiles, which can give a more nuanced viewpoint that can be both country- and subject-specific, an aspect that could be overlooked by using international benchmarks. In addition, previous research on the performance of higher and lower achievers in mathematics, science, and reading has usually focused on each subject separately. However, it is important to look at all three subjects together, as they are the foundations for a broad and competent educational underpinning. Furthermore, there has been a concerted drive in recent years to promote the develop of literacy and numeracy skills in Ireland, as well as heightened interest in science, technology, engineering, and mathematics (STEM) education (Pitsia, 2022). Examining the home learning environment of both groups of learners – those at the upper and lower ends of the distribution – in these subjects can help to compare and contrast their experiences. In doing so, insights can be found for both higher- and lower-achieving pupils, who will require different needs and supports to help them succeed in learning (Pitsia et al., 2024).

Current educational policy in Ireland

In Ireland, national policy frameworks have traditionally placed strong emphasis on the role of parents and the home learning environment in supporting children's learning. Key examples include the Primary Curriculum Framework (Department of Education, 2023), and the Literacy, Numeracy and Digital Literacy Strategy (2024-2033) (Department of Education, 2024). Both recognise that learning extends beyond the classroom and that meaningful parental engagement can help to create home environments that foster learning. The Literacy, Numeracy and Digital Literacy Strategy builds on the aims of its predecessor by continuing to promote targeted strategies to enhance learning in reading and mathematics. The revised strategy focuses specifically on supporting diverse learners. This includes ensuring that high achievers remain appropriately challenged, while also supporting those who are educationally disadvantaged or at risk of lower achievement.

The Delivering Equality of Opportunity in Schools (DEIS) programme specifically focuses on providing support to pupils and schools in socioeconomically disadvantaged areas (Department of Education and Skills, 2017). As socioeconomic disadvantage has been found to be a significant factor for learning in Ireland, schools within the DEIS programme are able to use a number of supports and resources to enhance learning. The Home School Community Liaison (HSCL) scheme, in particular, available to DEIS schools, focuses on the relationship between school and home with school coordinators working with parents to improve children's educational outcomes. Building communication between schools and parents can be crucial because it can provide schools with valuable insight into the home environment. This may be

particularly beneficial for those who are struggling to achieve, as well as for those who are not being challenged enough educationally (Gilleece et al., 2010).

It is encouraging that both low- and high-achievers are included in current national strategies. Yet, as policy and practice continue to evolve, a more nuanced understanding of parents' involvement and the home learning environment can give further insights into how current supports can be strengthened and more effectively targeted for pupils across the achievement spectrum.

Aim of the study

The aim of this study is to build profiles of the highest- and lowest-achieving pupils in Ireland across three core subject areas (mathematics, reading, and science), using data from the Progress in International Reading Literacy Study (PIRLS) 2021 and the Trends in International Mathematics and Science Study (TIMSS) 2023 and focusing on their home learning environments. The study seeks to identify patterns, similarities, and differences between these groups of pupils with regards to a range of home-related factors. In doing so, it aims to provide a clearer understanding of how the home learning environment may be associated with high and low achievement across subjects.

Methodology

Data

Data for this study was sourced from two IEA international large-scale assessments: PIRLS 2021 and TIMSS 2023. PIRLS is an international study that assesses the reading literacy of nationally representative samples of Grade 4 students.[2] TIMSS assesses the mathematics and science achievement of nationally representative samples of Grade 4 and Grade 8 students internationally.[3] Achievement in both studies is reported on a scale with a centrepoint of 500 (corresponding to the international average from the first cycle of each study) and a standard deviation of 100.[4] In both PIRLS 2021 and TIMSS 2023, pupils were asked to complete both the assessments and a Pupil Questionnaire, while pupils' parents/guardians were asked to complete a Home Questionnaire. These questionnaires gathered information on topics such as demographic background, home resources, learning practices at home, and related aspects of pupils' home learning environments.

2 For PIRLS 2021 in Ireland, pupils in Grade 5 were assessed rather than Grade 4, as testing was delayed by six months from spring 2021 to autumn 2021 due to the onset of the COVID-19 pandemic. As a result, pupils were six months older than those who participated in previous PIRLS cycles in Ireland as well as those who took part in TIMSS 2023.

3 Only Grade 4 data for TIMSS 2023 in Ireland was used for the analysis in this paper.

4 In TIMSS, mathematics and science achievement are reported on scales with a centrepoint of 500 and a standard deviation of 100. Although both scales use the same metric, they are constructed independently and should be considered separate measures.

