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L1 and L2 Reading Behaviors by Proficiency Level:
An English-Portuguese Eye-Tracking Study

Larissa Grahl

A thesis submitted to the faculty of
Brigham Young University
in partial fulfillment of the requirements for the degree of
Master of Arts

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ABSTRACT

L1 and L2 Reading Behaviors by Proficiency Level: An English-Portuguese Eye-Tracking Study

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The process of reading in a second language is an under-studied area of research on second language processing. Researchers have found similarities and differences between first- and second-language reading (Koda, 2007; Artieda, 2017; Walter, 2007), and many believe that readers' successful reading behaviors in their L1 reflect their reading patterns in the L2 (Yamashita, 2007; Cummings, 1991; Sparks & Ganschow, 1995). Others claim that a certain threshold level of L2 language proficiency is necessary before L1 reading ability transfers to L2 reading (Clark, 1978; Cummings, 1991). Eye tracking technology has enabled researchers to investigate early and late reading measures, the former associated with word recognition, and the latter with text integration (Rayner, 1998). However, research has not yet found much evidence for the effect of different proficiency levels in second-language reading behavior. This study builds from the aforementioned reading hypotheses and investigates whether multiple reading proficiency levels impacted reading behaviors of 37 Portuguese learners with native English backgrounds, with the use of eye-tracking technology. Participants read the same amount of passages in Portuguese (their L2), and in English (their L1), each of which ranged from Intermediate to Superior levels, and was followed by comprehension questions. Results indicate that, as expected, participants read faster in their first language and slower in their second language. Unexpectedly, proficiency level did not reveal significant effects on readers' reading behaviors on their first or second languages.

Keywords: language acquisition, eye tracking, second-language reading, reading behavior

ACKNOWLEDGMENTS

I would like to express my most sincere gratitude to every single person that contributed to this thesis. First, I am grateful for my chair, Dr. Cox, for directing, instructing, teaching, and believing in me and my capacities as a non-native English speaker. I am so grateful for all the advice and feedback I received from the other committee members. I am also really thankful for the amount of trust and guidance I received from other professors in the ICAMRA research group, and for the incredible opportunity I had to learn from each of them. I am especially grateful for the endless love and support of my parents, who provide means for me to achieve my highest dreams and plans in my life. They are the light of my life. I am grateful for my father's example of dedication, excellence, and trustworthiness. I am grateful for my mother's example of responsibility, happiness, faith, and hope.

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PREFACE

This thesis was written with the purpose of being submitted as a manuscript to be published in a journal. The following journals were chosen as options for publication: Reading in a Foreign Language, Journal of Eye Movement Research, Studies in Second Language Acquisition, Second Language Research, and International Multilingual Research Journal.

Introduction

Reading ability has been investigated for decades. Many believe that reading ability begins many years before the person actually starts reading printed words; that is, reading ability is influenced by many other aspects that are part of a person's life. For instance, most readers in their native language learn how to speak first in order to be able to identify the spoken reference of a printed word they encounter when reading. Another example of the lengthy process of reading ability development is that readers first learn to read (i.e., learn how to make meaning of printed words in a text) and then use that knowledge to read to learn (i.e., use their reading skills to obtain knowledge about other things). Thus, reading ability is not only influenced by other varied experiences readers have with a language, but also may play an important role in readers' development in languages.

Globalization has increased the need to communicate worldwide, thus urging people everywhere to learn other languages. Consequently, the relationship between reading ability in a first language (L1) as opposed to reading ability in a second language (L2) has received greater attention over the decades. As Altmisdort (2016) declared, "First and second language acquisition has been a common interest in academic studies due to the increasing demand of second language education" (p. 28). The fact that there is a difference between L1 and L2 language acquisition is clear, and many researchers claim that the phenomenon of *transfer* happens in L2 language acquisition, in which some properties and skills of the L1 are transferred into the L2 when it is being learned (Altmisdort, 2016; Cook, 2000; Siu & Ho, 2015). There are various definitions of transfer, all of which explain how and in what ways a first language affects a second language. Leafstedt & Gerber (2005) define *linguistic transfer* as the L2 learners' use of linguistic resources from their L1 when they start to learn the L2 (e.g., grammar, vocabulary,

syntax, pronunciation, etc.). Similarly, *cross-linguistic transfer* refers to the learners' use of L1 to gain skills in the L2, which skills are generally written and oral language (Cardenas-Hagan, Carlson, & Pollard-Durodola, 2007). Therefore, in spite of differences, L1 reading ability can influence L2 reading ability and there can also be some similarities between the two that can help in the transfer of skills from one language to the other.

Two conflicting theories of reading development include two frameworks that are related to this idea of transfer: The *Linguistic Interdependence Hypothesis* and the *Linguistic Threshold Hypothesis*. In investigating the effectiveness of the *Linguistic Interdependence Hypothesis*, Brisbois (1995) found that L1 reading abilities influenced L2 reading comprehension positively. The *Linguistic Interdependence Hypothesis* suggests that skilled L1 readers read well in their L2 (Goodman, 1973; Cummins, 1991). In other words, advanced readers would be equally efficient in reading in their L2 as in their L1. The *Linguistic Threshold Hypothesis*, on the other hand, suggests that a certain threshold level of L2 language proficiency is necessary before L1 reading ability transfers to L2 reading; that is, even skilled L1 readers cannot read well in their L2 until their L2 language proficiency has reached the threshold level (Clark, 1978; Cummings, 1991). Following the theory behind the *Linguistic Threshold Hypothesis*, Bossers (1991) tested 50 Turkish speakers learning Dutch to examine how L1 reading and L2 proficiency affected L2 reading, and found that L1 reading was more effective on high-level learners' L2 reading, while L2 proficiency was more effect on low-level learners' L2 reading.

In spite of data supporting both frameworks, less is known about the reading ability and performance of L2 learners from different proficiency levels and if those proficiency levels affect the way they read in their first and second languages. If a threshold is needed, at what point does it become important? For the purposes of this study, the two aforementioned frameworks will be

utilized to inform our investigation of the influence of different proficiency levels in L1 and L2 reading using eye-tracking technology. Additionally, many studies have been done with English as a Second Language (ESL) learners, but little research has examined readers of English as their first language and Portuguese as a second or foreign language.

