

Institute for  
Fiscal Studies



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## Does when you are born matter?

14<sup>th</sup> March 2012, Institute of Education

# Motivation

- Children born at end of academic year have worse exam results, on average, than children born at start of academic year
  - Our previous work: August-borns are 5 percentage points (10%) less likely to achieve 5 A\*-C grades at GCSE than September-borns
- This matters because educational attainment is known to have long-term consequences for a range of adult outcomes
  - Probability of being in work
  - Wages
  - Health
  - Criminal activity
- But other skills and behaviours have long-term consequences too, and may also matter for children's wellbeing in the short-term...

# Motivation

- We identify the effect of month of birth on a range of skills, behaviours and experiences amongst young people growing up in England today
- Through the age at which children start school and sit academic tests – a child's month of birth may affect other outcomes
- For example, through the impact on attainment:
  - Enjoyment of school
  - Perseverance
  - Effort and peer group
    - Risky behaviours
- Or through other mechanisms:
  - Experience of bullying

# Existing literature

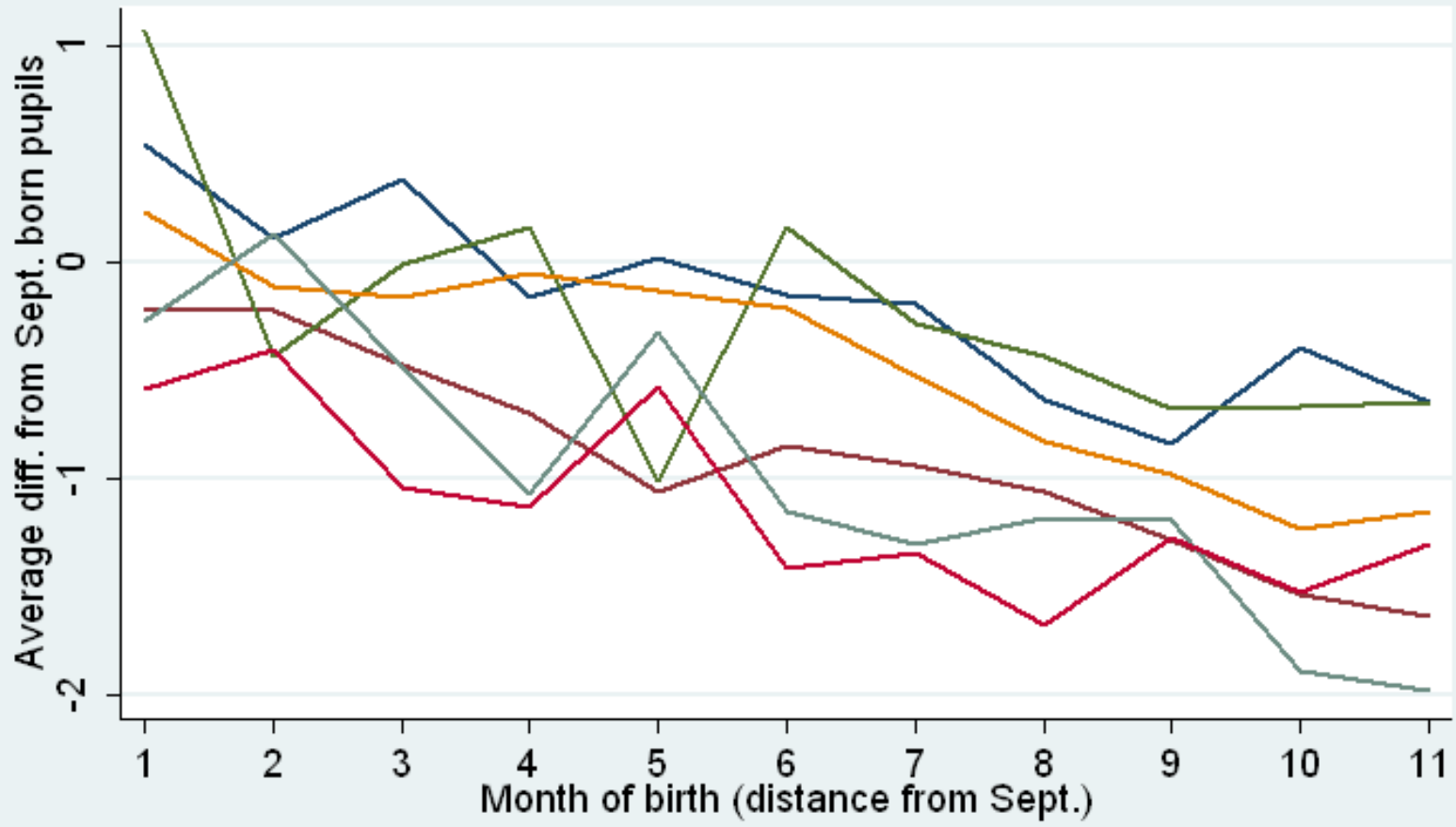
- Being the youngest in the academic cohort is associated:
  - Negatively with **attainment** (Crawford, Dearden & Meghir, 2007)
  - Negatively with **leadership** positions (Dhuey & Lipscomb, 2008)
  - Positively with **SEN** provision (Crawford, Dearden & Meghir, 2007)
    - Only present when assessed by teachers (Sharp, 1995)
  - Positively with the probability of being **bullied** (TellUs survey, DfE, 2010; PIRLS, Mühlenweg, 2010)

# Data

- Millennium Cohort Study (MCS)
  - Longitudinal study following around 18,500 children born in the UK around the millennium (we focus on approx. 12,000 born in England)
  - Interviews at 9 months, 3 years, 5 years and 7 years to date
- Avon Longitudinal Study of Parents and Children (ALSPAC)
- Longitudinal Study of Young People in England (LSYPE)

# Data

- Millennium Cohort Study (MCS)
- Avon Longitudinal Study of Parents and Children (ALSPAC)
  - Longitudinal study following the children of around 14,000 pregnant women whose due date fell between 1 April 1991 and 31 December 1992, who were resident in the Avon area of England at that time
  - Surveyed via high frequency postal questionnaires; children also take part in clinic sessions during which they undertake a range of tests
- Longitudinal Study of Young People in England (LSYPE)



# Data

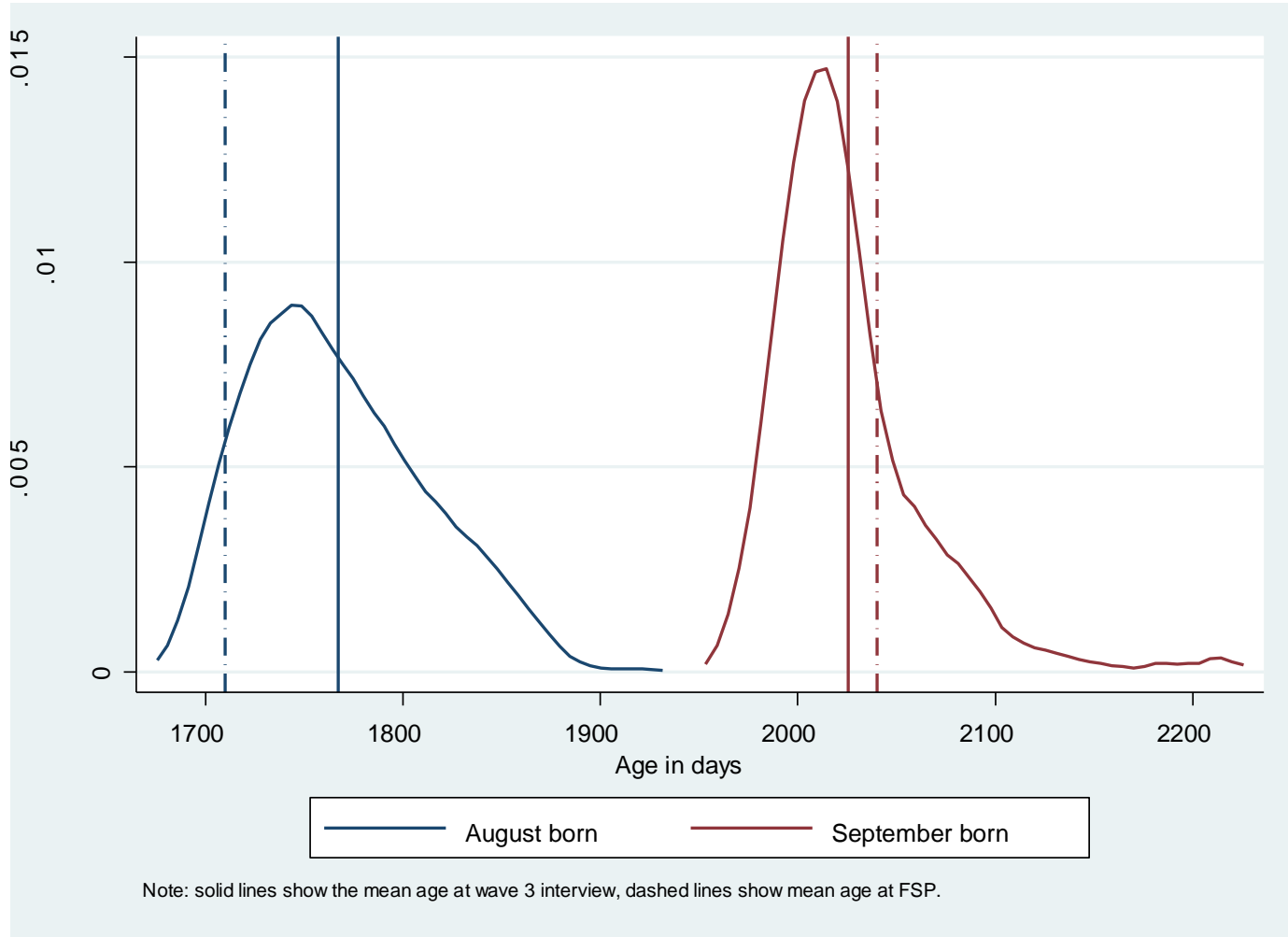
- Millennium Cohort Study (MCS)
- Avon Longitudinal Study of Parents and Children (ALSPAC)
- Longitudinal Study of Young People in England (LSYPE)
  - Longitudinal study following around 16,000 young people in England who were in Year 9 (aged 13/14) in 2003–04
  - Data collected annually, with information up to age 18/19 available



