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A literature review of the impact of early years provision on young children, with emphasis given to children from disadvantaged backgrounds

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A literature review of the impact of early years provision on young children, with emphasis given to children from disadvantaged backgrounds

Abstract

This report reviews international research on the impact of early years provision upon young children. Emphasis is given to work related to disadvantaged children. The issues of timing, duration, type, quality and quantity of early years provision are considered in terms of developmental effects upon children and when possible parents. An evaluative summary of the literature on cost benefit analyses of early years provision is also included. Conclusions tempered by the relative rigour and extensiveness of the evidence are produced. Early research was primarily concerned with whether children attending institutions developed differently from those not attending such centres. Later work recognised that childcare is not unitary and that the quality or characteristics of experience matters. Further research drew attention to the importance of the interaction between home and out of home experience. High quality childcare has been associated with benefits for children's development, with the strongest effects for children from disadvantaged backgrounds. There is also evidence that sometimes negative effects occur. The studies have largely been American but research elsewhere, including the UK, indicates results are not culture-specific. While the research on pre-school education (3+ years) is fairly consistent, the research evidence on the effects of childcare (0-3 years) upon development has been equivocal with some studies finding negative effects, some no effects and some positive effects. Discrepant results may relate to age of starting and also probably at least partly to differences in the quality of childcare received by children. In addition childcare effects are mediated by family background with negative, neutral and positive effects occurring depending on the relative balance of quality of care at home and in childcare. Recent large-scale studies (EPPE, NICHD) find effects related to both quantity and quality of childcare. The effect sizes for childcare factors are about half that for family factors. However, family effects incorporate genetic factors. Hence, family and childcare effects may be more equivalent than this comparison implies. Family factors and childcare quality covary, low-income families tending to have lowest quality care. The analysis strategy of most studies attributes variance to childcare factors only after family factor variance has been extracted. Where the two covary this will produce conservative estimates of childcare effects.

Keywords

backgrounds, given, emphasis, children, disadvantaged, literature, young, review, impact, early, years, provision

Disciplines

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**A LITERATURE REVIEW OF THE IMPACT OF EARLY YEARS
PROVISION ON YOUNG CHILDREN, WITH EMPHASIS GIVEN TO
CHILDREN FROM DISADVANTAGED BACKGROUNDS**

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Prepared for the National Audit Office

The views expressed in this paper are not necessarily those of the National Audit Office.

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EXECUTIVE SUMMARY

This report reviews international research on the impact of early years provision upon young children. Emphasis is given to work related to disadvantaged children. The issues of timing, duration, type, quality and quantity of early years provision are considered in terms of developmental effects upon children and when possible parents. An evaluative summary of the literature on cost benefit analyses of early years provision is also included. Conclusions tempered by the relative rigour and extensiveness of the evidence are produced.

Early research was primarily concerned with whether children attending institutions developed differently from those not attending such centres. Later work recognised that childcare is not unitary and that the quality or characteristics of experience matters. Further research drew attention to the importance of the interaction between home and out of home experience. High quality childcare has been associated with benefits for children's development, with the strongest effects for children from disadvantaged backgrounds. There is also evidence that sometimes negative effects occur. The studies have largely been American but research elsewhere, including the UK, indicates results are not culture-specific.

While the research on pre-school education (3+ years) is fairly consistent, the research evidence on the effects of childcare (0-3 years) upon development has been equivocal with some studies finding negative effects, some no effects and some positive effects. Discrepant results may relate to age of starting and also probably at least partly to differences in the quality of childcare received by children. In addition childcare effects are mediated by family background with negative, neutral and positive effects occurring depending on the relative balance of quality of care at home and in childcare. Recent large-scale studies (EPPE, NICHD) find effects related to both quantity and quality of childcare. The effect sizes for childcare factors are about half that for family factors. However, family effects incorporate genetic factors. Hence, family and childcare effects may be more equivalent than this comparison implies. Family factors and childcare quality covary, low-income families tending to have lowest quality care. The analysis strategy of most studies attributes variance to childcare factors only after family factor variance has been extracted. Where the two covary this will produce conservative estimates of childcare effects.

Summary of evidence for the general population

The evidence on childcare in the first three years indicates that for children who are not disadvantaged in their home environment, high quality childcare has no strong effects upon cognitive and language development. However poor quality childcare may produce deficits in language or cognitive development. There is evidence that high levels of childcare, particularly group care in the first two years, may elevate the risk for developing antisocial behaviour. In the UK this is not the case for childcare by relatives, which is associated with improved social development. This is some evidence that maternal employment and childcare in the first year of life may have negative effects upon cognitive and social development.

For provision for three years onwards the evidence is consistent that pre-school provision is beneficial to educational and social development for the whole population. The effects are greater for high quality provision. In England and Northern Ireland the evidence indicates that part-time provision produces equivalent effects to full-time provision and that the more months of provision from 2 years of age onwards the stronger the improvement. In England the types of provision with the most positive effects are integrated centres and nursery schools, and the least effective are Local Authority (Social Services) day nurseries.

Summary of evidence for disadvantaged children

The evidence on childcare in the first three years for disadvantaged children indicates that high quality childcare can produce benefits for cognitive, language and social development. Low quality childcare produces either no benefit or negative effects. High quality childcare with associated home visits appears to be the most effective package of services.

With regard to provision for three years onwards disadvantaged children benefit particularly from high quality pre-school provision. Also children benefit more in socially mixed groups rather than in homogeneously disadvantaged groups. Some interventions have shown improvements in cognitive development, but in relatively few cases have these persisted throughout children's school careers. However early childhood interventions do boost children's confidence and social skills, which provides a better foundation for success at school (and subsequently in the workplace). Reviews of the research infer that it is the social skills and improved motivation that lead to lower levels of special education and school failure and higher educational achievement in children exposed to early childhood development programmes. Studies into adulthood indicate that this educational success is

followed by increased success in employment, social integration and sometimes reduced criminality. There is also an indication of improved outcomes for mothers. The improvements appear to occur for those problems that are endemic for the particular disadvantaged group.

Characteristics of early years provision and child development

The research demonstrates that the following characteristics of early years provision are most important for enhancing children's development:

1. Adult-child interaction that is responsive, affectionate and readily available
2. Well-trained staff who are committed to their work with children
3. Facilities that are safe and sanitary and accessible to parents
4. Ratios and group sizes that allow staff to interact appropriately with children
5. Supervision that maintains consistency
6. Staff development that ensures continuity, stability and improving quality
7. A developmentally appropriate curriculum with educational content

In England the most effective types of provision are integrated centres and nursery schools. There are currently few integrated centres but the expansion of Children's Centres, if handled appropriately, may partly alleviate this deficit in provision.

Cost benefit analyses

The results of the few cost benefit analyses undertaken are unambiguous in showing substantial benefits. These analyses have been applied where high quality childcare has been used as a form of intervention for disadvantaged families. A striking feature of these results is that the size of the benefits allows a very substantial margin of error and interventions would still be economically worthwhile. However the applicability of these indications of savings to the general population is open to considerable doubt in that so much of the benefit in these studies of disadvantaged populations derives from reductions of negative outcomes e.g. crime, remedial education, unemployment, where the incidence of these negative outcomes is dramatically less in the general population and therefore the scope for savings is similarly dramatically less. However the 'prevention paradox' is relevant in considering poor outcomes such as learning difficulties or behaviour problems, in that while the rate of incidence is greater for disadvantaged populations, the absolute number of cases is greater in the general population.

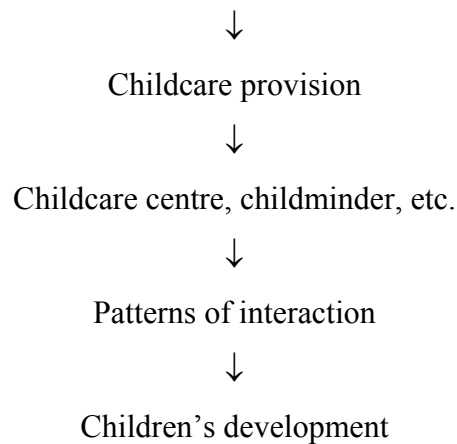
1. INTRODUCTION

1.1 The context of childcare research

Childcare has experienced three waves of research. The first wave was influenced by concerns deriving from attachment theory that repeated separations from the mother may weaken attachment to the mother and addressed the question 'is childcare bad for children?' The second wave recognised the diversity of childcare environments and considered how the quality of childcare affected development. The third wave considers the interrelationship between home and childcare environments and how the interaction may affect child development. However the social context beyond the family should also be considered (Melhuish, 2001a).

The impact of childcare upon children is dependent upon the context, or social ecology, of childcare. Industrialised societies have seen marked increases in maternal employment in the last 30 years. Countries have responded differently to the increased demand for childcare. In some countries, childcare provision is seen as a state responsibility, e.g. Sweden had 85% of mothers of a pre-school child in employment in the early 1990s, and provides high levels of publicly funded childcare. Elsewhere childcare is a private concern and there is little publicly funded childcare. In these circumstances, the quality and type of childcare will be more diverse. Where childcare costs fall to parents, parents are likely to choose on the basis of cost, particularly as information on quality is not readily available. Where childcare is publicly funded, cost constraints are reduced, and quality of childcare is usually regulated to minimum standards with training for childcare workers. Other factors such as parental leave will also influence childcare practices. Hence the range of quality, quantity and age of use for childcare vary markedly between societies. Such variation between societies produces different relationships between childcare and child development. These relationships are represented in the following diagram.

Culture and Social Context
(e.g. labour markets & ideology)



Within Britain with changes in social context the nature of pre-school childcare and education has changed. In recent years the government has made a commitment to increasing pre-school provision generally to fulfil political commitments (DfES 2002). A part-time pre-school place is to be made available for all children from three years of age to increase the school-readiness of children, particularly children from disadvantaged families. For the under-threes there is to be an expansion of childcare provision to increase employment opportunities for mothers.

1.2 Types of childcare and pre-school provision

Some forms of pre-school provision have explicit educational aims and are usually targeted on children from 3 years upwards (e.g. nursery schools, kindergarten). Other forms of provision are care-orientated and, while operating for under-threes, also cater for older children (e.g. day care centres, pre-kindergarten). There is an overlap between the care and education orientated sections with the distinction becoming increasingly blurred, with recognition of the importance of learning in the first three years for longer-term development.

Within the UK the forms of provision catering for under-threes are usually referred to as childcare and include relatives (e.g. grandmothers), childminders, nannies, local authority (social service) day nurseries, voluntary day nurseries, private day nurseries, integrated (combined) centres. Of the forms of individual childcare nannies are used by a very restricted range of the population, while relatives and childminders are used by most sections of the population. The different types of group care are worth distinguishing because they serve radically different client groups. Local authority and voluntary day nurseries and to a lesser

extent integrated centres are targeted on disadvantaged or ‘at risk’ groups where private day nurseries are largely used by relatively advantaged families with usually two incomes.

Provision for over-threes, often referred to as pre-school, includes playgroups, nursery schools and nursery classes. While these forms of provision are designed for the over-threes it is quite common for children to start in these forms of care a little earlier. All forms of childcare used by the under-threes are also used by over-threes. Playgroups are provided by voluntary or local authority sectors and are used by all sections of the population. Nursery schools and classes are used by all sections except that they are generally targeted, particularly nursery schools, on more disadvantaged communities. Private nursery schools (often called kindergartens in the UK; the term is used differently in other countries) also exist and are used by affluent families, although they may register under regulations for playgroups. Provision varies across the UK and in Northern Ireland children from three upwards can also be found in reception groups or reception classes within primary schools.

1.3 Evidence on developmental effects

In considering the extensive research literature it is useful to distinguish between evidence involving the age range 0-3 years and the age range 3 to school. The nature of the provision is frequently different and the nature of the findings differentiates according for these two age ranges also. In addition a substantial body of research is concerned with the use of childcare or pre-school provision as a form of intervention for disadvantaged children, who are given emphasis in this review. This raises the issue of the generalisability of the results of intervention research to the general population. Hence it is worth considering this research separately as intervention studies with disadvantaged populations are often treated as though they apply to all childcare with all populations, which is clearly inappropriate.