Eye-tracking technology is a powerful instrument to investigate language processing during reading since it reflects how readers interact with the written text (Rayner, 2012) and it “can tap into real-time (or online) comprehension processes during the uninterrupted processing of the input” (Roberts & Siyanova-Chanturia, 2013, p. 1). Thus, this method is considered by researchers to be the closest parallel to the natural reading process. Research has found that L2 readers rely on their L1 reading knowledge when reading in the L2 (Young et. al, 2017) and that stronger L1 reading skills are related to stronger L2 outcomes (Sparks, et. al, 2012). However, eye-tracking research has not focused much on the effect of various language proficiency levels of readers when they read in their L1 and L2. Only one recent study has found that different L1 and L2 reader groups are heterogeneous when language proficiency is considered, that is, native English speakers versus speakers of English as a second language. (Kang, 2014). Therefore, the purpose of this study is to investigate the effect of language proficiency on L1 and L2 reading behaviors, as reflected in eye movements.

Review of Literature

Overview of Reading

Over the decades, reading has been defined in various ways, and some researchers have explained this concept in quite simple statements, such as “the process of receiving and interpreting information encoded in language form via the medium of print” (Urquhart & Weir, 1998, p. 22). However, reading entails much more than just receiving and interpreting information, and most researchers have recognized the complexity behind this multicomponent process (Grabe, 2009; Koda, 1996; Bernhardt, 2001). Rayner & Pollatsek (1989) defined reading as the most complex cognitive activity humans engage in on a daily basis, and Grabe (1991) lists a number of adjectives that describe what reading is, such as “rapid, purposeful, interactive, strategic, flexible, and gradually developing”(p. 378). In relation to the latter, many researchers note that most first language (L1) readers learn how to read after having learned to speak their L1 for many years (Koda, 2007), thus arguing that reading builds on oral language competence, which can also be defined as *phonological knowledge*. In other words, reading is influenced by oral language in the sense that when readers read, they connect written representations of words just to the phonological characteristics.

Reading is also comprised of multiple cognitive processes, such as vocabulary knowledge, decoding, morphological knowledge, syntactic processing, metacognition, etc. (Jeon & Yamashita, 2014). Vocabulary knowledge is an important component of reading since it enables reading comprehension (Koda, 2007). Carver (1994) explained the strong relationship between reading comprehension and vocabulary knowledge with the notion of vocabulary threshold, the limit between having and not having sufficient knowledge for comprehension to occur, and argued that the majority of words in a text must be known in order to reach text

comprehension with the number of words ranging from 50 to 9590 (Grabe, 2009). However, before acquiring vocabulary knowledge, one must know how to recognize letters and decode words via orthographic knowledge which allows access to the meaning of words. This process is also influenced by phonological knowledge since once acquired, it “bonds the written forms of specific words to their pronunciation in memory” (Ehri, 1998, p.15). Respecting the structure of words, morphological knowledge is also necessary in reading, and when combined with the grammatical rules that apply to the use of words in a particular language, meaning can be created. In other words, knowing how words are structured and how they are used in sentences will assist the reader to comprehend the written text. The processing of words in a sentence is called syntactic processing and it can be processed in isolation or, as in the case of reading, in the context of the text. Lastly, metacognition refers to a person’s beliefs about how they read or which strategies they use when engaging in the reading process. It contributes to successful reading comprehension and it can also represent a person’s experience that accompanies the cognitive task of reading.

Another subskill of reading that builds up to comprehension is a mental schema (or knowledge base) that readers must have to derive meaning from. Smith (1995) mentions the connection between reading and mental schema stating that reading is “an interactive process in which the reader’s prior knowledge of the world interacts with the message conveyed directly or indirectly by the text” (p.23). So, while early readers use existing schema and learn the literacy skills needed to read, a transition occurs as their ability advances which allows readers to build new schema through the reading process. Another aspect that aids readers to derive meaning from a text is comprehending how sentences and text elements are structured together in the text

and identifying the clues that signal coherence relations between these elements. Thus, text structure is another factor of a more holistic view of reading.

Putting all the definitions of reading together, it is evident that reading is not only a linguistic process (i.e., is characterized by linguistic elements), but also a learning process that takes effort, time and practice. Readers begin the process of *learning to read* for particular purposes since early stages of language development, which in return improves reading ability (Anderson, 2000a). Learning to read begins a long time before readers actually read a text, since it is influenced by factors that are external to the written text. In contrast, *reading to learn*, is often carried out in later stages of language development, since the reader uses his or her reading skills to look for important information in a text. Carver (1992a) affirmed that this process is accomplished at a slower speed and demands a higher level of processing from the reader since he or she tries to remember main ideas of the text read.

In spite of the multiple and varied definitions of reading, one can conclude that it is a process that involves many stages (pre-, during- and post-reading) and all the components pertained to each stage are strongly connected in a cycle in which every characteristic of reading contributes to the importance of another, aiming at a specific goal. Ultimately, as Koda (2007) affirmed, the goal of reading is to “construct text meaning based on visually encoded information” (p.1).

Defining Reading Fluency

Reading Fluency can be defined in various ways, depending on the purpose it is being used for. In grade school (K-6), fluency focuses on oral reading – since these students are still in the early processes of learning how to read – and it is measured by accuracy (how many errors students make when they are speaking) and fluency including how many words per minute they

utter; that is, how many mispronunciations or how long their pauses are. When dealing with adults, their fluency of speech is not entirely relevant; so, it is more likely to focus on their reading speed and how their eyes move when they read (Grabe, 2009). Differently, the English as a Second Language (ESL) definition of reading fluency reflects “the ability to read rapidly with ease and accuracy” (Grabe, 2009). Another definition of reading fluency suggests that it is the combination of speed and accuracy, in which readers must read 250 words per minute, having 80% of comprehension of the text (English Language Center, BYU).

Fluent reading requires rapid and effortless access to word meanings, which requires strong and sufficient linguistic knowledge of the necessary skills for word decoding. Thus, *word decoding* can be defined as the reader’s extraction of phonological and morphological information from a printed word (Ehri, 1998); that is, readers engage in identifying and analyzing word-internal elements when they encounter a word in the text, which reflect their orthographic knowledge. Decoding is a vital component of the first stages of learning to read, since it is when readers access their stored phonological knowledge to identify a word. Sparks (et al. (2008) found that L2 reading comprehension was predicted by L2 word decoding. In addition, Whitford & Titone (2015) found that increased current L2 exposure increased the ease of L2 word processing, and also L2 reading fluency, suggesting a need of L2 readers to interact with the L2 environment. It is also known from eye-tracking research that readers process what they give attention to, that is, what they look at in a text is what they are visually attending to, and as a consequence, intellectually processing.

