

The relative age effect and the development of self-esteem

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A recent paper has demonstrated a relationship between suicide during the teen years and the age, relative to one's classmates, at which these individuals entered school. This represents the latest, and perhaps most important, of a series of studies that have focused on the effects of grouping children by age of entry into particular activities. This phenomenon, known as the relative age effect, is strikingly evident in activities that are competitive and where performance is highly correlated with age and level of maturity. To date, relative age research has reported significant and substantial achievement differences within the confines of athletic and academic pursuits. However, with the advent of the study noted above, it now appears that emotional development is also implicated. Here we demonstrate that a relatively young age of entry into the formal educational system is associated with reduced self-esteem several years later. This suggests that self-esteem (or a related factor, such as self-efficacy) serves as an important factor lying functionally between proximal relative age effects and suicide.

Keywords: Emotional development; Family structure; Relative age; Self-esteem; Suicide

Introduction

The relative age effect in sport was first noted among elite-level ice hockey players when it was observed that they tended to be born early in the eligibility year for youth entry into the sport, which for hockey corresponds with the calendar year (Grondin *et al.*, 1984; Barnsley *et al.*, 1985). These findings demonstrated that within the major junior leagues and the National Hockey League, players' birth dates decreased in prevalence from January through December. It was theorized that this relative age effect arose from the consequences of grouping young boys for entry into organized minor hockey, thereby producing a one-year age range for the participants. As size, speed and coordination are highly correlated with age, older players within the age-group will, on average, show superior performance.

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Thus, it can be said that maturity had been mistaken for ability by coaches, peers and the individuals themselves. The resulting expectations that are created for individual children creates a self-fulfilling prophecy that provides age-advantaged children with greater self-confidence and regard by others. The opposite will likely hold for those younger than the average in their age-group, with adjustments to poorer initial performance likely, including lowered self-confidence and self-esteem. One consequence that has been found is an increased drop-out rate for those youthful hockey players that had been disadvantaged by age in the past (Barnsley & Thompson, 1988), suggesting that given the choice, younger children will seek to leave or avoid an activity in which their competitive position is hampered by their relative age. Interestingly and predictably, the relative age effect has also been found in other competitive sports such as baseball (Thompson *et al.*, 1991), world-class soccer (Barnsley *et al.*, 1992; Dudink, 1994) and American football (Glamser & Marciani, 1992). From this research it can be reliably concluded that the relative age effect will be evident, if not profound in children's sports programmes that are characterized by age grouping, competition and selection by ability.

Having arrived at this conclusion, it should be noted that schooling shares many of the structural characteristics of children's sports programmes. Children are age grouped for entry into school, are rated according to achievement, and are placed in different programmes with different curricula and learning options based on these measures of performance. In line with this logic, a large body of literature has consistently reported a strong effect of the age of school entry on academic achievement.

In England, Pidgeon and Dodds (1961) and Jinks (1964) noted that chronological age could not account for such findings, thus paving the way for other explanations such as duration of instruction and relative age. Later investigations showed that school children with a relative age advantage are more likely to have higher achievement (Thompson, 1971; Allen & Barnsley, 1993), to be placed in programmes for gifted children (Maddux *et al.*, 1981) and to be placed in more challenging educational streams or classes (Freyman, 1965; Sutton, 1967). Children with a relative age disadvantage are more likely to be retained ('failed') for an additional year in the same school grade (Langer *et al.*, 1984), to be referred for psychological assessment (DiPasquale *et al.*, 1980) and to be placed in a specialized group or provided with a diagnostic label for remedial instruction (Maddux, 1980; Diamond, 1983). The relative age phenomenon is apparently long-lasting, as effects have been found among 13-year-olds (Kalk *et al.*, 1982) and 15-year-olds (Bell & Daniels, 1990).

As a consequence of these findings, the suggestion has arisen that parents, at least in North America, should postpone school entry for those younger children whose birthday places them near the 'cutoff' for their age-group (Uphoff & Gilmore, 1986). The result of such action would place the children in question among the eldest of their eventual classmates, rather than the youngest. This contradicts an earlier tendency of parents to try to arrange early admission for children who were actually too young to make a particular cutoff (Barnsley & Thompson, 1985). It should be noted that such parental discretion is not available in all countries. In England, for

example, almost all children are educated in the 'correct' grade for their age (Hutchison & Sharp, 1999).

The present study

The relevance of the above to the present study lies in a hypothesized link that was proposed between relative age and suicide. The proposed causal chain involves the following steps: first, relative age produces differences in achievement that are due to maturation, not ability. Second, these differences lead to variation in self-esteem and confidence. Third, low self-esteem and lack of self-confidence are associated with a child's inability to compete with his or her classmates leading to depression and hopelessness respectively. Finally, depression and hopelessness, which have been regarded as essential ingredients of suicide (Beck *et al.*, 1975; Dyer & Kreitman, 1984), become precursors of self-harming behaviour. In fact, a study based on this logic produced findings that were in line with its basic premise. That is, youth suicides in Alberta, Canada, showed higher rates among those who were in the younger half of the school-entry cohort than for those who formed the older portion (Thompson *et al.*, 1999).

