

School Influences on Children's Development

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Introduction

Schooling has direct effects on children's educational achievement, their acquisition of literacy, numeracy and scientific knowledge. These basic skills provide the foundation for later "subjects" such as geography, physics and foreign languages. Formal educational qualifications are the key to a child's entry into higher education or training and also employment. The learning of specific knowledge and skills is a direct effect of classroom teaching (Good & Brophy, 1986b). However, social cognitions and feelings are also influenced by school and these may be just as powerful in predicting later outcome as intelligence or school curriculum. Such indirect effects of school are more elusive because they are mediated by children's motivation to learn or avoid learning, their conception of themselves as pupils, and the attributions they create for explaining success and failure. Cognitive and motivational mediators of indirect effects continue to exert influence on individual development outside and beyond school.

This selective review considers the evidence concerning direct and indirect effects of school on children's development. Section 1 examines the evidence on the effect of pre-school education on children's academic attainment, social behaviour and cognitions. There are several well designed experimental studies of the impact of pre-school education which have included follow-up through young adulthood. These landmark studies employed randomised designs which contrasted the development of children who had and had not experienced pre-school education, thus allowing causal models to be devised which suggest lasting benefits of pre-school education, especially for those from disadvantaged backgrounds.

Section 2 outlines a few of the major studies on the effect of primary schooling. Research on the effects of primary and secondary education does not withhold education from children, thereby necessitating either natural experiments or correlational designs employing sophisticated statistical techniques, over time, to

Keywords: School effects, pupil cognitions, pupil attributions, academic self concept

Accepted manuscript received 29 July 1993

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unravel those experiences associated with better outcomes for different groups of children. Methodological weaknesses are discussed and the characteristics of "effective schools" are outlined.

The remainder of the paper examines the means by which schools influence development. It examines mechanisms which might underlie the influence of schools. Section 3 examines the ways education shapes pupils' attributions, motivations and beliefs about self. Section 4 looks at social participation and social responsibility in terms of its influence on attainment. Section 5 examines teacher influences and Section 6 looks at the ways classroom size and organization contribute to students' outcome. Thus, the extent of school effects are presented first, followed by consideration of mediating factors (cognitive, motivational, organisational) which might underpin them. The final section explores the direct and indirect effects of school and considers developmental trends.

The review focuses primarily on pre-school and primary school evidence, mentioning secondary research only to fill in gaps or explore methodology. It concentrates as much on "development" as on specific educational outcomes such as subject knowledge or skill. The review is limited to research on "mainstream" pupils because inclusion of those with special needs would have made the task unmanageable.

1. The Effects of Pre-school Education on Children's Development

Since education often begins before compulsory school, this review begins by examining the evidence on the effects of pre-school education.

Early programmes of "compulsory education"

The American project Head Start, a legacy of Lyndon Johnson's War on Poverty (Valentine, 1979) has received government funding for two decades in the hope that it would "break the cycle of poverty". A simple comparison design was used in early studies on the impact of Head Start. Typically, I.Q. or attainment test scores of pre-school "graduates" were compared to scores of control children who had no pre-school experiences. Initial evaluations seriously underestimated the value of the programme (Campbell & Erlebacher, 1970; Smith & Bissell, 1970) by focusing on measures of intelligence as the main outcome. Sadly they found that early I.Q. gains quickly washed out, leaving Head Start children no different from controls.

The British research mirrors that for the US with interventions during the 1970s aimed at "closing the poverty gap" leading to disappointment (Smith & James, 1977; Tizard, 1974) when the initial gains tended to "wash out".

More recent evaluations have employed sophisticated research methods and looked at a wider array of child outcomes. In 1985, a meta-analysis of research findings on the American Head Start programme was published (McKey *et al.*, 1985). This included the results of 210 studies evaluating the impact of Head Start. To enable comparison amongst the studies, findings were converted to statistical "effect sizes" and comparisons were made across different sites, target groups and tests on children. McKey and his colleagues concluded that Head Start had immediate, positive effects on children's cognitive ability but that cognitive gains were no longer apparent after

the end of the second year at school. Head Start also had short-term positive effects on children's self-esteem, scholastic achievement, motivation and social behaviour, but these advantages disappeared by the end of the third year. The authors point out that the studies were designed so differently and varied so widely in terms of rigour that it was impossible to come to firm conclusions on many questions, including those concerning the role of parental involvement. Most studies included in this research synthesis did not control adequately for pre-intervention differences in children's ability, many studies were on one site only, and a few had no "control" groups.

The smaller, better controlled studies of the effects of Head Start have yielded more robust findings. A well designed study by Lee, Brooks-Gunn and Schnur (1988) compared the outcomes of 969 disadvantaged children who had experienced three different pre-school environments: Head Start, some other pre-school programme and no pre-school. Large, initial differences on a wide range of outcomes were found at school entry, with Head Start children lower on almost all measures. After adjusting for initial scores (because those in the Head Start sample were lower), Head Start children showed *larger gains* on measures of social and cognitive functioning compared with children in the other two groups. Often children in Head Start begin school with lower levels of functioning since many researchers have found children participating in Head Start come from families of serious social disadvantage (Seitz, Abelson, Levine & Zigler, 1985) including lower levels of income and education (Hebbler, 1985). Thus, in Lee's study, Head Start was effective in "closing the gap" but did not succeed in doing so completely because its children began at greater levels of disadvantage.

Notable in Lee's study were the large gains made by black children in Head Start. "Pre-school intervention is particularly effective for the most economically disadvantaged children" (Zigler, 1987). Lee *et al.* reported that black children gained more than white children, even when controlling for initial levels of ability. Further, black students of below average ability gained more than their counterparts of average ability. Lee affirmed the effectiveness of Head Start:

not only were those students most in need of pre-school experience likely to be in Head Start programs, but also that those Black students who exhibited the greatest cognitive disadvantage at the outset appeared to benefit most from Head Start participation. (Lee *et al.*, 1988, p. 219).

Research studies designed as experiments

The failure to find a *long-term* impact of early education has not been confined to Head Start (see Porter, 1982, on Australia and Myers, 1992, on the developing world). However, there is cause for optimism when examining research on programmes which are *not* part of large government initiatives. Lazar and Darlington (1982) carried out a meta-analysis of the effects of pre-school education programmes which were part of research projects rather than government programmes. They ignored the garden-variety programmes (which included Head Start) to focus on projects of good curricular quality, mostly aimed at disadvantaged groups, which employed rigorous research designs. The meta-analysis was limited to pre-school projects with sample sizes greater than 100 children, which used norm-referenced assessment tests, comparison/control

groups, and followed up children well beyond school entry. By these strict criteria 11 carefully monitored programmes were chosen for meta-analysis, half using random assignment. The researchers located approximately 2000 pre-school "graduates" and their matched controls in order to document educational and employment histories. In addition they interviewed the youth, all aged 19, and their families.

Results from the 11 studies showed that attendance at excellent, cognitively oriented pre-school programmes was associated with later school competence. Pre-school graduates were less likely to be assigned to "special" education or to be held back in grade while their peers moved up, and where data were available, were more likely to be in employment. Interviewers found that pre-school graduates were more likely than the control group to give achievement-related answers to the invitation "tell me something you've done that made you feel proud of yourself". When parents were interviewed about attitudes towards school performance, mothers of pre-school graduates expressed more satisfaction with their children (even after controlling for the actual performance of each child). The greater satisfaction with school work appears related to the mother's aspirations for their children's employment. In answer to the question "What kind of job would you like (your child) to have later in life?", mothers of children who attended pre-school replied with skilled or managerial jobs.

Taken together with the "harder" outcomes, the attitudinal findings suggest that early education changed the achievement orientation of the family. Mothers whose children attended pre-school expected more from their children, and these expectations were fulfilled. The children themselves showed more pride in their achievements. Lazar and Darlington have constructed a theoretical model to explain their findings.

. . . it seems possible that mutual reinforcement processes occurred between the early education participants and their parents. Perhaps the children's participation raised the mothers' hopes and expectations for their children . . . Perhaps children interpreted these parental attitudes as a belief in and support of their efforts, and it served to spur them on. Along these lines . . . (it is) hypothesized that the early education experience may change children from passive to active learners who begin to take the initiative in seeking information, help, and interaction with others. When this increased motivation to learn is met by a positive response at home and at school, long-term gains on outcome measures of cognitive development can result. (Lazar & Darlington, 1982, p. 63).

The most carefully controlled of the 11 programmes reviewed by Lazar was the Perry Pre-school Project, later known as High/Scope. This active-learning curriculum includes a complex training scheme for staff, and parent participation. Research on it employed random assignment to experimental and control groups and has been carried out for almost 30 years. Although an initial I.Q. advantage for pre-school graduates disappeared by entry to secondary school, there were startling differences in outcome between the 65 children who attended the half-day educational programme over two years and the control group of 58 children who had remained at home (Berrueta-Clement, Schweinhart, Barnett, Epstein & Weikart, 1984). By the age of 27, the High/Scope "graduates" had

- significantly higher monthly earnings at age 27 (29% vs 7% earning \$2000 or more per month)
- significantly higher percentage of home ownership (36% vs 13%) and second car ownership (30% vs 13%)

- a significantly higher level of schooling completed (71% vs 54% completing 12th grade or higher)
 - a significantly lower percentage receiving social services at some time in the past 10 years (59% vs 80%)
 - significantly fewer arrests by age 27 (7% vs 35% with 5 or more), including significantly fewer arrested for crimes of drug taking or dealing (7% vs 25%).
- Schweinhart and Weikart (1993) speculate on the mechanisms which brought about such lasting change in disadvantaged children.

