Abstract

Background: A number of studies demonstrate that children who are younger within their school year have poorer academic attainment and are more likely to have special educational needs. Few, however, have considered the impact relative age may have on child mental health, behaviour and happiness in school.

Methods: This paper utilised data from the Supporting Teachers And ChildRen in Schools study (2075 pupils aged 5 to 9 years from 80 primary schools) to explore the relationship between relative age, behaviour and happiness in school. Behavioural and emotional development was assessed using the teacher and parent reported Strengths and Difficulties Questionnaire and the Pupil Behaviour Questionnaire. Children's happiness within school was assessed using the How I Feel About My School questionnaire.

Results: Relatively younger children had higher Total Difficulties scores on the Strengths and Difficulties Questionnaire than their peers. There was a mean increase per 30 day decrease in relative age of 0.09 (95% CI: 0.03 to 0.16; $p=0.007$) in teacher-reported and 0.08 (0.001 to 0.16; $p=0.05$) in parent-reported scores. There was little evidence of a relationship between relative age and children's behaviour and happiness in school.

Conclusions: For children with complex difficulties being relatively young for their school year may be an additional stressor that may undermine mental health.

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Examining the Psychological and Social Impact of Relative Age in Primary School

Children: A Cross-Sectional Survey

The youngest children in a school year may be nearly an entire year younger than their oldest peers. A number of studies have demonstrated that children born later in the school year are more likely to achieve lower scores in tests of academic attainment at primary (McPhillips & Jordan-Black, 2009; Sharp, Hutchinson, & Whetton, 1994) and secondary school (Cobley, McKenna, Baker, & Wattie, 2009), be overrepresented within lower ability streaming groups (D. Thompson, 1971) and be identified as having special educational needs (SEN) (Gledhill, Ford, & Goodman, 2002; Wilson, 2000). These ‘relative age effects’ can impact on a child’s future education and career prospects. As similar effects have been detected in countries with different school entry cut-off dates, it would seem that relative age rather than season of birth is the driving influence (Goodman, Gledhill, & Ford, 2003). Indeed, the scores of relatively young children did not differ significantly from their older peers on age-standardised measures of attainment in the British Child and Adolescent Mental Health Survey 1999 (Goodman et al., 2003). These findings have led to the UK Department of Education reviewing the guidance on school admissions to allow parents to defer their child’s entry to school by one year if they are born in the summer (Department for Education, 2014a). Despite evidence supporting the link between relative age and academic attainment, the policy changes about school entry in the UK and the increasing focus of schools on mental health issues described below (Department for Education, 2014b; Institute for Public Policy Research, 2016; Parker et al., 2016), few studies have considered the impact relative age may also have on a child’s mental health and well-being in school.

Child psychopathology, well-being and happiness have been a key focus for a number of school based initiatives worldwide including programmes such as the Healthy Schools Programme (Warwick, Mooney, & Oliver, 2009) and the Social and Emotional Aspects of Learning (SEAL) Programme (Hallam, 2009). Disruptive behaviour is the most common type of childhood psychiatric disorder in the school age population (BCAMHS 1999 and 2004) and is strongly associated with stress, burn out and exit from the profession among teachers as well as disrupting the learning of all in the classroom (Aloe, Shisler, Norris, Nickerson, & Rinker, 2014; Tsouloupas, Carson, Matthews, Grawitch, & Barber, 2010; Wharton, 2009). Teachers feel very torn between supporting individual children whose poor mental health impedes their ability to cope in the classroom and their duty to the rest of the class (Richardson et al., 2015). Poor mental health and disruptive behaviour is an accepted impediment to learning and has been linked to a number of adverse outcomes later in life including conduct disorder, anti-social behaviour, crime, substance misuse, educational failure and violence (Collishaw, Maughan, Goodman, & Pickles, 2004). Such adverse side-effects not only present during childhood but also persist throughout adolescence, leading to poor future prospects and high costs to society (Scott, Knapp, Henderson, & Maughan, 2001). Using a combination of psychological distress based on scores on the Strengths and Difficulties Questionnaire (SDQ) (Goodman, 2001) and psychiatric interviews in a large population based sample, Goodman et al. (2003) reported that children who were younger within their school year had poorer mental health than their relatively older peers. Similarly, in a large sample of African American and European American children, the prevalence of psychiatric disorders was higher among children who were youngest within their academic

year (Polizzi, Martin, & Dombrowski, 2007). Patalay et al. (2015) also found that relatively younger adolescents had more emotional symptoms and peer problems when compared with relatively older peers using SDQ data from a large population-based sample (born 1996-1998).