1.4 Structure of report

Childcare as an intervention with children from disadvantaged families is a distinctly separate area of activity and evaluation to childcare for the general population. The evaluations of this approach are dealt with first as the results are more straightforward, and key to understanding childcare effects for disadvantaged children. Next research on childcare as used by the general population is considered. As the nature of childcare and the nature of the research evidence for children under three and over three are different, the research literature is treated separately for the age ranges. Firstly the evidence on childcare for 0-3 years is considered, for

socio-emotional, cognitive and language development; and then the research evidence for childcare or pre-school for 3+ years is covered. Lastly the few cost benefit analyses available are reviewed. The conclusions section summarises the report and indicates gaps in the research evidence with regard to early years provision in the UK.

2. CHILDCARE AS INTERVENTION

2.1 Research methodology

Childcare or pre-school education has been used as an intervention strategy to improve the lives and development of specific groups, particularly children living in deprived circumstances. In some cases the degree of control over the intervention and the potential recipient population has allowed an intervention based on a randomised control trial (RCT) procedure to be adopted. In a RCT, assignment to intervention or control groups is random, hence theoretically balancing groups on background factors that may influence the results. Where properly executed this is the most powerful evaluation strategy. For more widespread interventions this level of control usually has not been possible and evaluations have adopted quasi-experimental designs where group assignment is not randomised and control for background factors is carried out by statistical adjustment. This strategy has a potential flaw in that there may be an unacknowledged background factor that may affect the results. However such designs do allow interventions to be assessed in typical or usual circumstances and hence produce results of potentially greater generalisability.

2.2 Randomised Control Trials (RCTs)

2.2.1 Ypsilanti/High Scope/Perry Pre-school Study

The Perry Pre-school Project was conducted in Ypsilanti, Michigan. This half-day, five days a week, centre-based programme starting at 3 years of age was supplemented by 90-minute weekly home visits. It was based in an area of extreme urban deprivation and the population was African-American. Children with IQs lower than 90 were randomly assigned to the intervention or control groups, and 123 of the children have been followed into adulthood. The intervention involved a high quality educationally oriented curriculum (High/Scope), with well-trained staff. In a RCT the programme was demonstrated to have a series of long-term effects. In school the intervention group showed higher levels of educational achievement, but there were no long-term effects for IQ. By age 27, the long-term benefits of the intervention included: reducing school drop-out, reducing drug use, reducing teenage pregnancy, enhancing employment, reducing welfare-dependence and reducing crime. Fewer females in the intervention group showed "educable mental impairment" or poor mental health, and the males had far fewer criminal arrests (Schweinhart et al., 1993).

2.2.2 Abecedarian Project

The Abecedarian project involved an Early Child Development (ECD) initiative in a poor African-American population in Chapel Hill, North Carolina, which was a largely middle class community with relatively little deprivation (Ramey & Campbell, 1991; Campbell and Ramey 1994; Ramey et al. 2000). The 111 children, whose mothers had a low intelligence quotient (IQ) and low income, were randomised into two groups. One group was placed in an ECD program that involved centre-based care and home visits beginning at three months of age and continuing until the children entered school. The control group received family support, social services, low-cost or free paediatric care, and child nutritional supplements but no additional childcare beyond what the parents and the local services provided. The programme had one qualified early childhood educator for every three infants and toddlers until age 3 and one for every six children over age 3. The children participating in the ECD programme showed gains in cognitive development, educational performance, and improved behaviour that were still evident at age 21, compared with the control group, and the earlier the start the greater the effect. The likelihood of being held back in grade during primary school declined by almost 50 percent for children who attended the ECD programme (Ramey et al. 2000). At the age of 21, 104 of the original 111 infants in the Abecedarian Project were measured for cognitive functioning, academic skills, educational attainment, employment, parenthood, and social adjustment (Clarke & Campbell, 1998; Campbell, Ramey, Pungello, Sparling & Miller-Johnson, 2002). At that time, researchers found:

- Participants had significantly higher cognitive scores as toddlers through age 21 than the control group. Reading and math scores were also consistently higher.
- Participants were twice as likely to attend higher education as those in the control group (40% versus 20%). More than twice as many of the participants (35% versus 14%) attended a four-year college at the age of 21.
- The intervention group were more likely to postpone parenthood until they were more mature. On average, they were more than one year older (19.1 versus 17.7 years) when their first child was born compared to the control group.
- There were no significant differences in criminality between the intervention and control group as had been found in the Perry Pre-school Project. Although there was a trend for less criminality and there was less marijuana use.

-
- Special programs for the control group when they entered the school system did not have a significant effect on their development, which further highlights the importance of the pre-school programme.
 - The mothers in the intervention group became better educated and were more likely to become employed, hence both generations benefited.

2.2.3 Project CARE

The same team that had been involved in the Abecedarian Project undertook a subsequent RCT study (Project CARE) that compared the effects of a centre-based programme, home-visiting and control condition with interventions starting shortly after birth, again with low-income African-American families. At 12, 18, 24, and 36 months, the day care plus home visit intervention group scored significantly higher on developmental assessments than the control and home visit only groups. At 30, 42, 48, and 54 months, the two intervention groups differed from each other in that the home visit only group's scores were lower than the day care plus home visit group's scores. Children in treatment groups that included childcare were rated as more task-oriented in infancy and tended to show higher, more stable cognitive scores beginning during late infancy and continuing through early childhood than the children who did not receive the childcare intervention. (Ramey & Campbell, 1982; Sparling, Wasik, Ramey & Bryant, 1990). In essence, only the centre-based programme had any significant effect (Wasik et al. 1990; Burchinal, Campbell, Bryant, Wasik, & Ramey, 1997).

2.2.4 Milwaukee Project

This project (Garber, 1988) targeted mothers with IQs lower than 75, who were unemployed and in poverty. The intervention included a full-time, child-oriented, centre-based programme from infancy to school with increasing educational input as age increased; and vocational training, childcare and household guidance was provided for mothers. Families were randomly assigned to intervention or control groups. Intervention children had higher IQ and better school readiness at school entry. Throughout school the intervention group were less likely to be retained in grade. By age 14 the higher IQ for the intervention group was less than earlier but still greater than the control group. However there were no benefits in educational achievement, which is puzzling.

2.2.5 Infant Health and Development Program (IHDP)

The Infant Health and Development Program (IHDP) was an intervention aimed at improving the health and development of premature, low birth weight (less than 2.500 kg.) infants through a combination of education and support for parents plus enriched educational day care and health services for children. A RCT was used at 8 sites to examine the impact of IHDP on children's growth and development from birth to 8 years of age. The results of the study differed markedly by child's birthweight. For children in the range 2-2.5 kg., there were large significant benefits of the enriched educational day care intervention. For the very low birthweight (less than 2kg.) infants' results were more equivocal, but with evidence of some benefit from the intervention (Ramey et al. 1992; Brooks-Gunn et al. 1994; McCarton et al, 1997). Also there is recent evidence that the positive effects of the IHDP intervention are moderated by child temperament in that positive effects are most pronounced for children rated highly for negativity in infancy (Blair, 2002).

2.2.6 Early Head Start (EHS)

Early Head Start is a two-generation intervention programme serving parents and children birth to age 3, targeted within disadvantaged communities. It began in 1995 and by 2003 had grown to over 700 programmes serving more than 62,000 children in the US. Early Head Start aims to promote children's development and provides childcare, developmental assessments, health and parenting services. There are three models of intervention; centre-based, home visiting, and a combination of these two.

Evaluation of Early Head Start has included a random controlled trial involving 17 EHS sites and following 3,000 Early Head Start children and controls up to age 3 (Love et al., 2002). There have been found to be several positive effects for Early Head Start participation. These include for children:

- better cognitive development
- better language development
- better immunisation records and less hospitalisation
- lower levels of aggressive behaviour
- more sustained play
- greater engagement and less negativity with parents

For parents positive effects include:

- greater warmth and supportiveness to children
- less detachment
- more time playing with children
- more stimulating home environments
- more language learning-aid reading support for children
- less spanking with a wider range of discipline strategies
- Early Head Start parents also were more likely to be employed or in training
- Early Head Start parents also delayed subsequent child bearing compared to controls

Effects sizes were modest, generally in the 10-20% range, and there were notable differences in the effects for different groups of parents. Where parents were enrolled in Early Head Start in pregnancy rather than later there were stronger impacts and early implementation had stronger effects on all outcomes. Generally, effects were stronger for African-American than other ethnic groups, with small impacts for White families. The effects of Early Head Start were strongest for families with a moderate number of demographic risks (3 out of 5) rather than low or high risk, and there was no significant positive impact from the highest risk families who seemed impermeable to this intervention.

There were also differential effects for the different models of intervention. Centre-based programmes had the strongest effects on child outcomes whereas home-based programmes had the strongest effects on parenting outcomes. The mixed model combining both centre-based provision with home visiting had the most wide-ranging and strongest positive impact.

2.2.7 Hackney study

This study was intended as a RCT of day care but because it took place in an Early Excellence Centre, which are primarily targeted on disadvantaged families, it is included here. Toroyan et al. (2003) attempted to implement a randomised control trial (RCT) of day care. In practice it was a RCT of being allocated a place at a particular Early Excellence Centre in Hackney, a socially mixed area including a high proportion of disadvantaged families. The intervention group were allocated a place at the Early Excellence Centre, while most of the control group used other forms of day care. The results found by the study are (1) an increase in the likelihood of mothers in the intervention group being in paid employment, but with no

increase in family income and (2) the intervention group children were more likely to be infected with ‘glue ear’ (otitis media with effusion). There were no child development effects and no positive cost benefits found but, as the authors say, estimates were imprecise. There are points on this study to be considered. The sample size is small. Using lenient criteria the authors’ own statistical power calculations indicated the need to recruit 140 mothers, whereas they actually recruited 120 with only 51 being in the intervention group. This small imbalanced sample size reduces the power to detect differences and makes the study vulnerable to chance variation. An illustration of this is the substantial differences between the two groups at pre-test, despite the apparently random method of selection. However, these substantial differences were not studied as the authors came to this decision: “Statistical tests were not conducted as this is not considered good practice.” These initial group differences make the likelihood of results consistent with the intervention hypothesis more likely if children with higher pre-test scores are more likely to improve, and less likely if the opposite is the case. Also, to be a worthwhile RCT the control group would need to have meaningful differences in exposure to day care. Experienced exponents of RCTs would have a good idea of what might happen to the control group, and the fact that the majority of the control group in this study used day care makes the study’s value questionable. While it is impossible to predict with certainty whether the control group would use day care, an inspection of the base rate of day care use in Hackney would have indicated that the majority would do so. In addition, the procedures for assessing child development would not usually be chosen by researchers experienced in child development, as several more sensitive procedures are available. It is worth noting that many of those who undertake day care and child development studies are experienced users of RCTs in other contexts, yet they choose not to apply RCTs in this context as they recognise the problems of applicability to studies of everyday day care. Overall this study provides little of significance.

Table 1 provides a summary of the RCT evaluations of projects using childcare as intervention for children from disadvantaged families.

Table1: Summary of Randomised Control Trials of Interventions

Study	Target Group	Intervention comparisons	Place and time	Significant Effects
Perry Preschool Project	African-American 3-year-olds followed to adulthood	N=123. High-quality centre-based preschool + other support vs. control	Ypsilanti, Michigan, 1960's onwards	Intervention associated with large long-term benefits in terms school dropout, drug use, teenage pregnancy, employment, welfare dependence, learning difficulties and criminality.
Abecedarian Project	African-American 3-month-olds followed to adulthood	N=111. High quality centre childcare plus home visits vs. control	Chapel Hill, North Carolina, 1960's onwards	Intervention associated with large long-term benefits in terms of cognitive development, educational success, employment, teenage pregnancy and social adjustment.
Project CARE	Similar to Abecedarian 3-month followed to 5 years old	N=83. Centre vs. Home visits vs. control	Chapel Hill, North Carolina, 1970's	Only high-quality centre-based intervention had a significant effect
Milwaukee Project	Low IQ, unemployed, poor mothers and infants followed to age 14.	N=40. High quality centre-based childcare birth to school, plus mother support vs. control	Milwaukee, Wisconsin, 1970's	Intervention produced benefits for IQ and school readiness, less retention in grade.
IHDP	Low birthweight (under 2.5 kgs.) children followed birth to 8 years old	N=985. High quality centre-based programme plus support for parents vs. control	8 sites in USA late 1980's early 1990's	For children 2-2.5 kgs. the intervention produced benefits in cognitive social and educational development. The effects were strongest for children rated as more negative in infancy.
Early Head Start	Families with infant in disadvantaged communities followed from birth to 3 years old	N=3000. High quality centre-based programme vs. home visiting vs. centre plus home visiting vs. control	USA nationwide Late 1990's	Interventions had benefits for cognitive, language and social development and increased immunisations. For parents: -better parenting, employment, training and delayed childbearing. The effects were strongest for African-Americans and for families at moderate risk.
Hackney Project	120 families birth to 3 years old	Early Excellence Centre vs. control (but control also received day care)	Hackney, London, Late 1990's	Nothing of any significance, because of methodological flaws.

