



The Onset of Reading Acquisition: Before and After School-start

There is a connection between children's language development and their ability to learn to read and this relationship includes several aspects of language and holds both in a short-term and a longitudinal perspective. Early prediction and identification of reading problems is an essential condition for early remediation and prevention. The first precursors of reading acquisition can be found early during the preschool period, long before the onset of formal reading instruction. Individual differences during the very first stages of formal reading instruction are also highly predictive of future development. The importance of the strength of association between early predictors and outcome is discussed as well as problems related to causality. Several practical assessment methods are illustrated and discussed.

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The dominating view for hundreds of years has been that reading acquisition starts when children receive the first reading instruction, usually when the child is around six years old. Whereas children acquire language without any formal instruction they hardly ever learn to read without some formal teaching. There are a limited number of children that learn to read and write spontaneously, even in most literate environments. An apparent reason for reading acquisition to take place after the development of spoken language is simply that print is invented to suit a person who already knows the spoken language. Written Farsi is "made" for a person who already knows spoken Farsi and written Swedish is tailored for a person who knows spoken Swedish. Thus, in order to learn to read and write you first have to know some spoken language, and since it takes some four to six years for a child to

acquire language it is not surprising that reading acquisition normally starts at this age.

The first precursors of reading acquisition can be found early during the pre-school period, long before the onset of formal reading instruction (see e.g., Snow, Burns & Griffin, 1998; Teale & Sulzby, 1986). Before conventional reading young children gain knowledge of a variety of functions, procedures and units of print and it is generally believed that children lacking this preparedness for reading are facing a more difficult task at the moment when formal reading instructions starts. However, recent research have shown positive causal effects for several of the predictors of reading achievement and also demonstrated positive training effects in practical applications. Among the most effective interventions are programs for training of phonological awareness of which some have long lasting effects on reading acquisition (Ball & Blachman, 1991; Kjeldsen, Niemi & Olofsson, 2003; Kozminsky & Kozminsky, 1995; Lundberg, Frost & Petersen, 1988; Olofsson & Lundberg, 1983; 1985; Schneider, Küspert, Roth, Visé, & Marx, 1997). Further, for younger children and children in less supportive environments interventions using storybook reading have shown

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positive effects on children's reading related literacy skills (Neuman, 1999; Senechal, LeFevre, Thomas, & Daley, 1998; Whitehurst, Arnold, Epstein, Angell, Smith, & Fischel, 1994). In most pre-school settings resources like teacher and time are limited and there is a need for an early detection of those children who are in need of extra stimulation and help. One way of detecting these children is to use a comprehensive screening battery, a way that involves both knowledge and resources in form of planning and organisation.

This article is presenting a longitudinal but rather simple procedure for assessing pre-school children's reading related development. Ordinary pre-school teachers can carry out the testing procedure. Before the assessment method is described and some pilot data are reported, we first give an overview of factors that are seen to affect reading related development prior to the onset of formal reading instruction.

Aspects of Language Development:

Phonology

All normal children learn to produce and understand language and demonstrate practical lexical, pragmatic, semantic, syntactic, morphological and phonological knowledge. Yet, knowing a language does not require a conscious awareness of its structure. The focus of attention in normal language use is on the content, the meaning, and only rarely on formal aspects of the language. That is, in normal language activity our attention is fully directed towards the semantic, pragmatic or social content of the communication situation. If we simultaneously also should have to attend to formal aspects of the language, like the order and identity of speech sounds, or the syllable structure in a word, then we would run the risk of seriously disturbing our comprehension processes.

It is assumed that a young child initially has a rather holistic impression of the sounds in a word, thus perceiving the word as a unitary speech gesture (Jusczyk, Friederici, Wessels, Svenkerud, & Jusczyk, 1993). The child's representation of phonological structure is then gradually refined during the years. When the vocabulary is expanding the child identifies more and more of the phonological elements in the language. The syllable is assumed to be more physically salient than the phoneme. Syllabic structure is inducing a rhythmic variation in the speech due to changes in pressure and energy. The syllable is composed of consonants and vowels and a typical syllable consists of one

consonant or a consonant cluster followed by a vowel. Languages differ in the way syllables are constructed. Swedish is a Germanic language with many closed syllables and complex consonant clusters in both the onset and coda positions. Swedish orthography is generally considered shallower than e.g., English, French and Danish orthography but less shallow than for example Greek, Italian and Spanish. The Swedish language has several syllables with three initial consonants followed by a vowel (e.g. *skri-va* (write)) but a syllable can also consist of one vowel (e.g. *ä-ta* (eat)).