The essential process connecting early childhood experience to patterns of improved success in school and the community seemed to be the development of habits, traits, and dispositions that allowed the child to interact positively with other people and with tasks. This process was based neither on permanently improved intellectual performance nor on academic knowledge. (Schweinhart & Weikart, 1993, p. 4).

Despite the attraction of so persuasive a theory, Weikart and his colleagues present little evidence from primary school to demonstrate the emergence of altered cognitions and motivations which they suggest underpin the "virtuous career" of children who had attended the High/Scope nursery school. Still, Schweinhart and Weikart (1993) present a cost-benefit analysis which shows that for every \$1000 that was invested in the pre-school programme, at least \$7160 (after adjustment for inflation) has been or will be returned to society. These calculations were based on the financial cost to society of juvenile delinquency, remedial education, income support, and joblessness—set against the running costs of a well-resourced pre-school programme. The economic analysis also estimates the return to society of taxes from the higher paid pre-school graduates.

There have been two other cost-benefit analyses carried out on pre-school interventions, both in the US. Barnett and Escobar (1990) present American data from a pre-school language intervention curriculum studied by Weiss and a comprehensive early day care programme for disadvantaged families studied by Seitz *et al.* Both showed that the costs of the pre-school interventions were more than offset by the savings later on in the children's educational career and medical history.

Although American studies do not suggest that *all* pre-school programmes will bring lasting benefits, they demonstrate that early education can change the course of children's lives, especially those from disadvantaged backgrounds. Although samples are often small, the experimental designs and longitudinal follow-up give strong support to the claim that the pre-school experiences actually *caused* the beneficial and cost-effective outcomes.

In a later study, Weikart and his colleagues compared the effects of three different curricula on randomly assigned children (Schweinhart, Weikart & Larner, 1986). They found that children from a High/Scope programme, a "free play" programme and also a formal skills-based curriculum all had increased I.Q.s at school entry. However, follow up at the age of 15 showed that children who had attended the formal programme engaged more in anti-social behaviour and had lower commitment to school than those who attended the two programmes based on active learning/play. Thus, raised I.Q. at school entry does not necessarily give children a good start to school. Only the children who experienced active learning programmes before

school retained the advantage of their early education, an advantage they showed by pro-social behaviour and higher confidence in adolescence.

There is considerable debate about why programmes such as High/Scope are so effective. One causal model supported by path analysis suggests that pre-school education promotes cognitive and social skills that result in greater school readiness and a smoother transition to school (Berrueta-Clement *et al.*, 1984). Children leave the nursery "ready to learn" and are easily recognised by teachers, who show positive expectations and treatment, and this, in turn, fosters improved student attitudes towards school and better school behaviour (called "school commitment" by Weikart and colleagues). These serve as protective factors against the later risk of maladjustment and delinquency. Schweinhart and Weikart (1993) argue that well resourced, cognitive orientated pre-school programmes such as High/Scope should be effective outside the original setting in which the research took place.

Woodhead (1985, 1989) questions this; he suggests that the explanation for lasting benefit in the longitudinal American studies is differential retention at grade or referrals to special education. Children in the pre-school group in Lazar's meta-analysis were less likely to be held back while the year-group moved up. If avoidance of grade retention, rather than the emergence of "bright and ready" graduates is what sets children on different pathways, then the positive results seen in these studies may not generalise to other settings where grade retention is not practised.

The next study to be reviewed is a quasi-experiment conducted by Jowett and Sylva (1986) on 90 working class children in Britain. This research examined the impact on the first year of school on two groups of children, one coming from well resourced state nursery education and the other from voluntary playgroups run by parents. Although the "quasi-experiment" did not employ random assignment to treatment condition, many background variables which might affect outcome in the two groups of children were carefully controlled (e.g. parental occupation, family structure, type of housing). Parent choice was eliminated to some extent because children were drawn from neighbourhoods where there was only one form of half-day education: *either* playgroup or nursery education. Previous research on provision in the same education authority (Sylva, Roy & Painter, 1980) showed curricular variation with the playgroups run along "free play" lines and nursery classes focusing on "guided play" and "extension" of children's own activities by highly trained adults. The researchers hypothesised that children from the better resourced provision would be recognisable by their teacher when they entered school as more "learning orientated".

Results confirmed that the children who had attended nursery engaged in more purposeful and complex activity in the first year of school than did the children who attended playgroup. During "free choice" sessions in the reception class, the nursery "graduates" chose more educational activities while the playgroup children spent more time engaging in non-demanding play. Nursery children were more likely than the playgroup children to initiate contacts with the teacher that were "learning orientated" while the playgroup children approached teachers for help. Finally, nursery "graduates" were more persistent and independent when they encountered obstacles in their learning. This study shows that the kind of pre-school education a child experiences affects the ease with which children begin their school careers.

Furthermore, it provides evidence for Weikart's hypothesis that children characterised by learning orientation can be easily recognised by their classroom behaviours.

Education in day care settings

There is still disagreement amongst scholars as to whether early entrance into day care, say before the age of one, is detrimental to children's later development (Clarke-Stewart, 1989; McGurk, Caplan, Hennessy & Moss, 1993). Hennessy and Melhuish (1991) reviewed the effects of day care on school adjustment and found mixed results; often day care was associated with better grades and social acceptance (Field, 1991) but sometimes with worse.

A longitudinal study by Osborn and Milbank (1987) on more than 8400 children born in the UK during 1970 showed a clear association between pre-school attendance and educational outcomes (reading, maths) and social ones (behaviour problems) at the age of 10. The authors argued that pre-school attendance *brought about* the better cognitive performance seen in children who had attended pre-school "education" but not those who attended "care". But is the causal evidence firm? Birth cohort studies do not randomly assign children to different pre-school experiences; these researchers used *post hoc* statistical analysis for differential intake. Clark (1988) queried whether the statistical adjustment could completely eliminate factors such as family choice or parental interaction. In the '80s we have been taught to measure the "value added" component (see Section 2). However, the longitudinal study shows clearly that many day care children fare worst of all in later life. Explanation for their poor outcome may lie in identifying those families who managed to obtain one of the places in government day care. McGuire and Richman (1986) found that children attending day care centres run by UK Social Services Departments had 10 times more behaviour and emotional problems as children in the same neighbourhood attending playgroups. The educational outcome of day care may rest on social balance in enrolment and perhaps on age of entry.

Swedish longitudinal research by Andersson (1989, 1992) and Cochran and Gunnarsson (1985) found day care experience gave children a better start in school. Andersson examined the development of 128 children who attended neighbourhood day care centres in Gothenburg where both low and middle income families routinely sent their children. Progress was monitored from the children's first year in day care to the age of 13. No developmental disadvantage was found in the day care group compared to children who had stayed at home. In fact, the highest performance in school tests and the best emotional adjustment was found in the children who had experienced the *most* day care, even before the age of one year. This study is important because it shows that the benefits of pre-school education are not confined to those from disadvantaged backgrounds.

An interesting study in the US by Howes (1990) focused on 80 children in deliberately contrastive care. Half were enrolled in excellent centres and half in poor ones. "High quality" centres were characterised by the following: (1) stable child care arrangements such that children interacted with just a few primary caregivers in any one day; (2) low staff turnover so that children were cared for by the same individuals over several years; (3) good staff training in child development; and (4) low adult: staff ratios.

After controlling for family background and individual differences that might affect their development, Howes found that children enrolled in the higher quality centres had better educational and social outcomes at school. The children from low quality centres did particularly poorly when they had been enrolled in day care before their first birthdays. These "early entry" children were distractible, low in task orientation and had considerable difficulty getting on with peers. This mirrors an earlier study (Howes, 1988). A study to be described later (Ladd, 1990) suggests that their social pre-school difficulties may have contributed to later educational deficits. While commenting on this and other research McGurk *et al.* (1993) make a plea for considering the quality of provision, the social context of the community and even the national/cultural policy towards child care in all future research on its lasting effects.

Curriculum matters?