2.3 Quasi-experimental Studies

2.3.1 Head Start

Head Start is a broad-based early intervention programme to improve outcomes for children in disadvantaged families. It was initiated in the 1960s as a brief (8 week) summer pre-school programme but rapidly developed to be a year-round programme and has included a wide range of variations. Typically a Head Start programme would include centre-based early childcare and education from 3 years of age on at least a half-time basis. A range of other services may supplement this basic package and the diversity has made it difficult to assess. By the early 1970's Head Start had become a continuous pre-school programme serving around 400,000 children at a cost of \$4,000 per child. By 1999 it served 800,000 children at a cost of \$5,400 per child.

Participation in Head Start has been associated with short-term improvements in cognitive development (see Barnett 1995 and Karoly et al. 1998 for reviews). However often these effects appeared to 'fade out' after a few years. However, subsequent follow-up in adolescence indicated that Head Start was still having an effect, possibly 'sleeper' effects in that Head Start graduates were showing higher educational attainment. Oden, Schweinhart, Weikart, Markus & Xie (1996) conducted a 17-year follow-up study of Head Start graduates. Once background differences were adjusted, Head Start subjects were generally equal to or better in educational development than what they would have been without Head Start. Kresh (1998) synthesized 30 years of research on the effects of Head Start. Findings indicated that Head Start had a substantial, immediate effect on participants, but the long-term effects were less evident. There was some evidence that Head Start increased parent-child communication, parental participation in school, mothers' satisfaction with their quality of life, and confidence in their coping abilities. Head Start participation decreased maternal depression, anxiety, and somatic symptoms. Head Start was associated with some community effects including increased educational emphasis on the poor and needy, greater sensitivity in health service delivery, and increased employment.

The Head Start initiative was a source of many studies of the effects of pre-school education. McKey, Condelli, Barrett, McConkey & Plantz (1985) developed a meta-analysis of 210 studies evaluating Head Start programmes. They concluded that Head Start programmes have an immediate positive effect on child development, but these effects 'wash out' after two years. However many studies were poorly controlled. In one of the more robust studies, Lee,

Brooks-Gunn & Schnur (1988) considered data on 969 children and nineteen pre-schools. Some children had attended a Head Start pre-school, some had attended other pre-schools and some children had not attended pre-school. They found evidence of beneficial pre-school effects upon cognitive measures, with the greatest effects occurring for the most disadvantaged children.

However such summaries have not been aware of ethnic variation in Head Start effects. Currie & Duncan, 1993, 1995) used the National Longitudinal Survey of Youth (NLSY, a nationally representative US cohort) data to evaluate Head Start. They compared children who attended Head Start with siblings who did not. This strategy provides a means of controlling for family and other background factors. Using this nationally representative sample they find substantial gains in literacy, numeracy and grade repetition for White and Hispanic children, but not African-American children, at eight years of age, associated with Head Start. For African-American children these gains ‘fade out’ over the early school years. Head Start also appeared to positively influence the immunisation rates, growth and nutritional status for African American children, with those children attending Head Start taller than their siblings who did not. For White children the educational gains persist into adolescence. This suggests that the ‘fade out’ is associated with African-American children’s experiences in the school system. This explanation is supported by further evidence from Currie & Thomas (1998) that African-American children attending Head Start go on to lower quality schools than other African-American children. This is not true for White children.

Garces, Thomas and Currie (2000) used NLSY data to consider the effects of Head Start for young adults. They found that Head Start had positive effects on educational and earnings for Whites but not African-Americans. White graduates of Head Start show an increased likelihood of graduating from high school, and higher earnings. For African-Americans attendance at Head Start was significantly associated with lower criminal activity. This was not so for Whites. These results indicate that interventions such as Head Start will have varying effects dependent upon the population and context involved. Other evidence supports the view that versions of the programme involving parents did improve children’s outcomes. (Lee, Brooks-Gunn, Schnur & Liaw, 1990)

A US General Accounting Office (1997) report concluded after the first 30 years of Head Start that very little was known about the impact of Head Start. Only 22 out of 200 studies

utilised any comparison group. These studies indicated higher gains in self-help, academic skills and cognitive development in the short-term. There was inconsistent support for the longer-term effects. There was also some evidence of health-related benefits in that Head Start participants were more likely to receive preventive health services. The dearth of strong evidence led to the setting up of two systematic evaluations. The Family and Child Experiences Survey (FACES) project is following a random sample of 3,200 families from 40 representative Head Start programmes. This study (Administration on Children, Youth & Families, 2001) currently reports significant positive effects for Head Start on vocabulary, literacy, numeracy and social skills at the start of school, with effects being greater for the most disadvantaged children (McKey, 2003). They also report that independent observers rate the quality of Head Start programmes as generally high, with some indication of better child outcomes being associated with higher quality programmes. Also there were some benefits reported for parents in terms of increased employment and decreased benefit dependence. In 1998, the US Congress authorised the National Head Start Impact Study, which will study 5000 + children. This study has yet to report.

2.3.2 Chicago Child – Parent Center Program

This programme (CPC) started in 1966, and provides centre-based pre-school services for disadvantaged families, including education, family, and health services and half-day pre-school and school-age services in linked elementary schools up to 9 years.

Reynolds and colleagues (Reynolds et al. 2000, 2001) have been running a long-standing quasi-experimental study of a non-randomised, matched-group cohort of 1,539 (989 intervention, 550 control) low-income, mostly black children born in 1980 and enrolled in alternative early childhood programs in 25 sites. The intervention group received CPC services while the control group typically did not receive any educational services until age five.

Children who participated in the pre-school intervention for 1 or 2 years had a higher rate of high school completion, more years of completed education, and lower rates of juvenile arrest, violent arrests, and school dropout. Children with two years of pre-school experience began school more academically competent than those with one year of pre-school. Both pre-school and school age participation were significantly associated with lower rates of grade retention and special education services. The effects of pre-school participation on

educational attainment were greater for boys than girls, especially in reducing school dropout rates. Children with extended program participation from pre-school through second or third grade also experienced lower rates of grade retention and special education. In addition intervention children had lower rates of child abuse (Reynolds & Robertson, 2003). These positive effects of early childhood intervention on educational attainment, social development and criminality have largely persisted up to age 20.

2.3.3 Syracuse Study

The Syracuse Family Development Research Program (Lally, Mangione and Honig 1988) was a comprehensive childcare, education, health and family support programme from pregnancy to the start of school. The evaluation study involved 190 families and found that the intervention produced better educational attainment and school attendance for girls, but not boys, as compared with a control group. In adolescence, there were improvements in social adjustment and reduced criminality for the intervention group.

2.3.4 Brookline Early Education Project

This project began in 1972 providing a range of health and centre-based care and education services from birth to school to families in the intervention group. The intervention was open to any family in Brookline, an area of Boston with mixed socio-economic characteristics. By seven years of age intervention children showed better educational attainment and as young adults reported more years of education. At five years of age intervention children were more cooperative and task-oriented. As young adults the intervention group reported higher incomes, less depression, better employment, better health and less risk-taking behaviour than the comparison group. (Tremblay, Kurtz, Masse, Vitaro & Phil 1995; Hauser-Cram, Pierson, Walker, & Tivnan, 1991).

2.3.5 Diverse State-based programmes in the US

Following the success of Head Start and other projects demonstrating positive effects for pre-school attendance, many states have set up their own pre-school programmes. Georgia from 1993 has provided pre-school for all 4-year olds. The longitudinal follow-up of 4,000 of these children indicates positive effects as reported by teachers (Henderson, Basile and Henry, 1999). New York started a universal pre-school service for 4-year olds, but no reliable evaluation has been carried out. Michigan started a pre-school programme for children 'at risk' of school failure in 1985. An evaluation of this programme comparing programme

children with non-programme children from similar backgrounds found evidence of positive effects. Teacher ratings indicated improved interest in school, and attainment on a wide range of subjects. Programme children were also 35% less likely to be retained in grade. (Michigan Department of Education, 2002).

From 13 state programmes with an impact evaluation, Gilliam and Zigler (2001) conducted a meta-analysis. None used a RCT although some form of comparison group was usually used. They identify some methodological flaws, but the pattern of overall findings offered modest support to the conclusion of pre-school improving children's developmental competence, mostly in terms of reducing retention in grade, improving attendance and educational attainment. A few studies found such effects persistent over several years.

2.3.6 Meta-analyses and reviews

The Consortium of Longitudinal Studies (Lazar et al., 1982) considered eleven studies, which included centre-based, home-based and centre/home based programmes, with children from disadvantaged backgrounds. Quasi-experimental and approximately randomised designs were used to assess a variety of cognitive, motivational and social development outcomes. The meta-analysis across 11 studies provided strong evidence of lasting beneficial effects for pre-school education. Gains in cognitive development were evident for several years but not at 19 years. However, differences in motivational aspects were still present. A number of other studies have found similar effects with children from disadvantaged backgrounds (e.g. Ramey, Bryant, Campbell, Sparling & Wasik, 1988; Garber, 1988; Fuerst & Fuerst, 1993). Sylva (1994) concluded in her review that strong experimental studies support the claims that pre-school experiences actually cause relatively lasting benefits for children's development. Rutter (1985) concluded in reviewing such research, "the long term educational benefits stem not from what children are specifically taught but from effects on children's attitudes to learning, their self esteem and on their task orientation". Lazar et al. (1982) suggest that there may be mutual reinforcement between pre-school participation and parents' attitudes. The virtuous circle is seen to promote better motivation for the children to learn, resulting in long-term gains.

The pre-school programmes that were most consistently associated with positive developmental effects were regarded as high quality programmes. Schweinhart (1987) has

documented what he sees as quality indicators for pre-school education validated by research.

These are:

- Developmentally appropriate curriculum that features child-initiated learning activities within a supportive environment.
- Careful selection of staff and effective training
- Staff-child ratios
- Partnership with parents and community
- Strong support services, administration, health and nutrition
- Procedures for evaluating children's progress

Table 2 provides a summary of the quasi-experimental evaluations of childcare as intervention for children from disadvantaged families.

Table 2: Summary of Quasi-experimental Evaluations of Interventions

Study	Target Group	Intervention comparisons	Place and time	Significant Effects after controlling for demographics etc.
Head Start	Poor Families with child 3+ years old	Total N in thousands. Centre-based preschool (Head Start) vs. non Head Start	USA 1960's onwards	Short-term benefits for literacy, numeracy and social development. Some indication of improved employment/decreased welfare dependence for parents. Long-term effects on education/earnings for Whites and reduced criminality for African Americans. Possibly bigger effects with increased parental involvement.
Chicago Child Parent Centers. CPC	Poor, mostly African American, families with child born in 1980	N=1539. Preschool and family services from age 3 to 9 years. CPC vs. no services	Chicago IL 1980's	At age 20 education achievement, school dropout and criminality all improved.
Syracuse	Poor, mostly African American families	N=190. Pregnancy to start of school, centre-based childcare, health and family support vs. no services	Syracuse NY 1970's	Better educational success in adolescence for girls but not boys: Long-term benefits for social adjustment and criminality. Parents had better social adjustment, but no economic benefits for parents.
Brookline	Any child in Brookline, a mixed area.	N=240. Centre- based childcare and education plus health and family support birth to school vs. no services	Boston MA 1970's	As young adults intervention group better education, earnings, employment, depression, health, less risk-taking.
Diverse US States	Varied, some targeted on poor, some universal.	Preschool 3-4+ years vs. no preschool	USA 1990's	Indications of short-term educational improvement, no long-term results

2.3.7 Summary of childcare as intervention

The results of evaluations of the use of childcare as intervention are generally rigorous, and produce a consistent pattern of results. The RCT studies all show the clear benefit for disadvantaged children of high quality pre-school childcare provision, whether started in infancy or at 3 years of age. Where the quasi-experimental studies have rigorous methodology they produce similar results. The small-scale tightly controlled interventions produce larger effects than the more extensive large-scale interventions such as the Chicago Child-Parent Centers and Early Head Start. However the impact of large-scale interventions is still substantial and produces worthwhile benefits for children, families and communities. The effects of interventions depend upon the population and the context. For example, where crime is endemic effects on criminality are significant, but not where crime is not endemic. Also early childhood interventions often use home visiting as a supplement to childcare. This can be associated with additional benefits. However it should be noted that home visiting alone is often relatively ineffective and it works best as an addition to childcare provision. Also home visiting provided by nurse-qualified staff has greater impact than that provided by para-professionals, particularly if a structured approach is used (Olds et al., 1997, 1999).