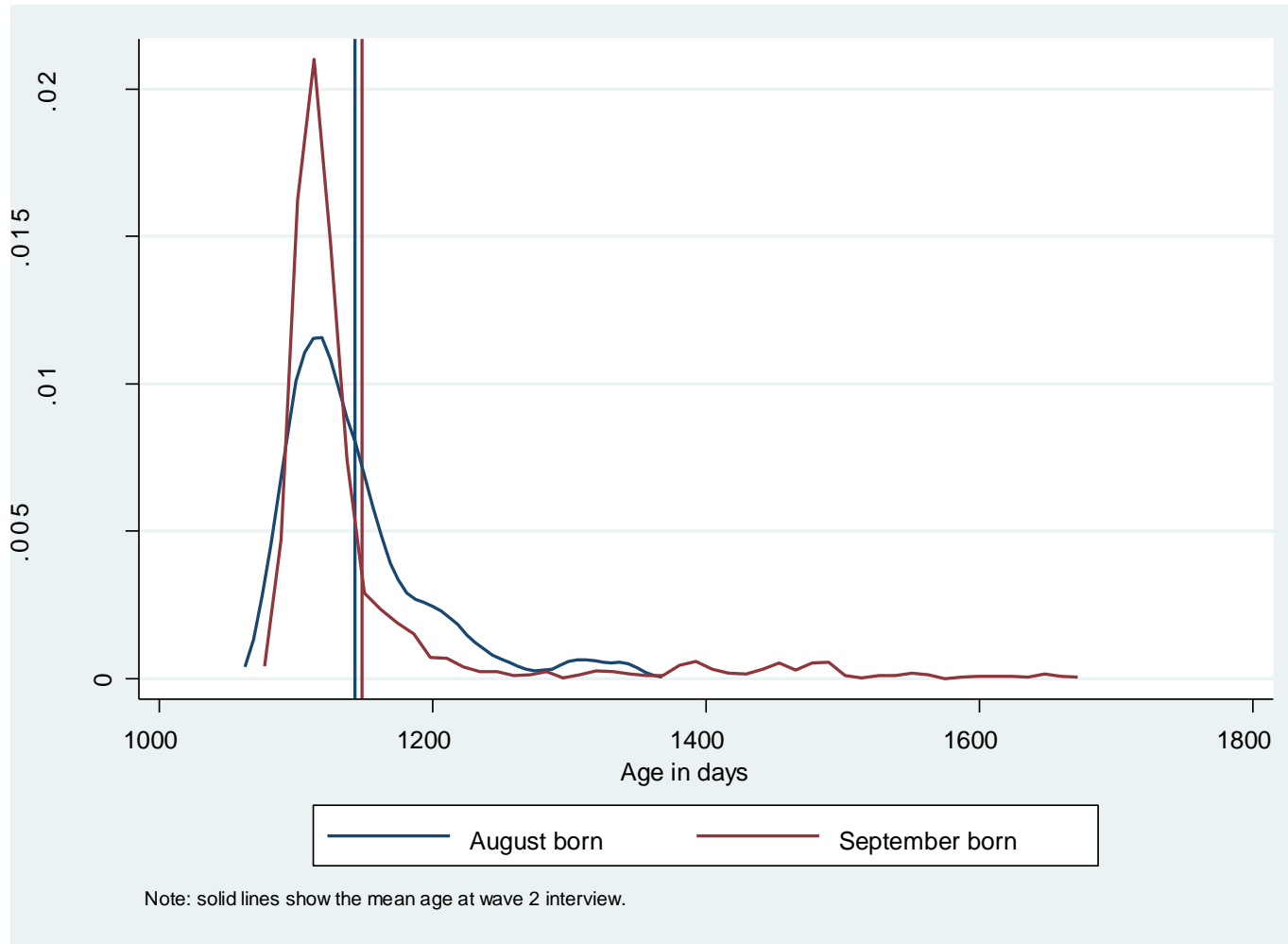
# Methodology

- Simple regression models, including:
  - **Month of birth:** entered using a series of binary variables indicating whether or not a child was born in a particular month; here we focus on the effect of being born in August relative to September
  - **Month of interview:** entered linearly; included to recreate the scenario in which all survey outcomes are recorded on the same day, as is the case for national achievement tests
  - **Individual and family background characteristics:** included to ensure that the children we compare are as similar as possible
    - e.g. gender, ethnicity, parent's education and socio-economic status, etc

# Methodology: month of interview



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# Outcomes presented today

- Academic and cognitive skills and behaviours
- Non-cognitive skills and behaviours

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- Academic and cognitive skills and behaviours
  - National achievement test scores;
  - Other measures of cognitive skills, e.g. British Ability Scale test scores;
  - Post-compulsory education participation decisions;
  - Parent, teacher and child perceptions of academic ability.
- Non-cognitive skills and behaviours

# Outcomes presented today

- Academic and cognitive skills and behaviours
- Non-cognitive skills and behaviours
  - Children's perceptions of their own well-being, including whether or not they have been bullied;
  - Parent and teacher perceptions of children's socio-emotional development;
  - Children's engagement in a range of risky behaviours;
  - Whether parents respond differently to children born in different months of year, e.g. in terms of child's home learning environment.

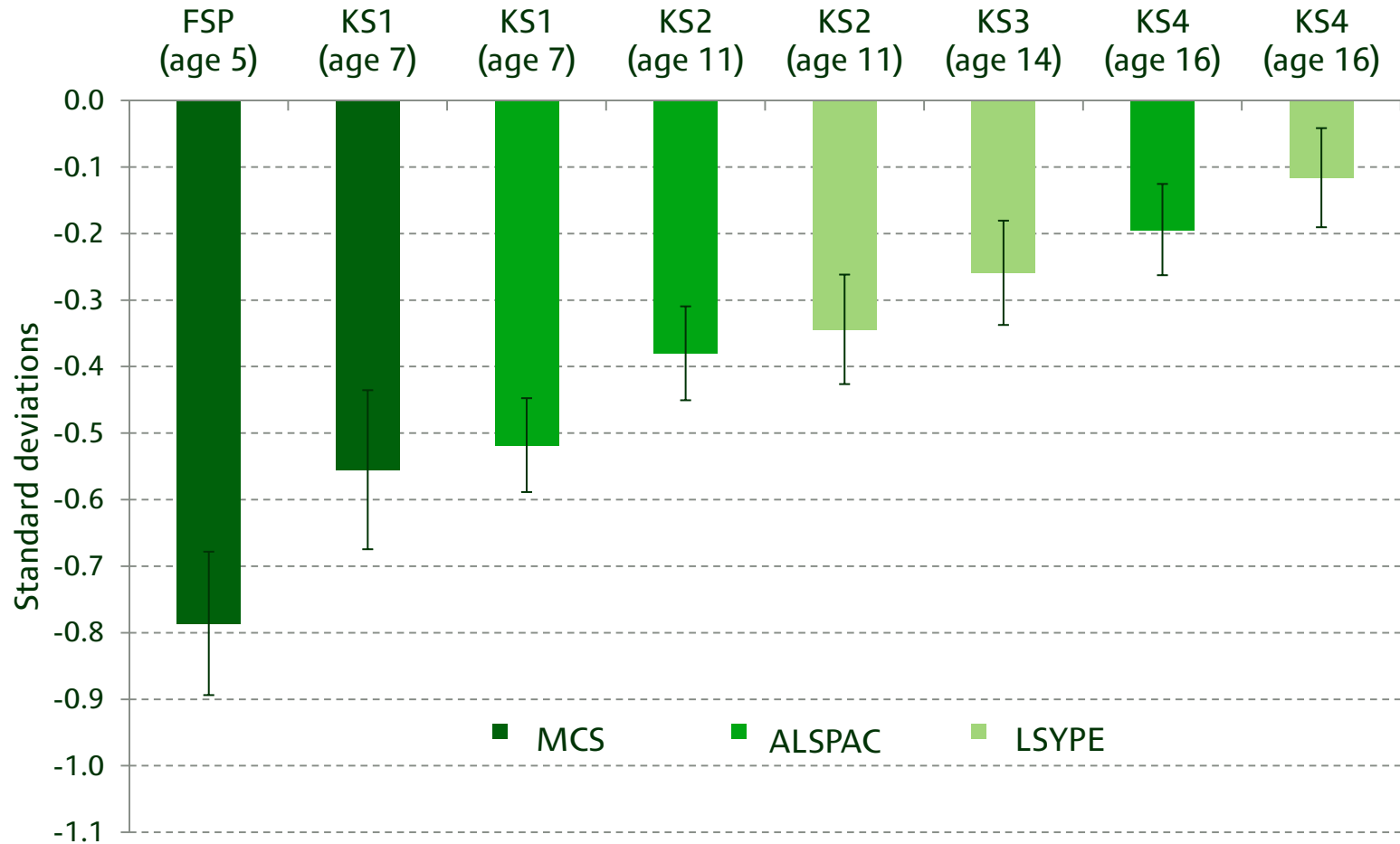
# Academic and cognitive skills and behaviours

# National achievement test results

- As measured by:
  - Foundation Stage Profile (age 5): total score from teacher assessments of child's performance across domains including communication, language and literacy
  - Key Stage 1 (age 7): average score from tests in reading, writing and maths (teacher assessed in the MCS; externally assessed in ALSPAC)
  - Key Stage 2 (age 11) and Key Stage 3 (age 14): average score from externally assessed tests in English, maths and science
  - Key Stage 4 (age 16): average score based on eight best results in externally assessed GCSE or equivalent exams
- All scores standardised to have mean zero, standard deviation one
  - Differences reported in standard deviations



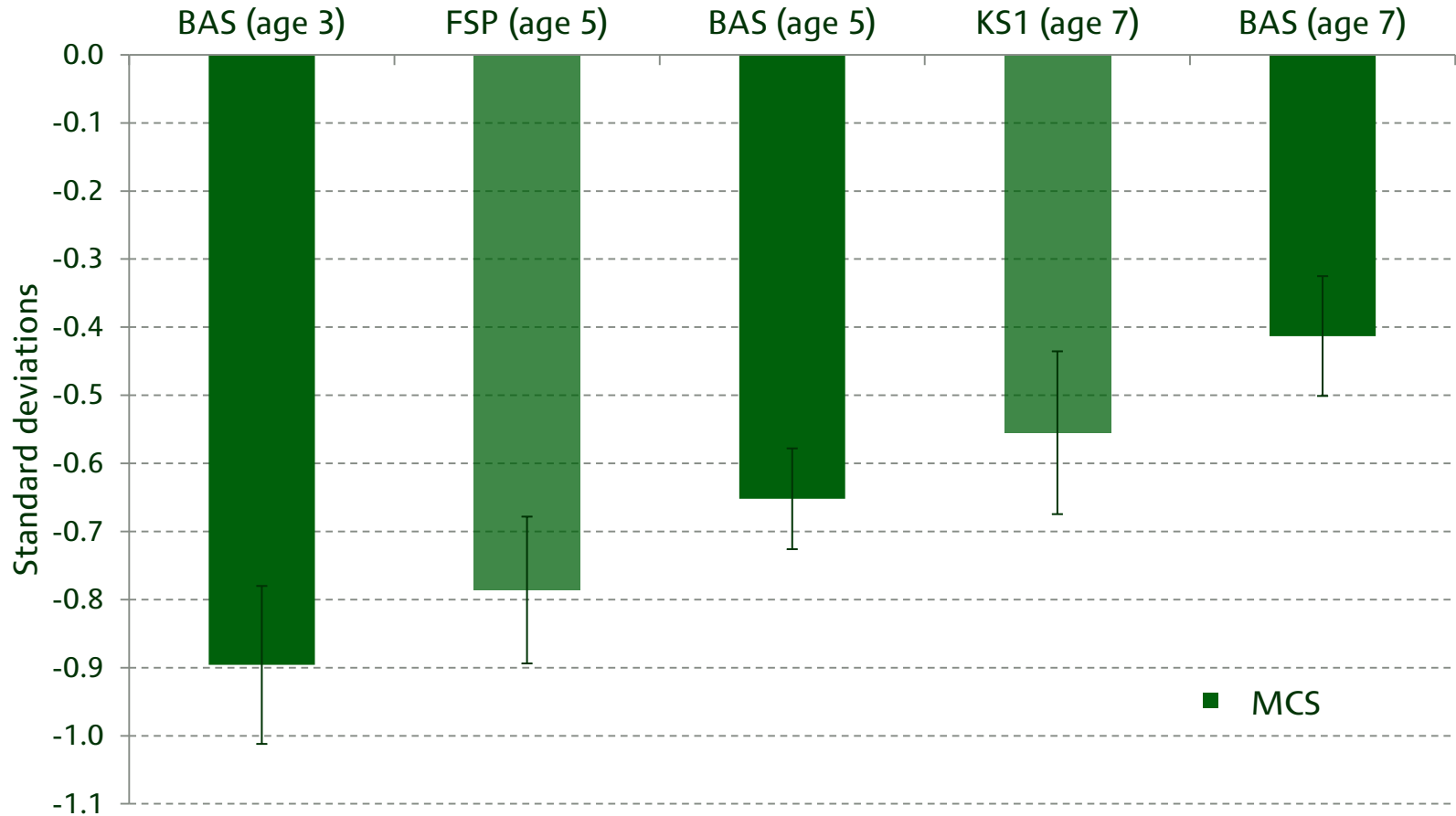
# National achievement tests: performance of August-borns relative to September-borns