Text integration, on the other hand, represents the connections between multiple words in a text and how readers understand their relationships in order to comprehend global functions of reading. Sometimes, re-reading will need to happen in order to convey meaning from a word in a

sentence. Therefore, readers must be successful in identifying parts of a word until they comprehend its meaning, and then use their syntactic knowledge to connect it to other words in the text to collect meaning from larger linguistic units, such as phrases and clauses. While word decoding is an early measure of reading because it reflects the first encounter a person has with letters and/or words in a text, text integration is considered a late measure of reading, since it comprises the connections made between these decoded words in the text as a whole unit.

In sum, fluent (and skilled) readers are successful in morphological analysis and decomposition (Chilant & Caramazza, 1995). Since fluent reading is linear and quick, fluent readers move effortlessly from word to word. Ashby & Rayner (2006) affirmed that “once reading becomes an automatic process, it feels effortless [...] Skilled readers are rarely conscious of coordinating the cognitive processes involved in reading.” (p. 52).

With the purpose of understanding second language acquisition, researchers have connected the theory of automaticity in reading directly with fluency. *Automaticity in reading* represents the ability to read and understand words in a text without making a conscious effort to do so. To reach automaticity, a reader must engage in extended practice, which will in turn make some tasks automatic and remove the need to perform tasks with effort due to skill level improvement (Samuels, 1997). In addition, automaticity is also considered “an essential prerequisite for skilled reading” (Segalowitz, 1997, p. 103), indicating that fluent and skilled readers engage in reading processes while other minor unconscious processes also take place in their brains. Thus, skilled readers must engage in effortful and consistent extended practice before becoming automated readers due to the crucial role of extended practice: “extended practice, under particular conditions and circumstances, will increase fluency by developing automaticity.” (Segalowitz, 1997, p. 401). Favreau and Segalowitz (1983) investigated the role of

automaticity in visual word recognition and concluded that automaticity of single word recognition underlies fluency. In sum, it is evident that automaticity in reading facilitates L2 reading performance and must continue being investigated.

Eye-Tracking

In language acquisition research, eye-tracking technology has increased the capacity to analyze real-time eye movements in first and second-language reading. Liversedge & Findlay (2000) explained that eye movements reflect the cognitive processes that happen in the reader's brain; eye-tracking technology, then, reflects these cognitive processes and allows for evaluating early and late stages of natural reading previously explained in this paper (Roberts, 2013).

With the assistance of eye-tracking technology, it is possible to notice that when we read, our eyes do not follow a straightforward path through the line of text, but instead we make jumps from one position to the next (called *saccades*), followed by periods of steadiness on words (called *fixations*), in order to identify and process written information. Saccades are necessary to direct the gaze to a new location, but do not provide new, meaningful visual information. In relation to these eye movement behaviors, Rayner (2009) explained that disfluent readers make longer fixations, shorter saccades, and engage in more re-reading.

With the increase of the use of eye-tracking in reading research, it is possible to make some other conclusions concerning readers' reading patterns in relation to eye-tracking measures. In comparing readers' reading abilities, Whitford & Titone (2015) found that those with poor reading abilities demonstrate slower reading rates, shorter fixation durations and more regressions. Additionally, Conklin & Sanchez (2016) concluded that skilled readers make right to left regressions (i.e., re-read) 10% to 15% of the reading time as opposed to unskilled readers, who spend more of their reading time making regressions. In spite of patterns found among these

groups of readers, one should not ignore the impact of individual differences in reading ability on eye movements. These individual characteristics move readers in the spectrum of these categories they can be grouped in (i.e., strong reading abilities, poor reading abilities, etc). Proficiency level could be considered as one of these individual characteristics that may distinguish readers' reading performance and behaviors.

In the present study, we compare reading behaviors between two Latin alphabetic languages (English and Portuguese), among various proficiency levels. Our goal is to analyze readers' performance in both languages and look for possible differences as their proficiency level increases. Researchers have found that readers of alphabetic languages also demonstrate similar reading behaviors in eye-tracking variables, such as their mean fixation duration on an individual word is 200 to 250 milliseconds, and their mean saccade length (i.e., the time spent moving from one word to the other) is around 7 to 9 letter spaces (Rayner, 1998; 2009). These findings suggest a proximity between alphabetic languages with similar scripts, which in turn suggests that bilingual reading behavior in two alphabetic languages may display less discrepancies than bilingual reading behavior between languages that use different types of scripts.

In the present study, we used three eye-tracking measures to gather and analyze our data: first fixation duration, gaze duration, and total reading time. First fixation duration is an early reading measure and it reflects how long a person takes to look (i.e., fixate) at a particular word for the very first time in a text before they move their eyes to any other point in the text. It normally reflects first letters recognition made on a word and represents decoding, that is, how much time a reader can decode a letter or a word when reading them for the first time. Gaze duration is the sum of all the times a reader looked at a word or an area of interest (AOI) before

exiting to the right or to the left of that word. Gaze duration is also considered an early reading measure since it reflects a person’s understanding of a word in the text and how many times this word is looked at before the reader understands it. These two measures are considered early measures because they take place in the early stages of reading. Lastly, total reading time refers to the sum of all fixations made on a word or AOI during a trial. This is considered a late reading measure since it represents the reader’s connecting of a word to other words in the text. See Figure 1 below for an illustration of eye movements representing these eye-tracking measures (Figure 1 followed the eye-tracking measures model suggested by Conklin and Sánchez, 2018).

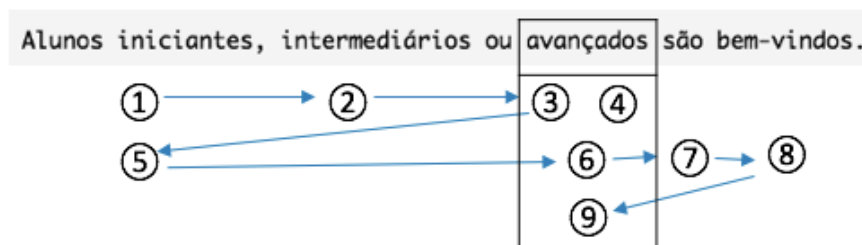


Figure 1. Early and Late Eye-tracking Measures.