3 RESEARCH ON GENERAL POPULATIONS

3.1 Childcare (0-3 years)

3.1.1 Socio-emotional development

3.1.1.1 Attachment

The issue of whether day care was bad for children was partly derived from the theoretical work of Bowlby (1951, 1969) on the development of an attachment by the infant towards the principal caregiver, usually the mother. Attachment has come to be seen a fundamental step in development and that disruption to attachment may have longer-term developmental consequences (Ainsworth, Blehar, Waters & Wall, 1978). A child's attachment to the mother may be classified as secure or insecure, with secure attachment leading to positive development but insecure attachment being associated with an increased risk of negative developmental outcomes. Examples of developmental sequelae are; children with secure relationships to their mothers when infants have been reported to be more sociable (Pastor, 1981), and more socially competent in pre-school (LaFreniere & Sroufe, 1985; Waters, Wippman & Sroufe, 1979).

The perspective that daily separations may harm the development of a secure attachment influenced a considerable amount of early research on infant childcare.

Caldwell, Wright, Honig & Tannenbaum (1970) followed children from infancy. Some had received full-time day care since one year of age, and others were home reared. Mother's reports revealed no differences in attachment behaviours. However, possibly direct measurement of attachment might reveal differences. A study by Blehar (1974) was the first to test this proposition using the Strange Situation, a direct observation procedure, to measure attachment. Blehar found that a group of 2-3 year olds who had experienced day care showed higher levels of insecure attachment than a comparable group of home-reared children. It is dubious whether the Strange Situation should be used to measure attachment with infants older than two and this early finding was not replicated (e.g. Moskowitz, Schwarz & Corsini, 1977; Ragozin, 1980). Reviews of the day care literature of that period concluded that there was no strong evidence that day care experiences might influence the quality of the infant-mother attachment, (Belsky & Steinberg, 1978; Clarke-Stewart & Fein, 1983; Rutter 1981). However, in the 1980's several studies appeared in which the reunion behaviour and attachment security of infants with and without day care in the first year of life were compared. These studies found evidence that extensive non-parental care in the first year of

life was associated in increased avoidance and insecurity in the infant-mother attachment, (Jacobson & Wille, 1986; Owen & Cox, 1988; Schwarz 1983; & Jacobson, 1984, Vaughn, Gove & Egeland, 1980).

The evidence was still equivocal in that some studies failed to find an association between non-parental care in the first year and insecure attachment (Burchinal & Bryant, 1986; Chase-Lansdale & Owen 1987; Owen, Easterbrooks, Chase-Lansdale & Goldberg, 1984). However the increasing accumulation of evidence suggesting a link between extensive non-parental day care in the first year of life and infant-mother attachment was a cause for concern (Gamble & Zigler, 1986; Belsky, 1986). The major proponent of this viewpoint was Belsky (1986, 1988a,b), which represented an about-turn from his previous position that there was no good evidence of such a relationship (Belsky & Steinberg, 1978; Belsky, Steinberg & Walker, 1982). Belsky argued that the diversity of methodologies produced confusing results. He argued that, if you took studies with a commonality of methodology; i.e. they only used the proper 'Strange Situation' procedure (Ainsworth et al., 1978) as the measure of attachment, and only considered day care children having at least 20 hours of day care per week for a large part of the first year of life; then the evidence was very consistent. Belsky (1988) presented a meta-analysis of four studies (Barglow, Vaughn & Molitor, 1987; Belsky & Rovine, 1988; Chase-Lansdale & Owen, 1987; Jacobson & Wille, 1986) with a total sample of 491 children. The conclusion reached is that insecure avoidant attachment patterns are over- represented within the day care group as compared with the home reared group (41% vs. 26%). This report was extremely controversial at least partly because of its ideological/political overtones.

Several papers attacked Belsky's interpretation of the evidence. Thompson (1988) argued that the distribution of insecure attachments within the samples Belsky was using as evidence was not sufficiently different from distributions seen in normative data (e.g. Ainsworth, Blehar, Waters & Wall, 1978) to justify a conclusion that early day care is associated with attachment insecurity. Another critic was Clarke-Stewart (1988) who argued that the 'Strange Situation' did not have equivalent ecological validity for day care and home-reared groups in that the procedure and attachment classifications were primarily developed for children reared at home. The meaning and functional significance of a separation and reunion would be different for a child with extensive day care experience and greatly more experience of separations and reunions. Hence day care infants would be expected to behave differently.

Clarke-Stewart further argued that possibly greater independence on the part of day care infants was being interpreted as avoidance. These criticisms were followed up by a meta-analysis (Clarke-Stewart, 1989) of the four studies used by Belsky (1988) along with data from twelve other investigations, (several unpublished). The 1,200 cases represented were separated into those with more and less than 20 hours per week exposure to day care for a substantial period of the first year. The analysis revealed that 36% of infants with 20+ hours per week of non-parental care were classified as insecurely attached as compared with 29% of infants with reduced or no day care experience. This 7% difference was statistically significant with the large sample, but was less than the difference found in Belsky's meta-analysis. Clarke-Stewart argued that this level of difference was not sufficiently profound to warrant Belsky's conclusions, and could be explained by day care children being more used to separations and hence less stressed in the Strange Situation so that attachment behaviours would be less likely to be shown.

Clarke-Stewart's argument that day care children would be less stressed by separation and hence be less likely to show attachment-orientated behaviour in the Strange Situation was tested by Belsky and Braungart (1991). They observed 20 infants classified as insecurely avoidant, 11 day care and 9 home care infants, in the 'Strange Situation'. The day care infants were rated by observers, blind to day care history, as being more distressed on separation than home care infants. While this study has a small sample, and generalisation must be cautious, the data contradict Clarke-Stewart's proposition that day care infants would be less stressed by separation.

Yet another meta-analysis of 13 studies of attachment in the 'Strange Situation' and day care was conducted by Lamb, Sternberg and Ketterlinus (1992). These investigators found 37% insecurely attached infants in the day care group and 29% insecurely attached infants in the home care group. These figures almost exactly replicate those found by Clarke-Stewart's (1989) meta-analysis, which is not surprising given the large overlap in the studies included in both meta-analyses. Lamb et al., (1992) argued that the greater proximity seeking of home-reared children is open to a variety of interpretations and drew attention to methodological limitations of the studies, including the absence of assessments of the quality of day care, the often unrepresentative nature of the samples, and the reliance upon the 'Strange Situation' as a measure of infant-mother attachment. In their analyses the rate of insecure attachment was greater for infants starting day care between 7 and 12 months, than for infants starting day

care earlier than 7 months. This suggests the possibility of a sensitive period for separation and day care effects, which is also suggested by a naturalistic observational study of reunions with 129 infants by Varin, Crugnola, Molina & Ripamonti (1996), where more difficult reunions were associated with starting day care either in the period 7-12 months, or 18-24 months. Infants starting day care at other ages showed easier reunions and were less easily frustrated.

The fact that 3 separate meta-analyses all indicate a small but significant increase in insecure-avoidant attachment where children have substantial non-parental care in the first year does imply that there is a phenomenon to be explained. However, in all cases the size of the effect appears to be small indicating that such an increase in risk is only a small part of the range of factors influencing attachment. Also these meta-analyses may be affected by the 'file drawer problem' as suggested by Roggman, Langlois, Hubbs-Tait & Reiser-Danner (1994). This refers to the likelihood that studies with insignificant results tend to be put in the file drawer rather than published. This, of course, is a problem of all research. Another limitation of these approaches to attachment is their reliance on one dominant measure, the Strange Situation, which reflects a limited sampling of the range of attachment behaviours.

When the samples in the studies showing such slightly increased risk for insecure attachment are considered, often it appears that they are samples likely to be experiencing a high level of poor quality non-parental care. Studies where the day care is known to be of at least moderate quality (e.g. Pierrehumbert et al, 1996) fail to find a difference in attachment associated with non-parental care in the first year. Studies using measures of socio-emotional development other than the 'Strange Situation' find that quality of non-parental care may be influential (Melhuish, 1987; Howes, 1990). Using an observational measure of attachment behaviours in the home, Melhuish (1987) found that separation anxiety differed markedly for children who had experienced different types of childcare. From the same study, Melhuish, Mooney, Martin & Lloyd (1990) reported that these types of childcare varied markedly in terms of the quality of adult-child interactions occurring. Taken together these reports suggest that attachment behaviour may be mediated by the quality of interactions in the child's care environment. A study of infant day care in Greece also found evidence that variations in infant attachment behaviours were related to quality of day care environments (Petrogiannis, 1995). Hence the discrepancies reported in the literature with regard to the possible effects of day care on attachment may reflect differences in the quality of day care. Taking this pattern

of findings together it is possible that poor quality non-parental care may be a risk factor for attachment. This is the same principle that underlies Ainsworth et al.'s (1978) finding with regard to the quality of home care, where insensitive mothering is associated with insecure attachment, and sensitive responsive care is associated with secure attachment.

A child from a home with poor quality care who experiences poor quality non-parental care is never in an environment that consistently provides sensitive responsive interaction. Such a situation would occur, for example, if the parents are stressed by the dual roles of worker and parent and the stress inhibits the altruistic behaviour essential to good parenting. Such a child would be at particular risk for insecure attachment. Possibly the small risk effects revealed in the meta-analyses by Belsky (1988), Clarke-Stewart (1989) and Lamb, Sternberg & Ketterlinus (1992) are due to children who experience this double dose of poor quality care. While studies reported at this point did not have the right data to test this proposition (but see NICHD, 1997, below), there was support for the more general proposition that the effects of non-parental care experience will be mediated by parental care experience. Benn (1986) found that where employed mothers provided sensitive responsive care, their infants were securely attached; whereas employed mothers showing less sensitive care had infants showing insecure attachments. Another example is a study of 4-year-olds by Howes (1990) where early entry into day care was associated with less social competence only if children had an insecure attachment to the mother.

At this point research into the association between attachment and non-parental childcare during infancy had not produced clear conclusions. Various hypotheses suggested that the effect probably depends upon a combination of: a) the child's characteristics; b) the mother's behaviour with the child; c) what is going on in the home during the infancy period (for example, the degree of maternal stress); and d) the characteristics of the alternate care setting (e.g., Clarke-Stewart, 1992; Lamb, Sternberg & Prodromidis, 1992; Thompson, 1991).

Such was the controversy raised by Belsky's proposition concerning day care and attachment in an ideologically and politically sensitive field (e.g. articles in Time magazine, questions asked in the US Congress) that it led to the funding of one of the largest studies of day care, the National Institute of Child Health & Human Development Study of Early Child Care (NICHD) study. This study has followed 1,300 children drawn from 10 sites in the US

longitudinally from birth. The NICHD study could find no direct or main effect of amount, quality or type of day care on attachment security. However, the combination of poor quality care in the home paired with either (a) more than 10 hours/week of day care, (b) more than one childcare arrangement, or (c) poor quality childcare was associated with an increased risk of insecure attachment (NICHD, 1997). Hence day care can be a risk factor as proposed by Belsky (1986,1988). In addition the NICHD study has found that more time in childcare is linked with less harmonious mother-child interaction from 6 through to 54 months of age.

3.1.1.2 Beyond Infant Attachment

If infant attachment had no longer-term developmental consequences then interest in this aspect of development would not be very great. However there has been an accumulation of evidence that variations in infant attachment are predictive of various aspects of later socio-emotional development. (Sroufe, Fox and Pancake, 1983; Suess, Grossman and Sroufe, 1992; Belsky & Nezworski, 1988; Sroufe, Carlson, Levy & Egeland, 1999). Hence any consistent effects on infant attachment of day care would be anticipated to have longer-term consequences.

