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Dear Parents,

It's time for our spring/summer newsletter. It's been a very busy few months since we last wrote to you. Firstly, if you've signed up since Christmas, welcome. It's important to us to keep everyone who registers their baby for our studies informed about our work.

This month we're going to report some results to you. Two studies were conducted at the team's previous home of Bangor University in North Wales so we're sending a copy of this letter to all the families registered on our Bangor database as well. The other study (the 7.5-Month Word Segmentation Study) was conducted here in York. We're also going to talk a bit about the theory that's underpinning our research by summarising Professor Marilyn Vihman's recent inaugural lecture.

One change since our Christmas letter is that we now have a permanent website address at <http://www.york.ac.uk/res/babylab>. Here you can read about all the studies that we are currently running and about the various members of the Infant and Toddler Language Studies team.

## **1. Results**

### *(i) Phonological Memory study: Repeating Nonsense Words*



The ability to repeat back sequences of language sounds (presented as either real words or nonsense words) immediately after hearing them is known to be related to children's vocabulary size and to their skill at learning new words. Some researchers assume that the ability to hold nonsense words in memory and to repeat them back accurately is a stable 'talent' which people are born with and which does not change much with development. Other researchers stress that the ability to

remember new or nonsense words is actually related to people's vocabulary - people unconsciously use similarities between their *old familiar* words and *new unfamiliar* ones, so anyone with a larger vocabulary is better at learning new nonsense words.

We wanted to see if we could find evidence for a natural talent, or to see if we could find evidence for language learning itself having an effect on children's ability to remember nonsense words. This study was conducted while we were still in Wales. 17 children did a head-turn experiment (the name we give to the speech perception tests we conduct in the large booth – most of you should be familiar with these by now!) aged 10 months in which we checked whether they could recognise familiar words often used around babies (e.g. *nappy*). We took recognition to be a sign of having a good memory for sequences of language sounds, or words, in infancy (although there was no reason to believe that the children actually understood the words). We then followed most of these children for several

months, recording them at home. When they turned 2, we tested them on their ability to repeat words, both real (e.g. *computer, magazine*) and nonsense (e.g. *tonkyuper, gazamine, taymee, seemer*).

We found no evidence that remembering words at 10 months was related to the ability to repeat words at age 2, so the idea of a natural talent was not supported by this study, though we think this merits further testing. However, we did find strong relationships between language learning and memory for nonsense words. Children who started to practise using consonants early in their babble were more accurate at repeating the nonsense words at age 2 than those who were later to start using consonants in their babble. Also, when we tested the actual consonants that children used in their words at age 2, most of the children found it easier to repeat the nonsense words that contained sounds which they used frequently. For example, the nonsense word *taymee* was easy to repeat for a child who was using “t” and “m” a lot (e.g. in words like *Thomas*), but hard to repeat for a child who seldom used those sounds. We concluded that children’s ability to remember new words, or new nonsense words, is strongly related to the extent to which they have practised producing sounds in general (i.e. the earlier you start, the better) and also to their practice at producing specific sounds in their words. This suggests that memory for new words is supported by prior linguistic knowledge.

(ii) *A study of typically developing children*



We wanted to see how practice at producing speech sounds by babbling supports word learning. We recorded 12 children at play with their parents at least once a month, starting at 11 months. We looked at the children’s first, most frequently used consonants (sounds like b, p, m, n, d, t, g and k). This meant tallying when a child started to use a consonant in a consistent way (i.e. many times in a session over several sessions), and which consonants each baby preferred. We were interested in consonants because children produce vowel-like sounds (like a, e, i, o, u) – and glides or ‘semivowels’ (w, y) – from very early on. The question was whether this type of practice at producing language sounds would be relevant for the babies’ first words.

Babies’ first words can be divided into two types:

(1) Words which a baby only knows how to use because they form part of routines. Here an adult, game or routine scaffolds the child’s word use: for instance, saying “da” for “star” when Mummy sings “Twinkle, twinkle little...”, or “two, three” after Mummy starts counting with “one...” or “ta” when given something. We call these context-limited words.

(2) More generalised, symbolic words (used in different situations, with no support from a special routine). Words of this kind name objects or actions, e.g. “ball”, when referring to several different balls, or “down” when referring to something being taken down or something which has fallen down. These are referential words.

We found that a baby’s first words tended to be based heavily on their first sounds, so that a baby who liked to make “b” sounds in babble would use “ball” as one of his/her first words, whereas one who liked to make “d” sounds would have “down” as one of his/her first words. We also found a trend showing that the referential words the children used tended to be shorter and simpler in structure than context-limited words. We concluded that there is a trade-off in complexity between word form and word meaning. Because children’s processing capacities are limited, words which are too complicated are simply not learned early on. Therefore, if a word is complex in the way it is used (referential words), it can be learned if its form is simple and easy to remember, but it is less likely to be learned if its form is complex. Conversely, when the use is simple, as when it is predictable from the game or routine (like our “two, three” example above), it puts less of a load on processing, thereby leaving the child “space” for dealing with words that are harder to pronounce.