We chose the eye-tracking measures just mentioned for this study because they would enable us to analyze whether participants’ proficiency levels changed the way they looked at, identified and understood a word in their L2 as opposed to their L1, which investigation reflects the descriptions of these measures. They allowed us to understand better how differently L2 learners read in their L1 as opposed to their L2.

L1 vs. L2 Reading

The relationship between L1 and L2 reading is explained in various ways in the literature. Yamashita (2002) reviews the most well-known frameworks to explain this relationship: the *Linguistic Interdependence Hypothesis*, another closely related theory, the *Linguistic Coding Differences Hypothesis* and the *Linguistic Threshold Hypothesis*. The *Linguistic Interdependence*

Hypothesis proposes a transfer of L1 reading ability to L2 reading, and as a consequence, skilled L1 readers also read well and use reading strategies as efficiently in the L2 (Goodman, 1973; Cummings, 1979). Sparks and Ganschow (1995) furthered the work in this area by proposing the *Linguistic Coding Differences Hypothesis* and argue that one's skills in the native language strongly influences one's ability to learn a foreign language. Sparks (2012) added that "students who read more in their L1 may exhibit stronger proficiency and achievement in a second language" (p. 497).

On the other hand, the *Linguistic Threshold Hypothesis* advocates that there must be a necessary threshold level of L2 language proficiency before L1 reading ability transfers to L2 reading. Advocates claim that even skilled L1 readers cannot read well in L2 until their L2 language proficiency has reached the threshold level (Clark, 1978, Cummings, 1991). Thus, based on these and other frameworks proposed by researchers, it is possible to affirm that second language learning is an interaction between the existing L1 system and a new linguistic system. While readers' linguistic knowledge of their L1 can support the transfer of reading skills, it can also be a source of interference with their L1 linguistic knowledge can sometimes hinder their learning experience.

Lastly, the *compensatory model* proposed by Bernhardt (2005) also tries to determine the role of L1 literacy and L2 knowledge in L2 reading ability in investigating how some knowledge can assist other knowledge sources. The model considers a similar amount of influence from L1 literacy and L2 language knowledge to L2 language reading, but the other half of influencing factors is not yet clearly established. This exploratory study tries to add to this model by investigating the influence of L1 knowledge into L2 reading. In addition, since research in L2 reading usually assesses in the L1, doesn't assess L1 literacy or reading ability, and needs a

wider variety of languages, this study contributes to this gap in research by assessing L2 reading ability in another language as opposed to the L1.

Reading and Language Proficiency

According to the American Council on the Teaching of Foreign Languages (ACTFL), language proficiency is the ability someone has to perform an action or function in a foreign language, using language in real-world interactions across a vast range of topics and settings. The scale used in the present study was the ACTFL Proficiency Scale with its four main levels (Novice, Intermediate, Advanced and Superior), and it is not tied to any theory of how language is acquired, but rather describes different levels of language ability in which each level subsumes those that are lower (see Figure 1). The purpose of this proficiency scale is to judge language learners' ability to function in a foreign language. Since reading is not a productive skill, reading comprehension is harder to measure and it is mainly based on comprehension and the amount of information readers can capture from a text; that is, reading proficiency describes what readers are able to understand from what they read.

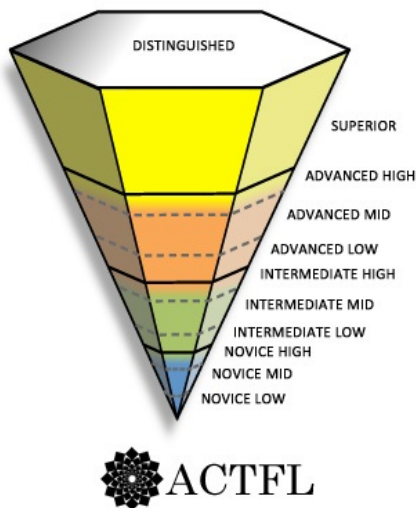


Figure 2. ACTFL Proficiency Guidelines.

L1 reading proficiency is not different from L2 reading proficiency, but the process of acquiring L2 reading proficiency is different due to the various discrepancies between L1 and L2 reading mentioned previously. For instance, one's reading literacy development in two different languages plays an important role in their reading proficiency. It is expected of a person to have a higher reading proficiency in the L1, since it is developed for more years than the reading proficiency in the L2, and it might take some years until equal or higher L2 reading proficiency is achieved. Many researchers have concluded that there are strong connections between L1 and L2 skills. Sparks et. al (2012) found that early success in L1 reading may be important for successful L2 proficiency. Additionally, Sparks and Ganschow (1995) suggested the *Linguistic Coding Differences Hypothesis* (LCDH), which relates one's ability to learn a foreign language to one's skills in the native language. In other words, if students achieve a high level of proficiency in the L2, it is reflecting their strong L1 skills. Sparks (2012) also found L2 proficiency was significantly influenced by L2 print exposure; therefore, the more students read in the L2, the more they will be able to increase their L2 proficiency.

In relation to the construct of transfer, Kang (2014) found that L2 proficiency can build on L1 proficiency; that is, the essential reading competency factors are similar in L1 and L2 reading. Kang argues that after basic language proficiency is reached or the core vocabulary is mastered, one becomes a fluent reader because of metacognitive reading skills. On a similar note, Altmisdort (2016) found that different language learners can demonstrate varied results in the transfer process because of diverse proficiency levels in the L1 and the L2. Therefore, it is important to analyze the influence of L1 reading proficiency in L2 reading proficiency, and to compare how students perform in reading in the two languages.

Characteristics of Portuguese

Originated from Galicia in northwest Spain, Portuguese is the sixth most spoken language in the world and the official language of nine countries (Estivalet & Meunier, 2015). It has been considered as the fastest-growing European language in the world behind English. Portuguese is the second Romance language after Spanish in terms of numbers of speakers and it is part of the Indo-European language family. Each verb tense in the Portuguese language has six different conjugations depending on the pronoun used in the sentence. This feature of the language requires readers to pay closer attention to the ending of verbs when reading in Portuguese.

There are important differences that must be mentioned between Portuguese and English that could contribute to differences in reading behaviors of readers of these languages. It is common to see Portuguese speakers using words and expressions borrowed from English, such as *feedback* or *hot dog*, but the English language has also incorporated some words that come from Portuguese, such as *cobra*. Regarding orthography, Portuguese words are marked by some features that originate from the Latin alphabet, such as the acute accent (e.g., *água*), the circumflex accent (e.g., *francês*), the grave accent (e.g., *àquela*), the tilde (e.g., *mãe*), and the cedilla (e.g., *dança*). These characteristics in orthography reflect the way people speak the language as well, since they are used to denote stress, nasalization and vowel quality. In English, one can say that some words are not spoken the same way they are written, such as *isle* or *autumn*. Thus, while Portuguese has a relatively phonemic orthography, English has a non-phonemic one.

