

Differences in Predictive Ability of Gross and Fine Motor Skills Towards Language Outcomes: A Systematic Review

Background and Aims

- Motor and language skills can be parsed into two categories per area: gross and fine motor, and receptive and expressive language.
- Early motor skills can have cascading effects on language.^{1,2,3}
- However, it is still unclear precisely why gross and fine motor development are related to language outcomes. It may be that each skill type impacts language outcomes differently.
- A systematic review follows strict search criteria to collect, analyze, and synthesize published research about existing findings on a particular topic.⁴
- **Aims:** Systematically review current literature on the impact of gross and fine motor skills on language acquisition.

Methods

- **Abstrackr:** Online screening tool that imports database searches and aids in the article selection process (see **Figure 1**).
- **Database Search:** PsycINFO, PubMed, MEDLINE were searched using the keywords “gross motor”, “fine motor”, “motor performance”, “motor development”, or “psychomotor development” along with “language”, “language development”, or “communication skills”. $N = 6210$ records found (see **Figure 2**).
- **Inclusion Criteria:** Studies that include a typically developing sample within the range of 0 to 5 years of age, and studies that measured both motor and language skills.
- **Exclusion Criteria:** Case studies, studies with only atypical samples, studies where only motor or only language were measured and only suggested motor-language links, and studies where the measured motor skills were exclusively on speech-motor/oro-motor control.
- **Screening:** 3000 articles were screened manually and 3210 were screened utilizing the Abstrackr algorithm based on our previous rejections. (See **Figure 2**).

