Processing speed in word learning and vocabulary during the first year of life

Ervin Ferreira Velasco, Paloma Suárez Brito & Elda Alicia Alva Canto
Universidad Nacional Autónoma de México

Introduction

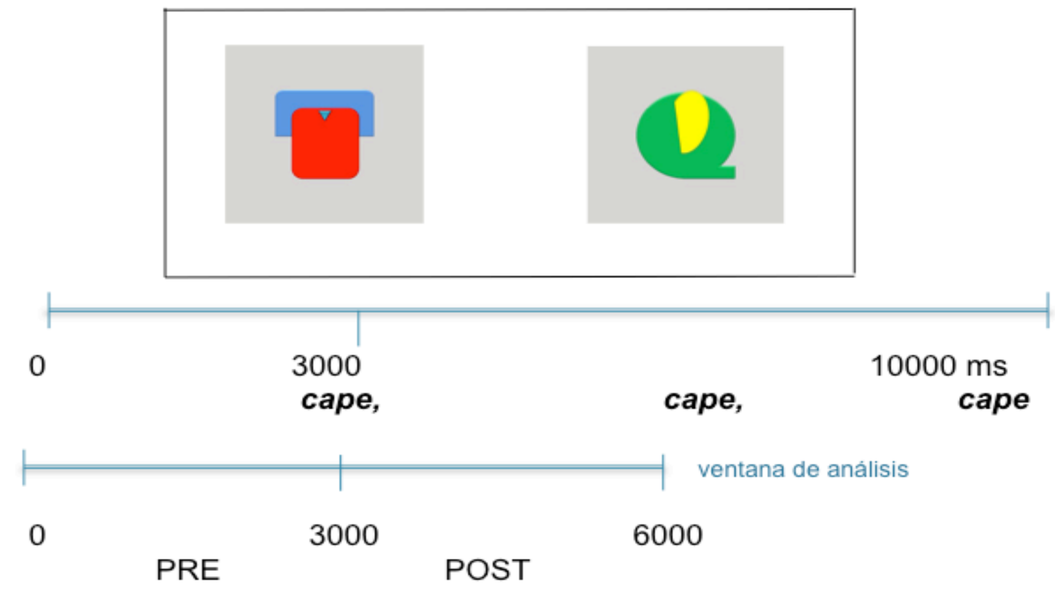
Knowing the rate at which two year old infants perform cognitive tasks such as word recognition, has allowed researchers to predict their efficiency in tasks related to skills such as vocabulary size, reasoning and intelligence, at 8 and 12 years (Bornstein et al, 2006; Marchman, 2008; McCall & Carriger, 1993; Rose, et al, 2012).

The aim of this study was to determine whether processing speed (PS) of infants at 10 months through a task with novel words, could also be an indicator of productive vocabulary during the second year of life.

Method

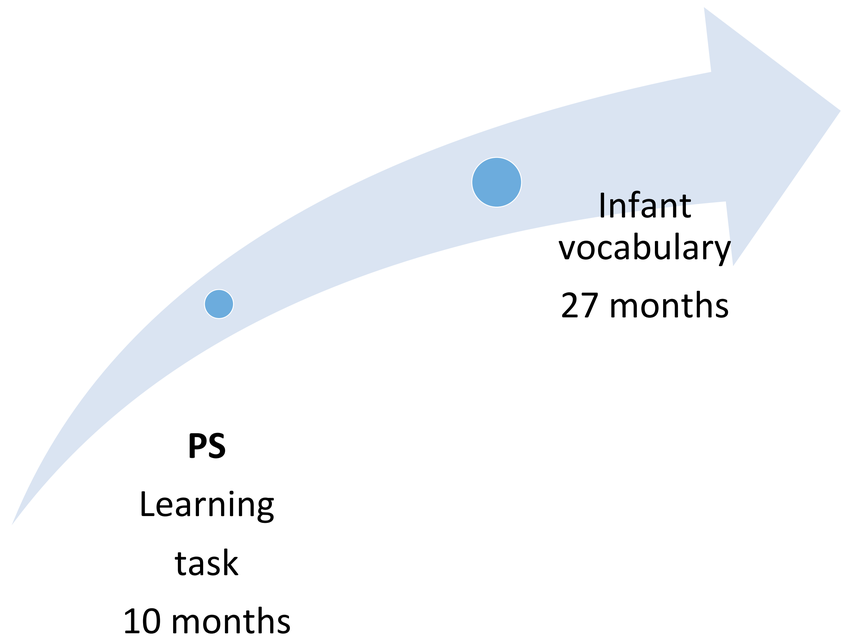
Participants were 13 infants of 10 months of age (X=10.15) at the beginning of the study, whose native language was Spanish and without visual or auditory problems reported by parents. This study consisted of two visits to the laboratory; during the first, an *Intermodal Preferential Looking Paradigm (IPL)* was used (Golinkoff, et al, 1987) for the presentation of a word learning task based on Schafer and Plunkett (1998).

