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Word Recognition Speed in English Literature Students: A Lexical Decision Study

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ABSTRACT

The lexical decision task was used in this study to evaluate the cognitive processes of word processing in English Literature students. This study focuses into the distinctive characteristics of word processing in people who are proficient in English literature, specifically how their literary analytical abilities impact lexical judgment problems. The goal was to investigate how linguistic information gained via literary study affects word processing. The web-based PsyToolkit program was used to record response times and accuracy. Ten English literature students took part in a web-based lexical judgment exercise that required them to differentiate between actual and non-words. The results show that reaction times differ between three stimulus categories: related words, unrelated words, and nonsense words. The findings of this study demonstrate that participants responded faster to related words, suggesting a beneficial impact of semantic connection. However, equal response times for unrelated and nonsense words imply similar categorization problems. These findings provide connection between semantic processing and lexical decision-making, highlighting the significance of semantic priming in word recognition.

Introduction

Comprehending language requires fundamental word processing, and it is critical to understand the cognitive mechanisms that occur to understand human language processing. The lexical decision task has been used in psycholinguistics to study word recognition and semantic processing. Meyer and Schvaneveldt (1971) developed a lexical decision task (LDT) as a popular tool for studying word recognition. Within this framework, participants must determine whether the letter combinations presented on the screen are authentic words or nonwords.

Lexical decision tasks measure both lexical access and formation, making it easier to examine lexical items (Gijsel, Bon, & Bosman, 2004). The process of creating lexical decisions is based on a continual stream of facts about the word-likeness of both non-words and words. Participants complete the task by quickly determining whether letter strings are words or non-words, with the goal of reacting quickly and accurately (Tillman, Osth, Ravenzwaaij, & Heathcote, 2017). Some researchers have argued that participants needed more time to eliminate pseudowords that had phonemic similarities to actual words (Lukatela & Turvey, 1990). In their study of a standard lexical decision problem (Wagenmakers, Ratcliff, Gomez, & McKoon, 2008), the researchers found a strong connection between response time (RT), accuracy rates, and the lexical characteristics of the stimuli. Participants responded more slowly and inaccurately to pseudowords that resembled genuine words than to pseudowords that did not.

However, the unique qualities of word processing in persons with English Literature competence, who have a unique language and literary analytic talents, have yet to be examined. English Literature students examine and analyze literary texts thoroughly, strengthening their skills in critical reading, interpretation, and understanding of complicated linguistic systems. Such education gives them a distinct viewpoint and ability to interpret the various nuances of written language. However, how this specific linguistic information acquired through literary studies affects their word-processing processes is a new field of inquiry. Within the last two decades, the lexical decision task has seen widespread use in the study of visual word recognition. In this task, decisions on the lexical status of stimuli for both non-words and words are made based on a consistent supply of evidence about word-like features. Within the last two decades, the lexical decision task has seen widespread use in the study of visual word recognition. In this task, decisions on the lexical status of stimuli (both non-words and words) are made based on a consistent supply of evidence about word-like features.

Participants do this activity by quickly categorizing letter sequences as words or non-words, striving for quick responses while preserving accuracy (Tillman et al., 2007). Word recognition is a part of word processing that can be studied with lexical decision tasks.

Researchers can assess the speed with which lexical representations are retrieved inside the mental lexicon by examining the time it takes participants to identify actual words correctly. Real words with faster response times indicate successful storage and retrieval from memory. On the other hand, longer response times may indicate a more significant cognitive load for obtaining and recognizing words that are less common or known.

Literature Review

There have been several studies conducted regarding the lexical decision task. The first research, entitled "Can a lexical decision task predict efficiency in the judgment of ambiguous sentences?" by Laurence et al., (2018) involved the participation of 33 university students who completed both the lexical and semantic choice tasks. In the lexical decision test, the data demonstrated differing outcomes across the three-word categories for all measured variables. However, significant differences were detected solely in regressive saccades during the semantic decision task—furthermore, ambiguous statements induced fewer regressions than ones associated with objects. Notably, only the average time taken to process common words emerged as a predictor of reading efficiency, accounting for 24% of the observed variance. The findings of this study contribute to our understanding of the impact of lexical variables on reading efficiency. The findings show that the time spent processing frequent words predicts reading efficiency, meaning that quick recognition and access to general terms improve overall performance. Furthermore, the differences in regressive saccades among word types found in the semantic judgment test suggest that phrase contextual factors influence reading behavior. Using lexical decision tasks in connection with the inverse efficiency score to measure semantic performance has significant implications for future research efforts. While lexical decision tasks have been widely used, it is critical to recognize their inherent limits as well as the inclusion of other variables that may alter the acquired results. Researchers are urged to investigate different techniques that embrace the complex character of reading to acquire a full grasp of the intricate reading process. Furthermore, understanding the lexicon's predictive potential in semantic comprehension sets the door for future research to elucidate the underlying mechanisms that promote reading efficiency. There is a similarity between the first literary and the current study since both involve university students as participants. According to the findings, the time necessary to determine words in common vocabulary is substantially less than for other categories of words. The difference between the first literary work and this

research is that the former aims to identify relevant lexical items in a lexical decision taskand investigate their influence on semantic understanding.

