

Talk to Your Baby / Zungumza na Mtoto Mchanga Project

A summary of relevant research (3)

Introduction

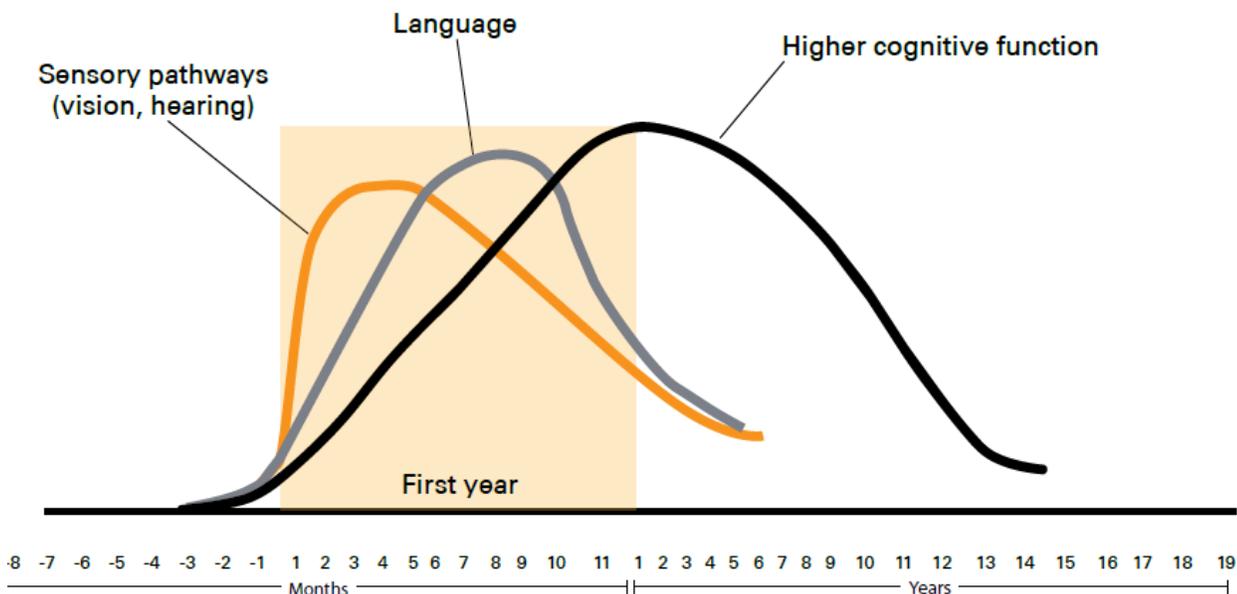
This paper is a brief summary of recent and relevant research findings which justify and underpin the TtYB/ZUMM project, and what it seeks to achieve. It includes research findings from a wide range of disciplines: developmental neurology; cognitive psychology; language development; sociology; socio-economics and education. Each section heading is an important conclusion that the research literature points to, and the following text is the evidence.

What emerges very clearly from all the research findings, in all disciplines, is the *centrality* of language skills (and, in particular, the early acquisition of language skills) to an individual's chances of success in life, from the earliest years to adulthood. Scaled up from the individual to society as a whole, this has important implications for the nation.

1. Brain development is at its peak at the beginning of life

"Skill formation starts in the womb. The early years of a child's life, before the child enters school, lay the foundation for all that follows." (Heckman, 2011)

The formation of neural connections (links between brain cells) is the physical process that lays down and fixes learning. Everything the human body and mind can do, from the most basic process to the most complex, depends on these connections. Importantly, the way these connections are made is cumulative; the basic links are laid down first, and the more complex links build on the basic ones. This means that if the early 'brain wiring' is poor, what comes later will also be poor, rather like a house built on weak foundations.



From "In Brief: the science of early childhood development", Harvard University Centre on the Developing Child.

This diagram shows the time frame for the sequence of laying down of neural connections for vision and hearing, followed by language, followed by the higher cognitive functions. Of course, speaking is not

emerging at this stage, but the brain-wiring is being established. Note that the shaded box represents *the first year of life*.

According to The Harvard University Centre on the Developing Child (2007), just as complex wiring builds on simple wiring, complex and higher skills build on simpler skills. For example, the ability to name objects depends on the ability to perceive the different sounds of the mother tongue; the ability to understand text depends on the ability to understand the spoken word (we will return to this important issue in Section 5, below).

