

An Early Start with Books: literacy and mathematical evidence from a longitudinal study

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ABSTRACT *Children from inner city families who had participated in a pilot project of book gifting when they were babies were followed up to their First year in school and matched with a comparison group whose families received no book gift pack. Baseline scores reveal that the Bookstart group are significantly further ahead in six measures of literacy and numeracy.*

Introduction

The focus of this paper is on literacy development and early experiences at school. We argue that home interactions with parents and carers are crucial for later educational development and that book sharing plays a central role in laying the foundations of literacy. The pilot Bookstart project in Birmingham in 1992 made gifts of books to families of 6-9 month-old babies via health clinics and health visitors.

Initial analysis of that pilot study provided encouraging results (Wade & Moore, 1993); so did an intensive follow-up study of home activities and book behaviour when the children were 2: -3 years of age (Wade & Moore 1996a,b). In this paper we present evidence from a further follow-up of the original Bookstart children at 5 years of age, when they had entered and settled into their primary schools. First, we review evidence for parental interaction and specifically book-oriented behaviour with young children at home. Then we briefly describe the Bookstart project and its findings. Next we describe the organisation of our school-age follow-up and present its results. Finally, we discuss the implications of the findings for literacy and learning and for further research.

Early Parental Involvement in Learning

If parents involve themselves actively in their children's development and learning, then evidence shows that children achieve more. Jean Piaget (for example 1952, 1954) firmly established that young children learn through interaction with people and objects in their environment. Far from being passive observers, infants learn through exploring and through action. Adults are essential in providing both encouragement and opportunities to engage with a variety of experiences. They also provide

models of behaviour. Bronfenbrenner (for example 1979) stresses that development is best effected if adult-child relationships are warm and non-dominating. In other words, following Piaget, a child needs guidance, but the opportunity to discover and practise is also essential, so that control of objects and situations is gradually learned. Bronfenbrenner argues that the best kind of interaction is reciprocal, with adult and child taking turns and sharing roles. The safe presence of a well-known adult is a prerequisite for the risk taking that leads to learning. Ainsworth & Bell (1970) showed that 1-year-olds in three different contexts (alone; with a stranger; with a parent) explored a playroom more in the company of parents. We know too that young babies exhibit learning potential through responsiveness, discrimination, imitation and reciprocal behaviour (Richards, 1974; Bower, 1979). Appleton *et al.* (1975) demonstrated that by 4 or 5 months of age a child responds differently to voices; for example, will smile when mother speaks. Just as early experimentation with sounds at about 3 months gives pleasure to both child and parent, so the reciprocal pleasure of book sharing, rhyme and story are motivating and pleasure giving from, say, 9 months onwards.

Early Book Sharing

There is plenty of evidence (for example Bryant & Bradley, 1985; Brice Heath, 1989; Harmon & James, 1990) that the active involvement of parents through rhymes, stories and books lays the foundations of literacy in children's early years. In particular, the child's early experiences of story and making stories (Wade, 1984) and sharing books (Wells, 1985; Toomey, 1993) affect educational progress. Wells (1996) Butler (1988) and Juel (1988) all argue importance of a head start the-- onset of schooling; those children who have established literacy foundations by school age are likely to achieve more in their school years. Bus *et al.* (1995) put the matter succinctly:

... pre schoolers who are already ahead at the start of formal reading instruction tend to maintain their position relative to other children at school during the stage of formal reading instruction. (p. 5)

Their review of existing research on adult-child book sharing in the pre school years showed a quantitative relationship to growth of language, emergent literacy and achievement in reading. Scarborough & Dobrich (1994) corroborate this relationship between reading achievement and early book sharing. Thus there is plenty of evidence to support the conclusion of De Barysche (1993) that it may be important to introduce books to pre schoolers at a very early age. The Bookstart pilot study commenced in Birmingham in 1992 and set out to influence book sharing and develop positive attitudes to books in a group of families with young babies living in the inner city.

