

Naming Speed and Reading: From Prediction to Instruction

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The effects of naming speed across languages and the nature of its relationship to reading are examined. The double-deficit hypothesis is also considered, in which students with both slow naming speed and low phonological awareness are hypothesised to be most at-risk of reading disability. Finally, the instructional literature regarding attempts to improve naming speed and use of naming speed as a predictor of response to intervention is reviewed.

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Current theoretical interpretations of naming speed and the research literature on its relation to reading are reviewed in this article. The effects of naming speed across languages and the nature of its relationship to reading are examined. The double-deficit hypothesis is also considered. This suggests that students with both slow naming speed and low phonological awareness are most at-risk of reading disability. Finally, the

instructional literature regarding attempts to improve naming speed and use of naming speed as a predictor of response to intervention is reviewed. Naming speed is uniquely associated with a range of reading tasks across orthographies, and early identification would be improved by the inclusion of naming speed measures.

- Reading is complex, and it is not surprising that the factors contributing to reading success or failure are multiple.
- One of these factors is naming speed (or rapid automatised naming [RAN]), which refers to how quickly an individual can pronounce the names of a set of familiar stimuli.
- For example, a student may be shown a page of 50 colour patches presented in a semi-random order and asked to name them as quickly as possible.
- The four types of stimuli that have been used most often are colours, objects, digits, and letters.
- There is considerable evidence that naming speed is related to reading development (even after controlling other key variables) and slow naming speed is a characteristic of poor readers or those with dyslexia.
- Naming speed is one of many cognitive processes underlying skilled word recognition, which is extremely important for reading comprehension.
- The other key processes underlying skilled word reading include phonological awareness, phonetic decoding, orthographic processing, morphological processing, and vocabulary.

What is naming speed?

- This refers to the ability to name quickly a number of highly familiar visual stimuli (such as digits, letters, objects, and colours) presented on one page.
- The stimuli are presented in group form (not one by one) and are highly familiar.

- Speed should really be expressed as the number of correct responses per unit of time; however, many researchers measure only naming time, either ignoring errors or only counting responses when few errors are committed.

Why is naming speed related to reading?

- Naming speed and reading have so many common features that RAN has been characterised as a microcosm of reading. For example, both require eyes to move sequentially across the page, that the stimulus in fixation be encoded and can access its mental representation, and that the associated instructions for naming the stimulus be activated.
- Their differences are that reading does not always involve articulation (but naming speed does) and that reading usually involves the extraction or construction of meaning (but naming speed does not).
- One theory (e.g. Torgesen et al. 1994), hypothesises that naming speed tasks are related to reading through the more general construct of phonological processing because they measure the rate of access to stored phonological information in the long-term memory.
- Another theory (e.g. Bowers, 1995) suggests that naming speed is related to reading and is distinct from phonological awareness because it underlies or leads to orthographic processing. Orthographic processing occurs when groups of letters or entire words are processed as single units rather than as a sequence of grapheme–phoneme correspondences.
- Yet another view (e.g. Kail & Hall, 1994) states that naming speed is just one manifestation of general processing speed.
- These theoretical explanations are not mutually exclusive, and each may provide a part of the explanation for the close relationship between naming

speed and reading.

Naming speed predicts performance on a variety of reading tasks

- Correlations between naming speed and word reading speed (or fluency) are generally higher than with word reading accuracy.
- The similarity of correlations of naming speed with real word and pseudoword challenges the orthographic interpretation of naming speed. By definition, pseudowords are not familiar words that could be recognised as orthographic units and should correlate less with RAN than words if orthographic interpretation applied.
- Timed measures of word or text reading are more strongly correlated with RAN than untimed reading measures (for example, reading accuracy and reading comprehension).
- Naming speed has survived many controls. It has been a significant predictor of reading after controlling statistically for verbal and nonverbal IQ, prior reading ability, attention deficit disorder, socioeconomic status, articulation rate, speed of processing, phonological short-term memory, phonological awareness, morphological awareness, and orthographic processing.
- The effect of naming speed is at least partly distinct from the effects of phonological awareness, orthographic processing, and processing speed, that affects the theoretical basis of RAN.
- The relationship between naming speed and reading may be curvilinear, stronger at lower levels and weaker at higher levels of reading ability.

