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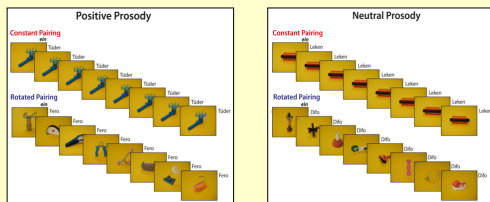
## INTRODUCTION

Previous studies have shown that infants and children prefer to listen to the emotional prosody characteristic of child-directed speech and positive affective (happy) speech rather than adult-directed speech or neutral speech (e.g., Singh et al., 2002). Whether and how children use this preference for emotional prosody to learn a new word is still an open question (e.g., Doan, 2009).

In our study with different age groups, we addressed this question by combining electrophysiological and behavioural data. We investigated how emotional prosody is processed during the word-object mapping phase (encoding) and whether the memory for words is enhanced by positive affective prosody (retrieval).

## METHODS

During the **ERP training phase** 20- and 26-month-olds were repeatedly presented with pairs of 32 novel objects and 32 novel words. 16 of the words were spoken with **positive** affective intonation and the other 16 words were spoken with **neutral** intonation. In each emotion condition 8 of the words were presented in a constant pairing condition in which the word-object mapping could be learned; the other 8 words were presented in a rotated pairing condition in which no mapping could take place. Each stimulus was presented 8 times.



The training phase was followed by a **behavioural test phase** to evaluate the children's word learning. In an object-selection task the children were presented with 4 of the objects simultaneously (2 from the rotated condition, 2 from the constant condition) and had to identify the object named by the experimenter (= target). All the objects in a given row had been presented with the same emotional prosody during the training phase. The query was made in child-directed speech. The target word always appeared as the last word of a carrier sentence.

## LITERATURE

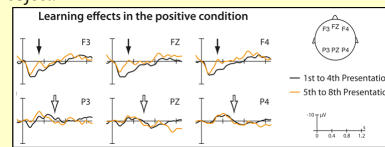
Doan, S.N. (2009). The role of emotion in word learning. *Early Child Development and Care*, 1-14. iFirst Article. DOI: 10.1080/03004430902726479  
 Singh, L., Morgan, J.L. & Best, C.T. (2002). Infants' listening preferences: Baba talk or happy talk. *Infancy* 3(3), 365-394.

## ERP RESULTS

### Emotional learning effects

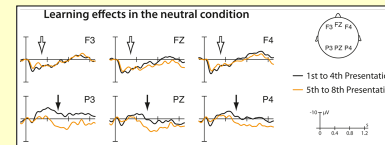
#### Positive condition (constant pairing)

Between 200-400 ms a frontal negativity was elicited by words during the 5th to 8th presentations (**N200-400**). This early negativity might be interpreted as facilitated phonological-lexical processing and it indicates that toddlers expect a certain word form after seeing an object.



#### Neutral condition (constant pairing)

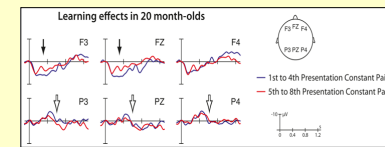
Between 400-800 ms a long lasting parietal negativity decreased during the 5th to 8th presentations (**N400**). This semantic priming effect shows that toddlers expect a certain word meaning which facilitates the semantic processing of that word.



### Age effects

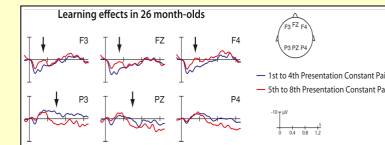
#### 20-month-olds (N=19)

In these children only the N200-400 learning effect was observed.



#### 26-month-olds (N=24)

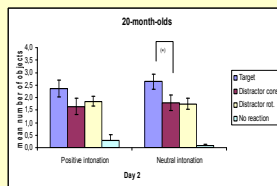
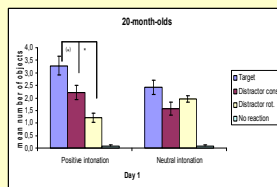
In these children both the N200-400 and the N400 learning effects were observed.



## BEHAVIOURAL RESULTS

### 20-month-olds (N=14)

(8 boys, 6 girls)

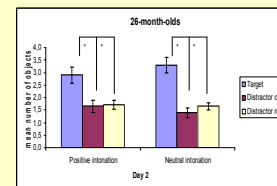
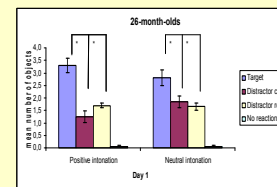


The results of day 1 show that initial word learning is enhanced by positive affective prosody compared to neutral intonation. Only in this condition did the children choose the target significantly more often than any other object.

However, the memory for words does not seem to be enhanced by positive affective prosody. On the contrary, target identification in the positive condition decreases marginally from day 1 to day 2.

### 26-month-olds (N=20)

(7 boys, 13 girls)



These children show a learning effect independent of the emotional prosody used in the training phase. In both conditions they chose the target significantly more often than any other object.

On day 2 the children again chose the target significantly more often than any other object. In this age group the memory for words does not seem to be influenced by the emotional prosody used in the training phase.

## DISCUSSION

At 20 months of age children benefit from positive affective prosody when learning a new word-object mapping. This is reflected both in the ERP and in the behavioural results on day 1. However, their memory for words does not seem to be enhanced by this initial learning process. Whereas the number of correctly identified targets learned with positive prosody stays the same, the correctly identified targets learned with neutral prosody decreases.

At 26 months of age the children in our study show a learning effect independent of the emotional prosody condition in which the words were presented during the training phase. This is reflected both in the ERP and in the behavioural results.

All of these children are well within the scope of the vocabulary spurt (62-215 produced words). This provides evidence that children at this stage in language acquisition no longer rely on (affective) prosodic cues to enlarge their lexicon.

The preliminary results of our study with 20- and 26-month-old German-learning children indicate that while 20-month-olds initially benefit from emotional prosody, 26-month-olds no longer depend on emotional prosody to learn new words.

## ACKNOWLEDGEMENTS

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