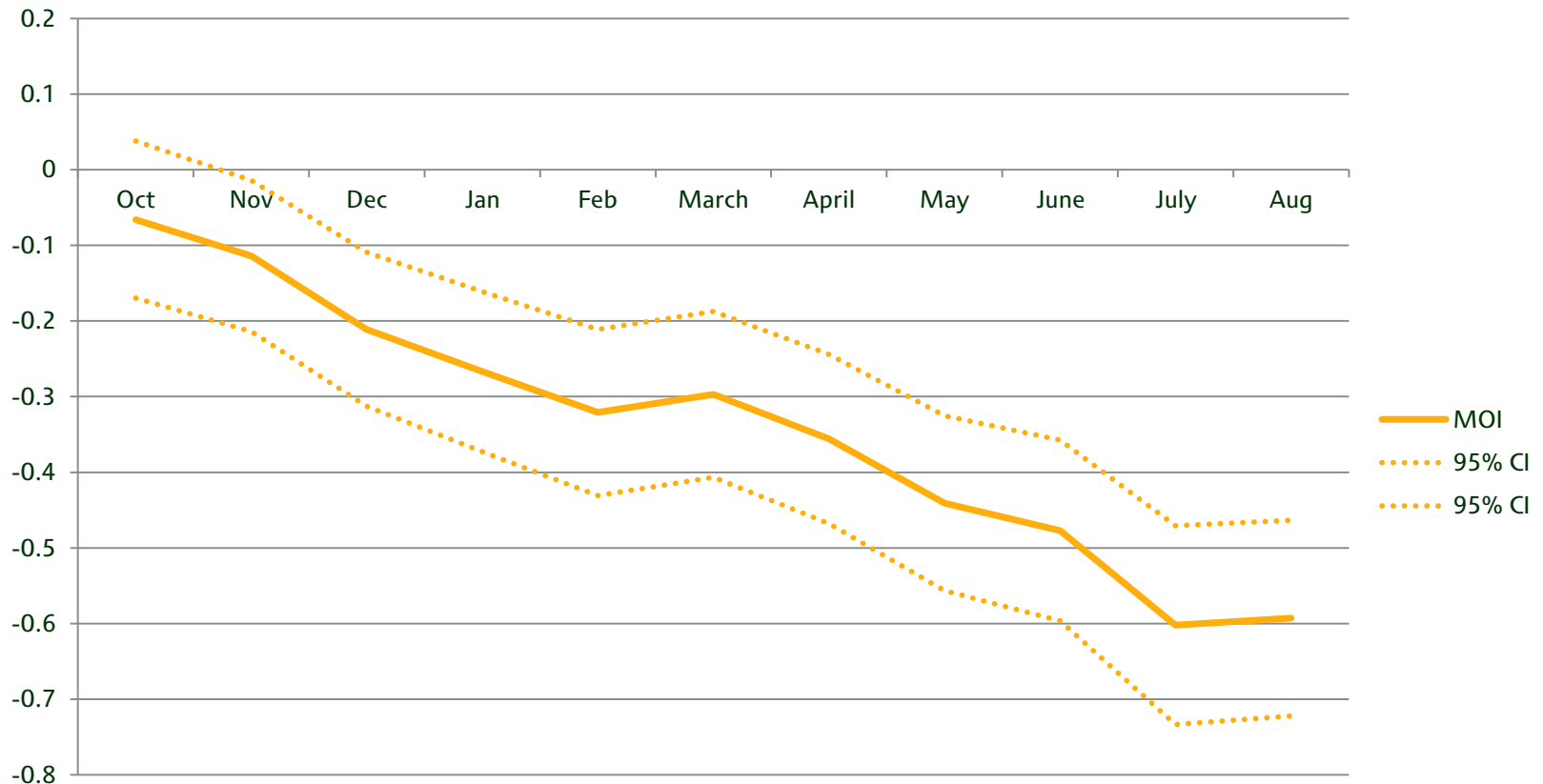
# Other measures of cognitive skills

- As measured by:
  - Average scores on the British Ability Scale, covering:
    - Vocabulary at age 3
    - Vocabulary, picture similarity and pattern construction at age 5
    - Word reading, pattern construction and maths at age 7
  - Compared to differences in FSP (age 5) and KS1 (age 7) scores
- All scores standardised to have mean zero, standard deviation one
  - Differences reported in standard deviations

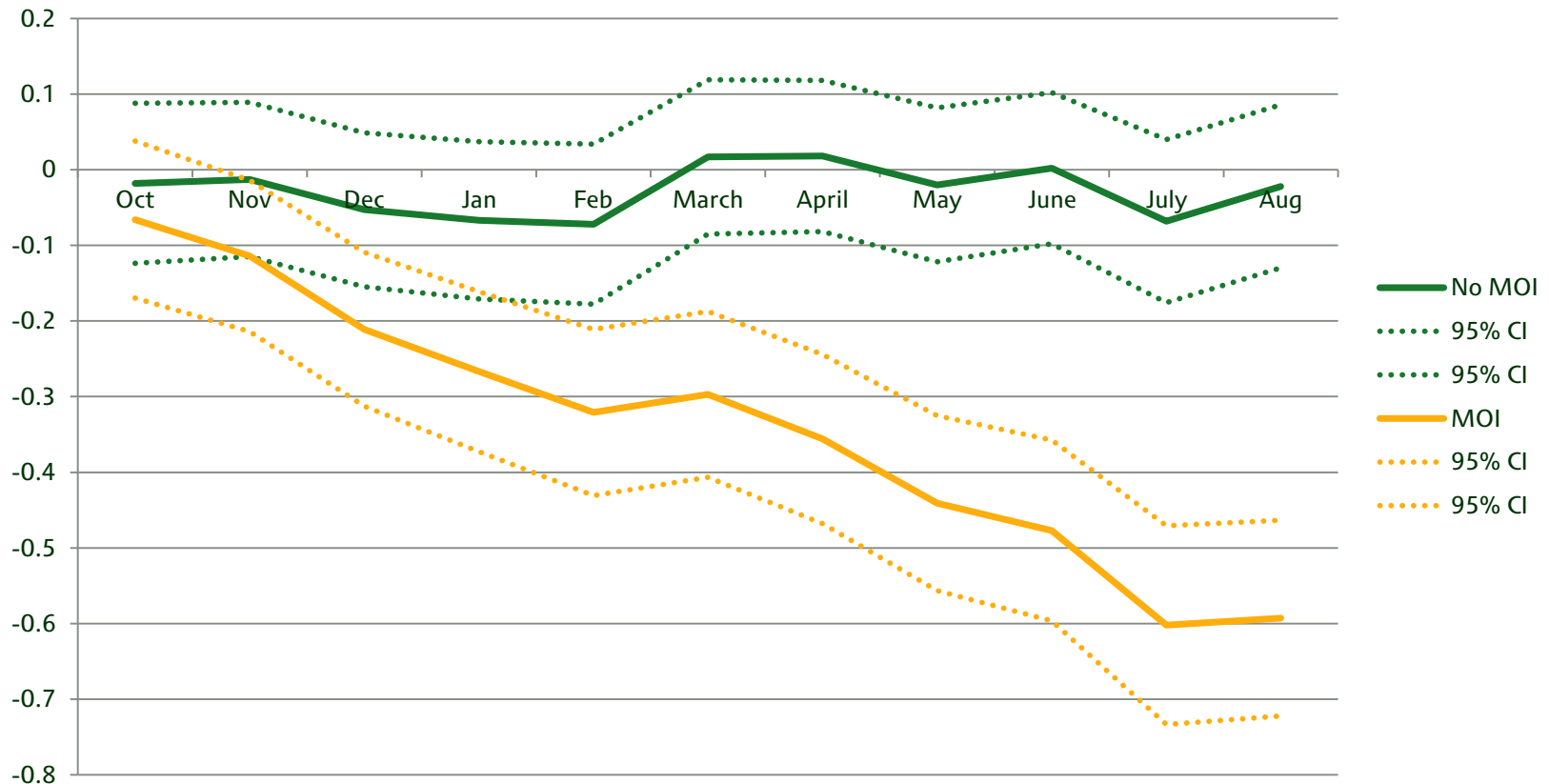
# Other measures of cognitive skills: performance of August-borns relative to September-borns