Evidence of longer term effects of day care experience on socio-emotional development studies indicate that children attending group day care interact more with their peers, both positively and negatively, and has usually led to conclusions that day care does not hinder socio-emotional development (e.g. Belsky, Steinberg & Walker, 1982; Clarke-Stewart, 1982) and may even promote some aspects of socio-emotional development (e.g. Hennessy & Melhuish, 1991; Clarke-Stewart, 1993). The research evidence contains examples of findings indicating negative, neutral and positive effects on aspects of social, emotional and behavioural development. On the positive side group day care has often been associated with improved social competence with peers (Melhuish, 1991; McCartney, Scarr, Phillips, Grajek & Schwarz, 1982; Field, Masi, Goldstein, Perry & Parl, 1988; Balleyguier & Melhuish, 1996) and also easier social interaction with adults (Cochran, 1977; McCartney et al, 1982; Clarke-Stewart, Gruber & Fitzgerald, 1994). On the negative side, Moore (1975) found that British children with day care experience later appeared to be more aggressive and non-conformist and similar results were reported by Robertson (1982). Children with infant day care experiences have been found to be less compliant with adult requests and more aggressive with peers (Schwarz, Strickland & Krolick, 1974; Rubenstein, Howes & Boyle, 1981;

Haskins, 1985; Field et al, 1988; Thornburg, Pearl, Crompton & Ispa, 1990). This aspect of children's social behaviour is sometimes represented as greater aggression, uncooperativeness and non-compliance and sometimes, in a positive light, as increased assertiveness and independence. To some extent the discrepancies between studies may reflect differences in ages of children studied. In Britain a longitudinal study found evidence of day care effects on socio-emotional development up to age three, but by age six all day care effects had disappeared, reflecting the increased equivalence in social experience of children in the study from three years onwards (Melhuish, Hennessy, Martin & Moss, 1990; Hennessy, Martin, Moss & Melhuish, 1992). Such age effects are likely to be closely tied to patterns of pre-school and school provision and hence may differ for different countries or sections of society.

In addition to suggesting links with infant attachment, Belsky (1986) also expressed the view that extensive non-maternal childcare before age one:

“...*may* be associated with diminished compliance and cooperation with adults, increased aggressiveness, and possibly even greater social maladjustment in the pre-school and early school years (Belsky, 1986).

This view was based on four American longitudinal studies (Farber & Egeland, 1982; Haskins, 1985; Rubenstein, Howes & Boyle, 1981; Schwarz, Strickland & Krolick, 1974) and one study conducted in Bermuda (McCartney, Scarr, Phillips, Gajek & Schwarz, 1982). However the effect for level of compliance with the mother among children who had or had not received regular non-parental childcare reported by Farber and Egeland (1982) was not statistically significant. In two of the studies (Haskins, 1985; Schwarz et al., 1974), it might be that the increased aggression was reflected the curriculum of the centres. With regard to Haskin's finding of increased aggression in day care children in the Abecedarian project, it has been claimed (but without clear evidence) that when daily activities were altered to facilitate social skills and reduce aggression then the increased aggression was eliminated (Finkelstein, 1982). Recently Bates, Marvinney, Kelly, Dodge, Bennett & Pettit (1994) in a study of 589 five-year-old children in 2 states with poorly regulated childcare, found that greater amounts of day care in the early years were associated with higher aggression, and lower social adjustment. These results held after controlling for family, child and background factors. Two studies using a national US sample of 4-6 year olds (NLSY data set) reported similar findings for non-compliance (Belsky and Eggebeen, 1991) and behaviour problems

(Baydar & Brooks-Gunn, 1991). Bearing in mind the often low quality of much American day care the results should be interpreted as possibly applying to children who experience predominantly low quality day care. These results parallel earlier findings in a study in Texas. Vandell & Powers (1983) found that 3-4 year old children from high quality centres (good adult-child ratio, well-equipped, good staff training) showed more positive interactions with teachers than children from poorer quality centres (poor ratio, training and large groups). Four years later the children from lower quality centres seemed less socially competent (Vandell & Corasaniti, 1990). These last four American studies all attempted to differentiate early from later day care and controlled for background factors. They all found evidence of the effects of amount of day care and some evidence that day care in the first year might be more influential.

While studies (e.g. above; Park & Honig, 1991; Belsky, 1999) have often reported negative effects on socio-emotional development for early day care, such evidence has been predominantly but not exclusively American. In Italy Varin et al. (1994) found that children with substantial childcare in the first year of life were rated by teachers as less able to tolerate frustration at three years of age. In Sweden Sternberg Lamb, Hwang, Broberg, Ketterlinus & Bookstein (1991) found that increased childcare in the first two years was associated with increased non-compliance for 3.5 years olds. In Norway Borge & Melhuish (1995) followed all the children in one municipality for the first 10 years of life and found that the quantity of non-parental care in the first 4 years was linked with increased behaviour problems at age 10. Some studies from countries where state support and regulations facilitate good quality day care have found rather different results. Another longitudinal study in Sweden has found no evidence of day care effects (Cochran, 1977, Cochran & Gunnarson, 1985; Lerner 1982). Similarly another Swedish longitudinal study of children who experienced various types of early childcare, could find no evidence of day care effects up to age 3½ years (Hwang, Broberg and Lamb, 1991; Lamb, Hwang, Bookstein, Broberg, Hult & Frodi, 1988). However at 7-9 years in the same study, while there was no overall home-day care difference, children who had been in individual day care were not as socially competent as children who had been in group day care (Wessels, Lamb & Hwang, 1996). In the same study there was also evidence that social competence and maturity of personality at 7 years were partly predicted by quality of home care and quality of day care (Broberg, Hwang, Lamb & Ketterlinus, 1989; Lamb et al. 1988; Wessels et al, 1996). A study by Andersson (1989) of children from birth to 13 years of age reveals a positive effect on academic and social competence of early day

care experience. Hence overall the Swedish studies reveal either neutral or positive effects of day care experience, with the possibility of some differences for different types of day care.

Norway has developed a system of childcare provision with many similarities to Sweden, but has been slower in making provision generally available. In the longitudinal study in Norway reported by Borge & Melhuish (1995) there was evidence of both positive and negative effects of childcare experience. Firstly, good quality pre-school provision from age 4 upward was associated with less behaviour problems reported by parents. However, early day care in the first 4 years was associated with increased behaviour problems reported by teachers when the children were 10 years old. The day care in the first 4 years being informal, unregulated and of unknown quality. Hence the differential effects may reflect the differential quality of care at different ages, or the differential effects of non-parental care at different ages.

Quality of care is made up of several dimensions. We can distinguish between process and structural aspects of quality.

Process- refers to the characteristics of the child's experience, e.g. interactions with others, learning experiences, variety in stimulation, responsiveness in environment.

Structural- aspects of environment that are fixed, e.g. accommodation, group size, adult-child ratio, training of staff, management structure.

Where legislation of day care quality exists it concentrates on structural aspects, as these are easier to inspect and control.

The importance of quality of care is indicated by a study of non-compliance and group day care by Howes & Olenick (1986). Non-compliance at 18, 24 and 36 months was studied at home, in day care, and in a structured observation. Non-compliance was not very consistent across situations indicating that this behaviour is likely to be strongly determined by the situation rather than the child. However the best predictor of non-compliance was quality of care, with children from high quality centres showing more compliance and cooperativeness than children from low quality centres. Quality of care may be positively correlated with other aspects of social competence as reported by Howes (1990) in the USA and by Beller, Stahnke, Butz, Stahl & Wessels, (1996) in Germany. A change in Florida childcare regulations enabled a study by Howes, Smith & Galinsky (1995) to find that improvements in care quality were associated with improvements in peer interactions. Similarly, a multisite study in four American states found that quality of care was associated with better social

competence after controlling for family background (Cost, Quality and Child Outcomes in Childcare Centers (CQO), 1995). Also Phillips et al. (2001) found that centres with higher quality care had children who showed less aimless wandering, a higher level of peer play, and had higher perceptions of self-competence. Also the NIHCD study (NICHD 2002c) found that quality of childcare contributed to social competence.

The importance of child-caregiver relationships as an aspect of quality of care is revealed in a longitudinal study reported by Howes, Hamilton & Matheson (1994). Children who showed secure attachments to caregivers were more competent in their social play, more sociable and less aggressive. Children without secure attachments to caregivers showed more social withdrawal and aggression. Volling & Feagans (1995) reported that socially withdrawn infants developed better peer relations in high quality day care centres yet their peer relations deteriorated if placed in centres with low quality care. In the Infant Health and Development Program intervention study with pre-term low birthweight infants, high quality day care, as part of the intervention, was associated with a reduced incidence of behaviour problems for 2-3 year olds (Brooks-Gunn, Klebanov, Liaw & Spiker, 1993). In a study of Israeli family day care, Rosenthal (1994) found that aspects of the quality of care (caregiver, expectations, forms of discipline and physical facilities) were related to the frequency of aggressive interactions.

The quality of day care centres depends in part upon the characteristics of children who attend. The practice of segregating 'at risk' children into social service nurseries results in a clustering of children prone to behaviour problems. In such centres McGuire & Richman (1986) have reported high levels of aggressive behaviour and behaviour problems. It is likely that in such circumstances children are learning problematic behaviour patterns through peer interaction and observational learning, leading to an increase overall in such behaviours.

Egeland & Hiester (1995) have found with children from poor families that attachment in infancy was predictive of social adjustment for home-reared infants but not for children who received day care from infancy. Such a finding suggests that day care may be influential on development by altering the significance of other aspects of the child's ecology.

Hence the controversial area of the potentially negative effects of extensive non-parental care in infancy upon social adjustment, particularly aggressive or antisocial behaviour was not

resolved by the end of the twentieth century. However the NICHD study has recently reported evidence that the quantity of non-maternal care is associated with problematic child behaviour. More time in non-maternal care across the first 4.5 years of life predicted more problem behaviour, particularly antisocial and aggressive behaviour at 4-5 years of age (NICHD, in press). These effects were partially mediated by quality of childcare, time spent in group care and maternal sensitivity, but quantity of childcare had a clear independent effect and quality of care had no separate main effect. Another study finding similar effects is Youngblade (2003) who finds that maternal employment in the first year of life is associated with behaviour problems for boys but not girls. A recent reanalysis of the NICHD data for 3-year-old European-American children reports that an effect for maternal employment in the first year of life upon behaviour problems may only be present where the quality of childcare is below average and not if it is above average (Brooks-Gunn, 2003). The possible importance of quality of care is supported also by some studies of the effects of childcare quality on the level of cortisol, an endocrine related to stress responses. In full-time day care cortisol levels tend to rise over the day, in contrast to the typical diurnal pattern. Increasing cortisol levels, indicative of increased stress, are more likely and larger as the quality of day care decreases (Dettling et al. 2000). Increased stress may lead to increased behaviour problems. The effects of time in non-parental care on behaviour problems has also been found in the results of a new longitudinal study of 17,000 children from 900 kindergartens in the USA (Early Childhood Longitudinal Study, ECLS-K). Analyses of data on these children at ages 5 and 7 show that greater amounts of childcare are associated with increased behaviour problems after controlling for demographic factors (Ritter & Turner, 2003). The effect sizes vary from 0.11 to 0.42 and are greater for childcare starting in the first year of life. In addition Han, Waldfogel & Brooks-Gunn (2001) report that maternal employment in the first year of life is associated with increased behaviour problems after controlling for demographic factors in an analysis of the NLSY dataset, a large-scale, representative, US sample. Again these results, at least in the context of the childcare available in the US, give clear support to Belsky (1988). In addition the EPPE study of over 3,000 children in England has found that early childcare, particularly in the first two years, is associated with effects on antisocial behaviour at 3 and 5 years of age (Melhuish et al., 2001; Sammons et al., 2003b). Childcare by a relative was associated with *decreased* antisocial behaviour, whereas very high levels of childminder care or moderately high levels of group (centre) care were associated with *increased* antisocial behaviour. In addition extremely similar results have been found for the

EPPNI study of 850 children in Northern Ireland (Melhuish et al., 2002a, b). Hence there is complementary evidence emerging from large-scale studies in the US and UK.