The Harvard Centre further explains that brain development depends on both genetics and the environment; this wiring process does not just happen naturally. While genes determine *when* neural connections are formed, *how* they are formed depends on the experiences of the infant. It can be seen from the diagram, therefore, that the language experience of the child in the first year of life is crucial to successful brain development for language.

“...early experiences create a foundation for lifelong learning, behaviour and both physical and mental health” (Harvard 2007)

2. Interaction between the infant and the primary caregivers is of crucial importance

The Harvard Centre for the Developing Child, at Harvard University in the USA, brings together expertise from a wide range of disciplines to collate the best available research-based information on early child development. They comment that young children *“naturally reach out for interaction”*; and describe what should follow:

“...when young children naturally reach out for interaction through babbling, facial expressions...gestures and cries, and adults respond by...doing the same kind of vocalising and gesturing back at them, and the process continues back and forth...”

In other words, it is most important to talk to babies, and to respond to their attempts to communicate. It is further stated that if this interaction does not happen, or if it is inappropriate (for example, by a parent or carer speaking harshly to a baby), then the brain development described in the previous section is adversely affected, and this can in turn affect future learning and even behaviour.

The Hanen Centre is a Canadian NGO whose focus is on helping parents to foster good language skills in their children, including young babies. A range of research evidence, cited by the Centre, sheds light on the concept of ‘responsive behaviour’. This is the language used to respond to the baby’s desire to communicate. Ryan & Deci (2000) suggest that the baby will be encouraged, by the parent’s responses, to interact and communicate more. As the parent responds to the baby’s initiative (babbling, smiling, gesture, etc), the baby is experiencing autonomy (being in control), competence (managing cause and effect) and relationships. All of these contribute to developing motivation in the infant, which, of course, is essential to learning. This is consistent with the well-observed phenomenon that if a 6-8 month old baby’s babbling evokes no response, the baby will gradually cease to babble.

According to Stock (2002), appropriate responsiveness has been shown to lead to better language comprehension at 12 months, and better comprehension, pronunciation and vocabulary at 2 and 3 years, compared with a control group. Long term studies have even shown that such children have increased vocabulary comprehension at 12 years. The educational benefits are clear.

There is strong evidence for the importance of reading to babies (yes, even to babies from a few months old) (National Literacy Trust, 2011) and for playing with them at eye-to-eye level (Zuckerman 2010). Both of these activities, and especially reading, along with talking to babies, have been shown to make the biggest contribution to good language development in the early years.

3. It is the *quality* of the interaction between caregiver and infant that makes the difference

It is often stated that babies develop well if they spend a lot of time with the mother. Research findings point to the fact that this is not enough; what brings about good development is the quality of the time spent. In other words, what the parents do is more important than just being there. It does not matter what their job is, or their financial situation, or how much the toys cost, but how they interact with their infant is very important indeed. This interaction is known as the Home Learning Environment (HLE). Section 1 established that if the HLE is not good, the brain development will be impaired. A strong HLE may be defined as one in which the child's experiences give him or her the best possible chance of success in life.

"Poor mothers with few qualifications can improve their children's progress and give them a better start at school by engaging in activities at home that engage and stretch the child's mind" (Sylva et al., 2008)

There is powerful evidence from the USA and the UK that what happens in a strong HLE is that parents talk more to their babies, they read stories to their babies and they play with them. In fact, according to the National Literacy Trust, a UK NGO, the time spent reading to babies (from soon after birth) is the single most important influence on language acquisition. This is probably because reading stories introduces a wider range of vocabulary than would be used in talking around the home. However, research by the Joseph Rowntree Foundation found that

"on average, children from poorer backgrounds are much less likely to experience a rich HLE than children from better-off backgrounds." (2010)

Poorer mothers talked less to their babies, spent much less time reading to them, and used a higher proportion of negative comments to positive comments than better-off (more educated) mothers. The consequences of this disparity are outlined in the next two sections.

In view of the high incidence of pregnancy among schoolgirls, research from the USA, concerning adolescent mothers, is relevant. The study (McGowan et al, 2008) identified important differences between 'adolescent mothers' and 'adult mothers': the former were less interactive, more directive and controlling and used fewer words to their babies. In other words, when they did speak to the baby, it was at their initiative, not in response to the baby. These children were found to have significantly poorer language skills on entering school than the children of adult mothers.