An effective pre-school curriculum must do more than instil a few facts or simple cognitive skills. The High/Scope programme (Hohmann, Banet & Weikart, 1979) described earlier was based on the Piagetian theory of active learning. Central is the *plan, do* and *review* cycle. In small groups children plan what they will do each day in a long session called "work-time". After planning they go to defined areas to carry out their plans. When finished, children take turns to review with peers and adults the outcome of their plans. Although the focus on active learning is Piagetian, the planning and reviewing of the High/Scope dialogue owes much to Vygotsky's (1962) work on effective instruction within the zone of proximal development. Children are led towards the outer bounds of their own competence by a skilful tutor who aids representation, shapes motivation and self efficacy (see work of Bandura, 1981) while discussing plans, outcomes and revisions. In the High/Scope curriculum children learn to be self-critical, without shame, to set high goals while seeking objective feedback. There is deliberate encouragement to reflect on efforts and agency, encouragement to develop persistence in the face of failure and calm acceptance of errors. This curriculum is explicit about its means to nurture learning-orientation based on intrinsic rather than extrinsic goals, and co-operative habits. Its programme aims to help children acquire resources for dealing with the stress of failure and the belief that achievement is not God-given but acquired through effort.

Why is pre-school education effective?

The positive conclusions to be drawn from these studies are not new. In 1985 (a,b) Michael Rutter reviewed the literature on the effects of education on children's development and concluded that: "The long term educational benefits stem not from what children are specifically taught but from effects on children's attitudes to learning, on their self esteem, and on their task orientation." Further "learning how to learn may be as important as the specifics of what is learned" (Rutter, 1985a, p. 700). Nearly a decade later we can put in place some of the pieces unavailable when Rutter wrote his classic review. The most lasting impact of early education appears to be children's aspirations for education and employment, motivations and school commitment (Sylva, 1992). These are not moulded directly through experiences in

the pre-school classroom but are indirect effects of children entering school with a learning orientation and beginning a "pupil career" with confidence. This enables them to avoid early school failure and placement in special education, two critical markers that constitute major turning points in the lives of many children (Maughan, 1988). Early childhood education may be viewed as an innovative mental health strategy that affects many risk and protective factors (Weissberg, Caplan & Harwood, 1991).

2. The Effects of Primary School on Children's Attainment, Attitudes and Behaviour

The strongest research design for examining the effects of any educational experience on children's lives is to compare those who have attended it with those who have not. The most convincing pre-school research has used experimental designs. Because (near) universal enrolment amongst children aged 6-16 makes a treatment/control design impossible in developed countries, researchers turn to other methods. One means for measuring the effect of school is to contrast educational attainment during term time with that during summer vacation. Heyns (1978) carried out a longitudinal study on 4866 children aged 11-12 years in 42 Atlanta schools. Information was collected through tests and interviews and the effect of schooling estimated by contrasting gains when schools were open with those when they were closed. In addition, children's summer activities were studied to assess the relative impact of summer schools, family holidays and library use. Rates of learning were higher during the school year than during the vacation but they found that

Learning rates of children are contingent on socioeconomic status more directly during the summer than when schools are in session . . . The determination of achievement during the school year seems more directly dependent on prior achievement level. (Heyns, 1978, p. 77).

The single summer activity most strongly and consistently related to learning was reading which had a substantial effect on achievement, largely independent of family background. In fact, sex and distance from the library were more important predictors for reading than family social status. Although this impressive study shows that schooling makes a significant contribution to cognitive growth, schools did not equalise outcomes in an absolute sense because relatively advantaged students learned at a faster rate during the school year as well as the summer. However, the gap between black and white children, and between more or less disadvantaged children, widened disproportionately during the summer. Heyns hypothesised that higher status children were not as dependent on schooling for their learning as those from disadvantaged backgrounds.

A second way to investigate the impact of schooling is to compare the effect of different schools on the development of their pupils whilst controlling for intake ability. When differences are found, or better still explained, researchers conclude cautiously that a given type of schooling affects pupil outcomes such as academic attainment, school behaviour or attitudes. Although, we know little about the effects of schooling

compared with its absence in developed countries, we know a great deal about the differences in schools which are related to successful pupil outcomes. By looking at the difference between, say, reading scores in the best vs the worst schools, we can begin to estimate the overall effect of school *per se* on the development of reading.

In the last two decades there has been an explosion of studies on "school effectiveness" (Rutter, Maughan, Mortimore & Ouston, 1979; Mortimore, Sammons, Stoll, Lewis & Ecob, 1988a; Gray, McPherson & Raffe, 1983; Ainley & Sheret, 1992; Creemers & Lugthart, 1989; Creemers & Scheerens, 1989) and these have yielded remarkably similar findings. Although their designs have been criticised in terms of scope and methodology (Clark, Lotto & Astuto, 1984; Murphy, 1985; Good & Brophy, 1986a; Bosker & Scheerens, 1989; Raudenbusch, 1989; Rutter, 1983) the fact that the studies have taken place in several different countries, with children in primary as well as secondary education, and on children from a wide range of social backgrounds all give support to the claim that school exerts a strong influence on development.

Increasingly sophisticated studies show that some schools promote positive effects and others negative ones (Scheerens & Creemers, 1989; Fraser, 1989). Moreover the same school may have positive effects on one group of pupils and negative effects on others, depending on gender, social class or ability. Overall, however, good schools tend to do well by most of their pupils and poor schools fail a wide range of students (Mortimore *et al.*, 1988a).

For years researchers in this area have been thwarted by the fact that different schools have different pupil intake, making it impossible to carry out direct comparisons across schools in pupil attainment. Various methods have been developed by researchers to deal with the problem of differences in pupil intake, with methods ranging from simple standardisation through multiple regression to multi-level modelling. However, they cannot fully compensate for the fact that random assignment of different pupils to different kinds of schools, as seen in pre-school evaluations, is a political impossibility.

The research design employed in most studies of school effectiveness is straightforward. A series of outcomes is selected, say basic skills of numeracy and literacy for primary schools or subject grades for secondary schools. Sometimes psychological outcomes are selected too and these may include self-esteem or anti-social behaviour like delinquency. The second stage of the procedure is to collect information on the characteristics of the pupils who enter the schools in the sample. This information may include earlier attainment scores, attendance rates and classroom behaviour along with information about home background, occupation of parents and ethnicity. Finally, "outcomes" (tests, behaviour ratings, attendance records) are measured when students leave the school or the grade which is the formal end of the study. Using complex statistical techniques researchers attempt to take into account the students' entry profiles when assessing their exit attainment. The contribution to progress made by each school is now known as the "value added" component (Reynolds & Cuttance, 1992). (See Reynolds & Cuttance, 1992, for a critical discussion.)

The "value-added component" shows what the school has *added* to its pupils' progress over and above what they brought to school from previous education or from home. Most of the recent research uses Multi-level Modelling (Paterson & Goldstein,

1991) or similar techniques. This is an extension of ordinary multiple regression which takes into account the hierarchical nesting of children within classrooms within schools, allowing the educational and social outcomes of pupils enrolled in different schools to be compared, *after taking into account different entry profiles*. The "School Effectiveness" researchers have shown that:

- a. Scholastic attainment varies considerably amongst schools regardless of the individual and social characteristics of pupils entering them. Rutter *et al.*'s (1979) *Fifteen Thousand Hours* forged new methods which showed the existence of effective and ineffective secondary schools. This ground-breaking study disagrees sharply with claims (Coleman *et al.*, 1966; Jencks *et al.*, 1972) that schooling has no significant effect on attainment.
- b. School characteristics influence their pupils' attitudes to school, as measured in attendance and also their feelings about classes and subjects (Mortimore *et al.*, 1988a; Tizard, Blatchford, Burke, Farquhar & Plewis, 1988).
- c. Effective schools influence rates of attendance (Mortimore *et al.*, 1988a) and antisocial behaviour (Gray *et al.*, 1983).

Two large studies of British primary schools have yielded comparable data on student progress, both showing clearly the impact of schools. Tizard *et al.* (1988) followed the progress of more than 300 children in 33 schools between the ages 5 and 7 years and Mortimore *et al.* (1988a) studied 2000 children aged 8–11 years in 50 schools. Both found wide variations in the rates of progress made by children of different ethnicity and gender. More importantly these and similar studies established that differences in the average *progress* of students in different schools is less tied to factors of home background (Douglas, 1964) than the more traditional measures of *attainment*. Mortimore *et al.* (1988a), used three types of measurement: pupil intake, pupil educational outcomes, classroom and social environment. Parents and teachers were interviewed, children were given standardised tests of reading and mathematics (cognitive outcomes) and self-report interviews (non-cognitive outcomes) were carried out. The major finding of this research was that the school makes a larger contribution to the explanation of progress than is made by the pupils' sex, age or social background.

Mortimore, Sammons, Stoll, Ecob and Lewis (1988b) report that their statistical model explained about 30% of the variance in an aggregate score of pupil progress. Of this, 25% was due to school factors and only 5% to home background, after adjusting for entry scores. More specifically, by the end of the third year, variations in pupil progress in reading, mathematics and writing quality—but not attendance—owed more to school membership than family background. There follows a list of cognitive outcomes and the percentage of variance in progress is explained in each of them at the end of the study.

	% Variance in progress
Reading	23.6
Mathematics	23.1
Writing quality	19.7

Source: Mortimore *et al.*, 1988b, p. 26

Analysed another way, the best school's reading marks were 28% higher than average (out of 100 marks) while the worst school's marks were 19% lower than average.