Data from both PIRLS 2021 and TIMSS 2023 for Ireland were used in this study. The number of schools and pupils that took part in both studies in Ireland, and the percentages of pupils' parents/guardians who completed the Home Questionnaire, are shown in Table 1.

TABLE 1

Numbers of participating schools and pupils, and Home Questionnaire response rates in PIRLS 2021 and TIMSS 2023 in Ireland

Study	N Schools	N Pupils	Home Questionnaire Response Rate
PIRLS 2021	148	4,663	93%
TIMSS 2023	153	4,750	94%

Analysis of the data was conducted using the IEA IDB Analyzer. Separate achievement quartiles were created for each subject (reading in PIRLS; mathematics and science in TIMSS), applying the appropriate sampling weights. Quartile cut-points were based on the weighted achievement score distributions for each subject (0-25%, 25-50%, 50-75%, and 75-100%). Pupils in the highest 25% (Quartile 4 [Q4]) and lowest 25% (Quartile 1 [Q1]) were used for analysis. All five plausible values were taken into account in the estimation of achievement distributions and quartile ranges for both PIRLS and TIMSS.

Table 2 presents the overall mean achievement scores for pupils in Ireland in PIRLS reading and TIMSS mathematics and science. It also shows the score thresholds for the highest and lowest 25% of pupils for each subject. Pupils scoring below the lowest 25th percentile score are categorised as low-achieving, while those scoring above the highest 25th percentile score (i.e., those above the 75th percentile) are categorised as high-achieving.

TABLE 2

Overall mean reading, mathematics, and science achievement and scores used to identify high- and low-achieving pupils in PIRLS 2021 and TIMSS 2023 in Ireland

	Mean achievement	Score at the lowest 25% percentile (Q1)	Score at the highest 25% percentile (Q4)
PIRLS: Reading	577	532	629
TIMSS: Mathematics	546	495	604
TIMSS: Science	532	484	587

Selected variables

The variables from the PIRLS and TIMSS Pupil and Home Questionnaires used in the analysis are outlined in Table 3. For a full list of all component items used to create the scales, please see Table A.1 in the Appendix.

TABLE 3

List of variables selected for analysis from the PIRLS 2021 and TIMSS 2023 Pupil and Home Questionnaires

Variable/scale name	Source	Description
Parents' highest education level	PIRLS & TIMSS	Parents' reports on the highest level of education achieved
Parents' educational expectations	PIRLS & TIMSS	Parents' reports on how far they expected their child's education to go
Home Socioeconomic Status scale	PIRLS & TIMSS	Scale created from parents' responses on home resources, occupation, and education. Based on their scores on the scale, pupils are classified as having a 'higher', 'middle', or 'lower' socioeconomic status.
Early Literacy Activities scale	PIRLS & TIMSS	Scale created to measure how frequently parents carried out specific early literacy activities with their child before the first grade of primary school (e.g., tell stories, play word games). Based on parents' responses, pupils in PIRLS were categorised as having parents who 'often', 'sometimes', or 'never or almost never' engaged in early literacy activities. In TIMSS, pupils were categorised as having parents who 'very often', 'often', or 'sometimes' engaged in early literacy activities.
Early Numeracy Activities scale	PIRLS & TIMSS	Scale created to measure how frequently parents carried out specific early numeracy activities with their child before the first grade of primary school (e.g., write numbers, play with number toys). Based on parents' responses, pupils in PIRLS were categorised as having parents who 'often', 'sometimes', or 'never or almost never' engaged in early numeracy activities. In TIMSS, pupils were categorised as having parents who 'very often', 'often', or 'sometimes' engaged in early numeracy activities.

Results

The results below describe the parental characteristics and home learning environment of the highest-achieving (Q4) and lowest-achieving pupils (Q1) in PIRLS reading (2021), TIMSS mathematics (2023), and TIMSS science (2023). Notably, while both PIRLS and TIMSS data are reported in each table, each study was carried out at a different time,

with a separate cohort of participants. However, as both studies were completed within two years of each other, cautious comparisons may be made across PIRLS and TIMSS.

Parental characteristics

Parents' educational background and educational expectations

Table 4 shows the percentages of Q4 and Q1 pupils by parents' highest education level and educational expectations. Across all three subjects, more than two-thirds of Q4 pupils had parents who had achieved a university degree or higher, compared to around one-third of Q1 pupils. Significantly more Q1 pupils had parents who reported attaining lower levels of education, ranging from having no education to finishing secondary school only. Overall, the range of education levels was broader for Q1 pupils' parents, while Q4 pupils had parents who were more concentrated in the higher education levels for both PIRLS reading and TIMSS mathematics and science.

