Dyslexia Hill Dissertation

Notes

Introduction

* Background
  + Philosophical inquiries into the senses has led to the scientific study of vision.
  + Reading has been an intricate part of social and educational society.
  + As technology allowing the control of stimulus projections evolved (such as the tachistoscope) so did the eye tracking technologies evolve.
  + Early eye-tracking machines (1935) recorded the reflection of light from the cornea of the eye, however, such machines required head stability and were usually uncomfortably equipped with a bite bar and special lights.
  + We are currently in Rayner’s third era of eye research, in which reading is utilized as a means to investigate information processing, attention, and perception; an “era of precise measurements of oculomotor behavior.”
  + However, Radach and Kennedy (2004) have suggested that the development of computer technologies, we have moved into a fourth era; and era involving computational models of the reading process.
* Eye Movements in Reading
  + **Saccade** – quick, jumpy movement (e.g. moving from one word to the next during reading does not occur smoothly but rather is a jump from one word to the next)
  + Because of the eyes highly centered foveal vision, it must move rapidly/constantly to accommodate.
  + Two major issues manifest when trying to successfully navigate a text:
    1. Where to move the eyes next
       - **Optimal Viewing Position (OVP) –** the center, or just left of center, of the word; the position where the saccade is intended to land.
       - **Preferred Landing Positions** – halfway between the middle of the word and the beginning of it.
       - Most saccades are intended to land on the OVP, however, they are guided by textual features and do not always do so.
    2. When the movements should be made
       - The “when” of eye movements is difficult to track and is still under heavy debate.
* The Perceptual Span and Parafoveal Processing
  + To discuss the relevance of the information provided in the following section.
  + Word length and lexical information are processed from the parafovea before making a saccade, allowing the reader to identify the potential ease or difficulty of the upcoming word.
  + With the development of technology came the development of new **gaze-contingent displays**, displays, such as the moving window or the moving mask, which employ changes contingent upon the position of the reader’s eyes.
  + Such gaze-contingent tests show, and allow the study of, the increase in viewing duration measures resulting from the previously masked word requiring a new fixation period.
* A Meta-analytical Examination of the Boundary Paradigm
  + Models on eye movement control differ in what triggers eye movement; some declare the need of a certain amount of lexical processing of a word to be completed before moving on to the next word, while others claim a range of visual processing that extends over the entire perceptual span.
  + Brysbaert et. Al. found that word length, not frequency, accounted for a majority of the variance found in all word skipping studies; concluding that “educated guesses” are what is driving the next progressive saccade.
  + The meta-analysis found two main conditions of parafoveal information acquisition that determine performance: parafoveal word shape and the similarity of the letter within parafoveal mask and target word.
  + To explain the purpose of the meta-analysis and its major result in respect to the current study.
  + It is not advantageous in reading research to discard large amounts of trials.
  + When Rayner is present, the results are better.
  + It can be assumed that length and random letter masks do interfere with lexical processing; further research is also needed to determine in what way word shape violations are affecting continuous reading.
  + To explain the complexity and possibilities of random letter masks.
  + “Shape information (shape of certain words are constituted of ascending, descending, and neutral features) is sometimes described as being processed parafoveally and in a prelexical fashion.”
* The Role of Word Shape in Reading
  + Word shape is a variable in parafoveal processing, however, there is not sufficient research testing the effects of different types of masks in word shape research.
  + To establish counterarguments in the field. (**WHAT IS A DOT?)**
  + Glenmore model is explained.
  + To explain ways of distorting word shape in relative research and two experiments using such ways.
  + It is difficult to generalize word shape distortion results because it is uncommon to come face to face with distorted words in the real world.
  + Word shape, in the sense of shape being made up of patterns of single or multiple letters, does play a role in word recognition.
  + To explain the results of Lete and Pynte (who concluded the last bullet point).
  + Confusability of letters in word masking is a potential confounding variable!
* Letter Similarity in Parafoveal Processing

**EXPERIMENT ONE:**

* Experiment design manipulated both word shape and similarity of the random letter mask
  + Parafoveal preview benefit – reading is facilitated when a valid preview of the upcoming word is available   
    (Veldre, A. & Andrews, S. Psychon Bull Rev (2017) 24: 519. <https://doi.org/10.3758/s13423-016-1120-8>)
* Hypothesis
  + An effect of word shape is expected to be found
    - Rare WS will be most informative -> show less disruption in lexical processing
    - Similar random letter masks = less disruptive than dissimilar
    - Interaction between word shape and mask similarity
* Materials and Design
  + How would one control for “Target words were controlled for lexical frequency (high) and word shape frequency (rare) in order to maximize the chances of discovering an effect of word shape. “ ??
    - Is this done by using the CELEX data base?
  + Within the 5 viewing conditions:
    - How is similarity in number 2 decided?
    - What is the difference between similar-provide and similar-denied?