There are also many similarities between these two languages that can assist in reading. Much of the English verb system (i.e., grammar) is familiar to Portuguese speakers since the

same features exist in their native language. One similarity is the use of the present progressive in both languages (e.g., “I am studying” and “Eu estou estudando”). However, a difference in verb tense is the use of the double negative in Portuguese that might confuse English speakers and might lead to the production of confusing statements such as “I don’t know nothing”.

Portuguese word order is more flexible than that of English; however, basic Portuguese sentence structure follows a similar pattern as that of English and should not create much confusion in speakers of both languages trying to express their ideas.

The English and Portuguese punctuation systems are similar enough that a writer or reader of one of these languages would not find many barriers while learning the writing system of the other language. Finally, while the presence of Latin roots enables these two languages to have cognates that facilitate the acquisition of a strong vocabulary, there are also “false cognates” who need also to receive some attention when reading in the other language. Cognates can play a large role in supporting reading comprehension, and Koda (2007) affirmed that these cognates are independent of proficiency, thus leading to the conclusion that even low-level readers can identify cognates and use their vocabulary knowledge to increase reading comprehension.

According to the similarities and differences mentioned above between English and Portuguese, it is noticeable that there are various linguistic differences across these two languages that may influence L2 reading comprehension. In Portuguese, readers pay more attention to the ends of words since there is much more grammatical information in the suffixes. Readers process words from a transparent orthography (i.e., Portuguese) in different ways than those from an opaque orthography (i.e., English). Da Fontoura & Siegel (1995) found that a common attribute of weak readers in typologically diverse languages like Portuguese are

phonological deficits, such as reading difficulties in the L1, which could be the cause of dyslexia. Since L2 readers tend to draw on L1 processing skills when trying to read in the L2, they must be aware of these differences and know how to identify them in order to be successful L2 readers.

Research Questions

The purpose of this study is to investigate what happens to first fixation duration, gaze duration and total reading time when readers of various proficiency levels read in their first and second language. The following research questions were created in relation to this investigation:

1. How differently do L2 learners of various second-language proficiency levels read in their first language as opposed to their second language?
2. Does proficiency affect how they look, identify and understand a word in their second language as opposed to their first language?

Research Design

Participants

The participants for this study were 37 students from Brigham Young University (BYU) who all spoke English as their native language and Portuguese as a foreign language. There were 21 males and 16 females, with ages ranging from 21 to 26 years old ($M=22.4$), who were recruited from 3rd year university Portuguese classes and whose ACTFL proficiency levels ranged from Intermediate-high to Superior (based on scores from the BYU Reading Proficiency Tests — see Materials section for more information). All participants spent between one to two years in Brazil or Portugal participating in a service project for the Church of Jesus Christ of Latter-day Saints and thus learned Portuguese during this period of time. In addition, they had normal or corrected vision without any history of reading problems.

Materials

On the in-person Reading Proficiency step of the experiment, participants took an English Reading Proficiency Test and a Portuguese Reading Proficiency Test, which were developed by the Center for Language Studies at Brigham Young University. These tests were computerized and took about an hour to be completed. Each test had 30 questions that spanned three ACTFL proficiency levels (Intermediate to Superior). In the Portuguese Reading Proficiency Test, the students read the passage in Portuguese side-by-side with the multiple-choice question on the right of the screen in English, having to choose an answer from five options. The English Reading Proficiency Test followed the same pattern, but all written text was in English.

For the eye-tracking portion of the experiment, a total of 34 reading passages (17 in each language) were also developed by the Center for Language Studies (see Appendix). These

reading passages were divided to be as equal as possible for total word count among the three levels (600 words per page). They reflected the same three ACTFL levels with the intermediate passages consisting of advertisements, announcements, signs and notes; the Advanced having tutorial instructions, and the Superior passages with texts of political and economic nature. The Portuguese Superior passage used was extracted from a college-level book on the current state of affairs in Brazil, whereas the English had a high-level op-ed piece on the effect of technology on society. In each language, there were 12 reading passages at the Intermediate level, and the word count for each text at this level ranged from 50 to 70 words. At the Advanced level, there were four reading passages, with word count ranging from 150 to 180 words. There was one Superior-level reading passage and its word count average was 300 to 400 words. Each reading passage was immediately followed by one multiple-choice comprehension question on a separate screen. The question had five possible options, with three distractors, one correct answer, and “I don’t know” as the last option (see Figures 3 through 6 for examples of reading passages and questions in both languages).

Normas de segurança para o uso do toboágua:

Sempre descer com os pés a frente do corpo, após a pessoa anterior haver descido completamente

É proibido brincar na área da piscina do toboágua

É proibido pular ou mergulhar do toboágua

É permitido apenas uma pessoa por vez no toboágua

É proibido o uso de brinquedos no toboágua

Figure 3. Example of a Portuguese intermediate-level reading passage.

Ross School Election Day Bake Sale

Tuesday, March 1st 8 a.m. - 7 p.m.

We need donations!

Baked goods: cakes, pies, breads, cupcakes, pastries, cookies

Individually wrapped please!

Items can be dropped off on Monday all day or call us to arrange a drop off or pick up.

As always, thank you for supporting Ross School!

Rita Stones 555-825-2147

Figure 4. Example of an English intermediate-level reading passage.

This ad is for _____.

dance classes

singing rock

piano teaching

guitar lessons

I don't know.

Figure 5. Example of an English question.

Esse anúncio é para o aluguel de _____.

um sistema de segurança

unidades de depósito

uma vaga de estacionamento

um estúdio de música

Não sei.

Figure 6. Example of a Portuguese question.

Apparatus

To evaluate eye movements for this study, an SR Research Eye-link 1000 Plus eye-tracker with a 35mm lens and a sampling rate of 1000 hz (1000 measurements per second) was used. The participants placed their heads on a chin rest which was 63 inches away from a 21-inch computer screen, where they read passages to complete the reading experiment. Eye calibrations were performed before the beginning of every session and additional calibrations occurred when necessary to ensure the collection of accurate data and successful completion of the task by the participants. Participants also used a computer mouse to select their responses to the questions.