# What if children are tested at the same age?



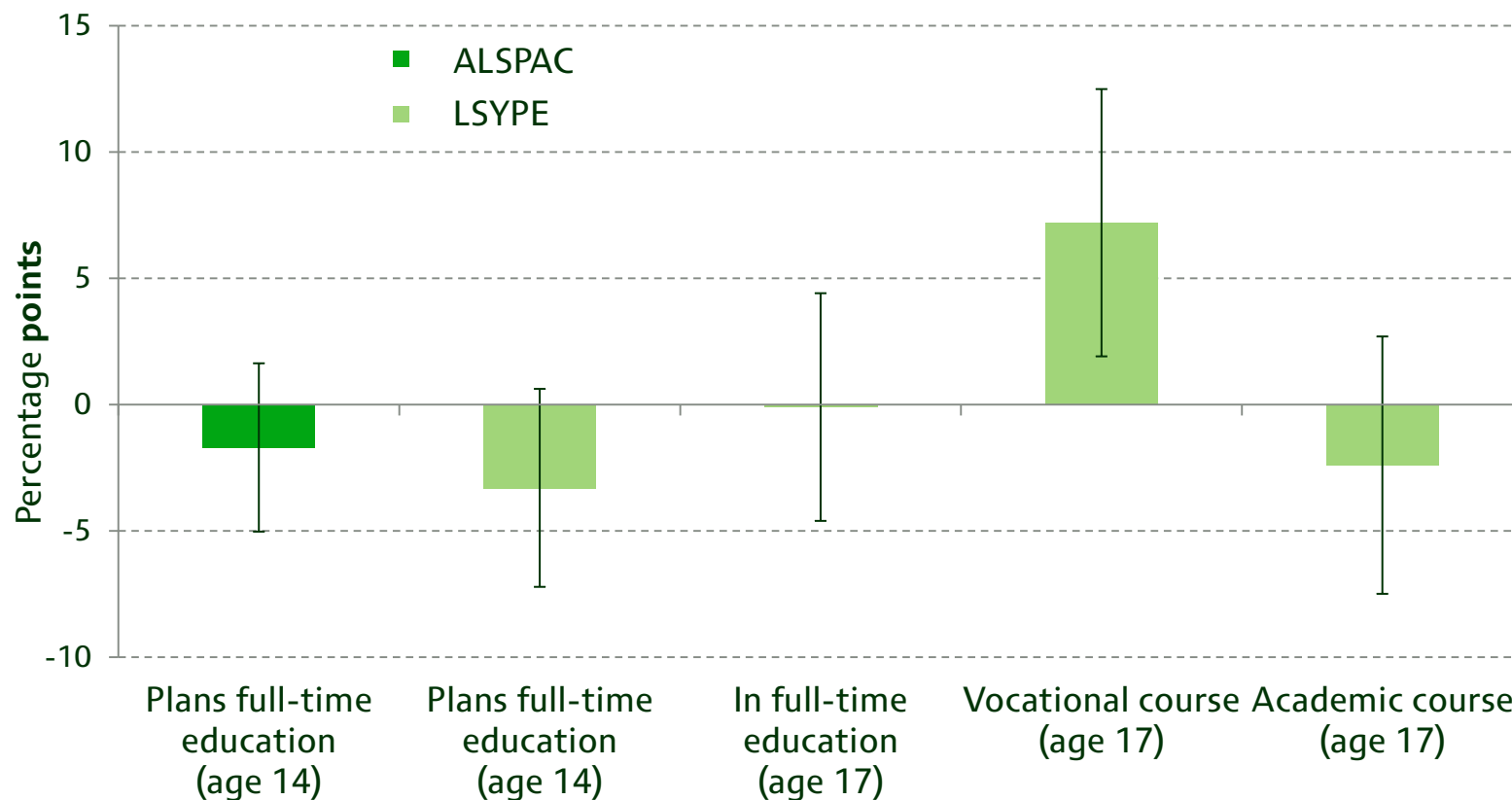
# What if children are tested at the same age?



# Aspirations for and participation in post-compulsory education

- As measured by:
  - Binary indicator for whether the young person plans to stay in full-time education beyond age 16, reported at age 14
  - Binary indicator for whether the young person is in full-time education at age 17 (first post-compulsory year)
  - Binary indicators for whether the young person is enrolled on a vocational or an academic course (not mutually exclusive)
- Differences reported in percentage points

# Aspirations for and participation in post-compulsory education: beliefs and actions of August-borns relative to September-borns

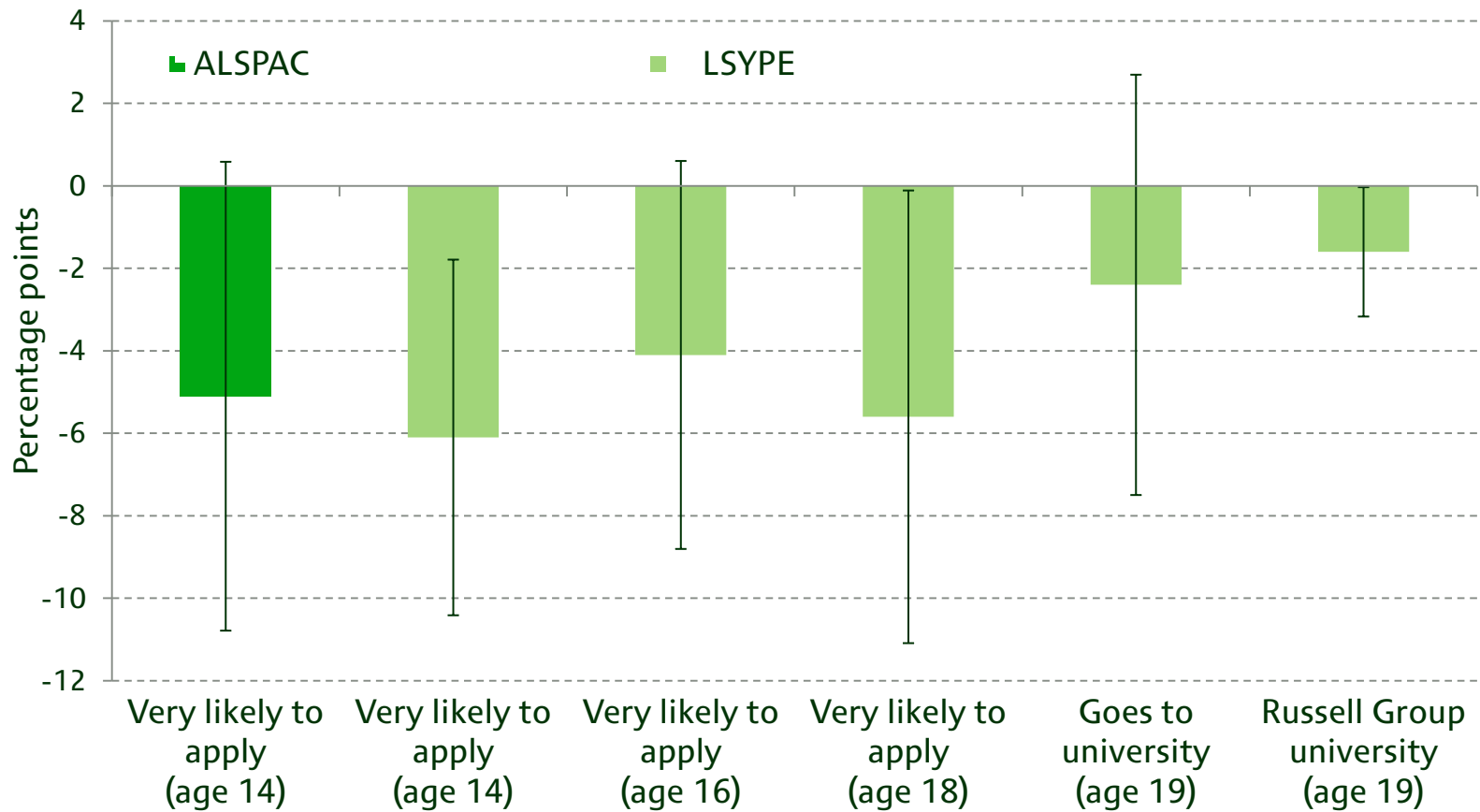


# Aspirations for and participation in higher education

- As measured by:
  - Binary indicators for whether the young person thinks they are “very likely” to apply to university (or college in ALSPAC) at some point in future, reported from age 14 onwards
  - Binary indicator for whether the young person goes to university at age 19 (the first year in which they are eligible)
  - Binary indicator for whether the young person attends a Russell Group institution at age 19
- Differences reported in percentage points



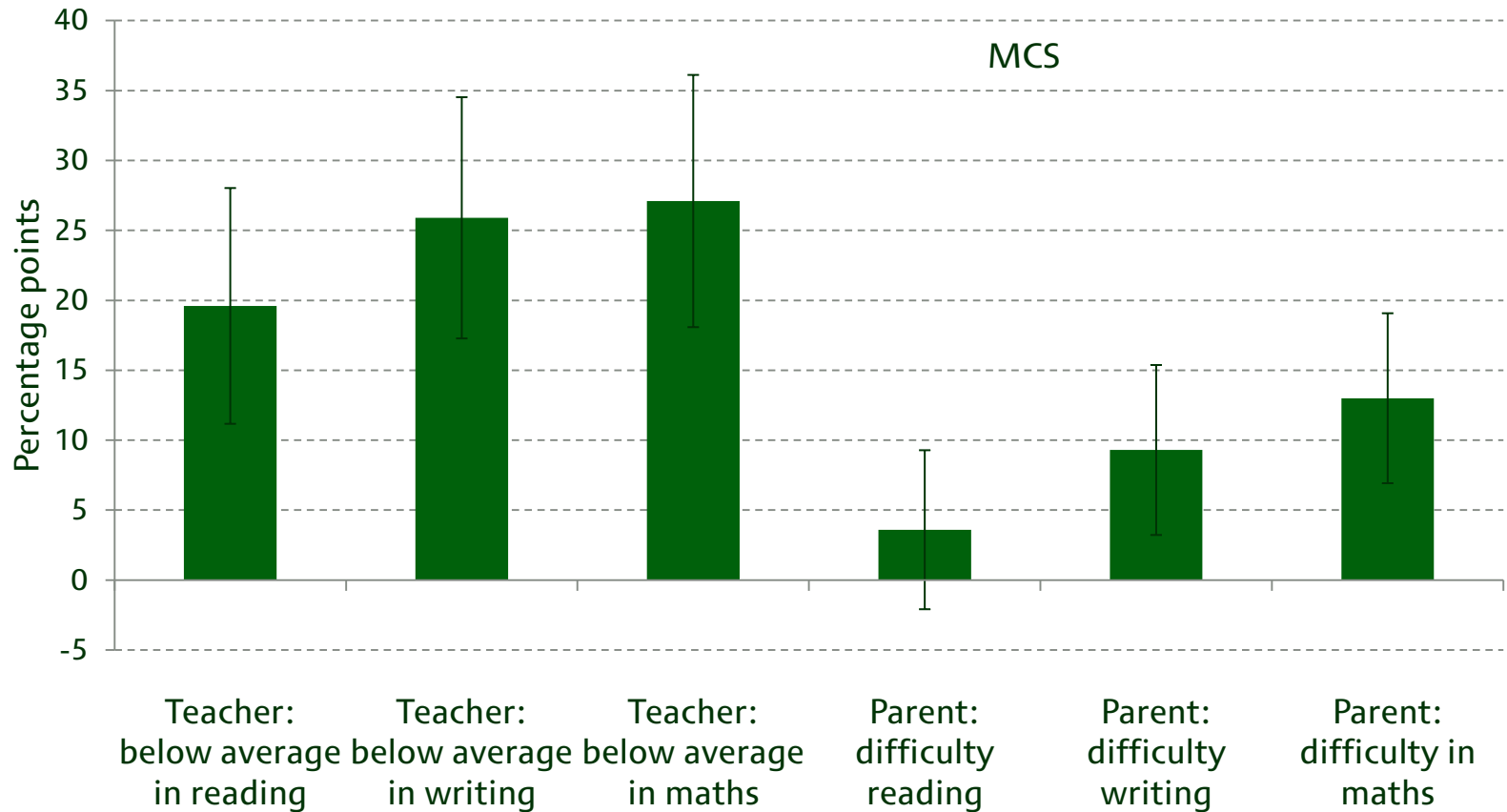
# Aspirations for and participation in higher education: beliefs and actions of August-borns relative to September-borns