On the second visit (at 23-32 months of age, X=26.15), the *Inventario de Desarrollo Comunicativo* (CDI) Versión II (Jackson Maldonado, 2003) was applied to parents. PS measure was determined by the time that infants took to direct their gaze to the named object once the name was presented and a 367-1800 miliseconds window was used for the data analysis.



Results

A positive significant correlation was found between PS obtained with the word learning task and the *vocabulary* CDI subscale (r= .586, p=.03). On the contrary, no significant correlations were observed between PS and the other CDI subscales (*length* r= .426, p=.146; *phrase complexity* r=.427, p= .146). Subsequent regression analysis showed that processing speed at 10 months of age explains performance on vocabulary of the same infants up to 18 months later (b=.58, t(12)=2.39 p<.05). R^2 =.34.



Conclusion

PS measured in a word learning task before the first year of life, could be used as a predictor of productive vocabulary in the second and third years of life. The fact that infants with slower PS were the ones who presented higher vocabulary scores, is contrary to previous studies in which a negative relationship between PS measures and vocabulary scores has been recorded. However, previous literature has demonstrated this relationship by analyzing PS in word recognition tasks and not in word learning.

The results presented here imply that infants who take longer in processing a novel object associated with a novel word, are the ones who will have more words in their productive vocabulary during the second year of life, as reported by parents. The measure of PS in this study, demonstrated the length of time it takes a child to process non-familiar information in real time. The results obtained, support the study of PS at early ages in tasks that measure cognitive abilities other than word recognition. It suggests taking into account the analysis of individual differences, either PS or vocabulary, to better understand the relationship between these two variables in the first years of life.

References

- Bornstein, et al. (2006). Stability in cognition across early childhood: A developmental cascade. *Psychological Science, 17*(2), 151.
- Golinkoff, R., Hirsch-Pasek, K., Cauley, K. y Gordon. (1987). The eyes have it: Lexical and syntactic comprehension in a new paradigm. *Journal of Child Language, 14*, 23-45.
- Jackson-Maldonado, D., Thal, D., Marchman, V., Newton, T., Fenson, L., y Conboy, B. (2003). El Inventario del Desarrollo de Habilidades Comunicativas: User's guide and technical manual. Baltimore, MD: Brookes Publishing Co.
- Marchman, V. y Fernald, A. (2008). Speed of word recognition and vocabulary knowledge in infancy predict cognitive and language outcomes in later childhood. *Development Science*. 9-16. McCall & Carriger, 1993
- Rose, S., Feldman, J., Jankowski, J. y Van Rossem, R. (2012). Information processing from infancy to 11 years: Continuities and prediction of IQ. *Intelligence, 40(5)*, 445–457.
- Schafer, G. y Plunkett, K. (1998). Rapid word learning by fifteen-month-olds under tightly controlled conditions. *Child Development, 69*(2), 309-320.

LABORATORIO DE INFANTES COGNICIÓN Y LENGUAJE
laboratorio_de_infantes@unam.mx

Investigación realizada gracias al Programa de Apoyo a Proyectos de Investigación e Innovación Tecnológica (PAPIIT) de la UNAM. Proyecto IN 307313- *Desarrollo de lenguaje en infantes mexicanos, una integración de habilidades lingüísticas tempranas.* Agradezco a la DGAPA-UNAM la beca recibida.
Agradezco al proyecto CONACyT 220225 *Análisis longitudinal de habilidades lingüísticas en edades tempranas: Indicadores de desarrollo cognitivo* por el apoyo para la realización de este trabajo.