Procedures

The data collection process of the present study was divided in three steps: Pre-Visit Intake, In-Person Proficiency Testing, and In-Person Eye-Tracking Visit. In the Pre-Visit Intake, participants answered an online Qualtrics Screening Survey, which also asked for demographic

information and included a Language Background Questionnaire (Appendix A). Participants also completed an electronic consent form for this data. Additionally, the screening survey asked for information about participants' visual competency to ensure that only participants with normal or assisted vision would participate in the research. After completing the online survey, participants were informed of the next step which consisted of taking the English and Portuguese Reading Proficiency Exams. In the In-Person Proficiency Testing step, participants went to the Humanities Testing Lab on BYU campus to take the online English Reading Proficiency and Portuguese Reading Proficiency Tests. These tests were developed by the Center for Language Studies at BYU. The Reading Proficiency Tests were crucial in determining participants' reading proficiency levels in English and Portuguese. The Portuguese reading items are still being trialed; therefore, the ratings (i.e., scores) assigned to the students were provisional. After taking these tests, participants were contacted by the researcher to schedule the last portion of the experiment in the eye-tracking lab. In the In-Person Eye-tracking Visit, participants were positioned in front of the eye-tracking machine, after which an eye calibration was conducted. Participants were given written and verbal instructions about the steps of the task. The eye-tracking experiment was divided in two languages: English and Portuguese. Since the languages were randomized, there was not a specific order in which participants read the passages within languages. The level of the passages was also randomized, making each session different for every participant. To get familiarized with the progression of the experiment, participants completed two practice questions at the beginning of each language block, and then read 17 English or Portuguese passages in the computer screen. To ensure that participants maintained attention while reading, one multiple-choice comprehension question after each reading passage was presented in a separate screen. This comprehension question did not figure into the analyses,

but was purely to ensure participants were reading to comprehend. Participants could not go back to a previous screen after they switched to the next. Participants were given a short break in between the language blocks and were also re-calibrated.

Part of the methodology used in the eye-tracking portion of this experiment was changed partway through due to a potential issue of switching costs¹ (Grosjean, 1982). In the first version of the program, the reading passages in Portuguese were followed by a multiple-choice comprehension question in English, and not in Portuguese itself. The issue of switching costs researched by Grosjean (1982) was raised and there was a need to translate these questions in the Portuguese block into Portuguese, in order to provide participants with a “true monolingual mode” in each language block. Thus, part of the program was changed in order to analyze if the English questions in the Portuguese block had any effect on the data, which it did not. Seventeen of the participants participated in the first version of the program, and the other 17 participants participated in the second version of the program. In addition to translating the multiple-choice comprehension questions into Portuguese, all instructions, messages, and answer choices were translated into Portuguese. In sum, in the second and final version of the program, participants read instructions, reading passages and answered questions in the respective language of the language block (i.e., in Portuguese when reading Portuguese texts and in English when reading English texts).

Upon completion of all the steps of the experiment, participants received a \$25 BYU account deposit and certificates for the Reading Proficiency Tests reporting their reading proficiency level in Portuguese and English.

¹ The terms switching costs stems from Pietro’s definition of code-switching, which phenomenon occurs when a speaker of two different languages switches between the two when communicating with other people who also understand both languages (1977). Thus, switching costs would reflect the simultaneous activation of the two languages and the possible costs for speakers to make this constant activation in their brains (Grosjean, 1982).

Data Measurements

This study focuses on the differences and similarities in reading in a first and a second language from readers from various proficiency levels. The measurements used in this study were first fixation duration, gaze duration, and total time. The first two measures are considered early measures since they reflect word recognition and lexical access processes. First fixation duration refers to the length of the first time the reader glanced at a word or an area of interest (AOI) in the text. In the present study, each word in the reading passages was a single AOI. Gaze duration (or first pass reading time) is defined as the sum of all fixations made on a word or AOI before the reader exits to the right or to the left (Conklin, Pellicer-Sánchez, & Carrol, 2018). This measure suggests how much time it takes for the reader to relate the word to its meaning (Hyönä & Niemi, 1995). Total reading time is considered a late measure and it represents the sum of all fixations made on a word or AOI during a trial, including the first two early measures mentioned above and any re-reading. It is generally accepted that late measures are a representation of more conscious, controlled and strategic processes (Altarriba, 1996, Staub & Rayner, 2007).

Since it is challenging to measure accuracy with eye-tracking technology because of the lack of exactness of comprehension questions, in this study, fluency will be represented by early and late reading measures collected with eye-tracking technology, which reflect word decoding and text integration, respectively.

This study focused on the aforementioned measures with the purpose of comparing first- and second-language reading behaviors. Readers from different proficiency levels read the same number of passages in their first and second languages. One of the purposes of this study was to investigate if readers took more or less time when looking at a word for the first time in their

second language as compared to their first language, as well as if they spent more time to identify a word, and if they generally spent more time reading a text in a different language.

Data Analysis

In order to address the research questions of this study, a Linear Mixed Effect Model (LME) was run using R 3.6.0. (R Core Team, 2019), using the lme4 package and the lmerTest package to get p values. A LME modelling is a type of linear regression modelling that takes into account fixed and random effects. Three dependent variables were used in this study: (1) first fixation duration, (2) gaze duration, and (3) total time.

Results

The goal of this study was to compare how students from various proficiency levels read texts in their native and second languages (English and Portuguese, respectively). The results provide stronger evidence of the similarities and differences in reading behavior in first and second languages. The research questions were as follows: (1) How differently do L2 learners of various second-language proficiency levels read in their first language as opposed to their second language? (2) Does proficiency affect how they look, identify and understand a word in their second language as opposed to their first language? We not only focused on their reading behaviors at the word level, but also on the text as a whole.

Predictor Variables

The model used in the study was a hierarchical linear regression with three predictor variables: Language (the levels being English or Portuguese), Proficiency level (Intermediate, Advanced and Superior), and Passage level (Intermediate, Advanced and Superior). The baseline conditions set for the analyses of this experiment were the following three categorical values: Portuguese as language, Advanced reader as proficiency level and Advanced passage as passage level. All other predictor variables were compared to these baseline conditions to see whether proficiency level as measured by the external text influenced readers' reading behavior when reading in the L2 as compared to the L1. Tables 1-3 present the interactions among these predictor variables.