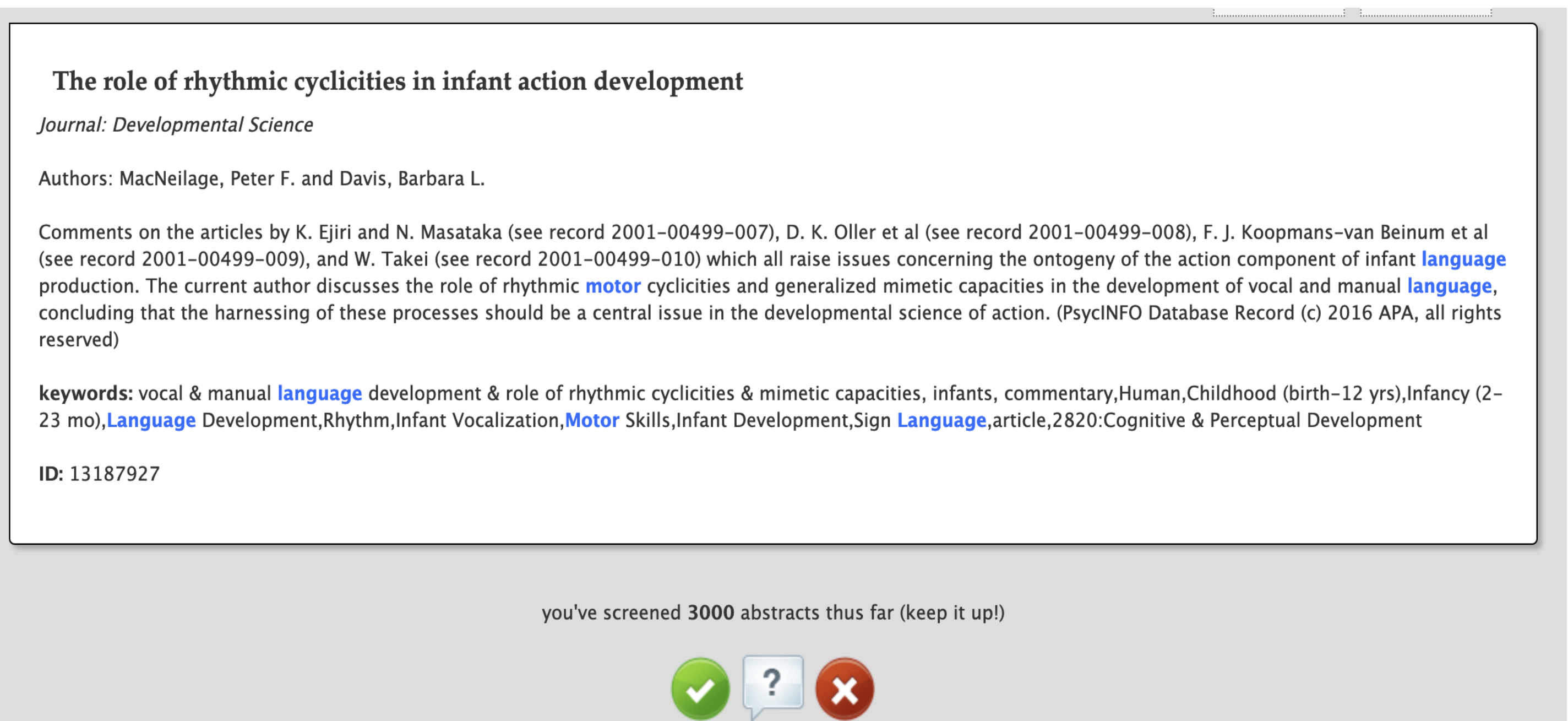


Fig. 1 Example Abstract from Abstrackr

Results and Discussion

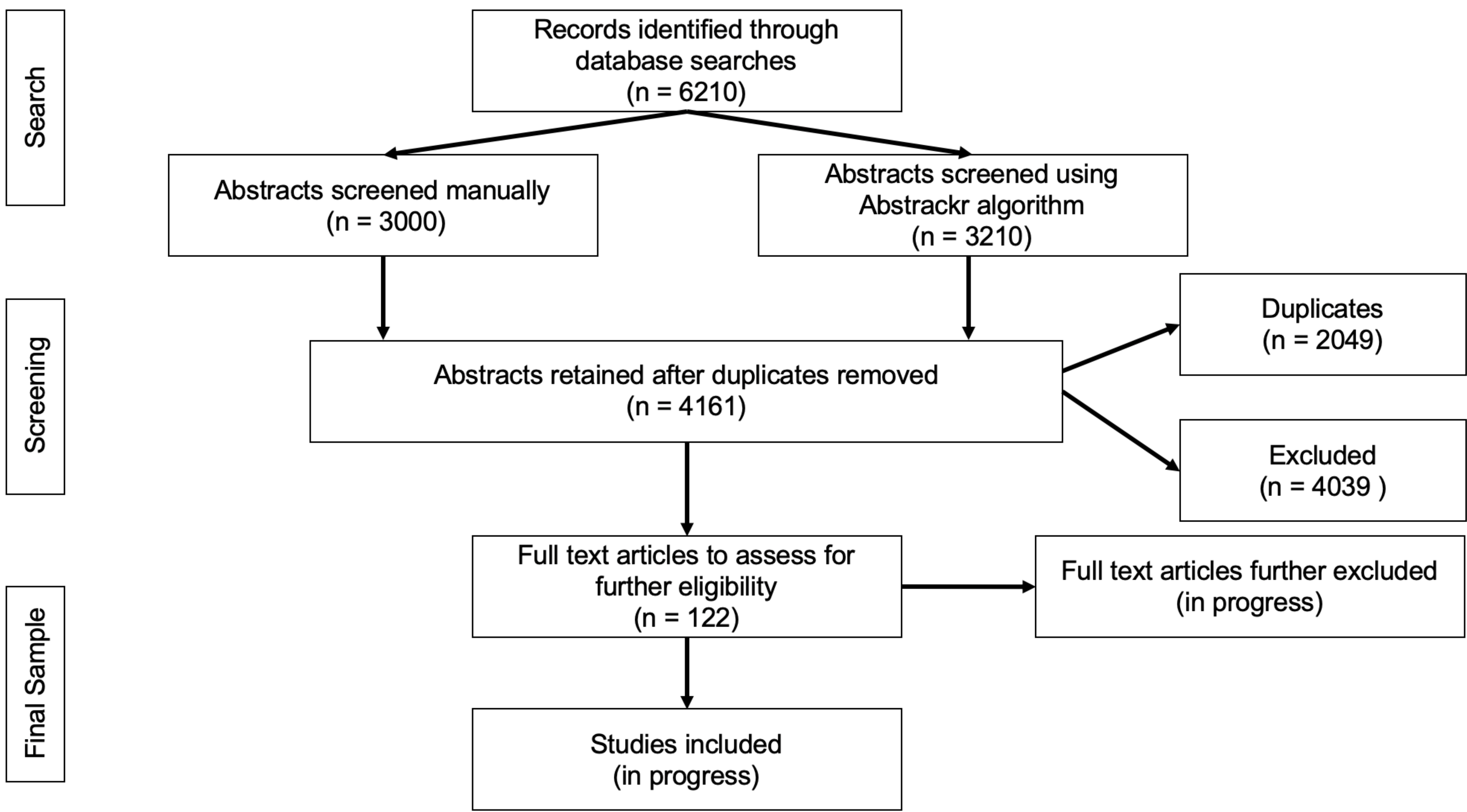


Fig 2. Flow Diagram for Screening Process

Preliminary Themes

- Full text articles screened thus far: 11.
- Thus far, most papers measure one type of skill (gross or fine motor, $N=7$) with fewer papers measuring both skills ($N=4$).
- **Gross motor:** walking skill is predictive of increases in receptive and expressive language right after motor onset and of language growth over time, sitting is predictive of language comprehension and production at single time-points
- **Fine motor:** skills like role differentiated bimanual manipulation or object exploration are predictive of language comprehension and production at single time-points. Research on fine motor and language over time has yet to be reviewed.
- It is important to note that 1 article out of 11 did not report a significant relation between gross or fine motor skill and language outcomes above and beyond other covariates measured (e.g. gestures, oral motor control).

✓ **Future directions:** The systematic review process for full text articles will continue. The current systematic review will allow us to analyze how gross and fine motor may differentially contribute to language development. Understanding how motor factors contribute to language outcomes can help inform future language interventions.

References and Acknowledgements

¹Walle et al., 2014. DOI: 10.1037/a0033238
²Nelson et al. (2017) DOI: 10.1002/dev.21560
³Iverson, J.M. (2010). DOI: 10.1017/S0305000909990432
⁴Liberati et. al (2009). DOI: 10.1136/bmj.b2700