Looking at parental educational expectations, the majority of Q4 pupils across all subjects (84% to 89%) had parents who expected their child to attain a bachelor's degree or higher, while around half (49% to 54%) of Q1 pupils had parents also expecting this level. Significantly more Q1 pupils had parents who expected their child to complete a lower level of education, that is no more than secondary school. Around one-tenth of Q1 pupils had parents reporting this, compared to just 1% of Q4 pupils (Table 4).

TABLE 4

Percentages of high-achieving (Q4) and low-achieving (Q1) pupils by parents' highest education level and educational expectations in PIRLS 2021 and TIMSS 2023 in Ireland

		Parents' highest education level (%)			*Parents' educational expectations (%)*		
		Secondary or below	Post-secondary (non-tertiary/ short cycle)	Bachelor's degree or higher	Secondary or below	Post-secondary (non-tertiary/ short cycle)	Bachelor's degree or higher
PIRLS: Reading	Q4 (Highest)	6	22	72	1	10	89
	Q1 (Lowest)	**29**	**42**	**29**	**12**	**34**	**54**
TIMSS: Mathematics	Q4 (Highest)	7	26	67	1	15	84
	Q1 (Lowest)	**25**	**43**	**33**	**11**	**40**	**49**
TIMSS: Science	Q4 (Highest)	7	24	68	1	14	84
	Q1 (Lowest)	**24**	**41**	**35**	**10**	**37**	**53**

Note. Q1 percentages in **bold** are statistically significantly different at the .01 level from the corresponding Q4 percentages.

Home environment

Socioeconomic status

Table 5 presents the reported socioeconomic status of pupils. Marked differences were evident between Q1 and Q4 pupils across all subjects. More than two-thirds of Q4 pupils were categorised as belonging to higher socioeconomic status homes, compared with fewer than one-third of Q1 pupils. Q1 pupils were more likely to be classified as having middle or lower socioeconomic status, with significantly more Q1 pupils being of lower socioeconomic status across all subjects than Q4 pupils.

TABLE 5

Percentages of high-achieving (Q4) and low-achieving (Q1) pupils by socioeconomic status in PIRLS 2021 and TIMSS 2023 in Ireland

		Home Socioeconomic Status scale (%)		
		Lower	Middle	Higher
PIRLS: Reading	Q4 (Highest)	2	26	71
	Q1 (Lowest)	**21**	**55**	**24**
TIMSS: Mathematics	Q4 (Highest)	1	32	67
	Q1 (Lowest)	**19**	**52**	**29**
TIMSS: Science	Q4 (Highest)	1	28	70
	Q1 (Lowest)	**18**	**54**	**28**

Note. Q1 percentages in **bold** are statistically significantly different at the .01 level from the corresponding Q4 percentages.

Educational support in early years

Tables 6 and 7 present the percentages of Q4 and Q1 pupils by how frequently parents reported engaging in literacy and numeracy activities with their child during early childhood (prior to starting primary school). Although the component items used for these two scales remained the same across the two studies, reporting categories differed slightly due to a restructuring of the scales and how the categories were classified (see Tables 3 and A.1 for further information). In PIRLS, two-thirds of Q4 pupils had parents who reported that they often engaged in early literacy activities with their child. Although a substantial proportion of Q1 pupils (45%) also had parents who reported this level of engagement, this was still significantly lower than the percentage of Q4 pupils. The majority of Q1 pupils (54%) had parents who reported engaging in such activities sometimes. In TIMSS, roughly equal proportions of high-

achieving pupils (45% to 47%) had parents who reported engaging in early literacy activities either often or very often. Among low-achieving pupils, however, responses were more concentrated in the "often" category, with over half (56%) of pupils falling into this category in both subjects, a significantly larger proportion than among Q4 pupils.

TABLE 6

Percentages of high-achieving (Q4) and low-achieving (Q1) pupils by the frequency with which their parents engaged in early literacy activities in PIRLS 2021 and TIMSS 2023 in Ireland

		Early Literacy Activities scale (%)		
		Never or almost never	Sometimes	Often
PIRLS: Reading	Q4 (Highest)	0	34	66
	Q1 (Lowest)	**2**	**54**	**45**
		Sometimes	Often	Very often
TIMSS: Mathematics	Q4 (Highest)	7	47	45
	Q1 (Lowest)	**16**	**56**	**28**
TIMSS: Science	Q4 (Highest)	6	47	47
	Q1 (Lowest)	**16**	**56**	**27**

Note. Q1 percentages in **bold** are statistically significantly different at the .01 level from the corresponding Q4 percentages.