The second research, entitled "Experimental Study on A Two-string Lexical Decision Task: Non-words and Words" by Zhang and Zhang (2019) conducting a comparative analysis of findings from different studies and to propose three hypotheses based on past research. Furthermore, it describes an innovative study project by the study School of Psychology at the Australian National University, which involved a two-string lexical judgment problem. This unique task expands the traditional lexical judgment by measuring participants' response time to non-words and words. According to the study findings, participants displayed faster response times when presented with non-words that phonetically resembled actual words, compared to non-words that shared visual similarities with words. Furthermore, when words had a strong association, individuals responded slower to non-words than actual words, regardless of whether the resemblance was based on visual or hearing qualities. Both the second literary work and the current study emphasize response time and accuracy as critical measures. While the current study focuses on the impact of literary critical skills on word identification among English Literature students, the second literary explores larger implications for English lexical education. The differences in participant characteristics, scope of analysis, and experimental design between the two research provide further insights on lexical decision-making and cognitive processes.

The third research, entitled "Responding to nonwords in the lexical decision task: Insights from the English Lexicon Project" by (Yap et al., 2015) using the English Lexicon Project dataset that was utilized in this study to investigate the effect of lexical factors on nonword decisionmaking performance. Nonword response time and numerous lexical factors were shown to have substantial connections in item-level analysis. Individual differences in vocabulary knowledge were shown by participant-level analysis of nonword replies. The study's findings provide valuable insights into word recognition models and reading ability. However, future research should address noted limitations and investigate other nonword production methods and the significance of semantic features in nonword decision-making. While the current study looks at the impact of literary experience on lexical judgment, this third literary looks at how statistical features of words affect nonword answers. Thus, the two studies provide complimentary insights on lexical processing while addressing distinct parts of the phenomena.

Method

The assessment instrument for the lexical decision task used in this study was a web-based PsyToolkit software. The task consisted of ten trials: eight non-word trials, six unrelated word trials, and six related word trials, all presented in English. Participants were shown two

words on the computer screen during each trial for up to two seconds. Within the time restriction, they had to determine whether the presented words were valid English or non-words. Participants were told to press the letter *l* on the keyboard for non-words and the letter *a* for real words to indicate their response. The PsyToolkit application was set up to record participants' responses and response times for each trial to capture their performance throughout the lexical decision task. This allowed for collecting accurate data on participants' accuracy in differentiating words and non-words and their decision-making speed. Using this standardized task and data recording technology, the study maintained consistency and impartiality in testing participants' verbal decision-making abilities.

For the participants, Ten English literature students were recruited to participate in the study. Participants were randomly chosen to create a representative sample of the population under study. Seven of the ten participants were female, while three were male, representing various opinions and experiences. Although none of the participants spoke English as their first language, they were all fluent and could fully participate in the study. Involvement in the study was entirely voluntary, and all individuals provided written informed consent before involvement. This ensured that all participants were fully aware of the nature of the study and their rights as volunteers.

The study followed ethical standards and procedures to protect the participants' rights and well-being. As the evaluation instrument, a web-based PsyToolkit software was used to collect accurate data in an unbiased and uniform manner. Ten English literature students were recruited as participants and chosen randomly to constitute a representative sample of the target audience. Their participation in the study was entirely voluntary, and each subject supplied written informed consent, assuring their understanding of the nature of the study and their rights as volunteers. No personally identifiable information was collected to ensure the confidentiality and anonymity of the participants' information. The information gathered throughout the study was used solely for research reasons and was not shared with any other parties. In summary, the study was done ethically, protecting the participants' rights and well-being.

The steps implemented in this experiment are as follows:

1. Recruitment and Consent: The study enlisted the participation of ten English literature students. Participants were given a thorough explanation of the study's objective and procedures and information about their rights as volunteers. Before participating, they were allowed to ask questions and offered written informed consent.

2. Instrument selection: The web-based PsyToolkit software was used as the assessment instrument for the lexical decision task. This software provides a uniform platform for delivering stimuli and reliably collecting participants' responses and response times.
3. Task description: Participants were given information about the task and its purposes. They were told that the test required them to decide whether the provided stimuli were exact English words or non-words. They were instructed to respond by pressing the letter *l* on the keyboard for non-words and the letter *a* for true words.
4. Stimuli presentation: The lexical judgment test consisted of ten trials, each displaying two words on the computer screen. The trials were presented in English, including eight non-word trials, six unrelated word trials, and six connected word trials to reduce potential order effects. Thus, the order of trials was randomized.
5. Time Limitation: For each trial, participants had a maximum of two seconds to decide. They were asked to react as correctly and fast as feasible within this time window.
6. Data collection: The PsyToolkit program was set up for each trial to capture participants' responses and response times. This enabled precise testing of participants' ability to distinguish between words and non-words and their decision-making speed. The software gathered the participants' responses and automatically recorded the related response times.
7. Task completion: All ten trials of the lexical decision task were completed by participants. They were then debriefed and given any extra information they required about the study's goal and findings. They were also allowed to ask more questions and share their concerns.