Interestingly, a short programme to educate very young mothers in talking to their babies led to a significant improvement in the infants' spoken language skills over time. This piece of evidence supports the implementation of a national 'Talk to Your Baby' information campaign, and stresses the importance of ensuring that this information reaches all communities, especially the disadvantaged.

4. Some facts and figures about early language

- Most of the brain connections for language are made between birth and the first birthday.
- A 2 year old child who does not know 50 words, and who is not putting 2 or more words together is considered to be 'a late talker' according to the internationally accepted definition.
- A three year old child should be using about 300 different words on average, including adjectives, and making quite long sentences. (MacArthur-Bates, 2007)
- A baby in the UK or the USA, in an educated family, hears about 2,000 words per hour at home; in a family that is low on the socio-economic scale, the figure is 600-800 words per hour.
- Roulstone et al (2011) show that there is a very strong correlation between a child's spoken language skills at age 2 and that child's performance across all subjects on entering primary school (at age 5).

5. The success of literacy learning depends on spoken language skills

The links between early language skills and literacy learning have been recognised for many years; researchers at the UK's leading universities, Oxford and Cambridge, were publishing papers over 25 years ago. Current research at the University of York Centre for Literacy and Language takes this as a given:

“Since it is now well established that (the) important foundations for literacy development are laid (years) before the child starts school at age 5....” (Snowling & Hulme, 2011, in press)

The findings of Roulstone (2011) mentioned above show powerfully how important very early (even at age 2) spoken language development is to a child's early success at school. Further, several studies have shown that the number of words a child knows at age 5 is the single best predictor of academic success throughout life. (Blanden, 2006)

Learning to read depends on vocabulary size and the ability to process the sounds of the language. These skills are developed from birth, with sound processing being an important pre-reading skill that is also vitally important in speech production. Furthermore, all education depends on being able to understand what one reads – comprehension. The research evidence is that reading comprehension depends crucially on spoken language skills, including vocabulary and the skill of decoding utterances. (many studies cited in Cain & Oakhill, 2007) As we have seen, if babies are not spoken to, indeed if they are not spoken to a great deal, from birth, they will fail to achieve their potential in spoken language, with very detrimental effects on their educational attainment.

6. Tanzanian research supports the international evidence

According to a survey carried out in Arusha Rural (REPOA, 2011), the link between early language and later success in education is not well known. In fact, only 0.5% of respondents identified 'intellectual development' as a reason for talking to babies (in this survey a baby is a child from 0-3 years; the Kiswahili term used was 'mtoto mdogo'). Further, only 1.5% identified 'can see, hear, move and speak at the appropriate age' as a sign of good child development. Nearly 60% of respondents did not start talking to infants until either 'the child begins to see and hear', (interpreted to me as a few months old), or even later, when the infant begins to use words. In view of the importance of talking to babies to develop early language, and the contribution this makes to academic outcomes, this is a cause for concern, and strengthens the case for an information campaign. Another important finding from this survey is that health facilities are the main source of information on child care, with parents and grandparents a close second. Over 90% of respondents identified one of these two, which suggests that information needs to be disseminated by hospitals and clinics; we must also convince the older generation of its importance!

Another survey was carried out in Mvumi village, Dodoma region, in September 2011, by Janet and David Townend, as a pilot for the Talk to Your Baby Project research. Babies were identified as infants from birth to one year old. 125 mothers gathered at a meeting to complete the form; 109 returned questionnaires were judged to be reliable. 34% of respondents needed an amanuensis. The following initial findings are significant:

65% of mothers started talking to their baby after one year old; only 8% talked from the child's birth. 54% did not expect the infant to start saying words until after 18 months; 50% expected infants to put words together after 2 years (half of those thought it would be after 2 ½ years). In more developed countries, words would be expected at 9-12 months; 18 months, or soon after, would be the expected time to combine words. A 2 year old child who does not know 50 words, and who is not putting 2 or more words together is considered to be 'a late talker' according to the internationally accepted definition.

74% of mothers estimated that their baby hears fewer than 50 words in an hour; compare this with figures in the UK and USA of 600-800 words per hour even in poor homes.