Bookstart: the beginnings

The national pilot of Bookstart provided a free pack for a cohort of 300 families who had babies approximately 9 months old. As well as a children's book, the pack contained a bookmark, poster and poem card, together with information about library facilities, the value of book sharing and book purchase. Investigations by questionnaire showed that families valued the pack. It led to positive attitudes to books, more

library enrolments, more book sharing with babies, more book club membership and more book purchase (Wade & Moore, 1993).

Some 2 years after the pilot an intensive, qualitative, controlled study was conducted involving a random sample of 29 of the original families. Structured interviews revealed that the Bookstart group gave higher priority to looking at books and were more likely to give books as presents than did a comparison group. They also visited libraries more often and engaged more often in book sharing with their child (Wade & Moore, 1996a). Observations of parent-child book sharing within the home revealed that Bookstart children showed more interest in and concentration on the book and were more active in pointing to the text and pictures and trying to turn pages than the comparison group who had not received the Bookstart pack. Their verbal behaviour also showed they participated substantially more actively than comparison group members; they made more predictions and joined in more with the adult's reading; they also asked and answered substantially more questions (Wade & Moore, 1996b). These positive behaviours we concluded were likely to be the result of regular and repeated experience of book sharing stimulated by the Bookstart pack. These findings also stimulated our interest to discover whether effects were even more long-lasting, that is to school age. Accordingly, we planned a further stage in our longitudinal study.

School Age Achievement of Bookstart Children

Procedure

By 1997 Bookstart babies from the Birmingham pilot, described above, had reached school age, so it became possible to discover what kind of baseline in literacy the Bookstart youngsters brought with them to school. Accordingly, a sample of children was randomly selected from the families who had provided the evidence referred to above. One of the 'problems with follow-up research is that families move, sometimes several times. Despite this difficulty of tracing subjects, a group of 41, satisfactory for intensive research and comparison, was obtained. All parents gave permission for their children's primary schools to be contacted.

With the co-operation of Birmingham Local Education Authority and head teachers, access was obtained to the city's Baseline Assessment procedures and specifically to the Baseline results for our sample. The Birmingham Baseline Assessment (Birmingham City Council, 1996) had been made jointly by staff involved in the children's reception classrooms and focused on achievements both in English and mathematics through careful observation of children's behaviour. Briefly, there are three assessments made in English: speaking and listening; reading; writing. There are three others in mathematics: using and applying mathematics; number (focus on counting); shape, space and measures (focus on shape). In each of these six assessment areas the child's achievement is assessed on a 4 point scale for which clear criteria are laid down. Thus, for example, in reading a child scores 0 if there is no observable evidence of developing an interest in books and print. If the child is assessed as developing this interest she/he scores 1. If the child can recognise familiar individual words in responding to books and print the score is 2. If the child can read to an adult simple personal or published books of their own choice a score of 3 is given. The Baseline Assessment procedures, therefore, give a professional observation of children's achievements in six important areas and are completed

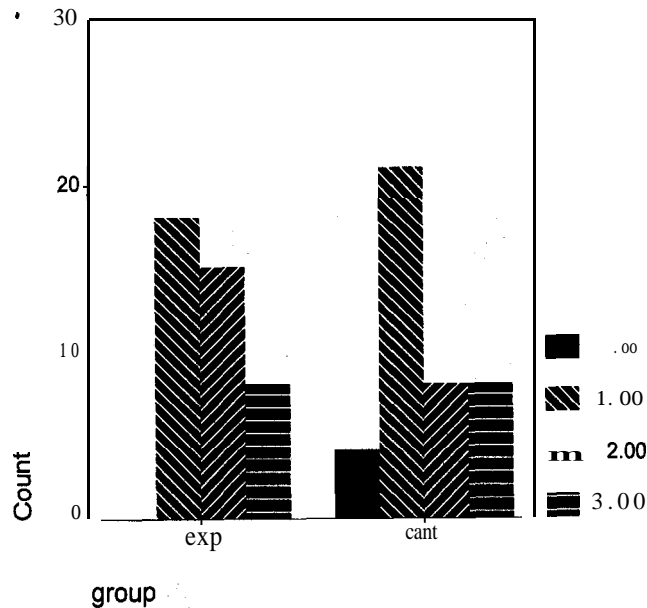


FIG. 1. Speaking and Listening.

when the child has settled down into his/her new class. A great advantage of the Birmingham Baseline is that for each child it provides five aspects of background evidence:

- gender;
- home language;
- ethnic group;
- nursery experience;
- date of birth.