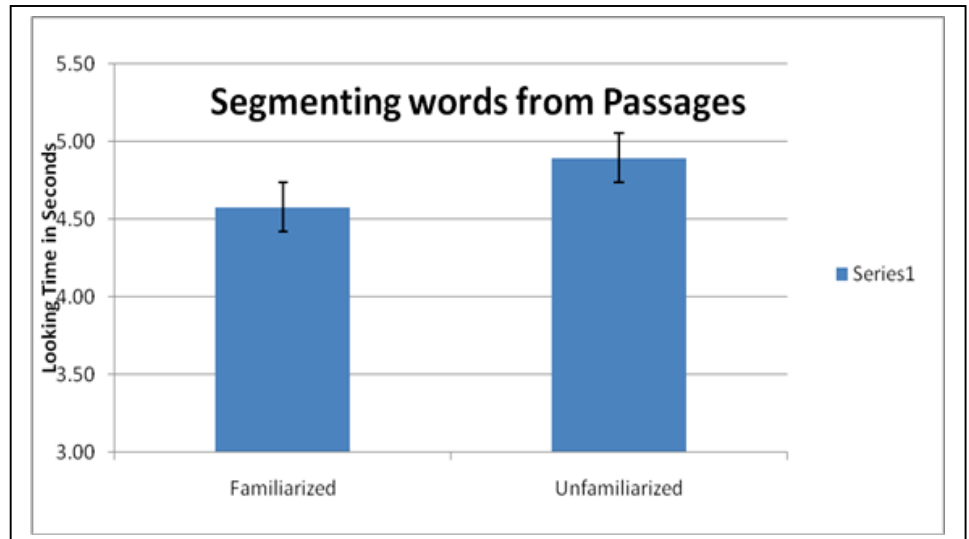
## (iii) 7.5 month Word Segmentation Study: A puzzling result



We have now had all 24 infants complete the 7.5 month study here in York. In 1995, two researchers from the USA found that if you familiarised an infant with words like *cup* and *bike* - or, in a later version, longer words like *kingdom* and *hamlet* - 7.5- but not 6-month old infants showed signs of being able to recognise these words in the middle of a passage. For many years this was considered the earliest age at which infants around the world would be able to segment words from passages. However, studies done since in French (in France) and Dutch with this age group found this not to be the case and that babies were not able to succeed at this task until well past their 8<sup>th</sup> month

(although French-speaking children in Quebec in Canada DID succeed). We were wondering if it was something special about English that caused this early ability in American infants. In our experiment, over several trials, babies in the head-turn booth were exposed to two different words for a total of 20 seconds: either *kingdom* & *hamlet* or *doctor* & *candle*. They then were played sentences containing the words that they had heard and sentences containing the two other words. The idea behind this is that if babies recognise the trained words in the sentences, they should look longer at passages containing these words.

However, the results clearly indicated that the infants had no preference for the trained as opposed to the untrained words. How could it be that American and English babies are so different, when both sets of babies are learning the same language? Rory, our man in the States, thinks it's possible that the answer is cultural and he is considering follow up experiments to compare parent-infant interactions in both countries. (Could it even be a North American phenomenon, if Canadian French-speaking babies can do it but European French-speaking babies can't?) We are also considering running this experiment with older babies in York to see when British babies do start to be able to recognise trained words within sentences.



## 2. Marilyn's Inaugural Lecture



Professor Marilyn Vihman, who is head of the Infant and Toddler Language Studies team, gave her University of York inaugural lecture on Monday April 28<sup>th</sup> 2008. We asked her to write a summary of what she talked about for you.



“A language is a highly complex system or set of systems – for sounds, grammar, meaning etc. – yet children learn to talk ‘like natives’ amazingly rapidly, in a matter of just 3 or 4 years. Some have argued that only by proposing an innate ‘blueprint for language’ (known as ‘Universal Grammar’) can we explain this rapid learning. However, many of us find it hard to accept the idea that evolution could have led to such a radical change from what is found in other mammals. So we must look for other explanations. My own research has focused on the transition from babbling to word use, finding that the forms of first words are very similar to infants’ babbling. However, later words show the emergence of a ‘word production pattern’, different for each child, which reflects generalisation from his or her own first words. We see the first words as the result of ‘production practice’, with the child unconsciously experiencing a match of the sounds he or she is making to what adults are saying. In contrast, the child’s later words are less accurate than the earlier ones but more like one another. They seem to show that the child is discovering a ‘system’. We see this as resulting from an unconscious sensitivity to the patterns in his or her own words. I argue that two biological advantages of humans are enough to explain the earliest stages of speech: (1) The human vocal tract, which permits rapid production of speech sounds which combine and overlap to communicate quickly. No other related animal has such a vocal tract. (2) The human dual memory system, which permits the powerful combination of item learning (picking up the relationship of a word with a meaning, in a given situation) with the ability to find patterns in every aspect of the world that we experience through the senses – including the sound patterns of words. Item learning gives us a vocabulary; pattern learning gives us a linguistic system or grammar.”

### **3. Babbling Babies Update**



Both Marilyn's lecture and the two studies conducted in Bangor show why we think researching babies' babbling is so important. Our Dynamic Interactions (Babbling Babies) study is specifically designed to study the relationships between babble, a baby's ability to perceive words, and producing their own first words. We now have our full quota of 60 babies in this study. All live in the York area and we are following them from the age of 9 months through to 18 months. We visit the babies at home to film them at play with their parents, and they come into the university twice for head-turn experiments, aged 10 and 11 months. The babies are growing up fast, and it's been fascinating for us to watch them develop.

But although our biggest study is now at capacity, we still need babies for other exciting projects! We are running other head turn studies in York for babies aged between 9 and 12 months. So please continue to spread the word and let your friends in York who have young babies know about us and the work that we are doing. We advertise regularly but we've found that the best way to recruit babies is still by word of mouth.



Well, that's all from us for now. Thanks again to everyone who took part in the studies we've given you the results for today.

Until next time, with very best wishes from

Marilyn Vihman, Tamar Keren-Portnoy, Rory DePaolis, Rebecca Dodgson,  
Nicola Armstrong, Amy Bidgood, Philippa Claxton,  
Michelle McGillion and Helena Sears