Phonological and Semantic Competition during Spoken Word Recognition in Late Talking Toddlers

Some toddlers fail to meet expressive language milestones in the absence of frank developmental disorders such as autism or sensory differences like hearing loss. These toddlers are referred to as late talkers (LTs), 18-35 month olds, with small spoken vocabularies but average non-linguistic abilities (Paul, 1993). Late talking is a risk factor for developmental language disorder (Singleton, 2018) with approximately 16% of LTs receiving a formal diagnosis of language disorder at school-age (Rescorla, 2002), the majority of whom (68%) retain suboptimal language outcomes at adolescence (Rescorla, 2009). Much of the literature on late talkers has focused on their salient spoken language deficits, with less work directed towards spoken word comprehension.

Spoken words that are phonologically or semantically related compete for recognition in typical adults (Magnuson et al., 2007; Yee & Sevidy, 2006), toddlers (Mani & Plunkett, 2011; Swingley & Aslin, 2007) and infants (Bergelson & Aslin, 2017). Atypical patterns of lexical competition have been reported in school-age children with developmental language disorder (McMurray et al., 2019). Additionally, toddlers with smaller expressive vocabularies process spoken words more slowly compared to peers with larger vocabularies (Fernald & Marchman, 2006). Surprisingly, there is a dearth of literature on lexical competition in toddlers with variable language abilities. The purpose of this study is to explore the effects of phonologically and semantically similar words on spoken word recognition in late talking toddlers.

Late talkers (LTs; 20-35 months; *n*=17; enrollment is ongoing) and two control groups: typically developing toddlers matched on age (TDA; 20-35 months; *n*=25) to LTs and younger, typical toddlers matched on expressive language level (TDL; 15-16 months; *n*=7; enrollment is ongoing) to LTs completed a simplified visual world paradigm task (Tanenhaus, et al., 1995). The word set contained phonological ("cohort") pairs (*bowl-boat*) and semantic pairs (*shoe-hat*). Phonologically and semantically unrelated trials (*bowl-hat*) were included as a baseline. Participants heard an auditory instruction including the target word *(look at the boat!)* while viewing a display containing a target image (boat) and a competitor image (bowl). Eye movements were classified as fixations to targets or competitors for the duration of the trial. Mean proportion of fixations to targets and competitors were calculated for an analysis window from 367 ms - 1,500 ms post-target word onset (Bergelson & Aslin, 2017; Swingley, 2012)

All groups demonstrated phonological and semantic competition as measured by lower mean fixation proportion to targets during competitor trials compared to unrelated trials. However, the late talkers showed greater competition effects (greater proportion of fixations to phonologically and semantically related items; Figure 1) compared to age-matched controls. Competition effects in LTs and TDLs (younger, expressive-language matched peers) were similar.

These preliminary findings suggest that some late talkers exhibit reduced efficiency in spoken word recognition as demonstrated by greater difficulty resolving phonological and semantic competition relative to age-matched peers. Notably, their performance aligns more closely to younger toddlers with similarly sized spoken vocabularies. These findings suggest that lexical processing differences may be part of a broader symptom profile of late talking.
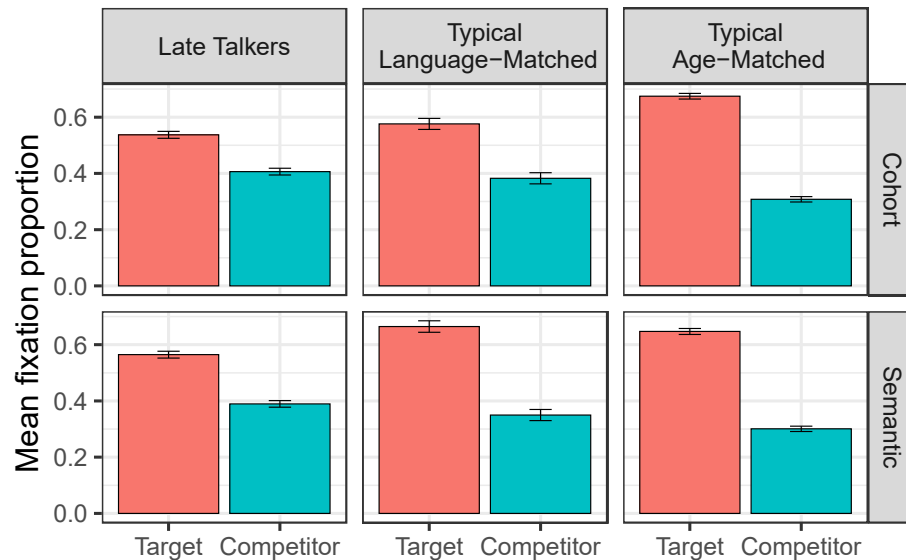
(496 words)

Figure 1.

Figure 1. Fixation proportion to targets (red) and competitors (blue) by group for competitor trials. Higher blue bars in late talkers reflect increased lexical competition compared to age-matched peers. Similar competition effects observed between late talkers and language-matched controls.

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