In addition to academic outcomes, some studies have explored the impact of different schools on children's feelings. Using a technique of "smiley faces" Tizard *et al.* (1988) studied children's feelings about their going to school, their teachers, and their school subjects (e.g. maths) and activities (e.g. reading to the teacher). Again, different schools appeared to engender different feelings of liking or disliking. Mortimore *et al.* (1988a) showed that schools influenced attendance patterns as well.

After establishing school effects, researchers seek processes which might explain the success and failure of individual schools. The most sophisticated research deals with "process" by attempting to pinpoint those aspects of the school's functioning (e.g. leadership, curriculum, staff expectations) which differentially contribute to its effective or ineffective role in enhancing the development of pupils. Edmonds' (1979) initial list of factors associated with successful schools has stood the test of time; although criticised by Scheerens & Creemers (1989). It includes:

- (a) strong educational leadership;
- (b) high expectations of student achievement;
- (c) emphasis on basic skills;
- (d) a safe and orderly climate;
- (e) frequent evaluation of pupils' progress.

Comprehensive reviews of this topic appear in Mortimore (in press a, b). Sometimes these five factors are considered aspects of school leadership (e.g. Sweeney, 1989) and sometimes they are seen as aspects of "school climate" (Scheerens & Creemers, 1989). This line of research has spawned scores of school improvement projects, practical interventions which, inspired by research findings, aim to improve the functioning of whole schools. Cross (1990) reports more than one thousand "effective school" intervention programmes in the US alone and Fullan (1982, 1991) offers trenchant suggestions how to carry them out.

Still, despite agreement about the existence of school effects, there is still too little theory to explain them.

It is important that the findings of school effectiveness should now be incorporated into some kind of theoretical framework in order to gain the maximum value from all the empirical work and to seek to identify the underlying patterns of activity . . . My own view is that the most productive use of theory would be to begin to construct a set of postulates to be tested empirically, and for these postulates to be focused on the mechanisms of school improvement. (Mortimore, 1991, p. 224).

Mortimore links this call for intervention research to the need for cost-benefit analysis. The unit of intervention would be the school, although information on "mediating factors" such as classroom interactions would be useful.

A thorny problem for theory that some factors belong clearly to the school level (such as leadership) whereas others may operate at the classroom level (emphasis on basic skills). Are classrooms or whole schools responsible for the greatest impact? A secondary analysis study by Scheerens, Vermeulen and Pelgrum (1989) on mathematics attainment in 17 countries suggests that more variance in pupils' mathematics achievement lies between classes than between schools when school and class are treated as independent variance components. These authors conclude that the case for "effective classrooms" is stronger than that for "effective schools". A

similar criticism is that research on school effectiveness is not sufficiently sensitive to subtle classroom interactions between teachers and pupils (McNamara, 1988). Bennett (1988) criticises *School Matters*:

this study (Mortimore *et al.*, 1988a) . . . ignored a cluster of classroom variables including the presentation, sequencing, level and pacing of curriculum content, the matching of tasks to children, and the diagnosis of children's work. (p. 24).

Methodological matters have come to the fore several times with respect to causal factors in development. Some claim that establishing causal mechanisms can only be done by studies which are both longitudinal (i.e. correlational) and experimental (Bryant, 1985; Nesselrode & Baltes, 1985). The pre-school studies in Section 1 are closer to this model than the research on School Effectiveness in Section 2, a weakness acknowledged by Rutter *et al.* (1979). In a welcome move, researchers are turning to the longitudinal/ experimental method for studying mechanisms which underpin educational progress. (See Adey & Shayer, 1993, on science education and also Bryant & Bradley, 1985, on reading.)

One further way to justify causal inferences in the absence of an experimental design is to establish *consistency* across different educational outcomes, over time, across different phases of schooling and for pupils of different characteristics, including gender and ethnicity. A recent review (Sammons, Mortimore & Thomas, 1993) has shown at least moderate consistency in all four areas, with greatest consistency of school effects in academic subjects but less consistency within schools between academic and behaviour measures. This is a promising new way to demonstrate that statistical "school effects" are both enduring and real.

In searching for a more comprehensive theory in school effectiveness work, researchers may draw on theories from organisational management (Scheerens & Creemers, 1989). The very breadth of this enterprise has made agreement difficult to achieve but there is no doubt that schools *do matter* in children's development. Recent debate does not concern the existence of effects, rather it centres on explanations for them, including the relative contribution of the whole school or the classroom.

3. Pupil Cognitions, Motivations and School Performance

Sections 1 and 2 have shown that both pre-school and statutory schools exert sizeable effects on the pupils' development, including scholastic attainment, attendance and social behaviour such as delinquency and employment. The remainder of the review makes an abrupt shift in the argument to focus on psychological and educational mechanisms which might explain the reasons behind the impact.

Mastery vs helplessness in problem-solving

For the past 15 years a group of American psychologists have been exploring academic motivation and attribution via a series of ingenious experiments involving problem-solving. The bedrock of this work is an experimental procedure whereby children are given a series of problem-solving tasks in which success is assured, followed

by tasks designed to promote failure (Dweck & Leggett, 1988; Dweck, 1986). They found that children responded with two different patterns of behaviour when failure trials began.

"Mastery" oriented children maintained a positive orientation to the task and continued to employ problem-solving strategies. They were observed to monitor their strategies and maintain positive affect throughout. From interviews it was clear that they viewed the difficult problems as challenges to be mastered through effort rather than indictments of their low ability. In contrast, children characterised as "helpless" in orientation began to chat about irrelevant topics, show a marked decline in problem-solving effort, and to show negative affect. These children appeared to view their difficulties as signs of their low ability; they rarely engaged in self-monitoring or self-instruction. Apparently one group of children saw the harder problems as challenges to be overcome by effort and self instruction while the others viewed the new problems as "tests" of their innate ability, convinced that they would fail. To summarise:

- (a) Helpless children avoid challenge and give up easily, whereas mastery-oriented children persist in the face of obstacles and seek new, challenging experiences.
- (b) Helpless children report negative feelings and views of themselves when they meet obstacles while "mastery" children have positive views of their competence, when meeting difficulties. This makes them task-oriented and resilient in the face of difficulties because they are confident and enjoy challenge.
- (c) The style of "helpless" or "mastery" oriented behaviour is not related to intelligence, rather it is a personality characteristic, a way of viewing oneself and one's capacity to be effective in the world of things and people.

Dweck and her colleagues have carried out scores of experiments with school-age children and adults and found that most individuals fall somewhere along a continuum of "helplessness" to "mastery". Interestingly, Goetz and Dweck (1980) have found the contrasting orientations in children facing problems in social contexts such as rejection by peers.

Mastery vs performance goals

Further experiments (Dweck & Leggett, 1988) revealed wholly different goal structures in the two kinds of children. Helpless children were pursuing performance goals through which they sought to establish their ability and avoid showing of inadequacy. Interviews showed that they view achievement situations as tests of their competence. In contrast, mastery oriented children were pursuing learning goals in which the problem-solving tasks were just one more opportunity to acquire new skills.

To test this theory Elliott and Dweck (1988) manipulated children's goals of "performance" or "learning", then gave them opportunity to choose either challenging tasks or easy ones. Those trained for mastery goals chose challenging tasks when given the choice whereas children trained towards performance goals chose easy ones. They summarised: "What was most striking was the degree to which the manipulations created the entire constellation of performance, cognition, and affect characteristic of the naturally occurring achievement patterns." For example, children

who were given a performance orientation and low ability pretest feedback showed the same attributions, negative affect and strategy deterioration that characterised the helpless children in their earlier studies.

Following the success of the experimental manipulation fresh research (Bandura & Dweck, 1985; Leggett, 1985) explored students' existing goal preferences and their link to classroom behaviour. In a correlational study they found that children with performance goals in class are vulnerable to distraction and show a tendency to avoid challenge similar to children in whom these goals were experimentally manipulated.

Dweck (1986) does not claim that it is always adaptive to believe oneself capable of intellectual tasks; indeed one needs to have an objective diagnosis of strengths and weaknesses in order to pursue goals effectively. However, adaptive individuals manage to co-ordinate performance and learning goals. An overconcern with proving oneself may lead the individual to ignore, avoid or abandon potentially valuable learning opportunities. On the other hand, high confidence may be difficult to sustain without adopting performance goals from time to time.

In an influential review Dweck and Leggett (1988) discussed the mechanisms through which different goal orientations might lead to clear patterns of cognition, affect and behaviour seen as children encountered problem-solving tasks. They amass evidence to suggest that the goal an individual is pursuing creates a framework for interpreting and responding to events that occur. Thus the same event may have an entirely different meaning and impact if it occurs within the context of a learning versus a performance goal. Within a performance goal the student is concerned with answering the question "is my ability adequate?" In contrast learning goals create a concern with increasing one's ability and lead individuals to pose the question "what is the best way to increase my skill?"

Outcomes provide information which answers the two different questions. Failure is merely task-information when a child operates under learning goals but it is a crushing blow when a child is acting according to performance goals. Other research described by Leggett and Dweck (1986) with 14-year-olds showed that goal preferences were related to views on the role of effort in problem-solving. Children with performance goals viewed effort as an index of high or low ability; they viewed effort and ability as inversely related such that high effort was a tell-tale sign of low talent. Children with learning goals were quite different because they regarded effort as a useful strategy in achieving mastery. For them, high effort did not mean low talent. Events that produced negative or depressed affect on one individual appeared to produce positive affect and heightened problem-solving in another.