In PIRLS, significantly more Q4 pupils (61%) had parents who reported that they often engaged in early numeracy activities compared to 46% of Q1 pupils. Correspondingly, over half of Q1 pupils had parents who reported engaging in these activities sometimes, compared with 38% of Q4 pupils. A similar pattern was evident in TIMSS. The majority of Q4 pupils (61%) had parents who reported engaging in early numeracy activities very often. Among Q1 pupils, responses were more evenly divided between the "often" (44%) and "very often" (44%) categories. Although substantial proportions of low-achieving pupils fell into these categories, these were still significantly lower than the corresponding proportions for of Q4 pupils.

TABLE 7

Percentages of high-achieving (Q4) and low-achieving (Q1) pupils by the frequency with which their parents engaged in early numeracy activities in PIRLS 2021 and TIMSS 2023 in Ireland

		Early Numeracy Activities scale (%)		
		Never or almost never	Sometimes	Often
PIRLS: Reading	Q4 (Highest)	1	38	61
	Q1 (Lowest)	2	**52**	**46**
		Sometimes	Often	Very often
TIMSS: Mathematics	Q4 (Highest)	7	33	61
	Q1 (Lowest)	**13**	**44**	**44**
TIMSS: Science	Q4 (Highest)	7	35	57
	Q1 (Lowest)	12	**44**	**44**

Note. Q1 percentages in **bold** are statistically significantly different at the .01 level from the corresponding Q4 percentages.

Discussion

The results of this analysis offer insight into the home environment and parental characteristics of the highest- and lowest-achieving pupils in Ireland, using data from PIRLS 2021 and TIMSS 2023. Significant differences were evident in the parents' education level of high- and low-achieving pupils. Specifically, lower-achieving pupils had parents whose qualifications were more broadly distributed across education levels. In contrast, high-achieving pupils were more likely to have parents whose qualifications were more concentrated in the highest levels. This pattern is in line with research by Hemmerechts et al. (2017) and Hidayatullah and Csíkos (2024), which highlighted that pupils who have parents with higher education levels tended to achieve at higher levels themselves.

Parents' expectations for their child's educational pathway did not necessarily reflect their own levels of education, but were, to some extent, more positive. Across subjects, the majority of high-achieving pupils had parents who expected their child to get a bachelor's degree or higher. Among low-achieving pupils, this was also the case for reading and science, while in mathematics the proportion was slightly lower (49%).

This finding is consistent with Smyth et al. (2010), who found that parents in Ireland tended to have high academic expectations for their children. Notably, however, some low-achieving pupils had parents who expected them to complete a lower level of education. These expectations may reflect pupils' recent level of academic attainment and are in line with findings from Gilleece (2015), which suggest that parents sometimes pitch their expectations based on their child's previous performance.

There were marked differences in socioeconomic status between high- and low-achieving pupils. Across all three subjects, significantly more high-achieving pupils had a higher socioeconomic status than low-achieving pupils. This indicates substantial differences in the economic circumstances of the homes of low- and high-achieving pupils, which supports findings by Delaney et al. (2023) and Pitsia (2022), who identified socioeconomic status as a significant contributor to achievement and found that pupils who come from homes with a higher socioeconomic status tended to achieve higher. Although the findings are in line with previous research, it is surprising to see, when examined by achievement quartiles, how stark the differences are between the two achievement groups. Only a very small percentage of high-achieving pupils came from low socioeconomic status homes, in comparison to the much larger proportion of low-achieving pupils from such backgrounds. It is unclear whether this pattern reflects the comparatively small number of pupils from disadvantaged backgrounds who reach the highest levels of achievement, or whether it suggests that some pupils who have the potential to be high achievers are not receiving the support needed to reach their potential.

The findings for early literacy and numeracy activities are broadly consistent with previous research (Clerkin & Gilligan, 2018; Cui et al., 2021; Hoover-Dempsey et al., 2001; Hwang, 2020; Sénéchal & LeFerve, 2002), whereby higher-achieving pupils were significantly more likely to have parents who reported frequent engagement in early learning activities than lower-achieving pupils. Although the distribution of responses differed somewhat between studies, likely reflecting changes to the reporting categories, the overall relationship was consistent across subjects. Pupils in the highest achievement group were more likely to come from homes where parents reported greater involvement in early learning activities.