Naming speed in different languages/orthographies

- Naming speed has been shown to be a strong concurrent and longitudinal predictor of reading ability in a wide array of languages/orthographies.

- It has been argued that naming speed is a stronger predictor of reading in orthographically consistent languages than in orthographically inconsistent languages. This may be because reading in consistent orthographies has been described in terms of reading speed measures (as opposed to reading accuracy measures in inconsistent orthographies). This gives an advantage to naming speed as a speeded measure itself, while consistent orthographies place less stress on phonological awareness and phonetic knowledge leaving more variance to be accounted for by naming speed.

The double-deficit hypothesis

- This hypothesis states that reading deficits are more severe in individuals with weaknesses in both phonological awareness and naming speed than in individuals with deficits in only one of these cognitive processing skills.
- Many empirical studies have verified the hypothesis by demonstrating that students in the double-deficit group experience the most severe reading difficulties followed by the students in either one of the single-deficit groups.
- However, a number of studies have challenged the predictions of the double-deficit hypothesis by challenging a) the independence of RAN and phonological awareness for predicting reading, b) the distinction of double-deficit and single-deficit groups, and c) the stability of group composition. There are many reasons for contradictory findings, for example, related to orthographies and methodologies used.

Can naming speed be improved?

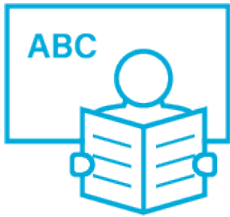
- In one study (Fugate, 1997), 1st grade students in a letter-training (or comparison) group were compared. In

the letter-training condition, each student received individual training and was provided with practice in letter naming (drill tasks in naming individual letters on flashcards). The letter-training group exhibited higher letter naming speed and oral reading fluency immediately post-test relative to the comparison group; however, there were no significant differences at follow-up.

- In another study (Conrad & Levy, 2011), Grade 1 or Grade 2 students were assigned to one of three groups: orthographic pattern training followed by letter naming training, letter naming training followed by orthographic training, or control (mathematics instruction). Letter naming speed improved only when the letter naming training followed the orthographic training; thus, promoting students' orthographic awareness may help them to develop more efficient letter naming skills.
- The positive effect of an early literacy intervention programme on English-speaking kindergarten students' phonemic awareness, letter naming speed, and word level reading skills has been identified (Nelson et al, 2005). The intervention programme comprised 25 lessons and targeted letter knowledge, phonemic awareness skills, understanding sentences, and rapid naming. Thus, a broad-based intervention that addresses emergent literacy skills (including naming speed training) can improve letter naming speed and reading skills in young at-risk students.
- Overall, studies suggest that naming speed is difficult to improve, and that students can improve in reading skills without accompanying improvements in naming speed.
- There is no evidence that improvement in phonological awareness improves naming speed.
- Several studies (e.g. Nelson et al, 2003) have demonstrated that slow naming speed is associated with a

less positive response to reading instruction, independent of other characteristics such as behaviour and phonemic awareness.

- Students with slow naming speed may require more extensive instruction in word reading.
- Action video games can improve processing speed.



Implications

- Naming speed measures help to identify students with (or at risk of developing) serious reading difficulties or disabilities.
- It is important to be able to diagnose the source of the problems so that instruction can be tailored to address the specific difficulties.
- Naming speed is phonological, but it is also related to orthographic processing. In addition, it is related to general processing speed, but continues to predict reading after the latter is controlled. Other factors (such as working memory and other executive functions) may be involved.
- Current research indicates that students with slow naming speed are less likely to respond well to regular classroom and remedial instruction.
- It is not yet clear what form of remedial instruction students with slow naming speed require, although preliminary evidence suggests that multicomponent interventions are successful.