Studies in North America, Sweden and Canada have also indicated relatively younger children in school are more likely to have received a diagnosis of, and receive a prescription for, attention deficit hyperactivity disorder (ADHD) (Elder, 2010; Halldner et al., 2014; Marrow et al., 2012). Goodman et al. (2003)' study is unique in that it considers psychopathology in general, but the data were collected in 1999 and, as there have been numerous changes in policy and practice (e.g., free part-time early years' education) since, they may not reflect children's experiences now.

Within adults there is a known relationship between "happiness", an affective component of well-being, and cognitive functions which can influence learning. For example, Fredrickson and Branigan (2005) found that positive versus neutral affect was associated with increased attention and cognition and others have found positive affect may also help increase creative (Isen, Daubman, & Nowicki, 1987) and holistic thinking (Isen, Rosenzweig, & Young, 1991). There are indications that relatively young children may be more unhappy at school (see Crawford, Dearden, & Greaves, 2011), be more likely to be bullied (Department for Education, 2010), have lower levels of self-esteem (Fenzel, 1992; A. Thompson, Barnsley, & Battle, 2004) and commit suicide (Thompson et al 1999) than their older peers. However, to our knowledge, few studies have considered the impact that being

young relative to others in your class may have on a child's happiness, particularly happiness at school.

The objective of the current study was to explore the relationship of relative age with child mental health, behaviour and happiness in school (hereafter referred to as 'happiness') in a large sample of primary school children aged 4 to 9 years old. We predicted that relatively younger children would (a) have poorer mental health, (b) be more disruptive than their older peers and (c) be less happy.

Method

This paper presents an analysis of baseline data from the Supporting Teachers And ChildRen in Schools (STARS) study, a cluster randomised controlled trial of the Incredible Years Teacher Classroom Management (TCM) programme (Ford et al., 2012). Ethical approval for the study was granted by Peninsula College of Medicine and Dentistry Research Ethics Committee, now University of Exeter Medical School.

Participants

The sample comprised 2075 children (out of 2188 eligible) aged 4 to 9 years from 80 schools in Devon, UK. Eligible schools were state-funded mainstream primary schools. Schools placed in special measures by Ofsted were excluded. Devon has a predominantly White British (93.5%) population with areas of high deprivation (Devon County Council, 2013). Participating schools were from a mixture of urban (54%) and non-urban locations; 18% located in a deprived area (lowest quintile according to the Index of Multiple

Deprivation (IMD)) (McLennan et al., 2011). More than half of schools (58%) had higher than the English mean proportion of children eligible to receive free school meals (Department for Education, 2012).

Procedure

Parents had two weeks to opt themselves and their child out of the trial; teachers provided written consent and children verbal assent. Data was collected during the first half of the autumn term in 2013 (15 schools), 2014 (30 schools) and 2015 (35 schools). Children in Foundation (ages 4-5) and Key Stage 1 (KS1) (ages 5-7) were given one-to-one support to complete the How I Feel About My Schools Questionnaire (see below) while children in Key Stage 2 (KS2) (ages 7-9) completed it as a class-based activity. Parents received paper questionnaires while teachers and special educational needs coordinators used a web-based electronic database. Parents and teachers were thanked for completing measures by receiving a £5 or £20 gift voucher respectively.

Outcome Measures

Mental health was assessed using teacher and parent versions of the SDQ (Goodman, 1997). The SDQ comprises 25 items that span five sub-scales (*behaviour, emotions, over-activity/concentration, peer relationships* and *pro-social behaviour*); respondents answer a mixture of positively- and negatively-worded statements on a three-point Likert scale (*not true* (0), *somewhat true* (1) or *certainly true* (2)). The 20 items in the first four sub-scales are summed to give a total difficulties score (range 0-40), with higher scores indicating greater difficulties (Goodman, 1997, 2001). The SDQ is a brief, valid and reliable measure (internal

consistency, Cronbach's alpha (α) = 0.73; cross-informant correlation, Pearson's correlation (r) = 0.34; test-retest stability after four to six months, α = 0.62) and is widely used to assess mental health in childhood.