The findings allow broad profiles of lower- and higher-achieving pupils to be identified. Lower-achieving pupils were more likely to have parents with lower education levels, although these parents often held positive expectations for their child to reach either a similar or higher education level. They were also more likely to come from homes with lower or middle socioeconomic status and to have parents who reported less frequent engagement in early learning activities. Higher-achieving pupils tended to have parents with higher levels of education, who typically expected their child to

complete a similarly high level of education. They were also more likely to come from higher socioeconomic status homes and to have parents who reported more frequent engagement in early literacy and numeracy activities.

Limitations and future directions

A limitation of the present study relates to the level of analysis undertaken. The analysis focused on a descriptive examination of achievement quartiles and therefore provides a broad overview of patterns rather than a detailed account of the factors associated with high and low achievement. Future research could build on these findings by exploring these achievement groups in greater depth through multivariate analyses, such as binary logistic regression modelling. Although some variables were found to be associated with achievement when considered individually, these factors are unlikely to operate in isolation. Rather, there may be important interactions between parental characteristics, home learning environment, and socioeconomic circumstances. It would be valuable to examine the interplay of such variables within each achievement group. In addition to the home-related variables examined here, it would also be valuable to examine the role of school factors, such as DEIS status, which may give more insight into how school and home learning environments intersect, particularly for groups such as higher-achieving pupils from lower socioeconomic status homes or lower-achieving pupils from more advantaged backgrounds.

Conclusions

The findings from this paper shed light on the home environments in which pupils in Ireland are raised, and recognise the importance of such as a key aspect of education policy. Policies established in Ireland such as the Literacy, Numeracy and Digital Literacy Strategy (2024-2033) (Department of Education, 2024) emphasise the importance of engaging with parents to continue children's education at home. In doing so the focus can be on how to support parents in their roles as educators and the importance of the partnerships between schools and parents. Parents are in the valuable position of being able to spend time with children, express their views on subjects, and hand down skills, carrying more influence for children than others in their lives (Thomas & Strunk, 2017). Parent-school partnerships would be highly beneficial as a way to prioritise communication and engagement with parents in identifying pupils who may be lower- or higher-achieving, particularly for those from lower socioeconomic backgrounds, so that supports can be put in place to encourage or challenge pupils as needed. Nationally, programmes such as DEIS have acknowledged the importance of building the relationships between schools and parents to help with pupil outcomes through initiatives like the HSCL scheme.

The findings here showed little difference in the home environment of pupils who achieved higher or lower in any of the selected subjects, confirming that the home environment is key to learning in general rather than being subject specific. Therefore, efforts to engage and inform parents about diverse learners in general, rather than for specific subjects, could be the focus of future frameworks. There has been recent movement in national policy to acknowledge both low and high achievers more clearly, and a focus on supporting those who are particularly low achievers. However, as Shiel and Pitsia (2022) noted, in practice, efforts may be focusing mainly on raising average performance and helping those who are lower achievers, while leaving less support for those potential high achievers. A beneficial next step would be to build on recent national policy by creating practical frameworks and tasks that can be implemented in schools nationwide to work with parents. Enabling parents and educational practitioners to work together to identity and engage with pupils who are either struggling to achieve, or who are not reaching their potential, could ensure all pupils in Ireland are able to achieve to the best of their ability.

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Appendix

TABLE A.1

Component items of scales selected for analysis from the PIRLS 2021 and TIMSS 2023 Pupil and Home Questionnaires

Scale name	Source	Component items
Home Socioeconomic Status scale	PIRLS & TIMSS	• Number of books in the home • Number of children's books in the home • Highest level of education of either parent • Highest level of occupation of either parent
Early Literacy Activities scale	PIRLS & TIMSS	Before your child started First Class, how often did you or someone else in your home do the following activities with them? (Response options: Often/Sometimes/Never or almost never) • Read books • Tell stories • Sing songs • Play with alphabet toys (e.g., blocks with letters of the alphabet) • Talk about things you had done • Talk about what you had read • Play word games • Write letters or words • Read aloud signs and labels
Early Numeracy Activities scale	PIRLS & TIMSS	Before your child started First Class, how often did you or someone else in your home do the following activities with them? (Response options: Often/Sometimes/Never or almost never) • Say counting rhymes or sing counting songs • Play with number toys (e.g., blocks with numbers) • Count different things • Play games involving shapes (e.g., shape sorting toys, puzzles) • Play with building blocks or construction toys • Play board or card games • Write numbers • Draw shapes • Measure or weigh things (e.g., when cooking)