The smaller segments, the phonemes, are much harder for a child to detect in the continuous speech stream since the phonemes tend to be coarticulated, i.e. the realisation of a phoneme is affected by both the preceding and the following phoneme. Thus, a phoneme is an abstract unit, which has different realisations depending on its phonological surrounding. In order to discriminate between for example the two consonants [s] and [ʃ] before a vowel the listener can use the acoustic information found in the noise burst at time before the vowel onset, or alternatively the listener can to a large extent use information found within the vowel (the nature of the formant transitions at vowel onset). There are convincing results showing that younger children tend to use information from the whole syllable in the identification of consonants more often, but that there is a developmental trend towards a stronger reliance on the acoustic information within the smaller segment (phoneme). Thus, with increasing age the child become more able of using smaller segments in speech perception (Nittrouer, 1996; Nittrouer, Neely & Studdert-Kennedy, 1996; Nittrouer & Miller, 1997a; 1997b).

As the child's vocabulary is increasing the child's language system will profit from processing different speech segments (phonemes) compared to processing each word as a unique holistic sound pattern (Walley, 1993). According to this theoretical framework vocabulary growth is seen as an important causal factor behind the development of a more segmented representation of lexical items (see also Elbro, 1996; Fowler, 1991).

Within the outlined theoretical framework, it is believed that pre-school children can understand and talk without problem but still their phonological representations of words are different from the adults. It is also widely believed that learning to read (learning the alphabetical principle) forces the



child's language system to develop segmented phonological representations.

With this background there are two possibilities. Either the child's first encounter with print takes place without prior knowledge of written language. However, equipped with a relatively large vocabulary and impressive cognitive abilities the seven years old child has a natural and implicit pre-knowledge of the smallest segments of the language, the phonemes. It will be a tuff period to many children but most of them will do it.

The alternative is that the child already in pre-school is introduced to a variety of aspects of written language and for an extended period of time gains knowledge about print and other reading related perspectives. During this period the child gradually becomes aware of those details of print and language it at each point in time is receptive to (see e.g., Chaney, 1992, for descriptions of early stages of this development).

Phonological awareness means a developing dissociation between the sounds of words and their meaning. The child can attend both to the meaning and to the sounds of a spoken word. Such awareness can cover different levels of phonology, such as syllables, onset-rime or phonemes. The last level, also called phonemic awareness, is for most children the hardest level to reach, and also the most critical kind of awareness for reading acquisition (Høien, Lundberg, Stanvoich & Bjaalid, 1995).

Why do some children run into problems?

An overwhelming part of the research during the last two decades strongly suggests that children having problems with handling, i.e., talking about and playing with, the small language segments, the phonemes, are at risk for problems in learning to read. It seems like a certain degree of phonological awareness is required for a normal reading acquisition.

Why do some children then have problems in their development of phonological awareness? What factors can block the children from making the necessary developmental spurt when encountering reading instruction? Two different explanations have been put forward. Either the child is delayed in its metalinguistic development due to lack of environmental stimulation or the child is suffering from a general problem in phonological development. However, the question seems not to be one or the other but rather a question of an intricate interaction between the environment and some hereditary dispositions (Snow et al., 1998). A crucial

point in this interplay is the young child's ability to unconsciously and instinctively affect, create and select its own environment. An example may clarify the picture. Suppose we have a little lad who is talented in other areas than those related to speech sounds. That is, he is less well equipped for language and reading. His language development however proceeds normally and he is a happy fellow. His parents are aware of the importance of storybook reading and they read aloud to their son daily. He is making drawings and paintings like most children and he signs the works with the initial letter of his name and later on he can spell the whole name. Thus, there are no noticeable problems in language development.

But if we look more closely at the situation we may find some interesting details. Most children every now and then want their parents to read more. "Read more" is a well-known cry, which can make any parent tired. However, our little lad almost never asks for more reading. He is quite satisfied even if his parents for some reason do not have time to read a bedtime story. He sometimes gets tired in the middle of the story and wants to sleep. He does not suggest a storybook if not asked to and he does not look at the books by himself. He does not interrupt the reading by asking questions about the words in the text. He may, on the other hand, in the middle of a reading session suddenly come to think of things in another room or recall unrelated events or start listening to sound from outside. He is not scribbling his name everywhere and he is not interested in how to spell the names of people he knows. He does not make any nursery rhymes of his own; create poems or play with words, and does not expect others to do so either.