Thus, performance goals focus the student on judgements of ability and trigger cognitive and affective processes that make the child vulnerable to maladaptive behaviour patterns. Learning goals create a focus on increasing ability and put into action cognitive and affective processes that promote adaptive seeking of challenge, persistence in the face of difficulty and sustained performance.

Although some of Dweck's work has taken place in classroom settings with "real life" tasks, her approach is usually contrived and experimental. Ames (1992), by way of contrast, sets her research firmly in the context of school. She began with research on achievement motivation (Ames & Ames, 1981) and its relation to classroom environments of competition or individual work (Ames & Felker, 1979). In early studies

she demonstrated that researchers could manipulate competitive vs individualistic goal structures and then fruitfully explore children's attributions concerning success or failure at tasks. In the individualistic task structure, children attributed outcomes to their own efforts whereas children in competitive situations more often attributed outcomes to luck.

Ames demonstrated that competition serves to increase the importance of both ability and luck as factors accounting for one's winning or losing. The individualistic context was the only one in which children appeared to rely on information from past performance. Ames and Ames (1984) argued that a belief in the causal relationship between one's effort and the outcome of one's performance will contribute to a feeling of personal control over academic tasks. Thus, they suggested that classrooms ought to favour individualistic rather than competitive situations. In the latter, children devoted a great deal of time to comparison with peers (Ames, 1984).

Beliefs concerning intelligence and effort

The last piece in Dweck's far-reaching theory concerns studies by Bandura and Dweck (1985); Cain and Dweck (1987) and Leggett (1985) which point to a link between mastery orientation and the belief that intelligence is malleable. Specifically these studies suggest that when children view intelligence as a malleable quality, learning goals come to the fore. These children believe that effort will lead to increased intelligence and tend to maintain persistence in the face of difficulty. They may view problem-solving or achievement outcomes as reflecting only effort or current strategy—not immutable talent. When children view intelligence as immutable, they eschew effort (“a waste of time”) and worry about the judgements of others, i.e. performance becomes paramount (Bempechat, London & Dweck, 1991).

Dweck's contrast between “learning” and “performance” goals is sometimes called “mastery” vs “ability” focus. Ames and Archer (1988) have discussed common themes in the theories and reported a series of studies in classrooms to test whether students' perceptions of the “goals” embodied in real-life classrooms were related to the ways they approached, engaged in, and responded to learning tasks. Results were in the predicted direction: when students perceived an emphasis on mastery goals in the classroom, they reported using more learning strategies, preferred tasks that offered the possibility of challenge and had a more positive attitude towards the class. This pattern was reversed for students who perceived the class as performance oriented. These pupils used fewer strategies, preferred easy tasks and had a negative attitude towards the class.

Ames concluded that learning goal orientation fosters a way of thinking that is necessary to sustain student involvement in learning. Students who perceived their class as promoting learning goals used more effective learning strategies, enjoyed their class more, and believed that efforts in it pay off with success. This finding suggests that students' perceptions of classroom climate were related to specific motivational variables.

The work of many researchers has been reviewed linking attributions of success/failure to children's persistent goal structures and their efforts at problem-solving in both experimental and classroom situations. These patterns are well

established by the age of 10 (Dweck & Leggett, 1988). But how do such adaptive and dysfunctional attributions begin and are they present at the very start of school? Many psychologists, especially those known as "ego psychologists" (Erikson, 1963; White, 1959), have stressed that the young child strives for mastery. By middle childhood, however, many children have abandoned mastery behaviour in situations when negative outcomes are encountered (Diener & Dweck, 1978, 1980) and opt for performance ones instead. When and why do they adopt dysfunctional goals?

Heyman, Dweck and Cain (1992) carried out a study to explore the affective reactions of children in kindergarten using role play which featured criticism of children by teachers following errors in a play-task. Children were interviewed concerning their affect at the time of the role play, the reaction they expected from their parents, and then invited to create story resolutions. Results indicated that some of the 5 and 6-year-olds showed motivational patterns in response to teachers' criticism which were consistent with the "helpless" orientation seen in Dweck's research. They expressed negative affect and were unlikely to engage in problem-solving strategies after criticism. In subsequent interviews the "vulnerable children" told researchers that mistakes in the classroom were evidence that the perpetrator was "bad" and that such "badness" was immutable, not a temporary state. Thus, vulnerability to teacher criticism can be seen at the age of five and is associated with the same views on the immutability of personal traits seen in older children with "helpless" orientation.

"Effort" vs "innate talent" in different cultures

A cross-cultural comparison concerning the themes of attribution of success and failure is beyond the scope of this review. However, several major studies (Robitaille & Garden, 1989; Keys & Foxman, 1989) on cross-national achievement in school mathematics show a relationship between home support for learning and pupil attainment. More important are parental views about the mutability of intelligence. Stevenson and Lee (1990) and Stevenson, Lee, Chen and Lummis (1990) studied large samples of primary students in similar environments in the USA, China and Japan. They found that mathematics achievement was considerably lower in the USA than in the Asian countries despite smaller classes. Although classroom experiences varied considerably across the countries, central to this review is the finding that parents in the two Asian countries appeared to believe that children's effort was crucial in school success, and *even more important than innate ability*.

Interviews showed that parents and teachers in Asian countries placed great weight on the possibility of children's advancement through effort. American parents, on the other hand, seemed quite satisfied with the mathematical achievement of their children, expected less of them in terms of skill, and passed on to their children the belief that "natural talent" was more important in determining school grades than sheer hard work.

The poor performance of the American children in this study was due to numerous factors, many of which are neither elusive nor subtle. Insufficient time and emphasis were devoted to academic activities; children's academic achievement was not a widely shared goal; children and their parents overestimated the children's accomplishments; parental standards for achievement were low; there was little involvement of parents in children's schoolwork; and an *emphasis on nativism* may have undermined the belief that all but seriously disabled children should be able to master the content of the school curriculum. (Stevenson & Lee, 1990, p. 103).

Academic self concept

During middle childhood the child constructs an increasingly complex web of self concepts and one of these, the academic self concept, appears to mediate achievement behaviour and motivation (Blumenfeld, 1992; Harter, 1986). There is empirical evidence that academic self concept has an independent impact on academic attainment beyond the effect exerted by intelligence and parental education (Eshel & Kurman, 1991).

Several studies have found that academic self concept tends to decline throughout primary school (Eshel & Klein, 1981; Blatchford, 1992) with younger children overestimating their school abilities. There is variation in the age at which accurate assessment is thought to begin, with Stipek (1981) and Crocker and Cheeseman (1988) reporting accurate assessment by the second or third year of school. How do they achieve accuracy? They may learn to compare their own performance to that of peers. Butler (1989) manipulated competition during group task-work. The manipulation did not affect children at age 5, i.e. they did not make "comparison glances" at peers during a competition manipulation. However, children of 7 and 10 years made more "social comparison" glances at one another's task performance when competition was in force. Butler concluded that the youngest children made mastery comparisons (gaining information on *how* to do the task by watching peers) but did not use peers to make social comparisons. Observation showed that the older children glanced at peers' work for mastery reasons during non-competition but for social comparison during competition. However, Nicholls (1978) suggested that it is not until children are 10 years old or more that they can accurately assess their attainment relative to peers. Blatchford (1992) gives persuasive reasons why different methods for assessing self concept will yield different results.

Entwistle, Alexander, Pallas and Cadigan (1987) studied the emergence of self concept and its relation to attainment in American children just beginning school.

Children's entrance into full-time schooling involves taking up a new role (student), identifying new "significant others", adapting new reference groups, and developing new standards by which to judge themselves and others. (Entwistle *et al.*, 1987, p. 1190).

Race and parental background did not affect academic self image in the first year of school, which was generally positive, but boys seemed to depend more on self evaluations of their performance and girls on their parents' evaluations of them. Interestingly, for most children there was little relationship between self concept and attainment at the end of the first year in school, except for black girls.

There are many individual differences in the accuracy of assessment, although most can be shaped by different types of evaluative feedback (Marshall & Weinstein, 1984; Pintrich & Blumenfeld, 1985). Working class children are slower to develop accurate assessment (Eshel & Klein, 1981) and there is some evidence from Blatchford (1992) that black girls may continue to over-rate their ability in reading, even towards the end of primary school while self assessment in black boys tended to drop dramatically between 7 and 11 years.

There is considerable literature on differences between under-rating and over-rating pupils with Harter (1986) suggesting that elementary school children who rated themselves higher than their teachers did were more positive in feeling towards themselves than children whose ratings were lower than their teachers. Connell and

Ilardi (1987) questioned this and showed in a carefully controlled study that over-rating was associated with anxiety over school achievement and that teachers' assessment suggested that many over-raters had low coping skill.