# Parent and teacher perceptions of academic ability

- As measured by:
  - Binary indicators of whether the child's class teacher reports that they are below average in reading, writing and maths at age 7
  - Binary indicators of whether the child's parent reports that they have difficulty with reading, writing or maths at age 7
- Differences reported in percentage points

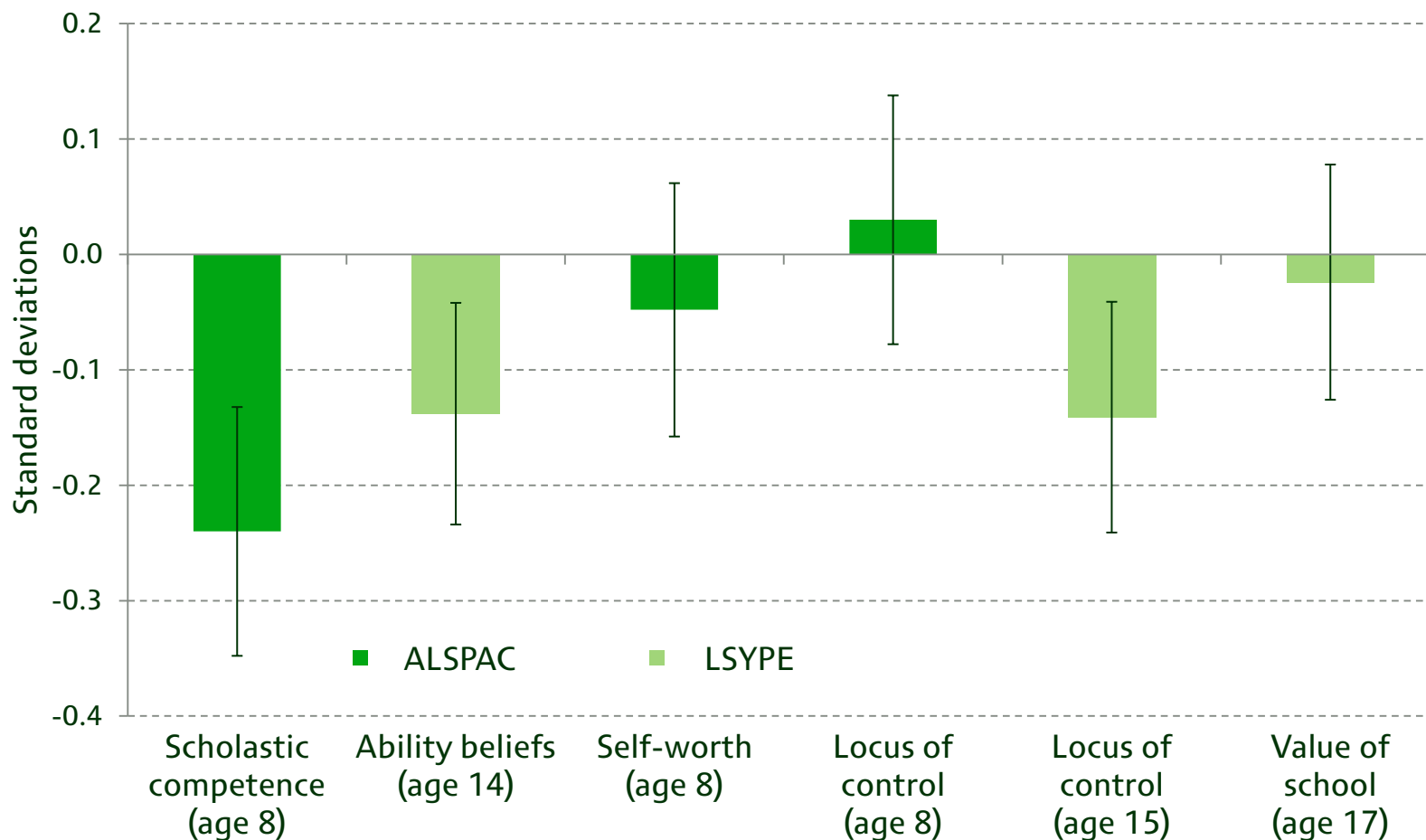
# Parent and teacher perceptions of academic ability: August-borns relative to September-borns



# Child's perception of themselves and value of school

- As measured by:
  - Scholastic competence: total score created from child's responses to statements such as "Some children are slow to finish their school work"
  - Ability beliefs: total score created from children's responses to questions such as "How good are you at maths?"
  - Self-worth: total score created from child's responses to statements such as "Some children are very happy the way they are"
  - Locus of control: total score created from child's responses to statements such as "Planning ahead makes good things happen"
  - Value of school: total score created from child's responses to statements such as "School work was usually worth doing"
- All scores standardised to have mean zero, standard deviation one
  - Differences reported in standard deviations

# Child's perception of themselves and value of school: August-borns relative to September-borns



# Summary

- Large and significant differences between August- and September-borns in terms of academic and cognitive skills
  - Slightly larger in national achievement tests than in other measures such as the British Ability Scales (though not significantly so)
  - Particularly pronounced when performance is teacher assessed
  - Absolute magnitude decreases as children get older, suggesting August-borns are ‘catching up’ with their September-born peers
- Reflected in young people’s beliefs about their own ability and the extent to which they are able to control their own lives
  - But not in self-worth or perceived value of schooling
- Also reflected in choice of qualifications during post-compulsory education and type of university attended
  - May leave August-born pupils at a disadvantage in their working lives

# Non-cognitive skills and behaviours

# Non-cognitive skills and behaviours

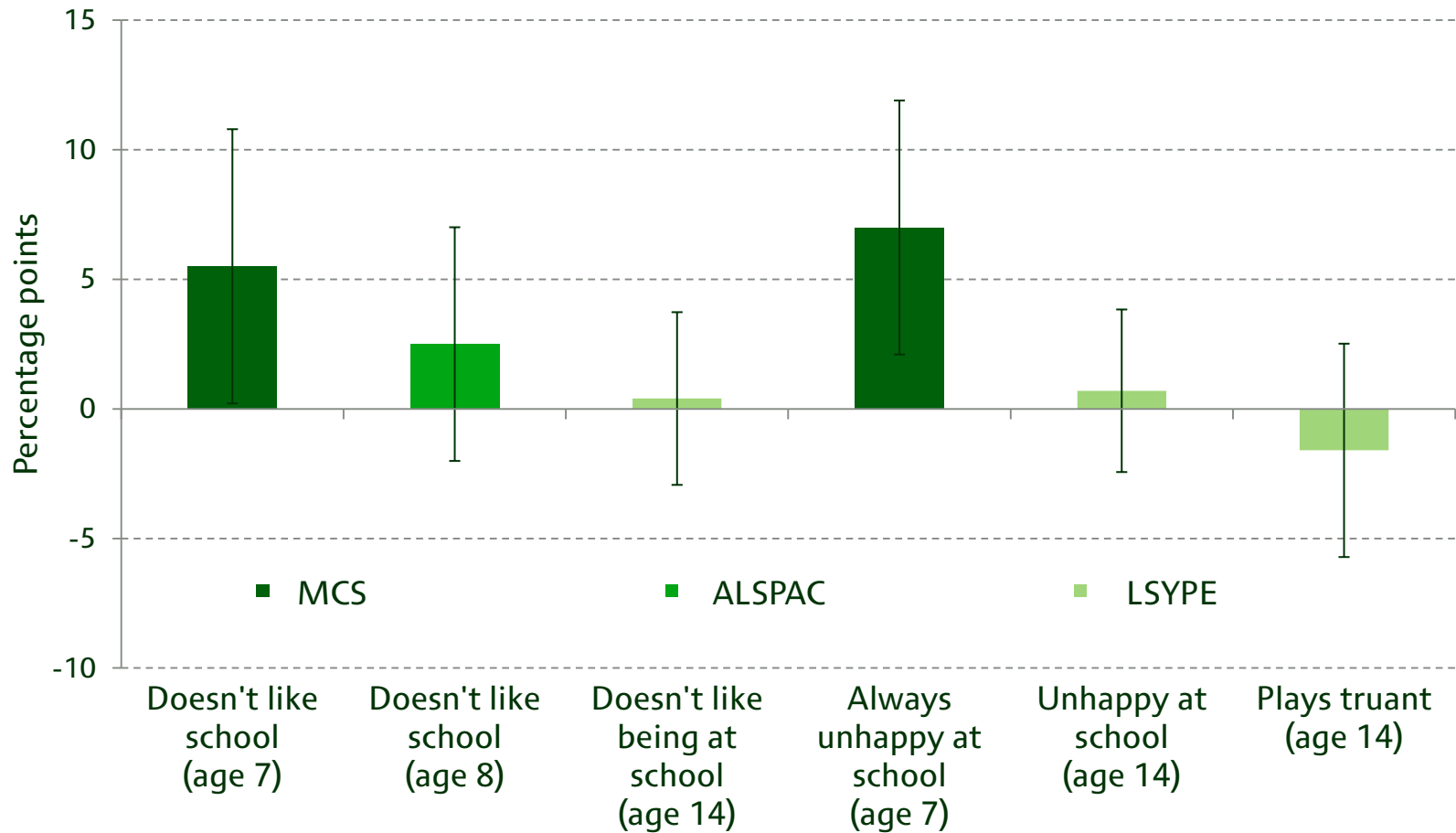
- We consider month of birth differences in:
  - Children’s perceptions of their own well-being, including whether or not they have been bullied;
  - Parent and teacher perceptions of children’s socio-emotional development;
  - Children’s engagement in a range of risky behaviours;
  - Whether parents respond differently to children born in different months of year, e.g. in terms of child’s home learning environment.