This finding, which we think has profound implications for social policy, has rekindled our interest in a study of the hypothesized intermediate role of self-esteem. Simply put, our interpretation of the relative age findings points to lowered self-esteem early in life as a significant link between relative age at school entry and the likelihood of later suicidal behaviour. The purpose of this study, then, was to evaluate the possibility that self-esteem can be determined by age of school entry. It should be noted that this study was conducted with the awareness of the criticisms that have been levelled at the self-esteem construct (Burr & Christensen, 1992). Of particular importance is Seligman's (1991) view that, while self-esteem may reflect an important condition, changing it does not affect other behaviours that are associated with it. With this in mind, self-esteem here will serve as an indication of some form of self-evaluation, without any implication that its manipulation will necessarily ameliorate any associated conditions such as depression or suicidal behaviour.

There is some reason to expect that relative age effects may vary according to the amount of stress that children have to deal with. Rutter (1979) has suggested that while the presence of only one risk factor has virtually no effect, additional stressors produce an exponential increase in emotional disturbance in children. Social problem frequency has a similar supposed effect on the likelihood of exhibiting a psychiatric disorder among adults (Thompson & Bland, 1995). Thus, the analysis to be described below includes a measure of family stress (i.e. intact versus non-intact family structure). The predictions made were (1) greater relative age at 1st grade entry will be associated with increased self-esteem, (2) those who lived with both parents will exhibit higher self-esteem than those who lived with neither, or only one, parent, and (3) those from intact families may not show a relative age effect that is as strong as those who had the additional disadvantage of a broken home environment.

Method

The database

The database used for analysis was created by matching individual student records from two existing electronic data bases. This resulted in a data file containing records of 1129 students, 46% in 1st to 3rd grades, 44% in 4th to 6th grades and virtually all of the remaining 10% being in the 7th to 9th grades. The file included general demographics and information on age at school commencement, self-esteem, and family structure, as well as other academic data not used in the present study. Once the matching process was completed, personal identifiers (e.g. student names, ID numbers) were deleted from the research file.

Individuals under age 16 at time of testing were administered the child form of the *Culture Free Self-Esteem Inventory* (Form A: Battle, 1981), and the remainder were administered the adult form (Form AD). This paper-and-pencil test was standardized on boys and girls in the 2nd to 9th grades in Canada and the USA. This instrument comprises a number of sub-scales (not presented here) that can be summed to produce the total self-esteem score that was used in the present study. Test-retest reliabilities as reported in the Manual (Battle, 1992) ranged from 0.72 to 0.93 for Form A, and 0.79 to 0.82 for Form AD. As suggested in the Manual, raw scores were converted to T-scores (mean = 50, Std. Dev. = 10) to allow meaningful comparisons across test forms.

Analysis

Relative age simply means one's age in comparison to the age of others in that person's cohort. Here, we used the calculation of age (in years and months) at 1st grade entry, regardless of 'current' age and grade. In accord with regular school procedure, those with the correct age for 1st grade entry would range from age 5 years 6 months to 6 years 5 months. We also analysed the records of those falling within three months of the outer limits of the correct age for grade limits to allow an examination of the data for those who entered 1st grade at an extraordinary age. More extreme age departures were not considered in the analysis.

Results

Mean total self-esteem data according to age at entry into 1st grade (grouped into three-month age categories) and family structure (living with both parents versus one or neither) are shown in Figure 1. In general, we see a linear increase in self-esteem as age at entry increases ($F_{1,1105} = 2.49$, $p < 0.03$), with a *post hoc* analysis showing no significant departure from linearity ($F_{4,1123} = 0.17$, $p < 0.96$). This was true regardless of family structure, but the self-esteem of those from broken homes was considerably lower at all of these ages ($F_{1,1105} = 20.36$, $p < 0.001$). The effect of family life on child development has often been mentioned (e.g. Bronfenbrenner, 1979), and is corroborated here by this finding of a substantial family structure effect. However, we did not find an interaction between relative age and family structure

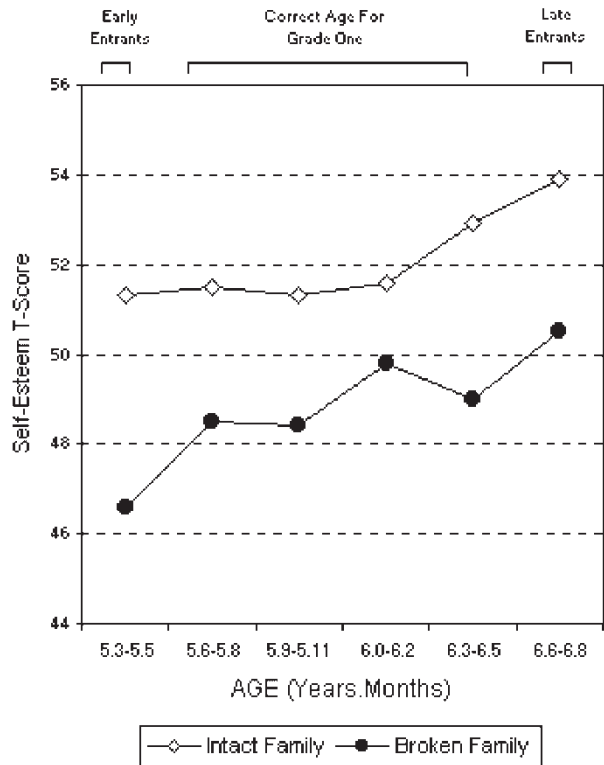


Figure 1. Variation in total self-esteem as a function of family structure and age at entering 1st grade