Hoge, Smit and Hanson (1990) looked at influences on children's global self esteem as well as their more differentiated (five school subjects) academic self concepts. Children were near or at the end of primary schooling and their academic self concepts were compared to school attainment tests. The researchers were particularly interested in changes in self esteem, hypothesising that these might be related to changes in actual performance or to changes in perceptions of school climate. Tests, school climate and teacher evaluations all had a significant effect on self esteem but grades were the most powerful predictor for self concept in particular school subjects. Furthermore, the authors found definite, although modest, school effects on self esteem.

Stipek and Daniels (1988) studied 80 children at ages 5 and 8 to see whether changes in the accuracy of academic self concept could be manipulated by the educational environment. Half the children were in classrooms where evaluative feedback was salient and half in classes where it was de-emphasised. Results showed that school-aged children were more accurate in self assessment than kindergarten children. However, even in kindergarten those in classes with salient evaluative feedback tended towards a more accurate self assessment.

Marshall and Weinstein (1984) reviewed a host of studies on school factors affecting students' self evaluation. They concluded that many teaching strategies affected student learning processes and outcomes through the contribution of self evaluation. These included: high visibility and comparativeness of teacher evaluations, variety and divergence of tasks and competitive tasks assigned to students. They showed empirically that social comparison on its own need not lead to students' low self assessments. For example, teachers who believed that intelligence was multidimensional and who used strategies that supported achievement in a variety of areas had students who engaged regularly in self-evaluation but did not condemn themselves as worthless.

Self-efficacy

A more subtle theory on children's concept of themselves has been put forth by Bandura (1981) and concerns their belief in self-efficacy. Bandura has shown that students high on feelings of self efficacy tend to regulate their own learning and to opt for high academic goals. This theory differs from those on academic self-concept because it fuses self conceptions with self regulation of behaviour. A recent study carried out by Zimmerman, Bandura and Martinez-Pons (1992) showed that students' belief in their own efficacy at the beginning of the year influenced that academic goals they set themselves and thus their final achievement at the end of the year. The path analysis presented by the researchers also included parental views, which were significant, and controlled for prior grades. Work on self-efficacy, typically carried out on secondary school pupils and adults, is similar to Dweck's in emphasising belief in self and effort but differs in its description of the specific components of self regulated learning found in individuals high in self-efficacy. To its credit the Dweck work is supported by well designed experiments; still classroom-based interventions are needed to tease apart cause from effect.

4. Social Competence and Attainment

A positive relationship between social adjustment and school attainment has long been known (Dishion, 1990; Feshbach & Feshbach, 1987; Green, Forehand, Beck & Vosk, 1980). Despite hundreds of correlational studies, some using path analysis, it is still impossible to tease out cause and effect.

Social responsibility

In a useful review, Wentzel (1991b) has argued that social responsibility, defined as "adherence to social rules and role expectations", is instrumental in the acquisition of academic knowledge and skills. Social responsibility makes two contributions to learning: (1) Behaving responsibly can aid learning by promoting positive interactions with teacher and peers, e.g. peer sharing of materials or exchanging help with assignments; (2) Students' goals to be compliant and responsible can constrain and enhance the learning process, e.g. pupils' striving to complete assignments on time to comply with requirements. Most relevant in the classroom are the rules and norms that define the student role. In them students are required to adhere to rules for interpersonal conduct as well as those related to curricular tasks. Evidence comes from studies such as that of Wentzel (1991a) showing that socially responsible behaviour contributed directly to academic performance after adjusting for I.Q., social background and school absence. Moreover the effect of sociometric status on attainment was mediated through social responsibility scores.

There is a tension here, however, in that an over-emphasis on co-operation and compliance with rules may be at odds with the "learning" orientation to schoolwork advocated by Dweck, Ames and Bandura. How can we reconcile the two theories, the one advocating intrinsic goals and the other advocating socially responsible pupils who are motivated to be compliant and to look towards others for approval (extrinsic goals)? Wentzel neatly resolves the issue by postulating that pupils may pursue two sets of goals simultaneously. Nakamura and Finck (1980) provide some evidence in their research showing that the combination of social and task-related goal orientations was associated with better performance in evaluative situations than having task goals alone. Similarly, Reuman, Atkinson and Gallop (1986) found that attempts to master tasks and gain social approval can combine additively to increase the likelihood of achievement behaviour.

Lastly, a recent study (Wentzel, 1989) suggests that the pursuit of goals compatible with the social requirements of the classroom is related to academic achievement in adolescence. In this study the pursuit of highly distinct sets of goals differentiated high, medium and low achieving students as measured by classroom grades. High achieving students reported trying to achieve several goals, including being dependable and responsible, learning and understanding things. In contrast the goals frequently pursued by the average or low achievers were to make friends and have fun. Thus, the simultaneous pursuit of social responsibility and learning goals appear to enhance performance in academic settings. Presumably this is because both types of goals are compatible with the performance requirements of the classroom.

How can schools intervene to help children develop social responsibility? One way might be to pay attention to social networks during educational transitions, especially

at the very start of school when children are constructing their concepts of themselves as pupils and teacher expectations are being formed.

The role of peers in transition to school

Research on the beginning of school is important because the reputations children establish and the view which they develop of themselves as "pupils" will influence learning later in primary school. Ladd and Price (1987) followed a group of 58 children from pre-school to kindergarten, the first class in American primary schools. Children with high levels of aggression in the pre-school and/or played more with younger children did not adjust easily to kindergarten and were not well liked by peers.

Another predictor of adjustment at the end of the kindergarten year (aged 5) was the presence of many familiar peers at the start of school. Perhaps the familiar classmates provided a "secure base" for children from which to develop new relationships and learn about new academic tasks. This hypothesis is supported by the finding that children who had many familiar classmates had more favourable peer ratings later in the year, even from children who had been unfamiliar to them at the start of school. These children with a large number of familiar classmates at entry to kindergarten viewed school more positively at both the beginning and end of the school year.

A later study by Ladd (1990) looked at children's adjustment over the kindergarten year *after* adjusting for mental age, gender and pre-school experience. This more rigorous design on factors associated with adjustment to school confirmed the earlier finding on familiar classmates at the very start of school, after taking into account individual child characteristics. Children's peer relationships added to the prediction of school adjustment after taking into account individual characteristics.

Functional and dysfunctional cognitions and goals

The last decade has seen a huge body of empirical research and theory establishing a link between students' motivational/attributional orientation and cognitive engagement in school work. Several sets of goal orientations have been proposed: mastery vs ability, learning vs performance, and task vs ego involvement. Each set of goals differed primarily in terms of whether learning is perceived and valued as an end in itself or as a means to some external end such as grades, teacher approval, or the avoidance of negative evaluations by others. Students who adopt mastery/learning/task goals are motivated to learn (Brophy, 1983). They try to benefit from school work, they report more self-regulation and employ cognitive and metacognitive strategies, all of which have been shown to lead to a deeper level of understanding of subject content (Weinstein & Mayer, 1986; Wittrock, 1986). Wentzel's work on social responsibility complements the work on self-cognitions and extends the theoretical base to the social context of the class. Relations with peers during the first year of school may independently influence later school adjustment, or it may be linked to the development of a positive concept of "pupil self".

5. The Role of Teacher Expectations and Behaviours

This section will consider how ordinary classrooms encourage students towards mastery and responsibility, or away from it, through teacher interactions, expectations and pacing the learning task. Some of the teachers' effects are direct (e.g. accurate instructions promote subject learning) and others indirect (e.g. expectations may lead to assignment of high/low level tasks which can affect child's academic self concept and eventually attainment).

Teacher expectations

There is an enormous literature exploring ways teachers' expectations of pupils' performance might influence achievement and classroom behaviour (Braun, 1987). Rosenthal and Jacobson's (1968) classic study showed that pupils whose teachers were led to believe were beginning an "academic growth spurt" performed better at the end of the year despite their being randomly assigned. This study has not been replicated and Mitman and Snow (1985) list a catalogue of methodological flaws in it. Brophy (1983) reviewed the evidence and cast doubt on the powerful role of teacher expectation as sole or even primary cause of pupil achievement. Most studies in Brophy's review show a strong association between teacher expectation, say at the beginning of the year, and pupil marks at the end. In fact a "teacher expectancy effect" is well established because teachers are quite accurate judges of which of their pupils will do well or badly as the year progresses. But this is not the same as a "teacher bias effect" in which teachers' expectancies actually cause the good or poor performance. In order to demonstrate that teacher expectancies cause pupil outcomes, researchers must show that the expectation (however measured) contributes to the variance in outcome over and above other factors such as pupil intelligence, social background and previous attainments.

A large scale study by Blatchford, Burke, Farquar, Plewis and Tizard (1989) demonstrated the effect on pupil grades in the early school years of teachers' expectations at the very start of school. More than 400 children in 33 schools were studied during the first three years of school. In addition to asking the teacher at the beginning of each year about the academic potential of children in the sample, they kept careful records of the "curriculum coverage" each child was offered, as well as sampling teachers' classroom behaviour towards the children in the study.