See Table 1 below for a summary of the predictor variables used in the analyses reported in this section.

Table 1. *Experiment parameters*

<i>Language</i>	<i>Proficiency Levels</i>	<i>Passage Levels</i>
English	Intermediate Reader	Intermediate Passage
	Advanced Reader	Advanced Passage
Portuguese	Superior Reader	Superior Passage

The reason why Portuguese was chosen as the baseline language for this study was to fulfill the purposes of this study investigate whether there was a difference, as a function of proficiency, in L2 readers. Results indicated that this discrepancy was not present; that is, the interactions between the independent variables were not significant, thus revealing that there was still no difference in the English language.

Eye Movement Measures

In analyzing the data from this experiment, three different models were run for the three different dependent variables. All models had the same structure and were identical. Two early reading measures and one late reading measure were computed for each trial: first fixation duration, gaze duration, and total time. The purpose of choosing these criterion variables was to investigate and compare how much time readers from different proficiency levels identified letters, understood and connected words in the L2 passage as opposed to the L1. We performed all analyses using linear mixed effects models (LME), using the lmerTest and lme4 packages (Bates, Mächler, Bolker, & Walker, 2016) in R 3.6.0. (R Core Team, 2019) with random by-participant and by-word intercepts. Random by-participant slopes for language were also included.

Figures 7-9 represent descriptive statistics for each of the dependent variables and include the mean and the standard error for the time (in milliseconds) readers read the passages in their L1 and L2.

In discussing the results of this study, the significant effects will be described in order of their appearance in the tables.

First Fixation Duration

We tested this dependent variable to investigate how much time participants took to decode letters on the L2 passages as opposed to L1 passages on their first encounter with them in the text. Results indicate that Advanced readers took less time than Intermediate and Superior readers to decode letters and words in the Advanced passages in English, as indicated by the negative estimate on Table 1. Similarly, words in the Intermediate passages were also identified and decoded in shorter periods of time as opposed to Advanced and Superior passages. Additionally, when reading in Portuguese, the L2 reading behaviors of Intermediate and Superior readers did not differ from the L2 reading behaviors of Advanced readers. Furthermore, there were no distinctions between the Advanced and Superior passages from a reading perspective; that is, readers decoded letters and words in these passage levels for the first time in similar ways. On the other hand, words and letters in the Intermediate passages were identified in shorter periods of time, in accordance with the results for Intermediate passages in English listed on Table 1. For first fixation duration, the different proficiency levels did not appear to significantly affect the way readers from various levels decoded words and letters in their L2 as opposed to their L1. The other interactions represented in Table 1 were not significant. For a summary of these results, see Table 1 and Figure 7.

Table 2. *First Fixation Duration for English and Portuguese words*

	<i>b</i>	<i>SE</i>	<i>t</i> -value	<i>p</i> -value
English Language*	-0.10	0.015	-6.37	< .0001
Int. Portuguese Reader	-0.04	0.047	-0.86	0.394
Sup. Portuguese Reader	0.02	0.036	0.79	0.435
Intermediate Passage*	-0.02	0.006	-4.19	< .0001
Superior Passage	0.01	0.009	1.54	0.122
English Language x Int. Portuguese Reader	0.01	0.025	0.65	0.515
English Language x Sup. Portuguese Reader	-0.008	0.019	-0.435	0.666
English Language x Intermediate Passage	0.006	0.010	0.66	0.506
English Language x Superior Passage	-0.009	0.013	-0.72	0.468
Int. Portuguese Reader x Intermediate Passage	0.02	0.009	2.28	0.022
Sup. Portuguese Reader x Intermediate Passage	0.006	0.007	0.91	0.358
Int. Portuguese Reader x Superior Passage	0.01	0.01	1.31	0.189
Sup. Portuguese Reader x Superior Passage	0.005	0.01	0.55	0.576
English Language x Int. Portuguese Reader x Intermediate Passage	0.001	0.014	0.08	0.928
English Language x Sup. Portuguese Reader x Intermediate Passage	0.0008	0.011	0.07	0.942
English Language x Int. Portuguese Reader x Superior Passage	-0.004	0.019	-0.24	0.805
English Language x Sup. Portuguese Reader X Superior Passage	-0.02	0.015	-1.90	0.056

Note. Int. = Intermediate. Sup. = Superior.

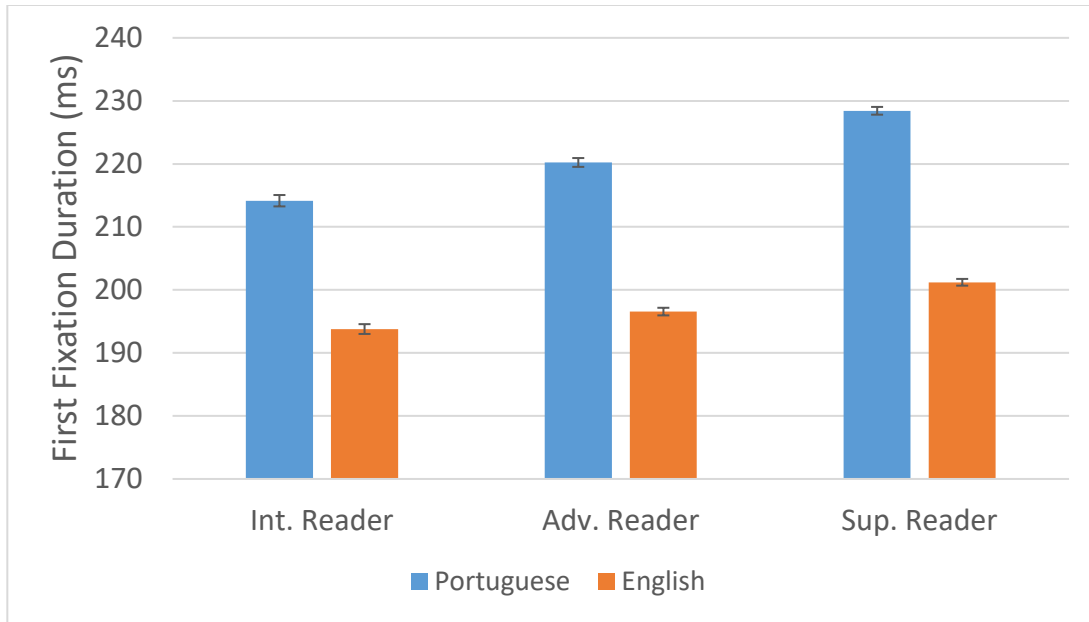


Figure 7. First Fixation Duration in English and Portuguese passages.