The question is now, how our lad affects his immediate environment. His parents will probably accept that it is enough to read a single short story and there is no need for any "time-consuming" talk around the story. When they want him to play quietly, they do not ask him to sit down and look at storybooks. The parents are not stimulated to discuss about words or expressions with him. Rather unnoticed the parents have accepted and adjusted to the fact their little lad is simply not interested in books and print. (C.f., Olofsson & Niedersøe, 1999, who found that parents reports of children's early interest in book reading predicted later reading achievement).

Why is not our lad interested? One explanation might be that his phonological system has not reached the stage that allows him to catch all new



words and refinements in the storybooks. Nor does his system allow him to appreciate language games and nursery rhymes. His phonological system is processing language in a way that is functional for extracting meaning from normal conversations and for learning new words but does not have words in their fully segmented form yet. (Elbro, 1996). In communication situations he may sometimes be slow in finding words. This may be a drawback when it comes to turn-taking or causing a change of topic in the discussion. Occasionally he produces a wrong word or mispronounces some words. The mistakes seem to embarrass him particularly if they amuse other people. (C.f., e.g., Rice, Hadley, & Alexander, 1993). For the reasons like these he decides that there are more interesting things in life than literacy and language.

In this way our little lad, who is in great need for language stimulation, has now created himself a less supportive environment.

There is a great pedagogical challenge embedded in our story. The problem is how to arrange a pre-school environment so that it stimulates those children who themselves are not especially interested in and supporting such an environment. (C.f. "the broccoli effect" discussed in Scarborough & Dobrich, 1994. See also, Wells, 1985).

Developmental Survey of the Individual Child

By means of systematically evaluating the initial stages of the development of emergent literacy and phonological awareness, it is possible to detect the children who need extra support and stimulation. By repeating the evaluation twice a year the child's developmental trend can be described. Children with problems or with a slow developmental trend do not necessarily need any dramatic interventions. On the contrary, the fundamental idea is only to adjust the normal daily pre-school environment so that the children in a regular and playful manner are stimulated to further develop their language awareness and emergent literacy.

The present chapter presents some preliminary findings on reading related development in pre-school children. In a longitudinal design the pre-school children were tested totally four times, once when they were three and a half years old, at the age of four, once when they were four and a half and finally at age five years. The same assessment form was used for all children and at all points of measurement but the number of tasks and items completed were a function of each child's ability level. The tasks were sorted in ascending difficulty order and the assessment was ended as soon as the child no longer could solve the tasks. The testing

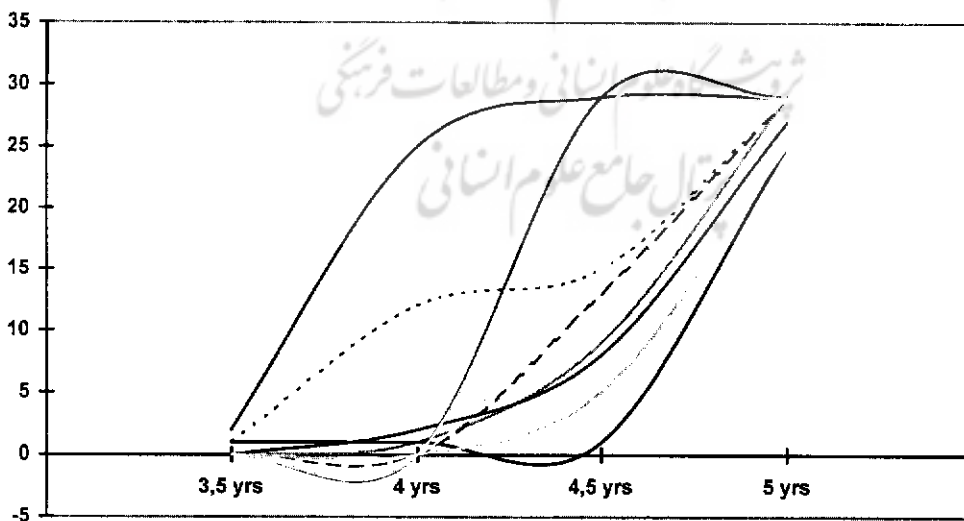


Figure 1.

Longitudinal development of letter-naming ability for upper-case letters for 10 Swedish pre-school children.



could be divided into two or three sessions if the child grows tired or less concentrated. So far, only two small groups of children have been scored for the whole body of measurement points and thus the complete series of data is only available for 10 children. For more details see Olofsson (2001).