We used these criteria to rigorously select a control group child from the same class. This procedure avoided possible bias on the part of researchers or class teachers and gave us a matched group of 41 children to compare with the Bookstart group.

Results

Speaking and listening provided similar numbers of children (about 20%) achieving a maximum score of 3. However, almost twice as many in the Bookstart group scored 2 as in the comparison group and the only scores of 0 were all in the comparison group. Thus, as Fig. 1 shows, the Bookstart group produced better results for Speaking and Listening. The difference in the range of scores is shown in standard deviations (Bookstart 0.7675; comparison 0.9253). While the Bookstart mean score of 1.7561 is higher than the comparison group, the difference is not statistically significant.

Similarly, for reading there were no scores of 0 in the Bookstart group, though about 17% of the comparison group scored nil. About 10% of the comparison group, but nearly twice as many in the Bookstart group, scored 2. Again, the only maximum scores of 3 (about 15%) were all in the Bookstart group. Thus, as Fig. 2 shows,

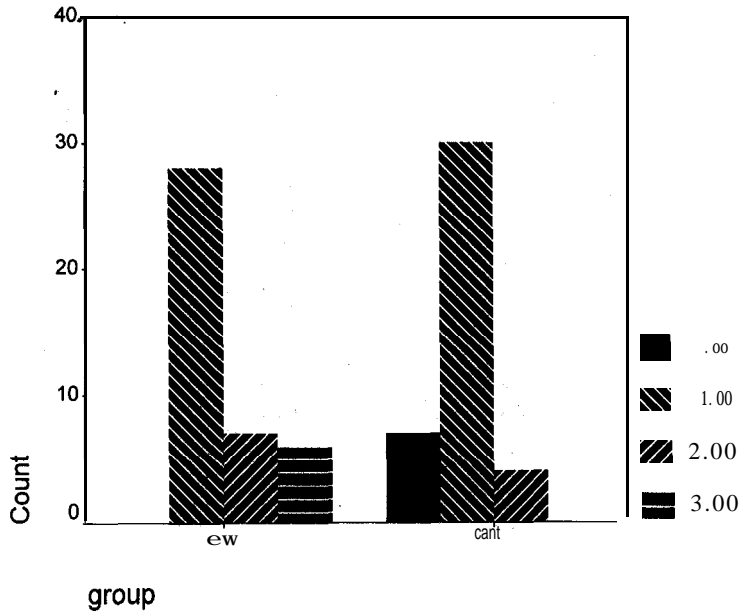


FIG. 2. Reading.

Bookstart children were, as a whole, ahead of the comparison group in reading. The Bookstart group mean is 1.4634 (SD 0.7449), compared with 0.9268 (SD 0.5191), and this difference is very highly significant ($t = 3.784$, $p < 0.001$).

In writing there was no difference in numbers of lower performing children with the same number (about 7%) scoring 0. However, twice as many Bookstart children scored 2 than in the comparison group and, again, the only two maximum scores were in the Bookstart group. Figure 3 records this superiority of Bookstart children at the higher levels of writing performance. Although the Bookstart group mean is higher (1.3171, SD = 0.6870, compared with 1.0976, SD = 0.4901) the difference is not statistically significant.

For using and applying mathematics there are smaller differences, but as Fig. 4 shows, these are in favour of the Bookstart children who, as a group, achieve higher scores than the comparison group. The Bookstart group mean of 1.4878 (SD = 0.8978) compares with 1.2683 (SD = 0.8667), but the difference is not statistically significant.

