

Presentation Parameters Affecting Effects in the Visual World Paradigm

Marie-Anne Morand & Constanze Vorwerg
University of Bern, Switzerland

contact: marie-anne.morand@germ.unibe.ch

Introduction

One question addressed by the visual world paradigm is lexical competition during spoken word recognition [1]. Parallel activation is determined by eye movements to concurrent visual objects that are phonological competitors to the target object (i.e., initial segmental overlap). The detection of competition may, however, be limited by finding the right presentation parameters. A methodological experiment tested the dependency on presentation conditions of competitor fixations.

Based on a review of the literature [e.g., 2, 3] and informal exchanges about the issue, we tested the following parameters: picture size, picture location relevant to the grid, preview time, and whether the participants are familiarized with the material before.

Research Questions

- What parameters affect the detection of lexical competition within (Swiss) Standard German?
 - Is the effect size of lexical competition sensitive to picture presentation factors and/or preview time?
 - Is the effect size of lexical competition affected by a familiarization phase prior to the experiment proper?

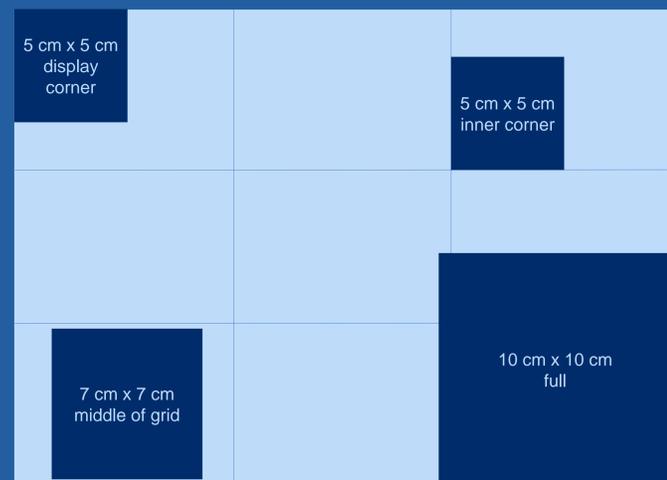
Display Stimulus

- Target (*Knoblauch* 'garlic'), competitor (*Knoten* 'knot'), filler pictures
- ~ 1/3 of the filler pairs with onset overlap (*Weltkarte* 'world map'; *Welle* 'wave')
- Competitor picture used as control and/or target picture in other trials



Design / Manipulation

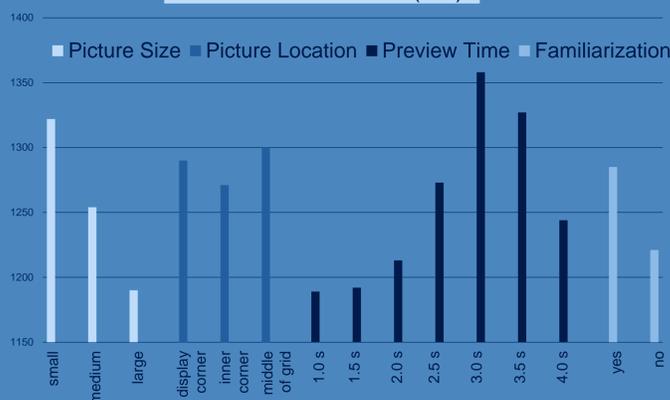
- Twenty participants (7 males; mean age = 28.35 years; 14 with right eye dominance)
- Sixty-seven different target pictures (some used with more than one competitor/control pair)
- **Picture size** (within subjects; 5 cm x 5 cm, 7 cm x 7 cm, 10 cm x 10 cm)
- **Picture location** (within subjects; display corner, inner corner, middle of grid)
- **Preview time** (within subjects; 1.0 s, 1.5 s, 2.0 s, 2.5 s, 3.0 s, 3.5 s, 4.0 s)
- **Familiarization** (between subjects; yes / no)
- Eight blocks of 24 trials each (192 trials in total)



Results

Excluded from the analysis were filler trials (120), errors (4), technical errors (49), trials without fixations during period of interest (153), and outliers (149). The biggest picture size and the picture location 'inner corner' produced a large number of trials without fixation during the period of interest [4] and thus these parameter settings proved unsuitable for the purpose of the experiment.

Mean reaction time (ms)



Effect size (proportion of fixation on competitor minus proportion of fixation on control pictures)

Preview Time	5 cm x 5 cm		7 cm x 7 cm	
	display corner	middle of grid	display corner	middle of grid
1.0 s	.16	.08	-.09	-.09
1.5 s	.05	missing	-.02	.04
2.0 s	.01	.04	.05	.03
2.5 s	.01	-.02	.10	.09
3.0 s	.09	.04	.08	missing
3.5 s	-.12	.05	missing	.03
4.0 s	-.01	.23	.09	.08

Discussion

The results show that the visual world paradigm is very sensitive to small changes. Therefore, studies should indicate all these parameters in their method sections.

The effect of lexical competition is most visible in the presented study with the following parameter settings: **no familiarization phase, small sized pictures that are displayed in the middle of the outer quadrants of a 3 x 3 grid, and 4.0 s of display preview until target word onset.** The chosen area of interest should be larger than the actual image, covering approximately 7 cm x 7 cm on the computer display (for a picture size of 5 cm x 5 cm). The results suggest that sensitivity to presentation parameters needs to be taken into account in the design and interpretation of studies using the visual world paradigm.

References

- [1] Huettig, F., Rommers, J., & Meyer, A. (2011). Using the visual world paradigm to study language processing: A review and critical evaluation. *Acta Psychologica*, 137(2), 151–171.
- [2] Chabal, S., Marian, V. (2015). Speakers of different languages process the visual world differently. *Journal of Experimental Psychology: General*, 144(3), 539–550.
- [3] Mercier, J., Pivneva, I., & Titone, D. (2016). The role of prior language context on bilingual spoken word processing: Evidence from the visual world task. *Bilingualism: Language and Cognition*, 19, 376–399.
- [4] Hitzel, E. (2015). *Effects of Peripheral Vision on Eye Movements: A Virtual Reality Study on Gaze Allocation in Naturalistic Tasks*. Wiesbaden: Springer.

ECEM 2017
19th European Conference
on Eye Movements

FNSNF
FONDS NATIONAL SUISSE
SCHWEIZERISCHER NATIONALFONDS
FONDO NAZIONALE SVIZZERO
SWISS NATIONAL SCIENCE FOUNDATION

CSLS
Center for the Study of Language and Society

u^b
UNIVERSITÄT
BERN