Results

On most of the variables the data showed a strong positive development during the assessment period. The results for a sample of variables are presented in the format of individual developmental curves. The curves are purely descriptive and no parameters are estimated. The development of letter-naming ability for upper-case letters is presented in Figure 1. Children were shown on a piece of paper all Swedish upper-case letters in random order and asked to name as many as possible of the letters. (The Swedish alphabet contains three more letters than the English, namely *Å Ä Ö* representing three of the Swedish totally nine vowels). Each correct identification of a letter, with its name or its sound, received 1 point (maximum 29). In Figure 1 it can be found that none of the children showed any letter knowledge at the age of 3 years and 6 month whereas half a year later there was one child who knew most of the upper case letters and one who knew half of them. Another six months later, at the age of 4 and a half, there were 3 children with maximum scores and only one child with lowest scores. Finally, at age five, about three months before entering the kindergarten class, practically all children have gained complete letter knowledge. Letter knowledge can also be measured with the

same procedure using lower case letters. For Swedish children the tradition is to start using capital letters, which are easier for the child to write, and it can be hypothesised that for most children in western societies the capital letters are learned slightly earlier than the lower case letters.

Figure 2 presents the development of the ability to spell the own name. The child was asked to write the name on a piece of paper. The written response was scored on a 6-point scale (C.f., e.g., Mann, Tobin & Wilson, 1987; Senechal, LeFevre, Thomas & Daley, 1998). Any letter or letter like writing was given 1 point whereas a single letter representing the first phoneme received 2 points. Three points were given if two or more letters were correctly spelled, 4 points were given for an almost correct spelling, and 5 points were given for a correct spelling.

Only two children have bottom scores at the first measurement. It can be seen that already at age 4 about half of the children spell their names correctly and at age 5 practically all children spell their names correctly. When comparing the name-spelling results (Figure 2) to the letter-naming results (Figure 1) it can be found that at age 4 several children who spell their own name correctly use letters which they can not name the upper case version of.

Phonological awareness is typically assessed by tasks demanding the child to manipulate or make judgements about speech sounds in spoken words. It has repeatedly been found that tasks demanding explicit access to units of phoneme size show the strongest correlation with reading acquisition. Figure 3 presents the results from an assessment using a summary of three tests demanding awareness of

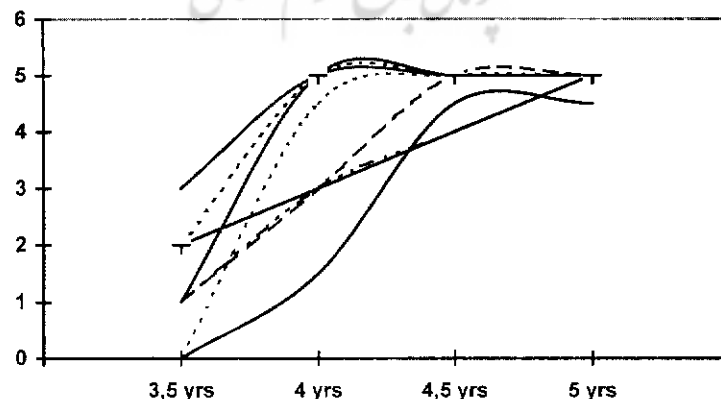


Figure 2.

Longitudinal development of the ability to spell own name for eight Swedish pre-school children.



phonemes. The first test measured initial sound identification. The child was shown a picture with the target word and then had to select the one of three pictures having the same initial sound as the target. The four items consisted of single- and bi-syllabic common content words that could be expected to be familiar to all children. One of the target sounds was a vowel and three were consonants. In the second test the child was told to segment words into parts and place a marker for each part. The words varied in length from two letters (and phonemes) to four letters (and phonemes) and there were four one-syllable words and one two-syllable word. In the third test the tester pronounced a phoneme sound and placed a marker in front of the child and then repeated the procedure with the next phoneme. The child had to synthesise the phonemes and re-create the word. The words used had the same structure as in the second test (above). The results (Figure 3) show a remarkably spurt during the last pre-school year and at the last measurement point none of the children score low on phonemic awareness.

A very similar developmental pattern was found for the children's ability to write an unknown name. Children were asked to write down a name that was new to them. This is a pseudo word spelling task but by using the name-format the task makes more sense to the child than many other tasks using non-words. The pseudo-names used did conform to Swedish

phonology and were four letter bi-syllabic words. The spelling was scored on a 5-point scale. A single letter representing some part of the name scored 1 point whereas a single letter representing the first phoneme received 2 points. Three points were given when the name was "recognisable" (readable) and 4 points were given for a correct spelling.

The children's ability to spell a known name (friend's name) showed a more varying developmental pattern than the previous variables. The greater variance and instability in the development of peer name writing may be explained by the fact that the children selected different peer names to write at different test occasions.