Children's behaviour in school. The *Pupil Behaviour Questionnaire (PBQ)* was developed for STARS (Ford et al., 2012) and was adapted from a scale used extensively in school effectiveness studies (Gray, Richer, Team, & Group, 1988). Teachers answered questions measuring classroom behaviours such as talking out of turn or making rude remarks. Responses to the six items are on a three-point Likert scale of *never* (0), *occasionally* (1) or *frequently* (2), with higher scores (range 0-12) indicating more disruptive behaviour. The PBQ has good internal consistency (Cronbach's α = 0.86) with factor analysis confirming a one factor structure, indicating all six questions measure the same dimension (Allwood & Ford, in preparation). There is preliminary evidence of validity, with a moderate convergence between the PBQ and teacher-completed SDQ Total Difficulties scores and Conduct sub-scale (Spearman's correlation coefficient (r_s) = 0.43 and 0.45 respectively) (Allwood & Ford, in preparation).

Children's happiness in the school context. This was measured by the *How I Feel About My School* (HIFAMS) questionnaire, which was also developed for use in the STARS study (Ford et al., 2012). This measure includes seven questions about how children feel about their school, relationships with their peers, teacher and learning. Answers are on a three-point Likert scale, with emoticons indicating *sad* (0), *OK* (1), and *happy* (2). Higher scores indicate greater happiness at school (range 0-14). Allen et al. (2017) found HIFAMS

demonstrated adequate two week test-retest reliability (Spearman's correlation (r_s) = 0.62; 95% CI: 0.54 to 0.69) and moderate internal consistency (Cronbach's α = 0.62).

Other Measures

Assessing Pupils' Progress (APP). The APP is an assessment tool used to measure children's attainment in literacy and numeracy in English schools, to enable professionals to track progress against nationally agreed criteria (Department for Children, 2009). Teacher reported attainment levels for each child were compared with the level expected by an average child in their year group. Results were categorised as *Working Below Age-Related Expectations* or *At/Above Exact Age-related Expectations*.

Special educational needs (SEN). Special educational needs coordinators reported whether a child had any recognised SEN, or extra support.

Demographic characteristics. Alongside child age and gender, parents were asked to indicate their own educational level (*any qualifications* versus *none*) and describe their current housing situation (*home owner* versus *not*) (Ford et al., 2012). Children's postcodes, where available, indicated whether they lived in an area categorised as in the lowest quintile based on the Index of Multiple Deprivation.

Statistical Analysis

Statistical analyses were conducted using Stata software, version 13.

Study measures were summarised for all children and by relative age category.

Sample characteristics were compared against Devon norms.

The main analyses examined the relationship between Relative Age (predictor variable) and each of the following outcomes: mental health (teacher and parent SDQ Total Difficulties score), disruptive behaviour (PBQ) and happiness (HIFAMS) using random effects linear regression, specifying school as a random effect. This method allows for the correlation between the responses of pupils within schools (clusters). Relative age was rescaled in such a manner that the regression coefficient is the estimated mean increase in the continuous outcomes *per 30 day decrease* in relative age. Relative age was used as a categorical variable when summarising the data with three levels defined by the child's month of birth (*Oldest* (September to December), *Middle* (January to April), and *Youngest* (May to August)).

Crude (unadjusted) analyses and analyses adjusted for potential confounders (gender, SES and year group) were run. The regression results reported are based on the analyses of 20 multiply imputed datasets in which missing values were *filled in*, with the assumption that data were missing at random. Data were imputed using the *chained equations* (fully conditional specification) method (Royston, 2004) with all study variables (outcomes, relative age, potential confounders and mediators) included in the imputation model. Analyses of imputed data provided essentially the same results as those from complete case analyses. The *mi impute* Stata command was used to impute missing data and *mi estimate* to analyse the imputed datasets.