# Child's feelings about school

- As measured by:
  - Binary indicators for whether the child reports not liking school at ages 7 and 8 or liking school at age 14
  - Binary indicators for whether the child reports being unhappy at school at ages 7 and 14
  - Binary indicator for whether the child has ever played truant by age 14
- Differences reported in percentage points

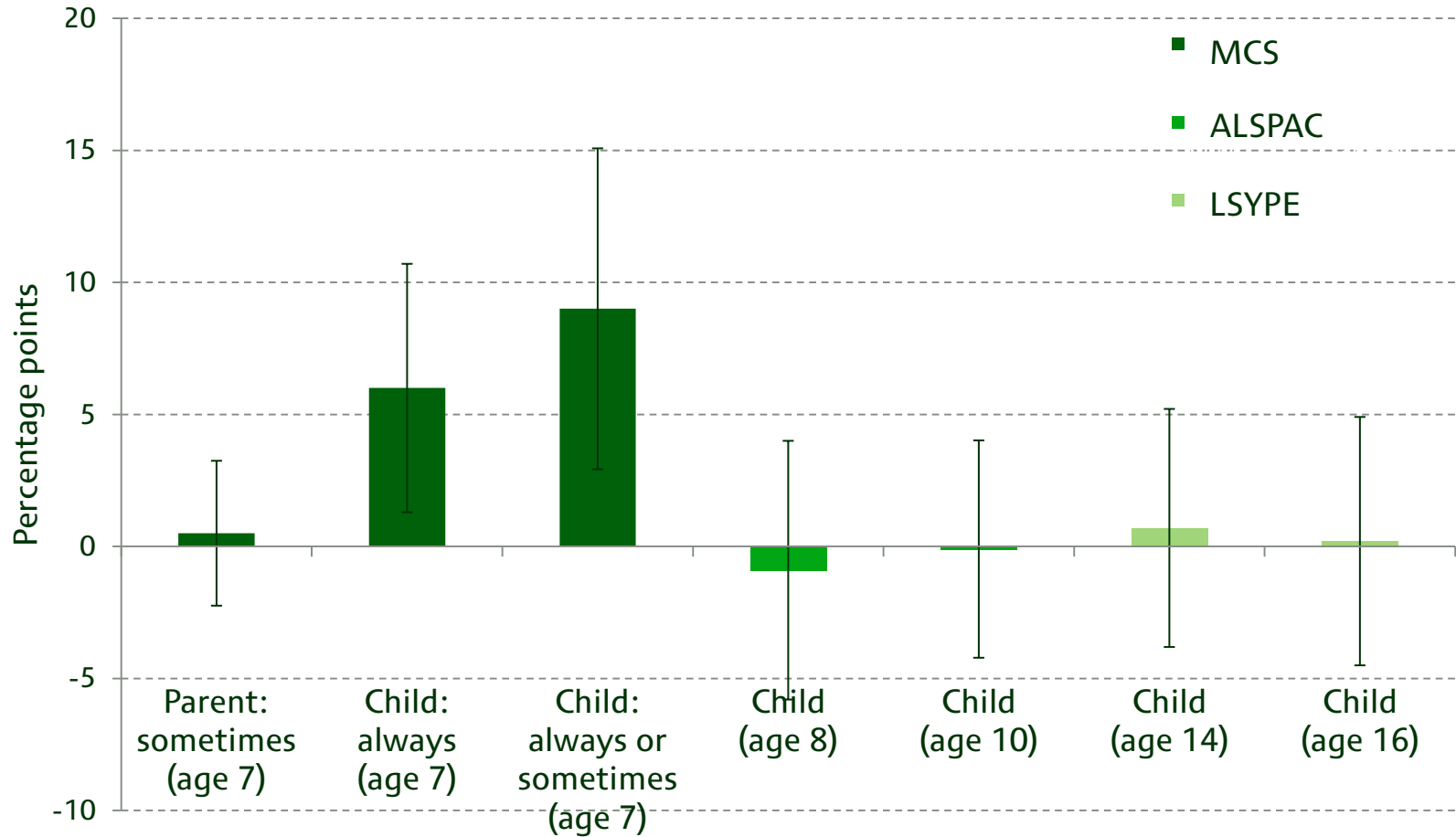
# Child's feelings about school: experience of August-borns relative to September-borns



# Incidence of bullying

- As measured by:
  - Binary indicator of whether the parent reports that their child has been bullied several or many times at school at age 7
  - Binary indicators for whether the child reports that they are bullied “sometimes” or “always” at age 7
  - Binary indicator for whether the child has experienced events such as being hit which indicate bullying at ages 8 and 10
  - Binary indicator for whether the child scores in the top 25% of a bullying scale – created using responses to questions such as “have you ever been called names?” – at ages 14 and 16
- Differences reported in percentage points

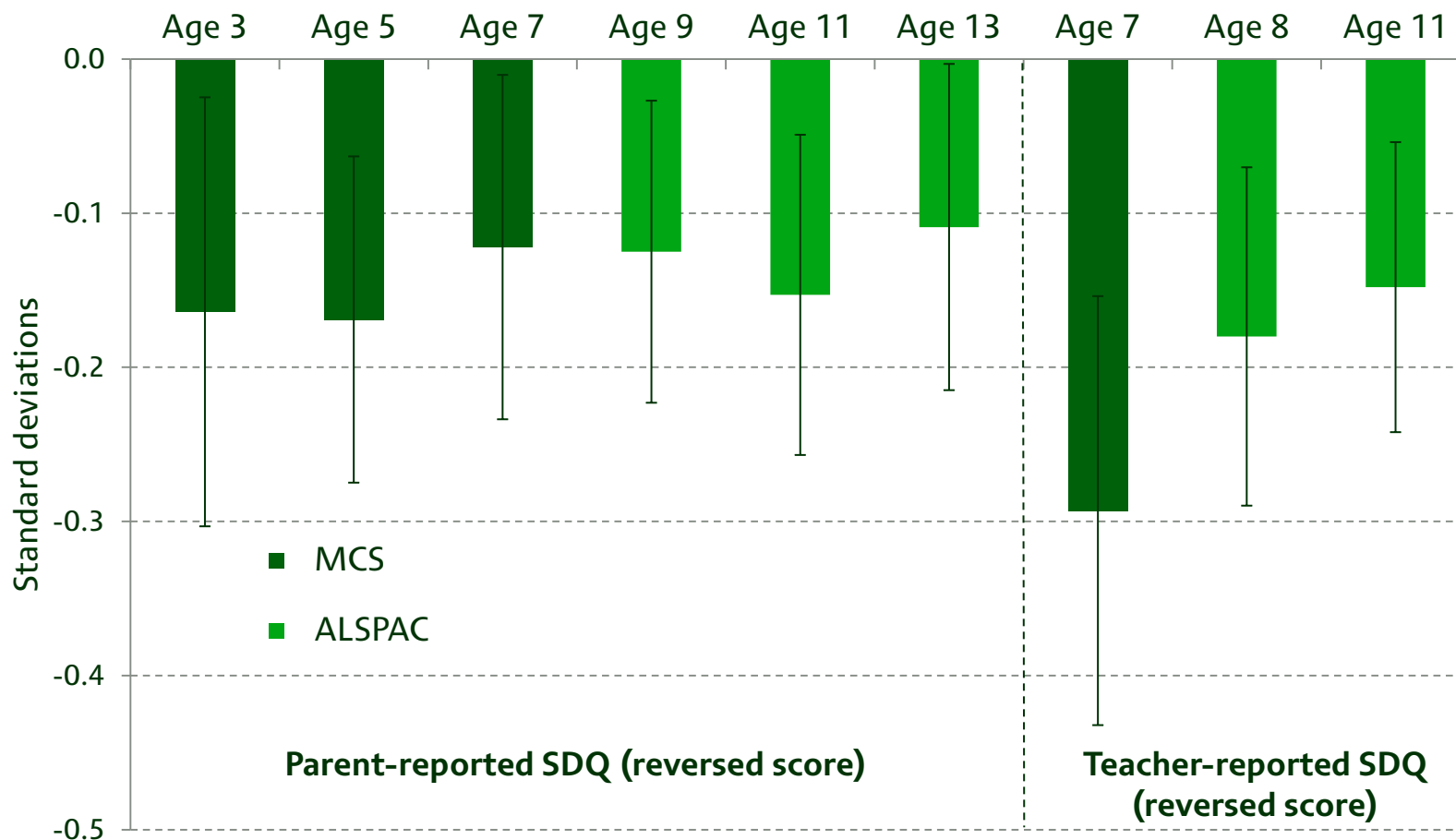
# Incidence of bullying: experience of August-borns relative to September-borns



# Socio-emotional development

- As measured by:
  - Parent and teacher reports of the child’s socio-emotional development based on the Strengths and Difficulties Questionnaire
  - Total score based on responses to questions on: emotional development, conduct, hyperactivity and relationships with peers
  - We reverse this score to make it a measure of “strengths” rather than “difficulties”
- All scores standardised to have mean zero, standard deviation one
  - Differences reported in standard deviations

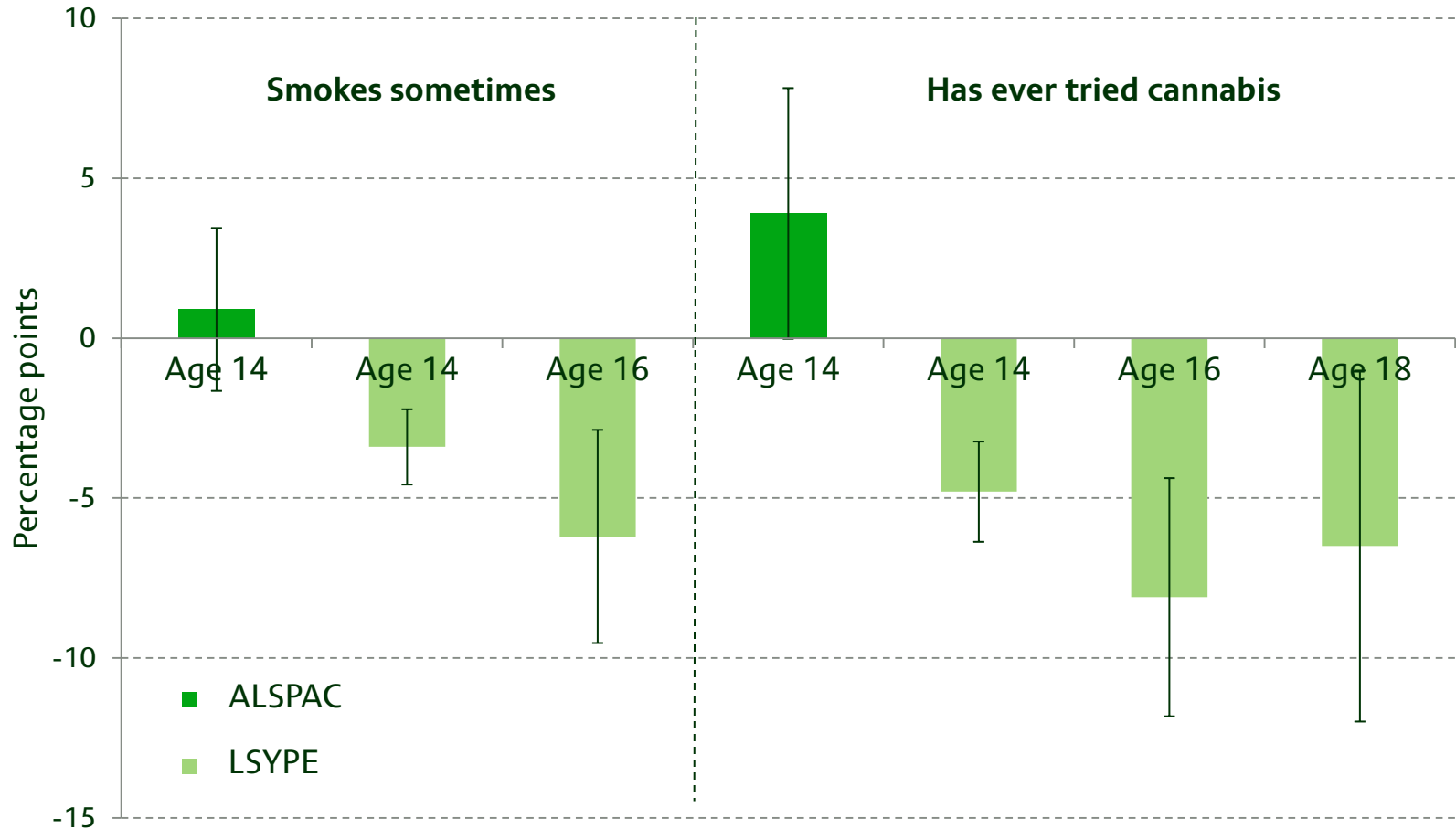
# Socio-emotional development: performance of August-borns relative to September-borns