62% of respondents thought it was not important to talk to babies in the first six months of life; of these, 50% identified the reason as 'the baby would not understand' and 50% as 'the grandparents would not permit it'. (More than one reason was allowed). Of the total respondents, 44% said it was more important to encourage the baby to walk than to talk.

While literacy levels in primary schools have been a cause for concern for some time, the UWEZO Reports (2010 and recently 2011) have quantified the problem and focused all our minds on how to address it. Most powerfully, the low level of attainment in Kiswahili reading and comprehension should be considered in the light of the evidence for the pre-eminence of early language skills in literacy acquisition, and the apparent lack of awareness of this pre-eminence among parents.

7. Language skills are the key to poverty reduction for the individual

Blanden's findings about the relationship between vocabulary at age 5 and eventual academic outcome is cited in a British Government paper in the context of social mobility (how to improve the life chances of the poorest children in society). They conclude that early language skills are the key to moving out of poverty. Importantly, they also conclude from the evidence that adults parent in the way they were parented, unless they are educated to behave differently:

"It is devastatingly obvious that poor parenting leads to underachieving children, and eventually creates another generation of poor parents..." (Taylor, M. cited in Brack et al, 2007)

The UK Government has concluded that there is a cycle of poverty that can and should be broken. This is even more true in developing countries, where there is a higher proportion of poor people.

8. Investment in the earliest years of life is very cost-effective

Heckman (2011), who is an economist and early years specialist, as well as a Nobel prize winner, shows, in the figure below, how cost-effective early intervention is, compared with interventions later in life. In short, and as confirmed by Doyle (2007), prevention is better – and cheaper - than cure. Furthermore, there is evidence that those who have good language skills (and now we know that these depend on the earliest experiences) have, on average, fewer behaviour problems in childhood and adolescence, fewer mental illnesses, better employment opportunities, better social integration and are less likely to engage in criminal activities. Those with good language skills will contribute to the economic growth of the nation by becoming well-educated, engaging in professional and business activities, and paying taxes. They will in turn be parents who talk to their babies, creating a strong home learning environment, thus benefiting the next and all future generations.

A short series published on-line by The Lancet (The Lancet: Engle et al, 2011) strongly supports much of what has been discussed in this paper. A very important difference is that their research focused on low-income and middle-income countries, including some in Africa. Their key findings, from a survey of a vast number of studies across these countries, include the following:

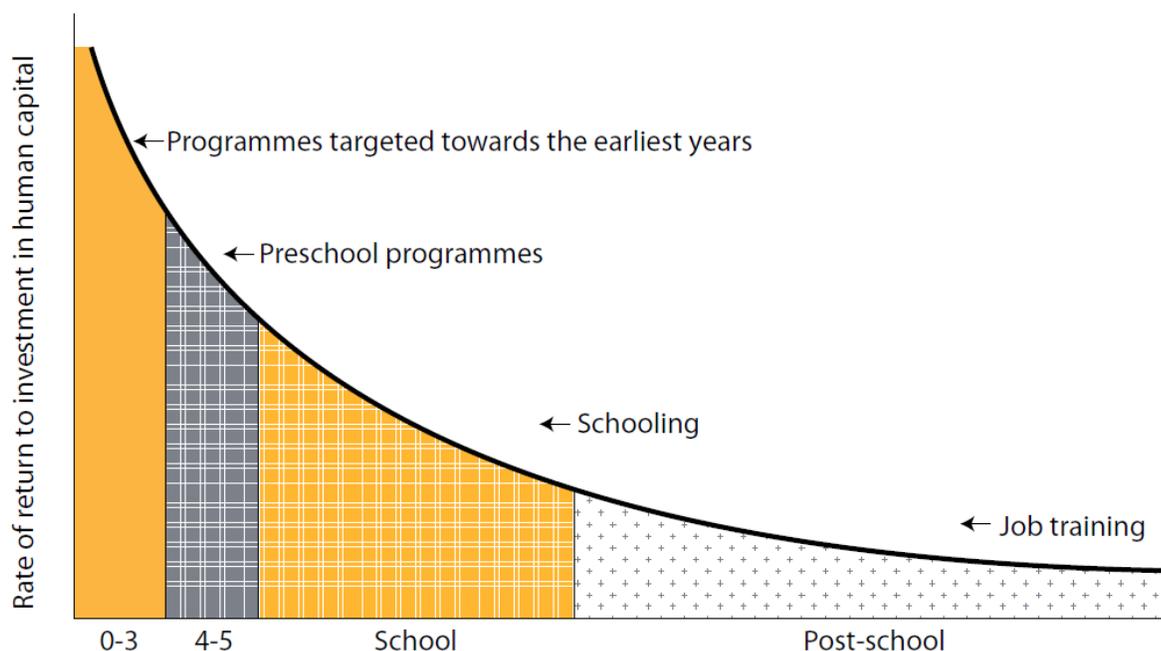
Early childhood is the most cost-effective, as well as the most efficient, time to intervene to ensure that children reach their potential. The returns on investment at this stage are substantial; one reason for this is that the inequalities between children tend to increase over time, and become more difficult to change. It is particularly interesting that the effects of appropriate intervention are larger in more disadvantaged communities. This is a powerful justification for our focus on the rural poor in the Talk to Your Baby project.