>>>>>>>>>>>>>>>>INSERT TABLE 2 HERE<<<<<<<<<<<<<<<<<

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Discussion

The current study found a statistically significant relationship between relative age and children's mental health, albeit of low strength. Relative age was not, as we initially predicted, associated with behaviour or happiness. Below, we explore our findings in the context of the existing literature and their implications for policy and practice, and consider the strengths and limitations of the data.

The effect of relative age tends to be most evident in activities that are "*characterised by age grouping, competition and selection ability*" (A. Thompson et al., 2004 p314), components that are all present in the education environment. Children who are relatively young within their academic year were more likely to score higher on a well-established measure of child mental health, the SDQ, but at group level, the differences were such that they would be unlikely to make a difference in isolation at an individual level. Our findings do replicate other studies (Crawford et al., 2011; Ford, Goodman, & Meltzer, 2003; Patalay et al., 2015), which implies there may be a number of relatively young children for whom the additional stress of trying to keep up with older, more developmentally advanced children at school may compound other adversities. Relative age may become more important when there are other challenges to mental health and learning.

The absence of a strong relationship between relative age and child mental health at a group level may reflect an increased focus on social and emotional wellbeing in UK schools during the early years of this century. For example, there has been a substantial increase in the entitlement to free early years education (Brewer, Cattan, Crawford, & Rabe, 2014),

increased emphasis on the foundation stage (Department for Education, 2014c) and an increase in well-being initiatives within schools (e.g. Department for Education and Schools, 2004; Department for Children, 2007). It is possible such changes may limit the impact of relative age on mental health, despite its continuing effect on perceived academic attainment and SEN status.

In contrast to our findings, previous studies have found that relative age can impact on behavioural problems (Norbury et al., 2015) and conditions such as ADHD. The PBQ focuses on low level classroom disruption, such as talking to peers, rather than general behaviour problems (lying, stealing) and does not measure core symptoms of ADHD. This was a surprising finding as we anticipated that relatively young children would struggle more than their older peers to meet the behavioural expectations of the classroom.

Similarly, we found no evidence that happiness at primary school was affected by relative age. Previous research has suggested that relatively young children are more likely to have lower levels of self-esteem (Fenzel, 1992; A. Thompson et al., 2004), be bullied at school (Department for Education, 2010) and commit suicide (A. Thompson, Barnsley, & Dyck, 1999), which could plausibly be associated with unhappiness. Additionally, Patelay et al. (2015) found of a small but significant effect of relative age on the emotional symptoms sub-scale of the SDQ in students aged 11-13 years. Children may not experience an emotional effect of relative age in school until they are older than our sample (4-9 years) and more able to compare themselves with others. More research is needed to clarify the impact of relative age on happiness and emotional difficulties in school children of different ages.

Recent changes in policy that may reduce or amplify the effect of relative age, such as allowing parents to defer their summer-born child's entry to school by a year in England (Department for Education, 2014a), should be closely monitored. Education and mental health practitioners should be aware that relative age may be an additional risk factor for those struggling with multiple difficulties, but our findings suggest that it is unlikely to significantly affect an individual child's mental health in isolation.

Our study has several strengths. It is one of the first to investigate the impact of relative age on children's happiness in school. The combination of a large sample with well-validated and reliable measures of child mental health allow us to confidently assert the current impact of relative age on child mental health among primary schools in Devon. We found the expected relationships between relative age and academic attainment and SEN status, which suggests that our unexpected results in relation to behaviour and happiness were findings that were not solely due to unusual characteristics of our sample.

However, given that participants were recruited from South West England, our results may not generalise to other areas, particularly those with high numbers of children from ethnic minority groups. While return rates for teacher-reported (100%) and child-reported (98%) measures were excellent, we only had parent SDQ scores for 70% of the sample. Teacher reports suggest that children whose parents did not return questionnaires were likely to experience poorer mental health. Multiple imputations allowed us to fill in missing data. In addition, previous research suggests that despite the inevitable loss of those living in deprivation and with poorer health from child mental health research, the pattern of association will not necessarily have been altered (Wolke et al., 2009). Finally, our data were

cross-sectional and it may be that the impact of the detected differences in attainment, SEN status and mental health might have led to later difficulties with behaviour and unhappiness. Alternatively, as the developmental variation between the youngest and oldest in the school year might be expected to narrow with age, these differences might be expected to reduce over time.