This study presents some of the strongest evidence for teacher effect. Expectations and attainment were highly correlated through the first three years of school; importantly, expectations were still a significant predictor of attainment after controlling for entry skills. The researchers note that the expectancies, obtained several weeks after the start of the school year, may nonetheless reflect teachers' accurate judgements of children's real ability. Still, only an experimental manipulation of expectancy can show "teacher bias" in that expectancies (in the absence of true discrimination of talent) cause outcomes.

Blatchford *et al.* (1989) found "mediating behaviours" however, which might contribute to a causal association between teacher expectancies and pupil marks. Although expectancies were unrelated to teachers' interactional behaviours in class (e.g. praise of pupils) they *were* related to the breadth of curricular tasks children were

assigned. Thus, if children's academic performance is determined in part by "messages" teachers sent them about their abilities, then this study suggests that it is in noticing the tasks given them rather than interactional "messages" that informs pupils as to how well they are expected to do.

Teacher classroom behaviour

There are many direct ways in which teachers can influence their pupils' achievement. After all, teachers usually assign tasks, provide evaluative feedback and encouragement. The evidence on "the effective teacher" is strongest for teaching of basic skills but even in the upper-grade specialities there appear to be generally accepted trends (Brophy & Good, 1988). In almost all studies the amount learned by pupils is related to their opportunity to learn which may be measured as coarsely as the length of the school year or as finely as the proportion of class time children are required to engage with the curriculum (Armento, 1977; Cooley & Leinhardt, 1980; Dunkin & Doenau, 1980).

The most consistent findings concern quantity and pacing of instruction (Borg, 1979; Good, Grouws & Beckerman, 1978). Amount of learning, again measured by attainment tests, is directly related to the teachers' business-like manner in the class and their making clear that instruction is basic to their role and their high expectations that pupils will master the curriculum (Brophy & Evertson, 1983; Fisher *et al.*, 1980; Stallings, 1975). A high proportion of class time devoted to academic tasks (as opposed to personal adjustment or group dynamics) is also predictive of pupil attainment (Brophy & Evertson, 1983; Coker, Medley & Soar, 1980; Fisher *et al.*, 1980; Good & Grouws, 1979; Stallings, Cory, Fairweather & Needels, 1977, 1978). Effective teachers manage their classes smoothly and make sure everyone knows the practical rules; this enables pupils to devote more time to learning tasks. For review of this research see Brophy (1983) and Doyle (1986) and for application suggestions see Good and Brophy (1984, 1986a).

Lastly, many studies have indicated that pupils achieve more when learning in classrooms where they are actively taught by their teacher rather than children working on their own. Galton, Simon and Croll (1980) pointed to children who adopted an "easy rider" role during groupwork and avoided diligent study. These were more often found in classrooms favouring groupwork over whole class instruction.

Brophy (1988) and Brophy and Good (1988) sum up qualities of the teacher which appear beneficial to student learning: structuring material so pupils know the objectives of a lesson and what they are expected to achieve, presentation of information in a brisk manner but with sufficient repetition to keep pupils of all abilities "on track", and clarity (which is more important than enthusiasm). The research on quality of questioning is inconclusive (Redfield & Rousseau, 1981) although Wood (1988) suggests that questions targeted just above the student's level of understanding may promote more learning.

6 Learning Tasks, Class Management and Size

Whereas much of the research in the previous section supports a traditional "no

nonsense" style of teaching, research on classroom management suggests that group processes, especially amongst peers, are vital and potentially supportive of learning. This is at odds with "traditional" teaching. Brophy and Good (1988) remind us that the teacher behaviours associated with learning outcomes as measured by tests are not the same ones associated with student attitudes towards teachers, subjects or the class. Positive student attitudes are linked to teacher warmth, praise and socialising with students, in addition to instructing them.

Co-operative learning

The roots of this type of learning are found in two psychological theories: (1) Cognitive theories such as Piaget's and Vygotsky's about how learning in groups prompts intellectual conflicts which push the learner to more complex understanding (Damon, 1984); (2) The motivational view (Slavin, 1980) concerning the benefit of rewarding groups on the basis of the individual learning of all members to create peer norms which favour achievement-related efforts and the active helping of peers. Slavin's (1980) perceptive reconciliation of these two theories shows them to be complementary, the one focusing on the cognitive benefits when students articulate their ideas (Doise & Mugny, 1984) and the other focusing on the motivation for sustained effort and positive interaction (including help for slower learners) which peer groups can engender. Slavin suggests that active peer discussion and peer explanation is more frequent under group rewards for learning than under conditions in which collaborative work is encouraged but there are no rewards based on group members' learning. Thus, he stresses the necessity of the motivational basis for co-operative learning at the expense of the "concept clarification" found in intellectual disagreement during group discussions.

Does co-operative learning work? The majority of co-operative learning studies have been concerned with achievement outcomes like basic computational skills and recall of simple facts. However, problem-solving skills acquired through this method have been shown to remain up to six months post instruction (Ross & Maynes, 1985). Despite these successful evaluations, there is some controversy as to whether co-operative learning is successful when pursuing higher order learning like the Tower of Hanoi task (Bargh & Schul, 1980) or learning science concepts (Rogan, 1988). There is no doubt, however, that students who work together in class like school more, and believe more than control subjects that their success depends on their own efforts (Slavin, 1987a,b). But do they learn more?

Classroom tasks

Some recent literature stresses the important role played by classroom tasks which are related closely to student motivation and also learning outcome (Bennett, Desforges, Cockburn & Wilkinson, 1984; Blumenfeld, Mergendoller & Swarthout, 1987; Marx & Walsh, 1988). Bennett (1988) suggests the matching of task demand to student ability lies at the heart of teaching; "... teaching is a purposeful activity and (the) teacher purposes or intentions inform the selection of tasks for children" (p. 25). The sections that follow on Topics and Mastery Learning are related to task analysis.

Project or topic-based learning

Influential American critics (e.g. Goodlad, 1984) have expressed dismay at the predominance of low-level factual learning and the tyranny of worksheets in US classrooms. Some see project-based learning as a solution to classroom tedium. In the US projects have two essential components: (1) they require a question or problem that serves to drive the activity; and (2) the activities lead to a product that addresses the driving question (Blumenfeld *et al.*, 1991). American projects are usually problem-focused while British topic work may require the students to do no more than collect a host of facts. In Britain, the topic approach is broader and often includes work which is merely information-gathering or expressive—not based on a definite problem.

It is widely agreed that implementation of this approach poses considerable strains on class management and resources. Researchers and government inspectors in Britain (Alexander, Rose & Woodhead, 1992; HMI, 1989; Kerry & Eggleston, 1988) suggest that badly organised and resourced topic work wastes much time and leaves many pupils carrying out tasks ill suited to their academic level.

A solution to the problem of classroom management and resources proposed by Blumenfeld *et al.* (1991) is the adoption of complex technology in the classroom (e.g. planning software, telecommunications software and multimedia databases). Suitably supported, projects can enhance most students' interest whilst providing variety, challenge, choice and the possibility of co-operation with like-minded peers. When projects are based on students' prior knowledge and thinking skills, they will support continuity in the learning of problem-solving skills and lead to feelings of efficacy in things that really matter (Blumenfeld, 1992). Technological development can improve classroom learning by making project-based work challenging and available, although effective class management will always matter most.

Mastery learning

In classrooms devoted to mastery learning (Anderson & Block, 1987) students are informed as to what they are expected to learn, how they are expected to demonstrate their learning, and how the adequacy of their learning will be judged. They are told about grading (emphasising that their learning will be graded relative to a predetermined performance standard, not relative to the learning of classmates). Finally, they are told they will receive extra help as needed in order to ensure their learning. A series of sub-tasks is then administered in rapid succession.

There are two approaches to mastery learning. The first is a group-based and teacher-paced approach in which students learn co-operatively with their classmates but the teacher controls the delivery and flow of instruction. (See Block & Anderson, 1975, for discussion of Bloom's Learning for Mastery.) The second approach is individual-based and learner-paced, an approach seen more often in college programmes than in primary and secondary schools. In both approaches the "function of the teacher is to manage learning rather than students" (Carroll, 1971).

In a recent meta-analysis of 108 controlled evaluations mastery learning programmes were shown to have positive effects on educational attainment in primary and secondary school, as well as college (Kulik, Kulik & Bangert-Drowns, 1990a). The effects were stronger on weaker students and positive effects were found on student attitudes towards

course content. On average, such programmes raise final examination scores by about .5 standard deviations. Kulik's conclusions were criticised by Slavin (1990) for concentrating on researcher-designed tests rather than standardised measure of attainment. Despite the argument about the best outcome indicators (see reply by Kulik, Kulik & Bangert-Drowns, 1990b), it is clear that mastery learning can increase pupil performance on classroom tests and that students, especially weaker ones, develop favourable attitudes towards learning.