The child's knowledge of nursery rhymes was measured by presenting the first line of six nursery rhymes selected from the repertory of the actual pre-school class. The child's task was to as to continue. If the child could continue beyond the first rhyme one point was scored. (Normally, a correct answer was equivalent to three lines). This task was modelled from Bryant, Bradley, Maclean, & Crossland (1989). However, the developmental data on nursery rhyme knowledge showed a lot of variability that was caused by the uncontrolled introduction of new nursery rhymes into the kindergarten classrooms. The overall impression was that the ability to recite nursery rhymes emerges relatively early and has a less steep slope than e.g. the phonemic awareness variable (c.f. Figure 3).

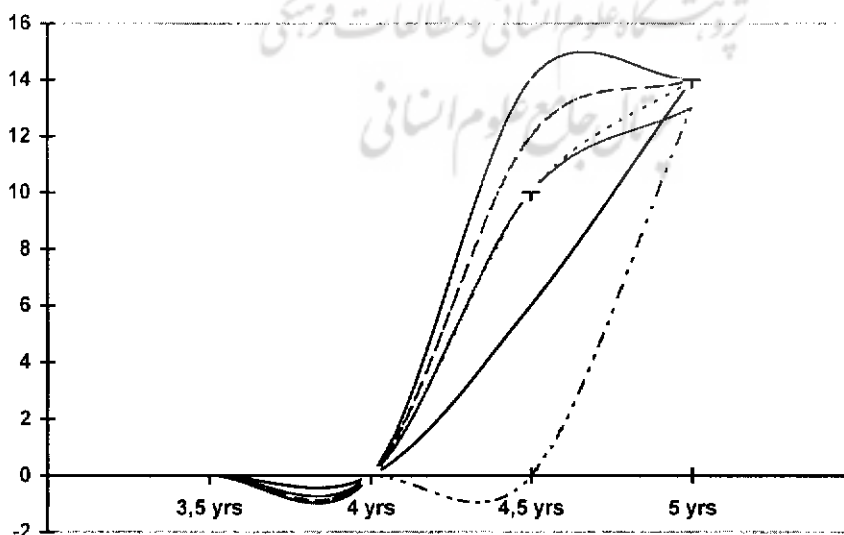


Figure 3. Longitudinal development of phonemic awareness in 10 Swedish pre-school children.



Conclusion

The present data, although only a pilot study, are congruent with the findings in Chaney (1992) in that preschoolers were found to show clear signs of meta-linguistic and reading related knowledge. These findings, as well as Chaney (1992), demonstrate that reading related development starts early in the preschool years and is not something that emanate abruptly at school start. The longitudinal design with repeated measures revealed a developmental spurt in phonemic awareness after age 4, a finding that replicates the results in Bloodgood (1999). A very interesting and promising feature in the data was the rich amount of information extracted from the name writing tasks. These tasks, to write the own name, a peer name and an unknown name, were highly appreciated by both the children and the staff and seem to be a developmentally and "ecologically" meaningful and valid task to most children already at age 3. The present small-size study cannot fully evaluate the unknown name-writing task. Further research is needed to evaluate the full potential of this task, a task that easily can be expanded to contain pseudo-names and thus tap non-trivial levels of orthographic knowledge. The interested reader is referred to Bloodgood (1999) for an exhaustive treatment of name writing.

The phonological awareness tasks constituted a large part of the present test battery, although not reported here in any detail. The tasks measuring awareness of words and syllables suffered from ceiling effects already for the youngest children. The phonemic tasks, as reported in Figure 3, showed

satisfying measurement properties (yet, remember the small sample size). However, it must be noticed that the language awareness tasks were rather time consuming and that the tasks can be slightly unpleasant for some children and consequently also for the tester. The utility of the phonological awareness tasks should be set in relation to the information extracted by the effective and non-obtrusive name writing and letter-knowledge tasks.

The assessment was accomplished by the preschool staff, which experienced the testing procedure as rather time-consuming but feasible and very rewarding. The general impression was that the testing schedule, with fall and spring tests, was nearly optimal. A shorter test interval would be too demanding and a longer interval (annual tests) would be of less value for the monitoring of the individual children's continuous development.

The two preschools in which the present data was collected have a considerably developed programme for early phonological awareness training. The materials used are largely based on Lundberg et al. (1988) and Olofsson & Lundberg (1985) (see Adams, Foorman, Lundberg & Beeler (1998) for an English version). In both participating preschool groups large amounts of spontaneous literacy related activities were reported. Thus, the level of performance of the children in the present pilot study can be expected to be slightly above average for Swedish preschools. Furthermore, the staff must be considered rather experienced, a fact that should be kept in mind when implementing similar assessment systems in other educational settings.

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