In number there are clearer advantages for the Bookstart children, who score more 2s and are the only group to record 3. Also, as Fig. 5 shows, the comparison group scores more 0s in number assessment. The mean for the Bookstart group is 1.5122 (SD = 0.6753), compared with 1.0976 (SD = 0.6247), and this is a highly significant difference ($t = 2.886$, $p < 0.01$).

In Shape, space and measurement both groups recorded scores at all levels from 0 to 3. However, as Fig. 6 shows, there are slightly better scores for the Bookstart group. Although the Bookstart mean (1.4146, SD = 0.7062) is higher than the comparison group (1.1463, SD = 0.7267), the difference is not significant.

When the three English scores are taken together, highly significant differences between the two groups emerge ($t = 2.929$, $p < 0.01$). At the extremes of the scale no Bookstart child obtains the lowest scores of 0 or 1 and no comparison group child

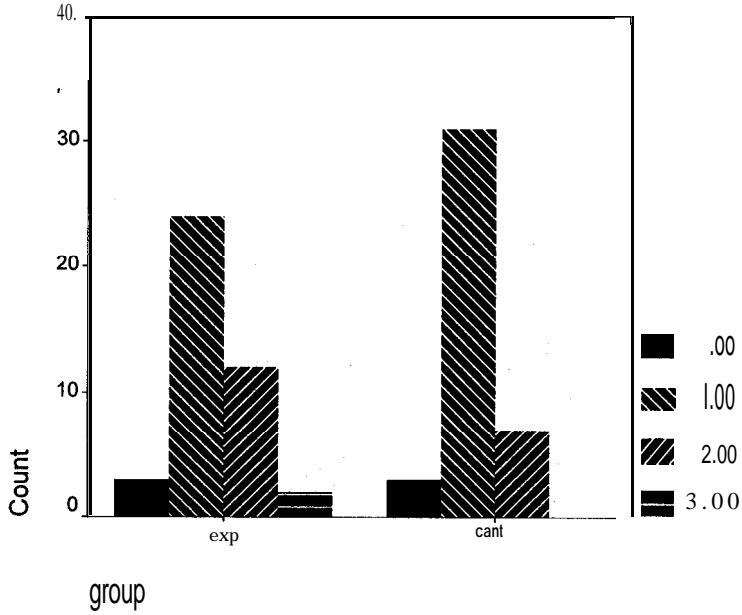


FIG. 3. Writing.

scores the maximum of 9, or even 8. Figure 7 shows the differences in means between the groups: Bookstart 4.5854, SD = 1.7603; comparison 3.5122, SD = 1.5512.

A similar contrast occurs when the three mathematics scores are taken together, with the Bookstart group outperforming the other. At the extremes of the scale more Bookstart children score 7 or 8 and none scores 0. Figure 8 shows how the total mathematics mean of 4.4146 (SD = 1.932) for the Bookstart group compares with

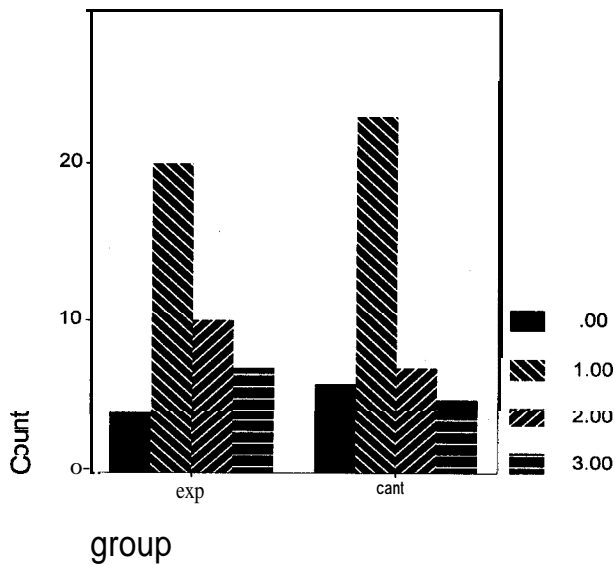


FIG. 4. Using and applying mathematics.