# Smoking, drinking and cannabis use

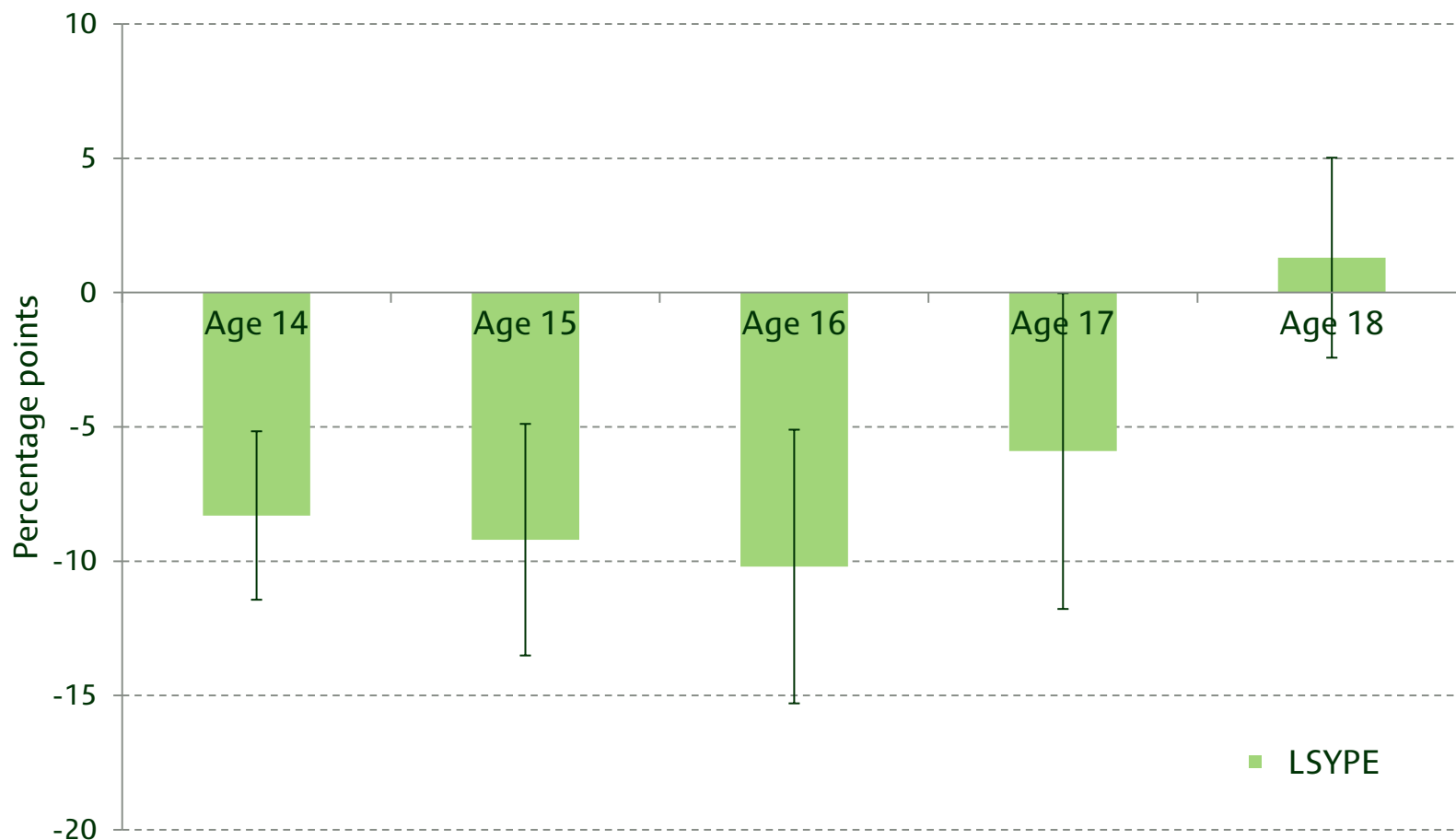
- As measured by:
  - Binary indicators for whether the young person smokes at least sometimes at ages 14 and 16
  - Binary indicators for whether the young person has drunk alcohol at least once a month over the past year, reported from ages 14 to 18
  - Binary indicators for whether the young person has ever tried cannabis by ages 14, 16 and 18
- Differences reported in percentage points

# Smoking and cannabis use: behaviour of August-borns relative to September-borns





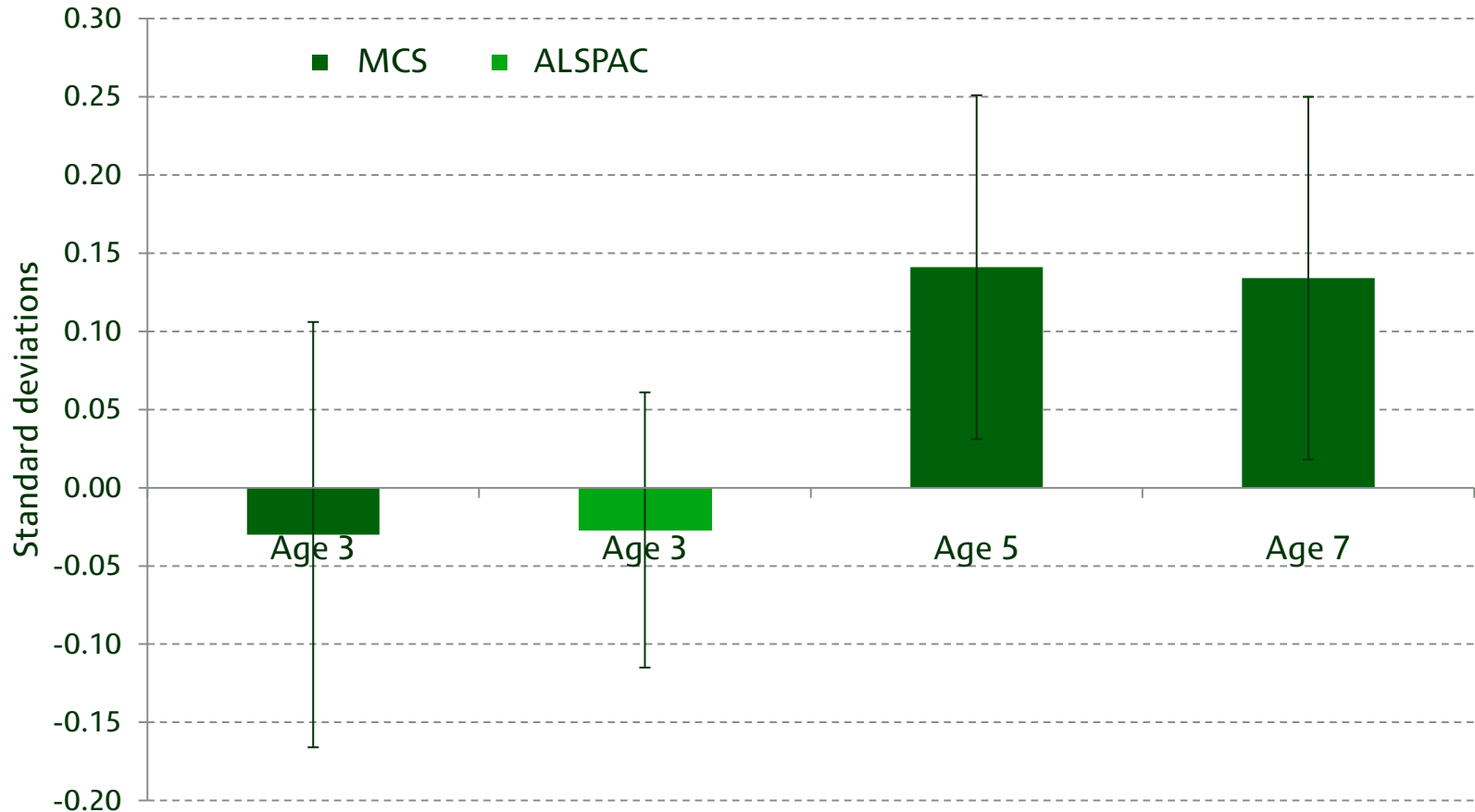
# Alcohol consumption: behaviour of August-borns relative to September-borns



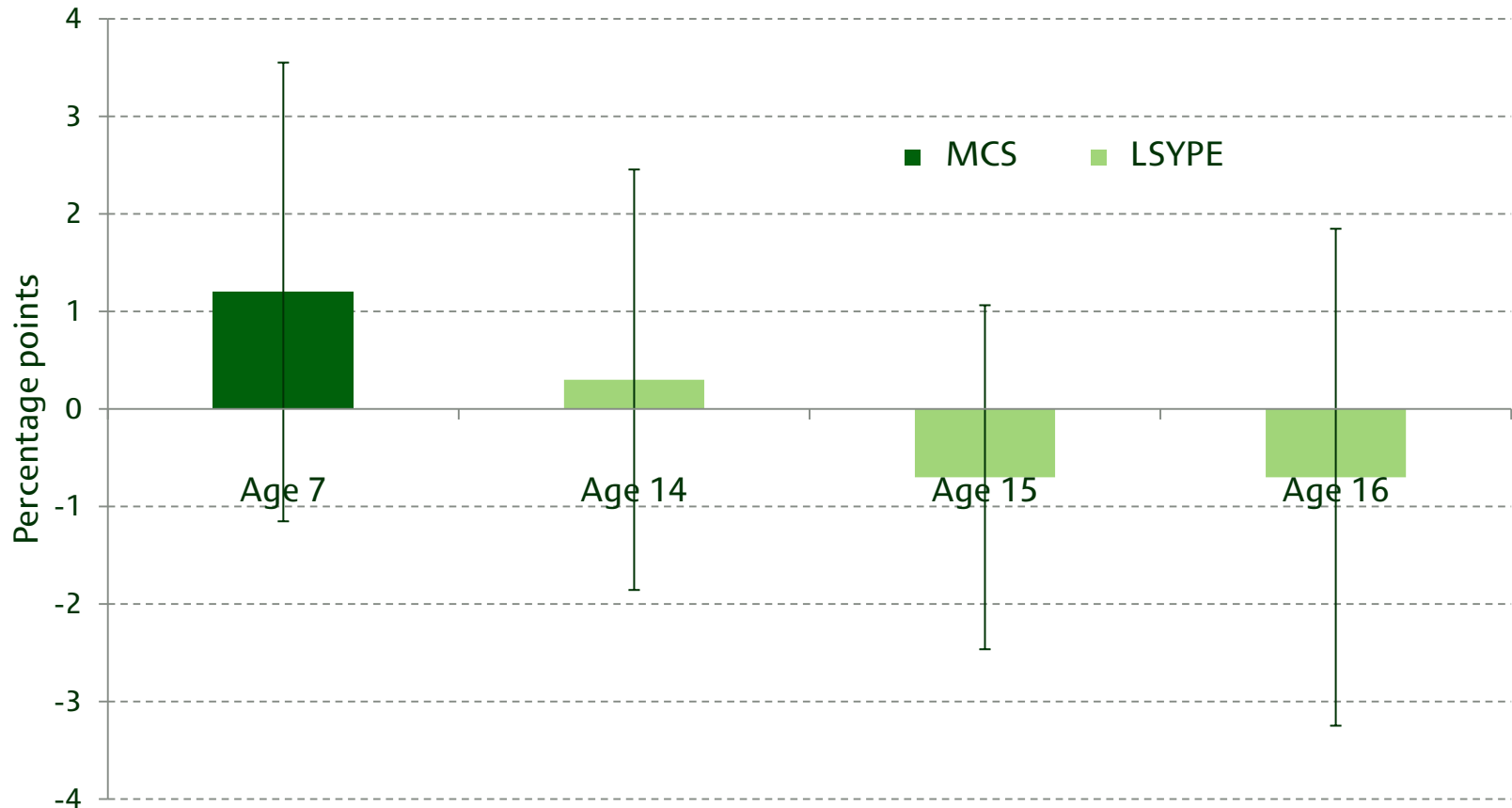
# Parental investments

- As measured by:
  - Home learning environment: total score created from responses to the frequency with which parents undertake various activities – such as reading, painting and drawing, telling stories or singing – with their child at ages 3, 5 and 7
    - All scores standardised to have mean zero, standard deviation one
    - Differences reported in standard deviations
  - Binary indicators for whether the parent paid for extra lessons in school subjects – including English and maths – at ages 7 and 14 to 16
    - Differences reported in percentage points