Discussion

The results obtained from the conducted experiment were compiled into a single table and categorized into three sections: related words, unrelated words, and nonsense words, measured in milliseconds (ms). The findings are presented as follows.

Table 1.
The Time Needed by Participants for The Lexical Decision Task

Participants	Related Words (ms)	Unrelated Words (ms)	Nonsense Words (ms)
1.	534	527	654
2.	726	678	965
3.	656	544	715
4.	433	443	398
5.	594	618	777
6.	841	1023	591
7.	599	679	607
8.	599	679	607
9.	521	467	491
10.	420	560	535

The study employed a lexical decision task to examine participants' capacity to differentiate between words and non-words. Response times were recorded for three distinct stimulus types: related words, unrelated words, and nonsense words. A total of ten English literature students, comprising seven females and three males, participated in the study.

The mean response times for each stimulus type were as follows:

a) Related Words: Participants exhibited an average response time of 602 milliseconds (M = 602 ms, SD = 132 ms) when categorizing related words.
b) Unrelated Words: The average response time for categorizing unrelated words was 617 milliseconds (M = 617 ms, SD = 164 ms).
c) Nonsense Words: Participants recorded a mean response time of 659 milliseconds (M = 659 ms, SD = 173 ms) for nonsense words.

The findings of this study provide important insights into the cognitive processes involved in categorizing related, unrelated, and nonsense words in a lexical judgment task. The results demonstrated significant disparities in response times across the three categories of stimuli, demonstrating variances in the ease and difficulty of classification.

The much faster response times observed with related terms demonstrate the beneficial effect of semantic priming. Semantic priming, defined as a phenomena in which the encounter of one word (referred to as the prime) alters the processing of future related words (referred to as the target), is highlighted. Scholars such as Ingram (2007) and McNamara (2005) define semantic priming as a cognitive phenomena defined by increased stimuli processing assisted by past exposure to a semantically related inputs. Participants with a background in English literature are assumed to have an advanced semantic structure, which is defined by the connections of words depending on their semantic meaning. As a result, when presented with a similar term, their pre-existing cognitive framework enables faster recognition and classification processes.

For instance, when a person meets the term "ocean" (a related word), their semantic structure is likely to recall additional semantically similar words like "wave," "beach," or "sailboat." This pre-activation mechanism enhances the following processing of words within the same thematic domain, resulting in faster reaction times for related words compared to unrelated or nonsense words.

First, participants responded faster when categorizing related words over unrelated ones. The average response time for related words was 602 milliseconds, whereas it was 617 milliseconds for unrelated words. This shows that participants found categorizing semantically related word pairs easier and more effective. Previous research has well-documented the facilitative effect of semantic relatedness on lexical judgment tasks (Balota et al., 2004). The activation of pre-existing semantic networks, which aid in retrieving and recognizing connected word pairs, can be attributed to the lower response times for related terms. These findings support that semantic priming is important in word recognition and semantic processing.

In contrast, comparable response times for unrelated and nonsensical words indicate that individuals had similar difficulty categorizing both stimuli. Participants took an average of 617 milliseconds to categorize unrelated word pairs and 659 milliseconds to categorize nonsense words. While general results indicate faster reaction times for related words, the standard deviations (SD) within each category show variation among participant answers. For example, Participant 4 had the shortest reaction time for related terms (433 ms), but Participant 6 had the slowest (841 ms) within the same category. These variances between individuals may be caused by a variety of variables, including past exposure to certain words, general cognitive processing routine, and individual differences in literary competence.

Further research with a larger participant cohort might look at the influence of these characteristics on lexical decision-making performance.

These findings imply that participants encountered similar difficulties differentiating between unrelated word pairs and non-words with no significant connotations. The lack of semantic priming effects for unrelated and nonsensical terms may have contributed to the same response times reported. Because they lacked semantic linkages, the participants were likely to rely more on phonological and orthographic cues in these circumstances.

Conclusion

In conclusion, these results emphasize the importance of semantic relatedness in word processing during the lexical judgment task. The faster response times for related words indicate that participants could use their semantic knowledge and engage relevant conceptual networks to aid in word recognition. The identical response times for unrelated and nonsense words, on the other hand, suggest the lack of semantic facilitation, forcing participants to rely more on phonological and orthographic cues. These findings have significance for understanding English literature students' unique word-processing abilities. While these people have high linguistic and literary analytic abilities, their performance in the lexical decision task does not differ significantly from that of unrelated or nonsense words. More research is required to investigate the effects of literary skills on other components of language processing.

Several recommendations for further research can be made based on these findings. To acquire a more comprehensive understanding of word processing in English literature students, exploring the function of additional factors, such as reading comprehension or text analysis abilities, in conjunction with the lexical decision would be good. Second, a bigger sample size and a control group of participants with no history in English literature would provide more insight into the precise impacts of literary education on word recognition and semantic processing. Finally, experimenting with different experimental paradigms or tasks that better represent the different linguistic skills of English literature students may generate more complex results.

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