The Link Between Rapid Automatized Naming Tasks and Reading Disabilities

SPED 540
Final Project
Lesson Objectives

• Define Rapid Automatized Naming (RAN)
• Define Rapid Alternating Stimulus (RAS)
• Define Reading Disabled (RD)
Learning Objectives

• Investigate the correlation between Phonologic awareness (PA) and RAN
• Explore the Link Between RAN and reading disabilities
• Discover the link between RAN and reading universally
Rapid Automatized Naming
RAN

“Rapid automatized naming (RAN), defined as the ability to name as fast as possible highly familiar symbols such as digits, letters, colors, and objects…”

• Determines fluency, recognition, and recall
• “…Predictor of reading acquisition.”

(Georgiou, Papadopoulos, Argyro, & Parrila, 2012, p. 1)
The RAN Process

“…visual symbols from a given category, such as letters, numbers, colors, or simple objects, [are] presented in randomized order in a serial array, and individuals are asked to name the items as quickly and accurately as possible.”

(Misra, Katzer, Poldrack, & Wolf, 2004, p. 242)
FIGURE 1. Example of a card used during an object naming scan. Note that during the experiment, objects were presented in white on a black background.

Misra, et al. 2004, p. 246
**RAN Letter Card**

<table>
<thead>
<tr>
<th></th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>a</th>
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</thead>
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<td>d</td>
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</tbody>
</table>

Google Images: Public Domain
RAN Color Card

Form A

Rapid Color Naming

www.hsl.unc.edu/exhibits/.../neurodevelopmentalDisabilities.cfm
RAN Color/Object Card

1. Red circle
2. Green star
3. Blue squares
4. Yellow crosses
5. Red crosses
Rapid Alternating Stimulus

“…Rapid Alternating Stimulus (RAS) alternates from one stimulus set to another. On the first task letters and numbers alternate while on the second task letter, numbers, and colors alternate.”

(Semrud-Clikeman, Guy, & Griffin, 2000, p. 73)
RAS Tasks

“Performance on the RAS tasks predicts later reading difficulties particularly in reading recognition.”

(Semrud-Clikeman, et. al., 2000, p.73)
Rapid Alternating Stimulus

- RAS is also used in studies to confirm results from RAN studies
  
  (Korhonen, 1995)

- “Children with more severe reading deficits uniformly were unable to complete the RAS tasks”

  (Semrud-Clikeman, et al., 2000)
Reading Disabilities

• Reading skills come from brain areas “wired” for other purposes, specifically language, vision, and attention

• “…to be a successful reader, one must rapidly integrate a vast circuit of brain areas with both great accuracy and remarkable speed.”

(Norton, & Wolf, 2012, p. 429)
Reading Disability

• “...an unexpected underachievement characterized as a discrepancy between achievement and intellectual aptitude, despite adequate opportunity to learn and in the absence of sensory difficulties or cultural deprivation.”

(http://education.stateuniversity.com/pages/2356/ReadingDisabilities.html)
Components of a Reading Disability

• Decoding
• Comprehension
• Retention
Predicting Reading Ability

• Kindergarten results in
  – Phonetic Awareness (PA)
  – Naming Speed (NS)
• Strengths and weaknesses depending on the student age

(Kirby, Parrila, & Pfeiffer, 2003)
Kindergarten, PA, and RAN

• Poor Phonetic Awareness (PA) resulted in 2 years of poor achievement
• Rapid naming deficits led to the worst outcomes for comprehension and reading

(Kirby, et. al., 2003)
Double-Deficit Hypothesis

- Phonological and naming speed deficits occurring in the same child
- Early Identification needed to identify at-risk students
- Early intervention to improve outcomes

(Wolf & Bowers, 1999)
Double-Deficit Hypothesis

• Lowest reading ability when compared to students with a single deficit
• RAN is a reliable predictor of reading achievement
• Insight to core deficit in reading

(Wolf, et. al. 1999)
Processing Times and RAN

- RAN’s link to slowed processing times
- Relationship between processing, reaction time, and RAN
- Does not explain the link between RAN and reading

(Powell, Stainthorp, Stuart, Garwood, & Quinlan, 2007)
Genetics and RAN Performance

• 1250 pairs of twins used in study
• 8-18 years of age
• Genetic link to reading disabilities

(Deater-Deckard, DeThorne, Petrill, & Thompson, 2006)
Genetics and RAN Results

• RAN task results linked to genetic factors
• Phonological awareness, reading outcomes, and environment

(Deater-Deckard et. Al., 2006)
Gender

• Males more likely to demonstrate reading difficulties by 2nd grade
• Females more likely to demonstrate reading difficulties by 8th grade
• PA and RAN used as predictors for study

(Adlof, Catts, & Lee, 2010)
Race and RAN

• Similarities between races and RAN performance
• Alphabetic and Non-alphabetic scripts
• Visual importance of the RAN tasks

(Chow, McBride-Chang, & Burgess, 2005)
RAN, Race, and Dyslexia

“...Chinese dyslexic children have phonological deficits like their alphabetic counterparts do.”

“The rapid naming deficit was found to be the most dominant type of cognitive deficit in Chinese dyslexic children.”

(Ho, Chan, Tsang, & Lee, 2002)
RAN, Race, and Dyslexia

• RAN and children of differing nationalities
• Reading speed and dyslexia

(Ho, et. al. 2002)
Application of RAN in Diagnosing RD

• Approximately 12% of population with dyslexia
• Usually not diagnosed until 2nd grade
• The use of RAN in early diagnosis of Dyslexia

(Ahonen, Aro, Eklund, Leppanen, Lyytinen, Poikkeus, Puolakanaho, Tolvanen, & Torrpa, 2007)
RAN, RD, and ADHD

- Differences in RAN results for older students with ADHD
- Picture naming taps attentional resources that digit naming doesn’t
- Not found in reading disabled students

(Savage, & Frederickson, 2005)
RAN and Decoding

• RAN performance is associated with early word reading development
• RAN has been shown to have predictive power in beginning and future reading achievement

(Compton, 2003)
RAN and Reading Fluency

- RAN task stimuli all predictors of reading fluency
  - Colors
  - Objects
  - Letters
  - Digits

(Fine, Pham, & Semrud-Clikeman, 2011)
RAN and Math

• Reading disabilities and math skills
• PA and RAN effects on math achievement
• Need for more studies on the subject

(Wise, Pae, Wolfe, Sevcik, & Morris, 2008)
In Conclusion

• RAN is a reliable predictor of RD
• RAN task results are significant in specific RD such as dyslexia
• RAN results proven to have a genetic component
In Conclusion

• RAN is found to be an important factor in reading regardless the child’s country of origin
• RAN has ties to math disabilities as well as decoding and fluency
• RAN has proven itself to be a necessary tool in reading development
Questions, Comments, or Experiences?


References


References


References


References


Semrud-Clikeman, M., Guy, K., & Griffin, J.D. (2000). Rapid naming deficits in children and adolescents with reading disabilities and attention deficit hyperactivity disorder. *Brain and Language*, 74, 70-83. DOI:10.1006/brln.20002337
References