The Families, Children and Child Care (FCCC) study is a new British study following 1,200 children from birth in Oxford and London. The full range of childcare options is represented in the study. Preliminary results at 18 months of age indicate that higher quantity of childcare is linked with poorer emotional regulation and increased anger amongst infants, and there are some indications of quality of childcare effects upon development also (Stein, Sylva & Leach, 2003). This is consistent with the other research discussed above. Another British study, ALSPAC, has recently reported (May, 2003) on an analysis of mothers' reports of activity levels and incidence of negative emotional behaviour (crying, irritable mood) for children over the period 6 to 36 months, according to whether the mother worked or not in this period. No differences were found in the report commissioned by 'Pampers' Ltd. This report (ALSPAC, 2003) does not address the main issues of concern with regard to maternal employment and is of little usefulness anyway as it relies entirely on mothers' reports.

3.1.2 Cognitive development

Much research has examined the impact of childcare experiences on cognitive development often using standardised IQ tests. Belsky and Steinberg (1978) reviewed the literature and concluded that for middle class children attending a high quality childcare centre there were either no effects or positive effects for IQ, while for low SES, high-risk children, day care experience may compensate for poor home environment and produce some positive effects in intellectual development. Since 1978, further evidence suggests that the intellectual development of middle class children in good quality centres is comparable to home reared children or may even be enhanced (Clarke-Stewart, 1982, 1984; 1987). Also the intellectual development of low-income children is generally facilitated by high quality care (e.g., Golden, Rosenbluth, Grossi, Policare, Freeman, & Brownlee, 1978; McCartney, Scarr, Phillips, & Grajeck, 1985; Ramey, Dorval, & Baker-Ward, 1983). However, Kontos & Fiene (1987) reported no associations when family background and childcare history variables were taken into account. Two Canadian studies of low SES samples produced mixed results (Fowler, 1978; Wright, 1983), however methodological problems may have accounted for their findings (Doherty, 1990). Lastly the ongoing British FCCC study also finds that lower quality of childcare is associated with cognitive development for 18 month-old children. The

type of care that is most associated with poor quality within the FCCC sample is day nurseries (Stein, Sylva & Leach, personal communication).

Specific aspects of childcare quality such as staff behaviour may be associated with enhanced cognitive development; e.g., staff who are highly responsive, exhibit high levels of positive interaction, provide informative verbal information, are not harsh or controlling in their discipline and are attached to the children may enhance children's cognitive development (Anderson, Nagle, Roberts, & Smith, 1981; Carew, 1980; Clarke-Stewart, 1987, 1989; Rubenstein & Howes, 1983). Finally, structural regulatable variables such as smaller group sizes, low staff turnover, and better trained staff who are knowledgeable about child development are associated with improved cognitive development (Clarke-Stewart, 1987; Goelman & Pence, 1987; Kontos & Feine, 1987). In summary there appears to be no difference in cognitive development related to childcare for children from most home environments if attending good quality childcare.

However there are effects associated with poor quality childcare and children attending such childcare may show lower cognitive development than attending high quality childcare or being in home care. This conclusion is supported by recent reports on the effects of maternal employment in the first year of a child's life. Using the National Longitudinal Study of Youth (NLSY) data on a representative sample of US children several studies have reported poorer cognitive development associated with maternal employment in the first year of life rather than later employment (Baydar & Brooks-Gunn, 1991; Blau & Grossberg, 1992; Han, Waldfogel & Brooks-Gunn, 2001; Waldfogel, Han & Brooks-Gunn, 2002). However these studies using NLSY data have limited capacity to control for potentially important variables such as quality of the home environment, maternal sensitivity, and the quality of childcare. However Brooks-Gunn, Han & Waldfogel (2002) and Waldfogel (2003) used NICHD data to determine whether, after allowing for the home environment, maternal sensitivity and quality of childcare, the negative effects of maternal employment were still present in 3-year-old European-American children, and they were. The maternal employment effect size was around 0.33 where the quality of childcare was below average and 0.15 where the quality of childcare was above average. Effect sizes were greater for longer hours of employment. Hence, assuming more maternal employment means more childcare, there appears to be a quantity by quality of childcare interaction affecting children's cognitive development.

3.1.3 Language development

Adults are important in facilitating children's early language development (McCartney, 1984). In childcare, children have fewer opportunities to interact verbally with adults, although more peer interaction can occur. A study using NLSY data finds that poorer language development was related to maternal employment and presumably childcare in infancy (Desai, Chase-Lansdale & Michael, 1989). This indicates that increased childcare is associated with poorer language outcomes and is consistent with the Brooks-Gunn et al. (2002) and Waldfogel (2003) results discussed above. Is this because much childcare in the USA is of poor quality? In a Bermudan study, McCartney (1984) reported that the quality of the day care environment was a strong predictor of children's language development, after controlling for family variables and centre experience. Where staff communicated frequently with children, children performed better on language tests than children from centres with high levels of peer speech.

Some studies have reported that centre-based care perform may enhance language development more than other types of care (Goelman & Pence, 1987; Clarke-Stewart, 1987). However, Ackerman-Ross and Khanna (1989), found that day care and home-reared children did not differ on measures of language performance. Also Melhuish et al. (1990a, b) found that children attending day care nurseries (centres) often showed poorer language development than children in other types of care or at home. This was related to the finding that many centres (day nurseries) provided poor quality care and that language development was influenced by quality of care. Other North American studies have documented positive correlations between attending high quality childcare and children's language performance (Kontos & Fiene, 1987; Phillips, Scarr & MacCartney, 1987; Schliecker, White & Jacobs, 1991). Also Clarke-Stewart (1987) observed that staff age, experience and training (aspects of quality) were all positively related to children's language development. Similar positive associations have been reported between children's language performance and caregiver experience (Kontos & Feine, 1987), caregiver stability (Clarke-Stewart, 1987; Kontos & Feine, 1987), caregiver education and training (Clarke-Stewart, 1987), and small group size (Kontos & Feine, 1987).

The NICHD study has reinforced the evidence that quality of day care is important (NICHD, 1999a) despite indications that the sampling procedures of this study may under-represent poor quality care and hence lead to an underestimation of the effects of quality of care (NICHD, 1998). The quality of care, particularly language stimulation in the second year,

was related to cognitive and language developments at 15, 24 and 36 months of age (NICHD, 2002b). This replicates earlier findings on the impact of quality of care on language development (Goelman & Pence, 1987; McCartney, 1984) and specifically the quality of the language environment (Melhuish et al., 1990a). The effect sizes for childcare factors (around 0.1 to 0.2) were about half that for family factors (NICHD, 1999b). However, family effects incorporate genetic factors. Hence, family and childcare effects are likely to be much more equivalent in terms of environmental influence than this comparison implies. Family factors and childcare quality covary, low-income families tending to have lowest quality care (Whitebook, Howes, & Phillips, 1989). The analysis strategy of the NICHD study, in common with many studies, attributes variance to childcare factors only after family factor variance has been extracted. Where the two covary this will produce underestimates or conservative estimates of childcare effects. Where childcare did have an effect, it was most consistently related to quality of care.

In summary, for those children receiving childcare, high quality centre care may facilitate children's language development as compared with low quality care. Where childcare is low quality, children will show lower language development than either if receiving high quality childcare or if not in childcare.

3.2 Pre-school for 3+ year old children

The nature of provision for children 3 years and older has typically a more educational orientation than childcare for children under 3 years. This section will consider evidence concerned with effects for children's development of experience in such pre-school provision. Pierson, Bronson, Dromey, Swartz, Tivnan and Walker (1983) and Pierson, Walker & Tivnan (1984) report that children who had been in a pre-school centres were more cooperative and socially competent at age 7 than children who were cared for exclusively at home prior to starting school. In these reports, it is unclear that the effects on social development reflect only pre-school centre experience. The parents received parent education through home visits and group meetings up to the time the children were age two and started attending a childcare program. The parents of the control children did not.

The Child Health and Education Study (CHES) is a longitudinal study of all the children born in Britain between April 5 and 11, 1970. (Osborn & Milbank, 1987) found that 4,863 had

participated in some type of regular centre-based early childhood program prior to school entry and 3,380 had not. A significant difference was found between the two groups of children on overall cognitive functioning, when the impact of socio-economic status and maternal educational level was controlled. The children with pre-school centre experience had superior scores. However somewhat different results are been reported in recent analyses of similar data. Feinstein et al. (1998, 2000) found that the effects of having attended nursery school were positive for the 1958 birth cohort and negative for the 1970 (CHES) cohort, when a wider social mix had nursery experience. The reports based on the 1958 and 1970 cohorts suffer from the surveys not containing much information collected on pre-school experience and the nature of the questions means that the data are of questionable reliability. Hence it is unclear how much reliance should be put on these reports.

In Quebec, Jacobs, Selig and White (1992) found that 6-year-old children with pre-school experience in Quebec did not do better than those without pre-school experience, but that children with higher quality pre-school experience have better language development than those with lower quality pre-school experience. They found no difference in teacher ratings of consideration or hostility towards peers.

In the US, Gullo and Burton (1992) found that children who had experienced pre-school programs had higher cognitive abilities at age 5. However, Winnett, Fuchs, Moffatt and Nerviano (1977) found no between-group difference for four- and five-year-olds on cognitive functioning related to pre-school experience. Other American studies report finding no significant pre-school effect for aggression towards peers and other aspects of social skills among 5 year-olds (Hegland & Rix, 1990; Raph, Thomas, Chess & Korn, 1968; Thornburg, Pearl, Crompton & Ispa, 1990). Cochran and Gunnarsson (1985) report similar findings for five-year-old Swedish children. The Raph et al. (1968) study found that children with two years of pre-school experience tended to have fewer negative interactions than did children with no regular pre-school experience. However children with only one year of pre-school experience did not differ from the home group. Hegland and Rix report that five-year-old children who had attended pre-school centres exhibited less aggression than children without regular pre-school experience.

The effects of pre-school experience is likely to be different dependent upon children's home environment (Melhuish, 1990). Caughy, DiPietro, & Strobino (1994) used NLSY data to investigate the interaction of childcare experience and quality of the home environment. Children from impoverished home environments benefiting from childcare had higher reading and maths scores than comparable children without childcare experience. However for children from home environments rated as high quality there was a detrimental effect of childcare experience upon reading and maths performance. This finding confirmed a theoretical prediction made earlier by Melhuish (1990). This theme is continued by Hausfather, Toharia, Laroche & Engelsmann (1997) in considering the interaction of age of entry and quality of childcare upon social competence. They found that an early entry into low quality childcare was associated with reduced social competence for 5-year-old children, but that early entry combined with both high quality childcare and favourable family circumstances was associated with higher social competence.

Stability and quality of care are connected and likely to be important. Kohen, Hertzman & Wiens, (1998), Kohen & Hertzman (in press) analysed data from the NLSCY National Longitudinal Study, a nationally representative cohort of Canadian children. After controlling for socio-demographic characteristics, Children experiencing change in their pre-school care arrangements has lower language development scores than children who had no change.

Peisner-Feinberg & Burchinal (1997) analysed data from the Cost Quality and Outcomes study (a multi-site US study). An aspect of quality in pre-school, teacher-child relationship, predicted language development and socio-emotional development. In another report Peisner-Feinberg, Burchinal, Clifford, Culkin, Howes, Kagan & Yazejian (2001) reiterated the above finding but also reported another aspect of quality, classroom practices (pedagogy) also predicted language development.

Positive pre-school effects are also found in two recent large-scale American studies. Magnuson, Meyers, Ruhm, & Waldfogel (2003) analysed data from the early Childhood Longitudinal study (ECLS-K), a nationally representative cohort of 12,800 children in the US. They found that after allowing for background child and family factors, that children attending pre-school centres do better on literacy and maths skills at ages 5 and 6, with greater effects for disadvantaged children. The effect sizes were around 0.15. The NICHD study

(NICHD, in press) used the NICHD longitudinal cohort data on around 1,300 children to estimate the effects of attending a pre-school centre in the US. They find that attending pre-school between ages 3 and 5 produces higher cognitive scores at 5 after controlling for background factors.