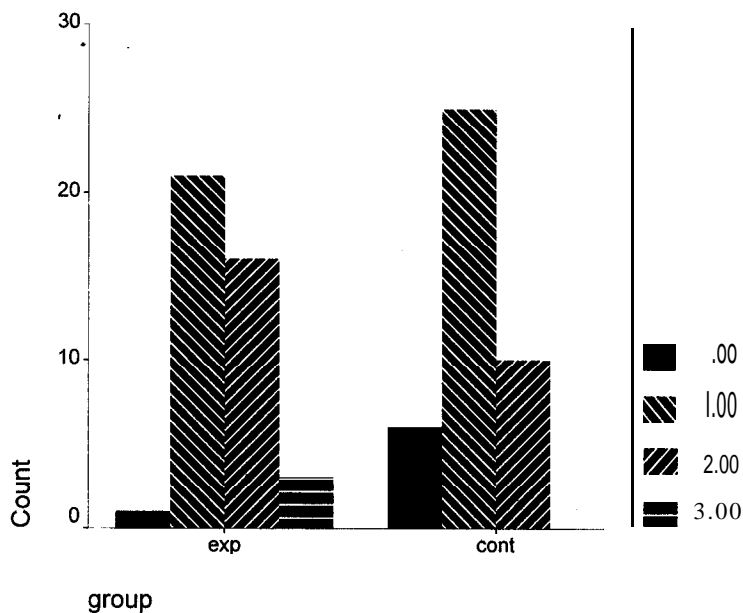


FIG. 5. Number.

3.5366 (SD = 1.9506) for the comparison group, a significant difference ($t = 2.052$, $p = < 0.05$).

Finally, the overall total Baseline score gives a statistically significant ($t = 2.52$, $p = < 0.05$) difference between group means, as Fig. 9 shows. The Bookstart group

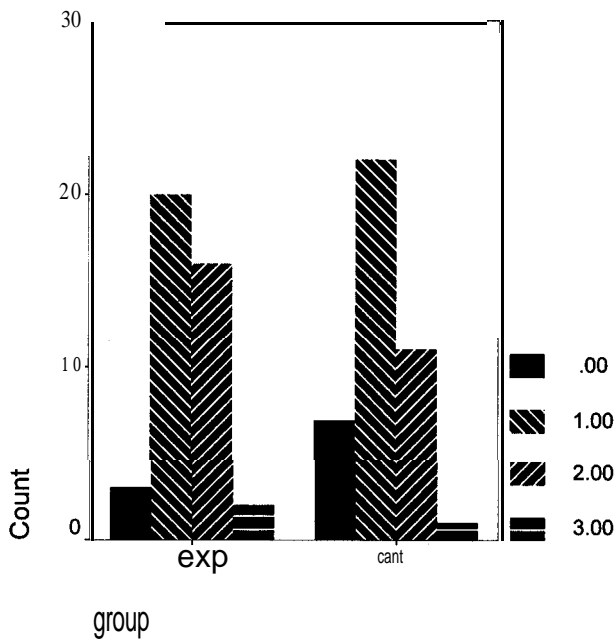


FIG. 6. Shape, space, etc.