($F_{5,1105} = 0.40$, $p < 0.85$), thus providing no support for our hypothesis that life within an intact family would neutralize relative age effects. Family structure and relative age, then, appear to operate independently and in an additive manner.

It is interesting that the highest self-esteem was displayed by those who were over-age for 1st grade entry. Why did these children enter 1st grade a year later than their eligibility allowed? C. Varnhagen, of the University of Alberta (personal communication, 1992), has noted that the school board in question allows parents of relatively young, 1st grade eligible children, to hold back these youngsters for one year (about 20% to 30% take advantage of this offer), in effect, changing the status of these children from being among the youngest in the class to being counted among the eldest when they do eventually begin the 1st grade.

Discussion

Educators, and many of us who have reminisced about our early influences, will intuitively grasp the causal relationship between competition with others who are older than ourselves and subsequent self-assessment and emotional response. Yet, to our knowledge, this is the first time that this has been demonstrated empirically. Our findings implicate structural aspects of society that may have been set up for one

purpose, but may produce harm to some that 'out-balance' the intended positive effects.

This is particularly notable in relation to differences observed between the early and late entrants. Given that the early entrants were probably perceived by parents, school district and teachers as being precocious and thus having the ability to function, if not excel, in school at an early age, it is important to note that a consequence of this decision was the lessening of the self-esteem of these individuals. As ability and self-esteem interact in direct and subtle ways to influence long-term achievement, risk-taking and, ultimately, life successes, it is paradoxical, and should be of great concern, that these potentially highly achieving children are perhaps being impeded, rather than advantaged. In fact, the data suggest that had these children enrolled in school at the regular time, their self-esteem would have been substantially higher, thereby producing the opportunity for the interaction with their exceptional abilities that was originally sought.

Similarly, the findings with regard to the late entrants are really counter-intuitive. The late entrants, some of whom may have been judged to require extra time for maturation, realized the highest self-esteem of all. Perhaps the overriding motivation in holding these children back was not to deal with a deficit in maturation, but rather to take advantage of the relative age benefits that accrue to those who are held back. This is a matter for further research. In any case, to the extent that high self-esteem may mitigate developmental disadvantage, the decision to delay school entrance was well considered.

This finding, then, has particular relevance for parents who may be faced with questions regarding their child's entry into school or other competitive, age-grouped activities and, especially, for those who may be considering an attempt to enter their child early. The evidence is quite strong that such children are at a substantial disadvantage and that the long-term effects are potentially damaging. The attractive action, in this context, is to simply hold a relatively young child out of school for one year. This would allow an additional 12 months of maturation before placement in the competitive classroom environment, thus putting the child in question in a position of relative age advantage with an attendant shift in the odds towards healthier emotional development and greater achievement. While this is fine from the view of a parent, from a public policy point of view it should not be expected to provide a benefit to children overall. Each child who gains advantage by being held back exposes another at the other end of the spectrum to a matched level of disadvantage. Clearly it is unacceptable that such important advantages and disadvantages accrue to children simply by virtue of their birth date.

While it is clear that relative age is associated with self-esteem, it should be remembered that this investigation has dealt only with relative age effects due to age of school entry. There will also be similar effects due to age of entry into various sports and other competitive pursuits. Furthermore, other structural aspects of our society that confer advantage or disadvantage would also affect the self-appraisal of a developing child in a similar fashion. Indeed the amount of variance accounted for here is not large. Future investigations may benefit from consideration of relative age effects in a more comprehensive manner.

From a societal point of view, it should be noted that relative age, while of great structural importance, is not the defining concept of its own effect. We see it as one aspect of a larger notion, the development of self-appraisal and the conclusions drawn from it. This involves a number of other related, and sometimes competing, concepts like self-efficacy, self-esteem, mastery, self-image, and so on. It is not our purpose to deal with this matter here, but to point out that we are contending with an entity that is much broader than birth date, and that in some form, has a significant effect on later happiness, health and social behaviour. It should be a goal of further research to identify ways in which the mechanisms that produce relative age differentials that favour some children over others can be changed, so that the benefits of any activity in question can be optimally applied to all children. But this structural approach does not represent the whole story. There are many ways to ensure that all children develop positive self-appraisals, and many of these will buffer negative relative age effects or supplement the positive ones. Research is needed to account for these and to describe their function in this context.

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