In summary, we found that relative age has a small but significant association with children's mental health but does not impact young children's behaviour and happiness at school. Future research is needed to further explore the developmental trajectory of relatively young children in terms of their behaviour and happiness longitudinally, among older school children and across different geographic locations.

Key Practitioner Message:

- This study suggests that children who are born later in the academic year, and are therefore relatively younger than their peers, have poorer mental health as rated by teachers and parents.
- In keeping with previous studies, findings showed population level effects on child mental health by relative age, but these average differences were too small to be clinically significant in isolation at an individual level.
- We found little evidence of a relative age effect on child reported happiness or teacher reported low level disruptive behaviour in school.
- For children with multiple challenges, relative age may be an additional stressor that could undermine mental health and is therefore worth considering when undertaking assessments.
- Parents deferring their summer-born child's entry to school by a year are likely to circumvent the negative impact of relative age on mental health.

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Table 1 *Sample Characteristics by Relative Age*

Characteristic	<u>All^a</u>	<u>Relative Age</u>		
		Oldest ^b	Middle ^c	Youngest ^d
Age, mean (SD)	6.8 (1.3)	7.1 (1.3)	6.8 (1.3)	6.4 (1.3)
Male, %	53.1	54.2	53.8	51.2
White British, %	95.1	94.1	95.9	95.1
Key stage 2, %	49.5	45.8	51.3	51.5
Parent any qualification, %	95.0	93.2	94.8	96.9
Homeowners, %	60.2	61.8	53.7	65.2
In the lowest 20% of SES, %	16.3	17.0	16.7	15.2
SEN or extra support, %	21.3	17.1	22.7	24.1
Below average APP literacy, %	60.7	52.4	60.7	69.0
Below average APP numeracy, %	53.8	45.2	53.2	62.9

^aN ranges from 1403 to 2075, ^bN ranges from 466 to 701, ^cN ranges from 465 to 671, ^dN ranges from 485 to 703

SES = Socio Economic Status, SEN = Special Educational Needs, APP = Assessing Pupils' Progress

Table 2 *Outcome Variable Characteristics by Relative Age*

Outcome Variable	<u>All^a</u>	<u>Relative Age</u>		
	Mean (SD)	Oldest ^b	Middle ^c	Youngest ^d
SDQ Total Difficulties teacher reported	6.7 (5.9)	6.4 (5.8)	6.9 (6.0)	6.8 (5.7)
SDQ Total Difficulties parent reported	7.0 (5.6)	6.6 (5.5)	7.6 (6.1)	7.0 (5.2)
PBQ child behaviour in school	1.9 (2.4)	2.0 (2.5)	1.9 (2.5)	1.9 (2.3)
HIFAMS child happiness in school	11.0 (2.4)	11.0 (2.3)	1.0 (2.4)	11.0 (2.4)

^aN ranges from 1403 to 2075, ^bN ranges from 466 to 701, ^cN ranges from 465 to 671, ^dN ranges from 485 to 703

SDQ = Strengths and Difficulties Questionnaire, PBQ = Pupil Behaviour Questionnaire, HIFAMS = How I Feel About My School questionnaire

Table 3 *Linear Regression Analysis to independent association between child mental health, behaviour and happiness with Relative Age (Coefficients Indicate Mean Change Per 30 Day Decrease in RA)*

Outcome Variable	Unadjusted regression ^a	Adjusted regression ^{a,b}		
	Coeff.	Coeff.	95% CI	p
Teacher reported SDQ Total Difficulties	0.08	0.09	0.03 to 0.16	0.007
Parent reported SDQ Total Difficulties	0.07	0.08	0.001 to 0.16	0.05
PBQ child behaviour in school	0.0003	0.004	-0.02 to 0.03	0.76
HIFAMS child happiness in school	-0.0003	-0.0001	-0.03 to 0.03	0.92

Coeff = regression coefficient; CI = Confidence Interval; ^aN=2075; ^badjusted for gender, homeowner status and year group
SDQ = Strengths and Difficulties Questionnaire, PBQ = Pupil Behaviour Questionnaire, HIFAMS = How I Feel About My School questionnaire

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