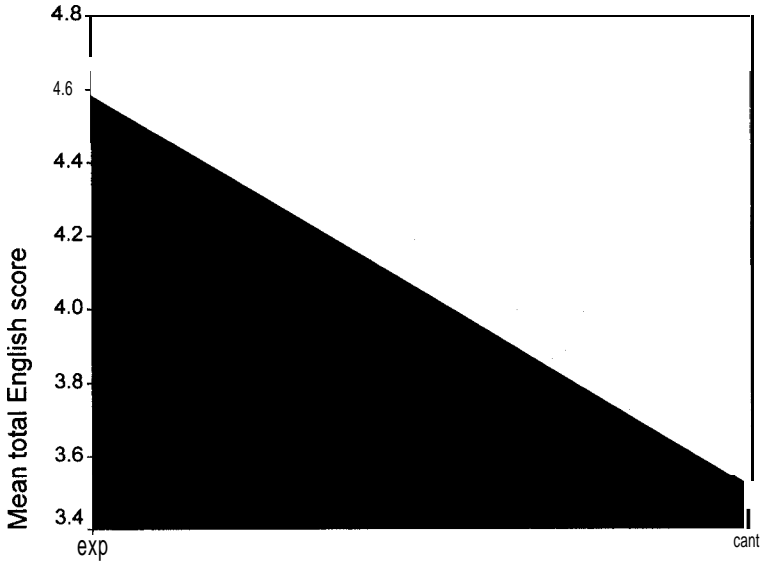


FIG. 1.

mean of 9.000 (SD = 3.5071) compares with the comparison mean of 7.0732 (SD = 3.4161).

Discussion

The findings reported above are consistent and cumulative. On each of the six baseline assessments the Bookstart group records a higher range of scores than does the comparison group. The trend of these results indicates that the Bookstart group, who had all received the Bookstart pack in infancy, had been better prepared for

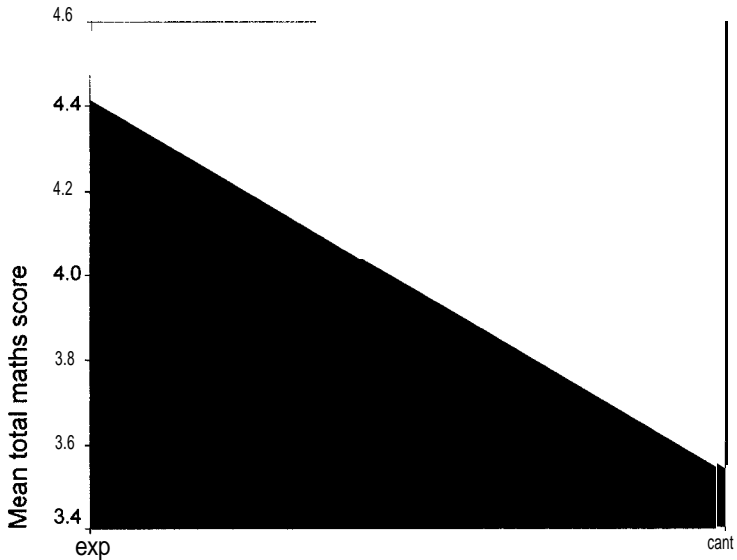


FIG. 8.

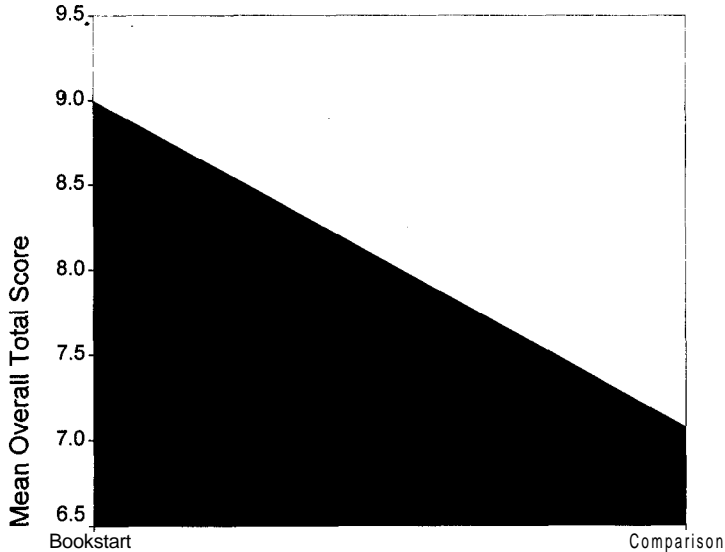


FIG. 9.

school by their early childhood experiences. This conclusion is consistent with previous studies (Wade & Moore, 1996a,b, 1997) using different samples which indicated that Bookstart children at age 2: -3 had more experience with books, showed more interest in and concentration on books and engaged in more active book sharing with parents and carers.