"Tracking" vs special education carried out in mainstream classrooms

Means for withdrawing slower children are common practice in many schools but they have been criticised for adjusting scholastic goals downwards (Snow, 1984) and creating an anti-school culture. In a well-known longitudinal study of inner-city school children Spivack and Rapsher (1979) found a significant relationship between failure to move up a grade, assignment to special classes and subsequent police contact. Goodlad (1984) reviewed the literature on tracking and noted the detrimental consequences of removing children from mainstream classes: lower self-esteem, lower expectations, feelings of isolation, dropout and delinquency. Goodlad reported that low achievers do less well when placed in middle or lower tracks than in mixed groups, adding that students in lower tracks are least likely to experience the types of teaching which are known to lead to achievement. Messick (1984) further criticised withdrawal and tracking approaches with low achievers for disproportionately representing minority students and failing to provide optimum teaching.

An alternative to withdrawing or tracking children is to implement teaching approaches in mainstream classes which provide greater opportunity for involvement, learning and success for children with lower achievement, all advocated by the "effective schools movement" (Goodlad, 1984) and buttressed by research linking school organisation and practices, students achievement and student behaviour (Rutter & Giller, 1984; Rutter, *et al.*, 1979).

Hawkins and Weiss (1985) have provided a theoretical foundation for means by which schools can inhibit delinquency and promote social commitment. Their model postulates three conditions that promote "bonding" to the school: availability of opportunities for conventional involvement, teaching the skills needed for such activities (e.g. interpersonal skills), and reinforcement for successful involvement. Hawkins, Doueck and Lishner (1988) tested the efficacy of this model on 513 experimental and 654 control students, all randomly assigned to 33 teachers who were, in turn, randomly assigned to experimental and control educational strategies. Although there were no significant effects on school grades or delinquency, the group taught by the methods listed above showed more positive attitudes to their classes, had higher expectations for future education and lower rates of school misbehaviour. Thus, an intervention which changed opportunity and reward structures in mainstream school classrooms had positive effects on school misbehaviour and also educational aspiration.

Classroom practices and pupil self perceptions

Many authors (Blumenfeld, Pintrich, Meece & Wessels, 1982; Rosenholtz &

Simpson, 1984a) suggest that certain classroom practices facilitate the development of wide differences in ability perceptions—either high or low. Ability perceptions become widely dispersed and consensual in those classes where task structures, evaluation practices and grouping practices make it easy for pupils to compare their own performance with that of their peers, classes which are labelled “high resolution” by Rosenholtz and Simpson (1984b). MacIver (1988) found that the evaluation practices and task structures had significant effects but that less important than the actual giving of grades was the “talent dispersion” in the class. The results of this study suggest that if grades are given at all, then their dispersion through the class is more important for self evaluation in pupils than their frequency and salience. Studies such as this highlight a problem of mixed ability grouping.

Another organisational factor related to pupils’ self assessment may be the school’s policy on grade retention. Many studies on older children show that retention does not promote achievement and is associated with negative self concepts in children, negative attitudes toward school, and higher dropout rates (Byrnes & Yamamoto, 1986; Grissom & Shepard, 1989). If children are held back at the very start of school, will they develop a poor self image (Lord, Umezaki & Darley, 1990)? Mantzicopoulos and Morrisson (1992) looked at children who were retained at kindergarten and compared them to a similar number of matched controls who were “promoted” to the first grade. The underlying objective of holding children from entry to formal school is that another year might provide the maturity they need for a successful experience in first grade. The results showed that the significant advantage demonstrated by the retained children at the end of their repeated year was not maintained past kindergarten. Thus, the grade retention at the end of kindergarten is shown to be ineffective and the reason for it may be children’s poor images of self-as-pupil.

Class size

The influence of class size on pupil learning and adjustment has been debated for decades. Glass, Cahen, Smith and Filby (1982) carried out a meta-analysis of 77 experimental studies to explore the relationship between class size and achievement ranking of pupils. The meta-analysis showed a negative relationship between size and achievement, one which was similar for students of different ages or different abilities. The critics replied almost immediately (Hedges & Stock, 1983; Slavin, 1984, 1989). The strongest assault was mounted by Educational Research Services who conducted their own meta-analysis of 24 studies and came to different conclusions. “Within the mid-range of 25–34 pupils, class size appears to have little if any decisive impact on the academic achievement of most pupils in most subjects above the primary grade.” However, they agreed with Glass in that, “Smaller classes are important to increased pupil achievement in reading and mathematics in early primary grades and that pupils with lower academic ability tend to benefit from small classes more than do pupils of average ability.” Further, “Smaller classes can positively affect the scholastic achievement of economically or socially disadvantaged pupils.” (All quotations from Glass *et al.*, 1982, p. 69.)

The advantage of small classes in the first year (but see the critique by Slavin,

1989) is further support for the thesis that a good start to the child's educational career can set in train a series of future events that create or close down opportunities (Rutter, 1985a).

In a succinct review, Mortimore and Blatchford (1993) single out for its rigorous methodology the recent study by Achilles, Nye, Zaharias and Fulton (1993) which was both experimental and longitudinal. Known as Project STAR, it examined 7000 pupils in 79 schools between the ages of 5 and 8. The researchers randomly assigned pupils to classes of differing size and found consistent results. Pupils in small classes (13-17) significantly outperformed pupils in medium-sized classes (22-25) and also in medium classes with a full-time teacher aide. Positive effects were evident two years later when pupils in the small sized classes had been returned to ordinary staffing ratios. Disadvantaged pupils benefited most from the reduction in class size, a gain which remained even after the return to larger classes. The explanation for the powerful and beneficial effect of class size in the first and second year of school probably relates to the acquisition of basic skills. The benefit for disadvantaged pupils may lie in the possibilities smaller classes afford for assigning work which is well matched to the educational level of students.

7. On Direct and Indirect Effects of School

An enormous literature has been skimmed to draw a relief map showing the major studies which establish the scientific evidence for the effects of school. Experimental studies, especially those on the impact of pre-school education, have demonstrated clearly that high quality, active-learning pre-school programmes can have lasting benefits which are measurable and cost effective. Researchers involved in the strongest of the studies pointed to "commitment to schooling" which was an important mediator between early intellectual gains and later educational and community outcomes in adulthood.

Commitment to schooling was a variable of surprising strength in this analysis—directly affected by pre-school education, closely related to school achievement (correlated at .56), and a predictor of reduced delinquency. The variable was an amalgam of elementary teacher ratings, scholastic attitudes and aspirations of teenagers, and whether or not the teenagers did homework . . . The direct relationship between commitment and pre-school education suggests that the direct effects of pre-school were motivational as well as cognitive. We assumed that commitment to schooling began as a response to school success. (Schweinhart & Weikart, 1993).

British research (Jowett & Sylva, 1986) has been cited to show that "learning orientation" varied with type of provision, variation that was detected in systematic observation during the first year of school to measure aspiration, persistence and independence. This research is consistent with the causal model created during the last decade to explain how pre-school experiences put in motion a virtuous cycle of learning orientation at school entry, followed by teacher recognition and expectation, followed by pupil self concept, school commitment and finally success in adult life.

Research on the impact of primary school is correlational and longitudinal, but rarely experimental. Its validity rests on new and powerful statistical techniques which

support causal arguments but do not prove them. We know that "effective" schools have consistent outcomes (Sammons *et al.*, 1993); this strengthens their validity but intervention studies are needed. When they have been carried out, we should know which interventions (and at which level, school or classroom) influence pupil attainment, attributions, goals and beliefs about success. The small-scale, often correlational studies reviewed here suggest that pupil cognitions and motivations will have an independent effect on attainment. "Mastery orientation", "learning goals" and "self efficacy" have all been shown in experimental studies to shape the ways pupils approach, carry out and evaluate their work on tasks. Which will nurture these cognitions, "mastery learning" or "project based" education? New intervention studies would also be wise to study cooperative learning because it has the potential for developing social responsibility in addition to academic attainment.

There is some evidence that schooling affects children differently at different ages. Sammons *et al.* (1993) found that the overall effects of primary school were greater than secondary. One reason for this might be that the mediating mechanisms described in this review are taking shape during the primary years: the pupil self concept forms between 5 and 8 (Entwistle *et al.*, 1987) although not at first tied to achievement. Global self worth is very high at school entry, soon to be honed by comparison with peers (Butler, 1989). Although we know a little about how teacher feedback influences the formation of pupil self concept, we know almost nothing about the roots of social responsibility. Some primary schools witness more of it than others, a fact not explained by intake. Why? As befits their developing cognitive powers, the primary aged pupil begins to differentiate roles, responsibilities, talents. It is tempting to say that the legacy of effective pre-school education is the "will and skill to do"; the legacy of the effective primary school is preference for learning goals, feelings of self efficacy, belief in the power of effort and goals of social responsibility.

Two powerful themes have emerged in the review. First the impact of school is potentially great, especially when schools are characterised by the management and teaching strategies documented in the Effective Schools literature. Second, many of the effects of schooling are indirect, i.e. they are mediated through change and development in pupils' cognitions and motivations. Social responsibility may be one of the most important of all and receives some support from the High/Scope longitudinal evaluation.

This paper has drawn on several research traditions to explore the direct and indirect pathways by which children follow successful and unsuccessful educational careers. When schools change pupils' self-concepts, goals, beliefs about success and social responsibility they exert powerful influence not only on subsequent education but also on employment and community participation in adulthood.

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