Recent British research expands on this theme. The Effective Provision of Pre-School Education (EPPE) project (Sylva et al, 1999; Melhuish et al., 2001; Sammons et al., 2003a, b; Siraj-Blatchford et al., 2003) is the first major European longitudinal study of a national sample of young children's development (intellectual and social/behavioural) between the ages of 3 and 7 years. To investigate the effects of pre-school education for 3 and 4 year olds, the EPPE team collected a wide range of information on over 3,000 children, their parents, their home environments and the pre-school settings they attended. Pre-school centres (141) were randomly sampled to include the full range in England (local authority day nursery, integrated centres, playgroups, private day nurseries, nursery schools and nursery classes). A sample of 'home' children (who had no or minimal pre-school experience) was recruited to the study at entry to school for comparison with the pre-school group. In addition to investigating the effects of pre-school provision on young children's development, the project explored effective practice through twelve intensive case studies.

The study (Sammons et al., 2003a, b) demonstrated the positive effects of high quality provision on children's developmental. The main findings are:

Impact of attending a pre-school centre

- ❖ Pre-school experience, compared to none, enhances children's development.
- ❖ Duration (number of months) is related to better intellectual development and improved independence, concentration and sociability.
- ❖ Full-time attendance led to no better gains than part-time attendance.
- ❖ Disadvantaged children in particular benefit significantly from good quality pre-school experiences, especially if they attend centres that cater for a mixture of children from different social backgrounds.

The quality and practices in pre-school centres

- ❖ The quality of pre-school centres is directly related to better intellectual and social/behavioural development in children.

-
- ❖ Good quality can be found across all types of pre-school. However quality was higher overall in integrated settings, nursery schools and nursery classes.
 - ❖ Settings that have staff with higher qualifications, especially with trained teachers, show higher quality and their children make more progress.
 - ❖ Where settings view educational and social development as complementary and equal in importance, children make better all round progress.
 - ❖ Effective pedagogy includes interaction traditionally associated with the term “teaching”, the provision of instructive learning environments and ‘sustained shared thinking’ to extend children’s learning.

Type of pre-school

- ❖ Some individual pre-school settings are more effective for positive child outcomes.
- ❖ Children tend to make better intellectual progress in fully integrated centres and nursery schools.

These results for the EPPE study have largely been replicated in the EPPNI study of 850 children covering the full range of pre-school centre experience in Northern Ireland (Melhuish et al. 2002b).

There are several studies from other countries pointing to the positive effects of pre-school experience for children. Studies of children in the French Ecoles Maternelle programme (Bergmann 1996) show that this programme enhances performance in the school system for children from all social classes and that the earlier the children entered the pre-school program, the better their outcome. There are examples of Early Childhood Development (ECD) programmes being used as interventions for disadvantaged children in several developing countries, e.g. the Integrated Child Development Service (ICDS) in India and the Initial Education Project in Mexico. Such studies illuminate the particular benefits of ECD. For example, children who participated in ICDS (India) scored higher on intellectual aptitude tests and on school attendance, academic performance, and general behaviour than children who did not participate (Chaturvedi et al. 1987). In Brazil, poor children who attended 1 year of pre-school stayed in primary school 0.4 years longer than children without pre-school. For each year of pre-school, children had a 7-12 percent increase in potential lifetime income, with larger increases gained by the most disadvantaged (Barros and Mendonca 1999).

In pre-school education (3+ years), quality is most often associated with the concept of developmentally appropriate practice. Bryant et al. (1994) report on several studies that

illustrate the relationship between developmentally appropriate practice and child outcomes. The High/Scope study shows that children who attend a developmentally appropriate, child-centred programme are better adjusted socially than similar children who attend a teacher-directed programme implementing a direct-instruction curriculum (Schweinhart, Weikart, and Lerner 1986). In North Carolina, Bryant, Peisner-Feinberg, and Clifford (1993) found that children's communication and language development were positively associated with appropriate care giving. Burts et al. (1992) and Hart & Todd (1995) show that children's attendance in developmentally appropriate kindergartens is associated with fewer stress behaviours. Educational content is also important for this age group. Jowett & Sylva (1986) found nursery education graduates did better in primary school than playgroup graduates, suggesting the value of an educationally orientated pre-school.

The research demonstrates that the following aspects of pre-school quality are most important for enhancing children's development:

- Well-trained staff who are committed to their work with children
- Facilities that are safe and sanitary and accessible to parents
- Ratios and group sizes that allow staff to interact appropriately with children
- Supervision that maintains consistency
- Staff development that ensures continuity, stability and improving quality
- A developmentally appropriate curriculum with educational content

4 COST BENEFIT ANALYSES OF CHILDCARE

4.1 Scope of Cost benefit analyses

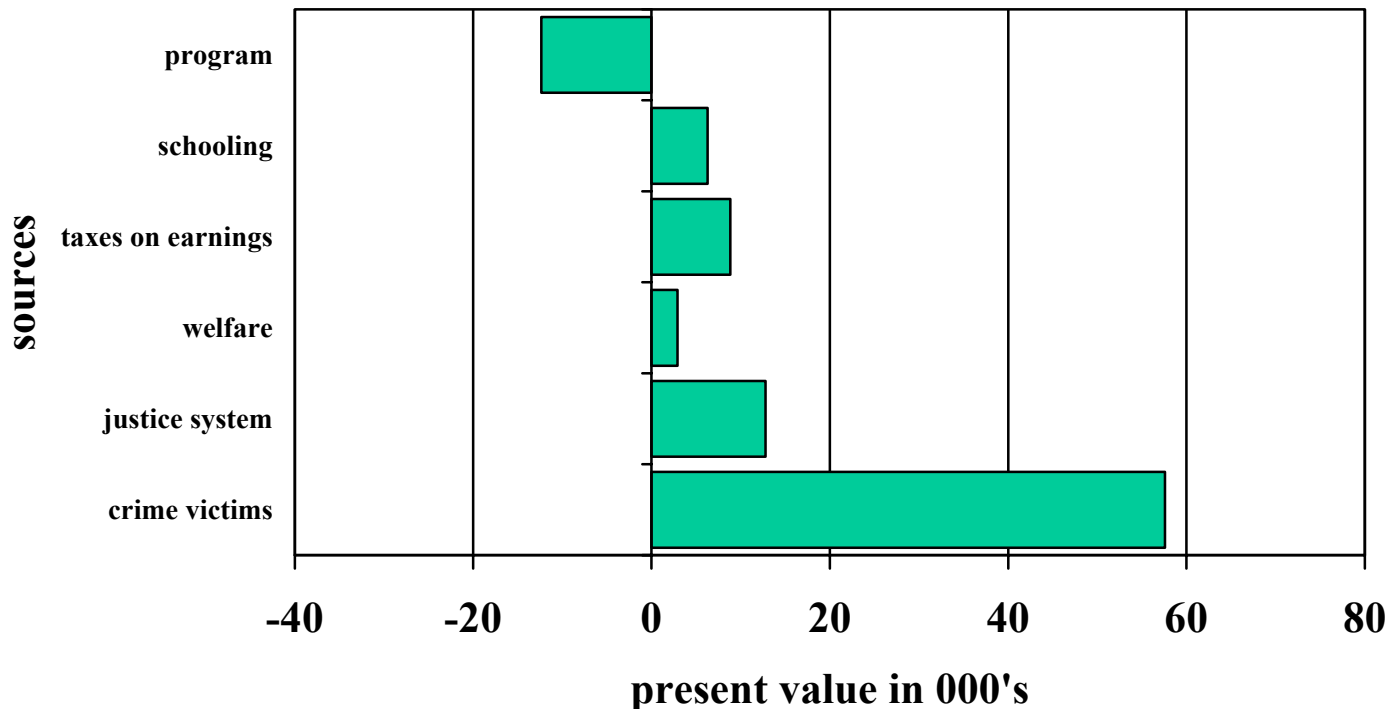
Cost-benefit analyses are available for only a small number of early years programmes. In every case the programme is one specifically initiated as a form of intervention for disadvantaged families and not childcare or pre-school education as experienced by the general population. The RAND report (Karoely et al., 1998) considered 9 programmes and for only 2 of these did they judge the data adequate for a cost-benefit analysis. These programmes were the Perry Pre-school Project and the Elmira Project. Of these the Elmira Project concerned evaluation of a nurse home-visiting programme for lower and higher risk groups, and did not involve evaluation of childcare or pre-school components. For the Elmira Project the RAND study estimates an overall benefit-value of 4 dollars for every dollar spent for the high-risk families, but a negative benefit-value for the low risk families.

4.2 Perry Pre-school Project

For the Perry Pre-school Project, they estimate an overall benefit-value of about 2 dollars for every dollar spent. This is markedly less than the 7:1 figure (Barnett 1996) often reported and reflects the more stringent criteria applied in the RAND study. However, Karoely et al. (1998) acknowledge that some benefits for the Perry Project may be underestimated in that neither outcomes for parents nor health outcomes were evaluated. The point where benefits exceed costs for the Perry Pre-school Project was estimated at 20 years of age.

The Perry Pre-school Project is the most cited study in this area and its benefits are well reported (e.g. Schweinhart et al. 1993). The cost-benefit analysis for this project (Barnett 1996) is worthy of some consideration as its findings are extensively used for justifying expenditure on pre-school education and care. The basis of the conclusions of this cost-benefit analysis can be seen in Figure 1.

Figure1: Return to taxpayers per participant



Total Public benefit	Net public benefit
\$88,433	\$76,077

Return the dollar: $88,433/12,356 = \$7.16$

Figure 1 shows that the benefits derive from schooling, taxes on earnings, welfare savings, justice system savings, and crime victim savings. Overwhelmingly the benefits derive from reduced crime by the program group. However the level of these savings may be overestimated. Because victim surveys indicate that there are five crimes for every arrest, it was assumed that each averted arrest of members of the intervention group resulted in five crimes being averted. It was these five crimes that were used as the basis of the estimates of the costs, both direct and indirect to victims. (Barnett 1996) However, this assumes that those likely to be arrested are “average” criminals, whereas the distribution of offences is known to be heavily skewed. (Yoshikawa 1995). Without evidence about the frequency of offending by those arrested in both groups it is difficult to argue that this estimate can be justified,

particularly in view of the magnitude of its impact on the whole calculation. In addition it should be borne in mind that the study participants are predominantly from an African-American, urban, deprived population. For such a population the base rate for crime is high compared to the general population. Hence the savings to be made via reduced crime would be much less for such an intervention applied to the general population. Thus these cost benefit figures need to be considered within the context of the population to which the intervention is applied. Blanket statements that pre-school will provide \$7.16 for every dollar spent are clearly misleading.

Inevitably cost benefit analyses are based upon certain assumptions and different assumptions can produce different answers. One example of this is the use of discount rates. Generally a benefit in the near future is valued more highly than one in the distant future. To accommodate this, the value of a benefit is reduced by the discount rate per year waiting for the benefit to occur. In the Perry Pre-school project a discount rate of 3% was applied and this could be considered to exaggerate the benefits because many benefits took many years to emerge. The value of benefits in this project up to age 28 would be \$60,000 at 4%, but only \$20,000 at 6%. Clearly the discount rate applied has a big impact on projected savings.

Another example concerns the estimation of future earnings within the Perry Pre-school benefit-cost analysis (Barnett, 1996). Meadows (2001) points out that two non-intervention females were murdered before age 27 and the analysis includes the estimate of their earnings post age 27 as zero. This has a clear logic but the consequence is a widening of the gap in projected earnings between intervention and non-intervention groups that is unrelated to the individual earnings of the members of those two groups. Were other assumptions applied, the gap between the two groups would still exist, but would not be as large.

4.3 Abecedarian project

Since the RAND report was published another significant cost-benefit analysis has emerged. Masse and Barnett (2002) conducted a cost benefit analysis of the Abecedarian project in North Carolina. This was a true experiment that followed children who participated in a high quality, early education intervention and a control group of children who did not receive the intervention. This study followed the children's into early adulthood. The cost-benefit

analysis used the same procedures followed by Barnett (1996) in the cost-benefit analysis of the Perry Pre-school Project. The results can be summarised as follows:

- The annual cost of the Abecedarian Program is about \$13,000 per child (2002 dollars). That is twice the cost of the average Head Start program.
- The children in the program are projected to make \$143,000 more over their lifetimes than those not in the program.
- Mothers of children who were enrolled can also expect greater earnings – about \$133,000 more over their lifetimes.
- Schools can save more than \$11,000 per child because participants are less likely to require special education.
- There was a possible impact on smoking. Participants were less likely to smoke (39% vs. 55% in the control group), resulting in a total benefit of \$164,000 per person.
- The children of participants are projected to earn nearly \$48,000 more throughout their lifetimes.