While some of the individual assessments do not produce significant results, the cumulative score for English is highly significant and that for mathematics is significant, as is the combined Baseline score. Two individual assessments produce dramatic results. A difference in reading might have been predicted from the research findings reviewed above. In fact, the difference between groups turned out to be very highly significant. Similarly, if less predictably, the difference in number assessment was highly significant. Thus the superiority of the Bookstart sample is affirmed compared with a similar group who had not received the early advantage of book gifting. The fact that Bookstart children were further ahead in mathematics suggests that there may be pay-offs across the curriculum, not only in literacy.

The significance of higher scoring in Baseline Assessment should not be underestimated. It seems likely that an early start with books has provided the reciprocal interaction, experimentation, practice and motivation that lead to learning. Our findings reaffirm the central role that parents and carers play in the education of pre-school children. We explicated this role above. Further, the findings corroborate research discussed above, particularly in underlining the relationship between reading achievement and early book sharing. Indications here are that early book sharing may lead to a general superiority as well as significantly establishing the foundations of literacy.

It is important to recall evidence (for example Wells, 1986; Butler, 1988; Juel, 1988; Bus *et al.*, 1995) that those children who are higher achievers at the onset of schooling maintain their position relative to other children as primary education continues. If Bookstart produces higher scoring in Baseline Assessment and such

superiority is maintained, then it represents an extremely cost-effective way of promoting higher standards in literacy and possibly also across the curriculum.

We have already referred to the intriguing and unexpected superiority of the Bookstart group in mathematics. The large part of this superiority is gained through the highly significant difference in number assessment. Assessment of number focuses on counting. Thus for a score of 1 a child would need to demonstrate ability to count with objects up to 5 (for example, counting with fingers in a rhyming song). A score of 2 necessitates observation of the ability to recognise and count with objects and order numbers to at least 10 (for example counting and organising numbers to 10 and placing them in the correct sequence). For a score of 3 the child would require to be observed recognising, counting and writing numbers to at least 20 with a reasonable degree of accuracy.

The reasons for this marked superiority of Bookstart children in number require further investigation. Firstly, books are a learning resource and many books for young children introduce number and counting in interesting and interactive ways. Some stories focus directly on number and sequence: e.g. *Three Bears* and *Ten Nine Eight*. Then, too, early children's books contain number rhymes: e.g. *5 Little Ducks*, *10 in a Bed* and *One, Two, Three, Four Five, Once I Caught a Fish Alive*. Repeated practice and interaction, say with finger rhymes when sharing books, is likely to make incidental number learning efficient and interesting.

A second possibility is that regular acts of book sharing in the pre-school years encourage attention and concentration. Book sharing provides pleasurable and purposeful quality time for both infants and adults and we know that it is easier to concentrate if activities are purposeful. Our follow up observational studies (Wade & Moore 1996 & Moore & Wade, 1997) showed this was so in book sharing in the home at about the age of 3 years. We regard attention and concentration as important for learning in all subject areas, not merely in the fields of oracy and literacy. The argument for attention and concentration is supported by Rowe (1995), who concluded, from a longitudinal study of 5092 students in 92 schools in Australia, that reading at home has much more effect on attainment than do socio-economic variables. Rowe's study drew attention to attentiveness in the classroom as an important predictor of reading achievement and also showed the powerful effect that reading activity at home has on attentiveness. His conclusion that there is:

a positive carry-over effect between activities at home and behaviour in the classroom which is clearly in the interests of individual students and other students, as well as teachers. That is, these findings indicate that the opportunity to develop and practise attentiveness-demanding skills at home results in positive transference of similar skills to the classroom. (P. 90)

It will be interesting to discover if these very positive findings are replicated with different and larger samples. The potential of Bookstart is huge, for all evaluations so far have been positive. One aspect is the potential to increase educational standards, particularly in the light of research referred to above that those children entering school with advantages retain their superiority after 2 years of schooling. A further potential of Bookstart is its ability to affect those 'hard to reach' families. There now exists a strong argument to make Bookstart a national programme and the entitlement of every child.