They found that parenting interventions could improve cognitive development, social and emotional development and readiness for school. The effects were greatest where there were high quality

programmes, systematic curricula and training opportunities for relevant professionals and for parents. The importance of monitoring, good governance and supervision were also stressed.

Among their recommendations were the maximisation of quality programmes for ECD and multisectoral integration. In particular, they advocate including ECD information into healthcare programmes for expectant and new mothers, and young infants.

Relative efficiency of interventions at different stages of life (Heckman 2011)



New research findings: 2014

Since the first version of this paper, in 2011, and the update in 2012, a number of relevant papers have been published, the findings of which are summarised below, in chronological order of relevance to a child's life.

In mid 2014, a study reported in the journal *Developmental Science* (Schulz et al, 2014) made the observation that babies at three months old attend selectively to speech, over other biological, but non-speech sounds. Evidence from MRI scans showed activity in the areas of the brain associated with spoken language when the babies heard real words. This shows that babies' brains are wired from the beginning of life to recognise and listen to language.

In May 2014 a report was published by the University of Washington, in the USA, also in *Developmental Science* (Ramirez-Esparza et al, 2014) showed much larger vocabulary in two year-olds if they had been talked to by parents in an exaggerated manner. This is often known as 'parentese'; it is characterised by extended vowel sounds, exaggerated intonation patterns, and slightly increased volume. Repetitions are frequent, and the parents also repeat the babies' babbling back to them (*ababababa, for example!*) This kind of talking is shown to have a very beneficial effect upon the language development of the infants in the study.

In January 2014, USAID published a 'Headline Findings Report' on the National Baseline Assessment for the 3 Rs in Tanzania (USAID, 2014). This is a provisional report, outlining 'emerging themes' from data collected in October 2013. The sample consisted of 2,226 students in Standard 2 (about 9 – 10 years old) in 200 schools in 20 districts. The researchers found reasonably good pre-literacy skills (phonic skills, for example), and 62% of the students had 'reasonable' reading accuracy, though they read slowly. However, significantly, 40% scored 0% for reading comprehension, and very few read with full understanding. In other words, they could decode text, but failed at that aspect of reading that crucially depends on good spoken language skills. This means that even those who can read the words, find no meaning in text, and therefore miss the whole point of reading. (Also see Section 5, page 4 for evidence of links between spoken and written language).

Finally, a large-scale longitudinal twin study in the UK (Ritchie et al 2014) found that children who did better at reading at age 7, consistently did better academically than those with poorer reading skills. Note that the comparison was being made between sets of identical twins, who have the same genetic make-up and can be presumed to be equally innately intelligent. This is a completely new finding, and the implications have yet to be worked out, but the lead author says that the evidence suggests that 'being a better reader makes a child more intelligent later'. Earlier in this paper, it was clearly established from the evidence that a rich language environment early in life is the most powerful influence on literacy learning; now it is being suggested that this literacy learning actually improves later academic performance. It appears that the effect of the language environment in the first months of life continues into adulthood.

Conclusion

Surely this range of evidence speaks very powerfully for itself; there is nothing I can add to its weight. From all the evidence cited in the previous sections, we can only conclude that improving early language skill development is the most effective way for our children to reach their potential. Clearly there is a need for the information to be disseminated, and for behaviour to change. The necessary cultural shift may be similar to that which was needed to encourage every mother to take her infant to the clinic for immunisations. Investment in educating parents and carers to talk to babies will be money well-spent, not only for the benefit of individuals and families, but for the better development of the nation.

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