# Home learning environment: experience of August-borns relative to September-borns

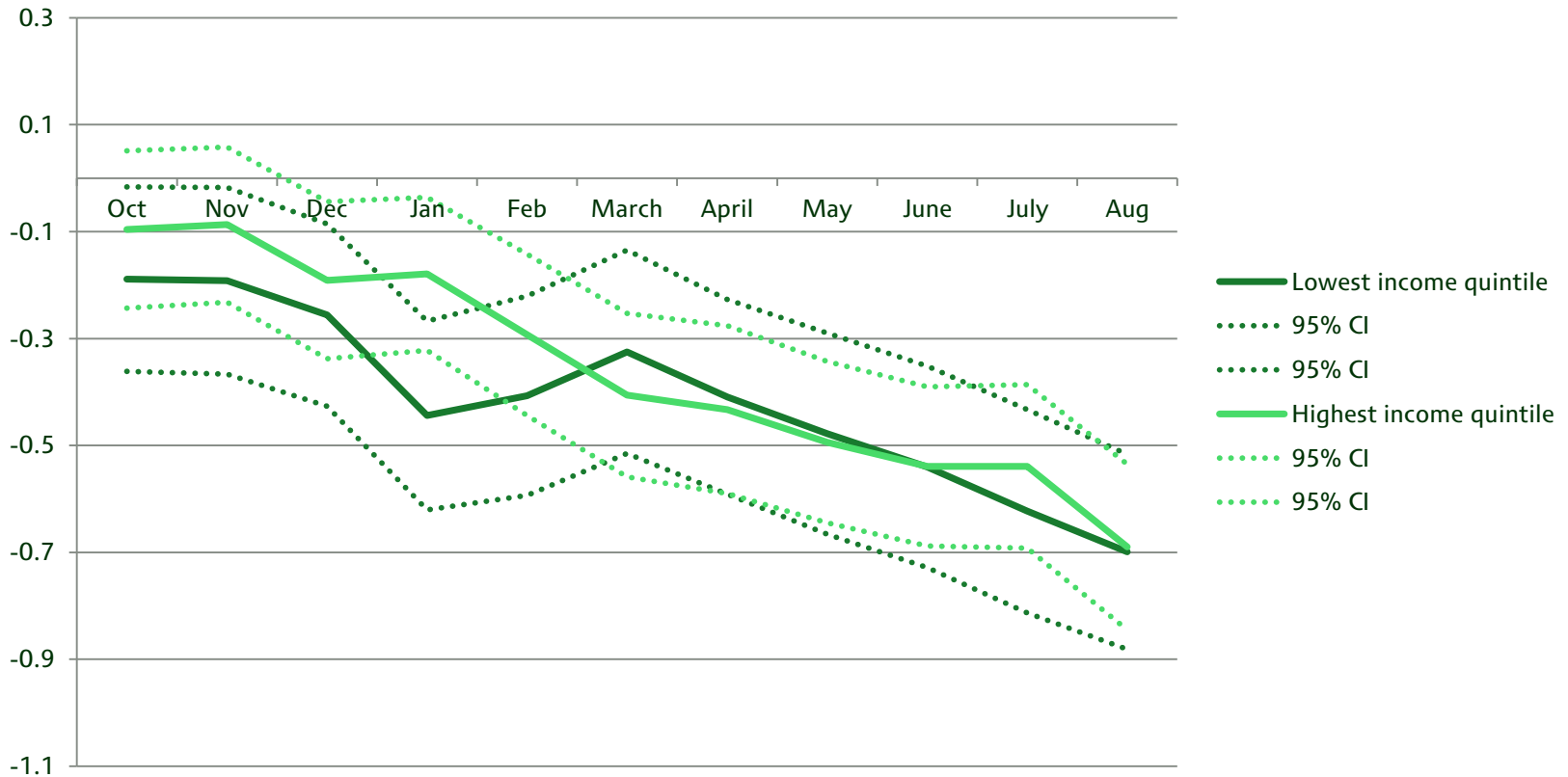


# Paying for extra lessons for child: experience of August-borns relative to September-borns



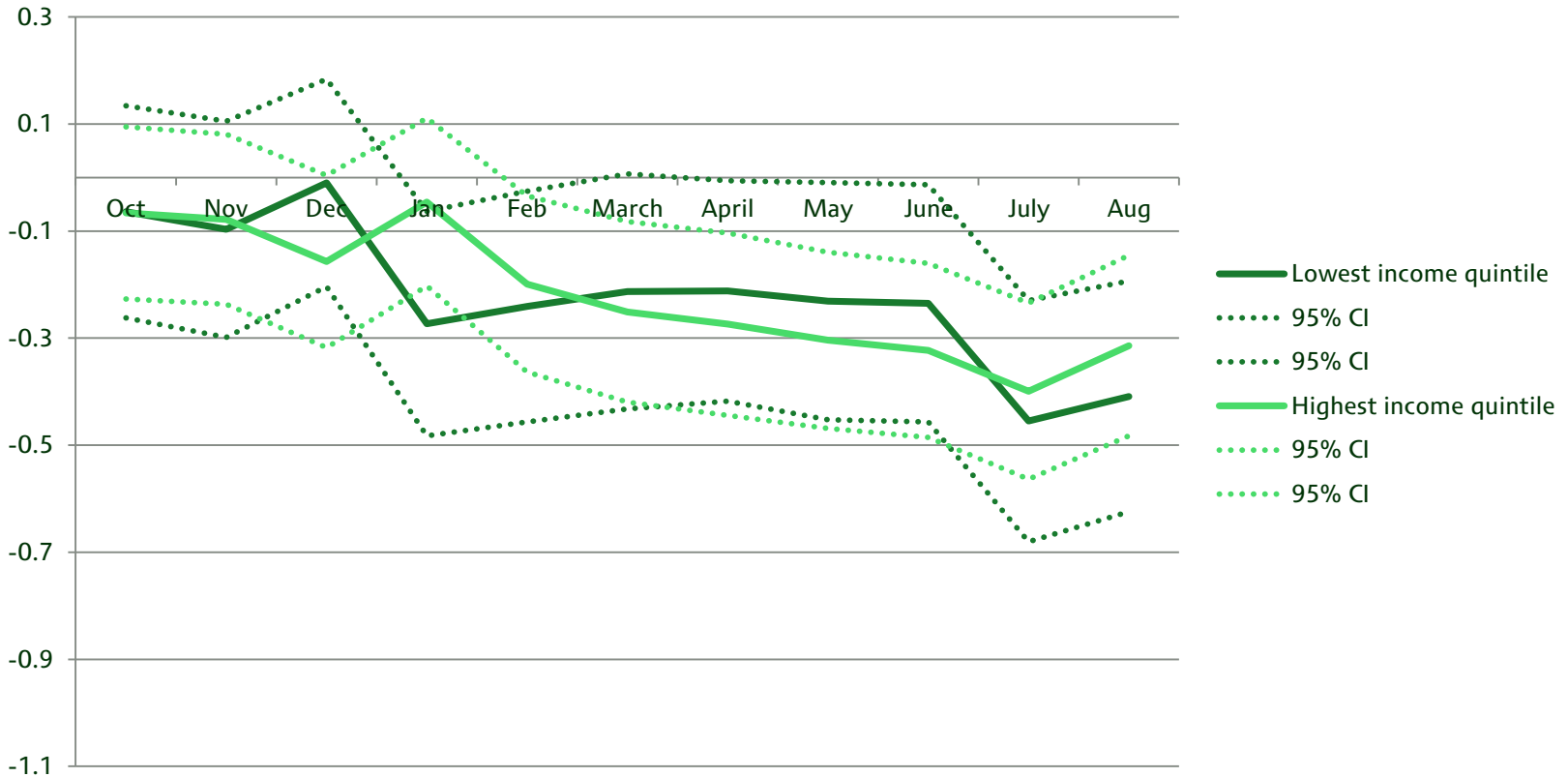
# Can high-SES families offset disadvantage?

## Wave 3: Total BAS



# Can high-SES families offset disadvantage?

## Wave 4: Total BAS



# Summary

- We find significant month of birth differences in a range of non-cognitive skills and behaviours
- Relative to September-borns, August-borns are:
  - Reported to have lower socio-emotional development by both parents and teachers
  - More likely to report that they are unhappy at school and subject to bullying – but only at younger ages (the differences do not persist)
  - *Less* likely to have smoked, drunk alcohol or ever tried cannabis as young teenagers – but these differences tend to decrease over time
- Parents of August-borns also provide a richer home learning environment than parents of September-borns at ages 5 and 7
  - Suggests parents may be ‘compensating’ for the disadvantages faced by their August-born children in school

# Conclusions

- We find significant differences between the outcomes of children born in August and September across a range of cognitive and non-cognitive skills and behaviours
- This is of concern for at least two reasons:
  - Some outcomes – such as unhappiness at school or experience of bullying – matter for children’s wellbeing in the short-term
    - Suggests the government should be concerned about the wider educational experience of summer-born children for reasons other than test scores alone
  - Some outcomes – such as the choice between academic and vocational qualifications, the quality of university attended or the extent to which you believe you control your own destiny – have implications for the chance of being in work and subsequent wages
    - Suggests that August-born children may end up doing worse throughout their working lives, simply because of the month in which they were born



# Next steps

- What drives the month of birth differences we observe?
  - Age of sitting the test (absolute age);
  - Age of starting school;
  - Length of schooling;
  - Age position (relative age).
- Will provide insight into the most appropriate policy responses to help summer-born children; expect to report results in 2012
- Also planning to investigate whether month of birth affects outcomes into adulthood using “Understanding Society”