These savings translate as four dollars of benefit-value for every dollar spent.

The Abecedarian Project involved 112, mostly African-American children who were regarded as ‘at risk’ for poor cognitive or social development. It was conducted in a largely middle-class community that is supportive of early education, and with relatively little crime. The benefits of the programme derive from the marginal differences in the quality of care received by the intervention group over that received by the control group. Masse and Barnett suggest that the pay-off would be greater in other communities, where the quality of alternative care was lower, and especially in high-crime and low-income neighbourhoods. Thus the analysis may underestimate the benefits of high-quality early education programs for disadvantaged communities.

4.4 Chicago Child-Parent Center Program

The only cost-benefit analysis of a large-scale pre-school programme is that provided for the Chicago Child-Parent Center Program (CPC) that has served 100,000 children (93% African-

American) over a thirty year period. The evaluation of this programme (see above) found that CPC pre-school involvement was linked to 29% higher high-school completion, 42% lower arrests for violent crime, 41% reduction in special education and a 51% reduction in child abuse and neglect. Based on these results Reynolds, Temple, Robertson & Mann (2002) have calculated that the CPC pre-school programme costs \$6,730 per child but returns to society \$47,759 in savings from subsequent reductions in costs to society for poor educational and criminal outcomes. This is equivalent to \$7.10 for every dollar spent. The primary school element of CPC was less effective, generating only £1.66 for every dollar spent. These figures represent the savings to the public purse without taking account of benefits for individual earnings.

4.5 UK Early Excellence Centres

The only UK attempt at cost-benefit analysis for pre-school provision is provided by a recent UK evaluation of eleven Early Excellence Centres (EEC's), which are integrated childcare centres usually serving disadvantaged communities, included a somewhat innovative approach to cost-benefit analysis. The approach can be illustrated by one of their examples.

“Nevertheless, the basic approach works and it is illustrated in the case study of Louise ... In this case study the cost savings identified for Louise and her family were:

1. Social Service foster care for two children: £70 per week per child for three children for six months (26 weeks); £5,460.00
2. Possible psychiatric counselling for parent: NHS psychologist £40 per hour once a week for a year; £2,080.00
3. Likely referral to School Educational Psychology Services for Behaviour Management: minimum £25 per hour for six months for 2 children £1,300.00

These cost savings totalled £8,840.00. This cost saving was set against the cost per family of providing support at the EEC for a year, which amounted to £880.00. This demonstrated that for this family the cost saving ratio was approximately 1:10 revealing savings more than the cost of the programme.”

All of the savings are based upon what might have happened if the child (Louise) had not had the benefit of the EEC. Participants were asked to imagine possible consequences of non-availability of the EEC. Should this novel anecdotal approach be widely adopted the costs of

cost-benefit evaluations would dramatically fall, in that no longer would there be any need for the tedious business of collecting actual evidence. Perhaps readers should be left to draw their own conclusions on the value of such an approach. The authors themselves conclude “The early findings from the EEC programme evaluation indicate identifiable benefits for a children, families, community members and early years practice, and that the programme is cost effective.”

4.6 Summary of cost benefit analyses

The consequences of childcare for maternal employment are inconsistently evaluated in this area. With regard to the benefits of providing childcare for maternal employment, Kimmel (1998) reports mixed results. However, the evidence from experimental and quasi-experimental studies does support the position that childcare provision is generally a benefit for mothers in disadvantaged families. There is a case that the quality of childcare may be an important aspect pertaining to maternal employment in that mothers may be able to focus more consistently upon employment when they have stable, good quality, childcare (Vandell and Woolfe, 2002). When mothers feel their children are secure and well cared for they will be more willing to participate effectively in the labour market. Another aspect largely overlooked by studies of benefits is the consequences for social equity. Where educational attainment, productivity and earnings of ‘at-risk’ children improve, overall social equity improves, which is a consequence for the society as a whole.

Cost benefit analyses have only been applied to a small number of cases where childcare has been used as a form of intervention for disadvantaged families. The results of these analyses are unambiguous in showing substantial benefits. A striking feature of these results is that the size of the benefits allows a very substantial margin of error and would still be economically worthwhile. For example the results from the Perry Pre-school Project imply a return of 16% p.a.. Even if this is a substantial overestimate, it is highly probable that such an intervention is worthwhile. The level of savings for the use of pre-school provision as a form of intervention with disadvantaged populations may be still to be settled. Nonetheless the consistency of positive cost-benefit results from the available studies does indicate that there are long-term savings to be made with such populations. However the applicability of these indications of savings to the general population is open to considerable doubt in that so much of the benefit in these studies of disadvantaged populations derives from reductions of negative outcomes e.g. crime, remedial education, unemployment, where the incidence of these negative

outcomes is dramatically less in the general population and therefore the scope for savings is similarly dramatically less.

5 CONCLUSIONS

5.1 Overview

While early research was primarily concerned with whether children attending institutions developed differently from those not attending such centres, later work recognised that day care or pre-school experience is not unitary and that the quality or characteristics of experience matters. Yet further research drew attention to the importance of the interaction between home and out of home experience. These have been referred to as the three waves of research. In addition the effects of childcare depend upon the age of children, type and quality of childcare, and the social context applying at any particular time in a specific community. Childcare has been associated with benefits for children's development, with the strongest effects for children from disadvantaged backgrounds. The studies have largely American but some studies have occurred in other countries, including the UK, indicating that the results are not culture-specific.

While the research on pre-school education (3+ years) is fairly consistent, the research evidence on the effects of childcare under 3 years of age upon development has been equivocal with some studies finding negative effects, some no effects and some positive effects. Discrepant results may relate to age of starting, amount of time in childcare, and also probably at least partly to differences in the quality of childcare received by children. In addition childcare effects are mediated by family background with negative, neutral and positive effects occurring depending on the relative balance of quality of care at home and in childcare. Recent large-scale studies (EPPE, NICHD) find effects related to both quantity and quality of childcare. The effect sizes for childcare factors are about half that for family factors. However, family effects incorporate genetic factors. Hence, family and childcare effects are likely to be much more equivalent in terms of environmental influence than this comparison implies. Family factors and childcare quality covary, low-income families tending to have lowest quality care. The analysis strategy of most studies attributes variance to childcare factors only after family factor variance has been extracted. Where the two covary this will produce underestimates or conservative estimates of childcare effects.

5.2 Summary of childcare effects

5.2.1 General population

Considering childcare in the first three years, the evidence overall indicates that for children who are not disadvantaged in their home environment, high quality childcare has no strong

effects upon cognitive and language development. However poor quality childcare may produce deficits in language development. There is some evidence that some forms of childcare, particularly group care, may elevate slightly the risk for developing antisocial behaviour. This is not the case for relative care in the UK, which is associated with improved social development. There is also evidence that maternal employment and childcare in the first year is associated with poorer cognitive and social development. This would suggest that positive effects of childcare accrue from the childcare after one year of age.

For provision for over-threes, the evidence is consistent that pre-school provision for this age range is beneficial to educational and social development for the whole population. The effects are greater for high quality provision.

5.2.2 Disadvantaged children

For children under 3 years of age, the evidence indicates that high quality childcare produces benefits for cognitive, language and social development. Low quality childcare is less likely to produce clear benefits.

With children 3 years of age and older, disadvantaged children particularly benefit from high quality pre-school provision. Some evaluations of early years interventions have shown improvements in cognitive developments, but in relatively few cases have these persisted throughout children's school careers. However early childhood interventions do boost children's confidence and social skills, which gives them a better foundation for success at school (and subsequently in the workplace). It is the social skills and improved motivation that lead to lower levels of special education and school failure and higher educational achievement in children exposed to early childhood development programmes. Often this educational success is followed by increased success in employment, social integration and possibly reduced criminality. The results of evaluations of the use of childcare as intervention are generally rigorous, and produce a consistent pattern of results. The RCT studies all show the clear benefit for disadvantaged children of high quality pre-school childcare provision, whether started in infancy or at 3 years of age. Where the quasi-experimental studies have rigorous methodology they produce similar results. The small-scale tightly controlled interventions produce larger effects than the more extensive large-scale. However the impact of large-scale interventions is still substantial and they produce worthwhile benefits for children families and communities. The effects of interventions depend upon the population

and the context. For example, where crime is endemic effects on criminality are significant, but not where crime is not endemic.

5.3 Characteristics of childcare affecting development

The research demonstrates that the following aspects of pre-school quality are most important for enhancing children's development:

- Adult-child interaction that is responsive, affectionate and readily available
- Well-trained staff who are committed to their work with children
- Facilities that are safe and sanitary and accessible to parents
- Ratios and group sizes that allow staff to interact appropriately with children
- Supervision that maintains consistency
- Staff development that ensures continuity, stability and improving quality
- A developmentally appropriate curriculum with educational content

In England and Northern Ireland the evidence indicates that part-time provision produces equivalent effects to full-time provision and that the more months of provision from 2 years of age onwards the stronger the improvement. In England the types of provision with the most positive effects are integrated centres and nursery schools, and the least effective are Local Authority (Social Services) day nurseries.

5.4 Cost benefits

The results of the few cost benefit analyses undertaken are unambiguous in showing substantial benefits. These analyses have been applied where high quality childcare has been used as a form of intervention for disadvantaged families. A striking feature of these results is that the size of the benefits allows a very substantial margin of error and the intervention would still be economically worthwhile. The level of savings for the use of pre-school provision as a form of intervention with disadvantaged populations may be still to be settled. Nonetheless the consistency of positive cost-benefit results from the available studies does indicate that there are long-term savings to be made with such populations. However the applicability of these indications of savings to the general population is open to considerable doubt in that so much of the benefit in these studies of disadvantaged populations derives from reductions of negative outcomes e.g. crime, remedial education, unemployment, where the incidence of these negative outcomes is dramatically less in the general population and

therefore the scope for savings is similarly dramatically less. Hence extrapolation of the results of the cost benefit analyses from intervention studies to the provision of childcare for the general population is clearly inappropriate.

5.5 Gaps in research evidence

The research in the USA and UK indicates that quantity of group care, in the first two years particularly, is associated with increased risk for developing antisocial behaviour. Emerging American research indicates that this is particularly so with extensive maternal employment in the first year paired with poor quality childcare. These results derive from large-scale, well-controlled studies. In the context of anticipated increases in the provision of childcare, particularly group care, in the near future, these are policy-relevant questions that are amenable to solution through research studies now:

- Are the effects of quantity of care in the first two years a result of much provision being of poor quality?
- What is the relationship of quality of care in the first 2-3 years in the UK to the development of antisocial behaviour?
- Are there changes in the curriculum or daily routine of childcare centres that would reduce antisocial behaviour either in childcare under three or childcare over three years of age? Current research suggests particular options for investigation here.
- To what extent are effects of early childcare mediated by interactions with adults or interactions with other children?
- In what ways might early years provision be used for early intervention with children at high risk for developing special needs both intellectual and behavioural?
- Are the American results on detrimental effects associated with maternal employment in the first year applicable to the UK?

Another category of question that requires further study is the nature of selection and training for workers in childcare and pre-school education. The EPPE study in England indicates that having a substantial proportion of teacher-qualified staff is beneficial. However this conclusion is limited by the current distribution of staff with particular kinds of qualifications in England. There may well be better solutions.

One approach to these questions in the context of an increase in state-funded childcare provision would be to plan the rollout of provision with planned variation (by community,

region or local authority) in the nature of provision that would enable systematic comparisons of the relative merits of different kinds of provision.

One issue that is tangential to the current report but could become central to the issues addressed here is the interaction of parental leave and childcare policies. In Sweden in the 1980's childcare in the first year of life and later was extremely common due to the extensive availability of state-funded provision. However with the extension of parental leave, parents voted with their feet, and the use of childcare in the first 18 months of life decreased dramatically. Consequently the quality of childcare in the first 18 months and relations with child development are relatively unimportant issues in Sweden. The extension of parental leave has largely removed the expense of providing high quality childcare for infants. A targeted experimental limited offering of parental leave options could address the viability of such strategies in the UK.

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