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REFERENCES

- AINSWORTH, M.D.S. & BELL, S.M. (1970) Attachment, exploration and separation: illustrated by the behaviour of one year-olds in a strange situation, *Child Development*, 41, pp. 50-67.
- APPLETON, T., CLIFTON, & GOLDBERG, S. (1975) The development of behavioural competency in infancy, in: F. G. HOROWITZ (Ed.) *Review of Child Development Research*, Vol. 4 (Chicago, IL, University of Chicago Press).
- BIRMINGHAM COUNCIL (1996) *Baseline Assessment for the Primary Phase* (Birmingham, Birmingham City Council and Focus in Education Productions).
- BOWER, T.G.R. (1979) *Human Development* (San Francisco, CA, Willi Freeman & Co).
- BRICE HEATH, S. (1989) Oral and literate traditions among black Americans living in poverty, in: P. SHAW (Ed.) *Becoming Political: readings and writings in the politics of literacy education*, pp. 29-41 (Portsmouth, NH, Heinemann).
- BRONFENBRENNER, V. (1979) *The Ecology of Human Development* (Cambridge, MA, Harvard University Press).
- BRYANT, P. & BRADLEY, L. (1985) *Children's Reading Problems* (Oxford, Basil Blackwell).
- BUS, A.G., IJZENDOORN, M.H. & PELLEGRINI, A.D. (1995) Joint book reading makes for success in learning to read: a meta-analysis on intergenerational transmission of literacy, *Review of Educational Research*, 65(1), pp. 1-21.
- BUTLER, S.R. (1988) & school language processing performance and later reading achievement, in: R. L. MASLAND & M. W. MASLAND (Eds) *Preschool Prevention of Reading Failures*, pp. 19-51 (Parkton, MD, York Press).
- DE BARYSHE, B.D. (1993) Joint picture-book reading correlates of early language skill, *Journal of Child Language*, 20, pp. 455-461.
- HANNON, P. & JAMES, S. (1990) Parents' and teachers' perspective on pre-school literacy development, *British Educational Research Journal*, 16, pp. 259-272.
- JUEL, C. (1988) Learning to read and write: a longitudinal study of 54 children from first through fourth grades, *Journal of Educational Psychology*, 80, pp.437-447.
- MOORE, M. & WADE, B. (1997) Parents and children sharing books: an observational study, *Signal*, Sept, pp. 203-214.
- PIAGET, J. (1952) *The Origins of Intelligence in Children* (New York, NY, International University press).
- PIAGET, J. (1954) *The Construction of Reality in the Child* (New York, NY, Basic Books).
- RICHARDS, M.P. (1974) *The Integration of a Child into a Social World* (Cambridge, Cambridge University Press).
- ROWE, K.J. (1995) Factors affecting students' progress in reading; key findings from a longitudinal study, *Literacy, Teaching and Learning*, 1, pp. 57-110.
- SCARBOROUGH, H.S. & DOBRIK, W. (1994) On the efficacy of reading to pre-schoolers, *Developmental Review*, 14, pp. 245-302.
- TOOMEY, D. (1993) Parents hearing their children read: a review. Rethinking the lessons of the Haringey *Project, Education Review*, 35, pp. 223-236.
- WADE, B. (1984) *Story at Home and School*, Educational Review Occasional Publication (Birmingham, University of Birmingham).
- WADE, B. & MOORE, M. (1993) *Bookstart* (London, Book Trust).
- WADE, B. & MOORE, M. (1996a) Home activities: the advent of literacy, *European Early Childhood Education Research Journal*, 4(2), pp. 63-76.
- WADE, B. & MOORE, M. (1996b) Children's early book behaviour, *Educational Review*, 48, pp. 283-288.
- WELLS, G. (1985) *Language, Learning and Education* (Slough, NFER-Nelson).
- WELLS, G. (1986) *The Meaning Makers* (Portsmouth, NH, Heinemann).