Gaze Duration

The test done with this dependent variable measured how much time participants spent identifying words in texts in the L2 passages as opposed to the L1 passages before moving to the next or previous word(s) in the passage. Readers did not spend much time looking at and understanding words when reading in English as evidenced in Table 2. There was still no significant evidence of proficiency effect on gaze duration; that is, readers from different proficiency levels read passages in the L2 in similar ways, despite their different levels of proficiency. Additionally, unlike in the Portuguese passages, in the English Superior passage, readers took longer to comprehend and look at words, as represented by the positive estimates in Table 2.

In the Portuguese part of the experiment, readers spent about the same amount of time to understand words from both the Intermediate and Advanced passages, but they took more time to comprehend them in the Superior passage in this language, as opposed to the other two passage

levels. Thus, it is possible to conclude that, there were no 3-way interactions among the variables for gaze duration, and also no significance in interactions involving proficiency level. See Table 2 and Figure 8 for a summary of these results.

Table 3. *Gaze Duration for English and Portuguese words*

	<i>b</i>	<i>SE</i>	<i>t</i> value	<i>p</i> -value
English Language*	-0.24	0.022	-10.79	<.0001
Int. Portuguese Reader	-0.05	0.059	-0.962	0.343
Sup. Portuguese Reader	0.01	0.045	0.242	0.810
Intermediate Passage	-0.01	0.009	-1.516	0.129
Superior Passage*	0.05	0.012	4.694	<.0001
English Language x Int. Portuguese Reader	0.03	0.035	0.934	0.356
English Language x Sup. Portuguese Reader	0.01	0.027	0.51	0.613
English Language x Intermediate Passage	-0.003	0.014	-0.258	0.796
English Language x Superior Passage*	-0.05	0.018	-2.778	0.005
Int. Portuguese Reader x Intermediate Passage	0.01	0.012	0.896	0.370
Sup. Portuguese Reader x Intermediate Passage	<.0008	0.009	0.096	0.923
Int. Portuguese Reader x Superior Passage	-0.004	0.016	-0.291	0.770
Sup. Portuguese Reader x Superior Passage	-0.01	0.013	-0.809	0.418
English Language x Int. Portuguese Reader x Intermediate Passage	0.007	0.018	0.38	0.704
English Language x Sup. Portuguese Reader x Intermediate Passage	-0.002	0.014	-0.2	0.841
English Language x Int. Portuguese Reader x Superior Passage	0.01	0.024	0.631	0.528
English Language x Sup. Portuguese Reader x Superior Passage	-0.01	0.019	-0.77	0.441

Note. Int. = Intermediate. Sup. = Superior.

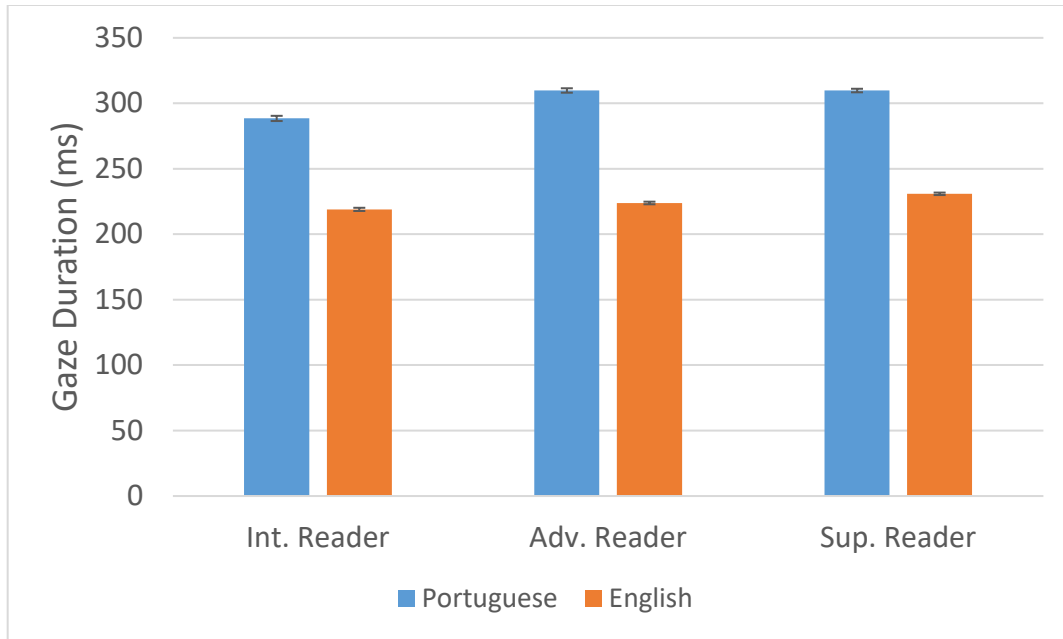


Figure 8. Gaze duration effects between Portuguese and English.

Total Reading Time

We examined the difference between participants' reading behaviors in English and Portuguese. The findings indicate that, in general, participants read English passages faster than Portuguese passages, taking into consideration all fixations made and/or any re-reading of a word or AOI during a trial. It is interesting to note that Portuguese reading proficiency still did not impact participants' reading behaviors at the word level; that is, readers from different Portuguese proficiency levels (i.e., Intermediate and Superior) read and re-read words in corresponding ways. A closer look at the data for total time reveals that readers read Intermediate and Superior passages slower than Advanced passages, but this effect is not present in English, neither for Intermediate readers. At the same time, Advanced Portuguese readers were slower in their reading rates when they read Intermediate and Superior passages, as opposed to when they read Advanced passages. In other words, Advanced Portuguese Readers read passages at their proficiency level faster than in other levels; however, this interaction does not happen when the

same readers in the same proficiency level read in their L1. For a summary of these results, see Table 3 and Figure 9 below.

Table 4. *Total Dwell Time between languages in a trial*

	<i>b</i>	<i>SE</i>	<i>t</i> value	<i>p</i> -value
English Language*	-0.32	0.034	-9.471	<.0001
Int. Portuguese Reader	-0.04	0.074	-0.658	0.515
Sup. Portuguese Reader	0.07	0.057	1.31	0.200
Intermediate Passage*	0.10	0.011	8.993	<.0001
Superior Passage*	0.12	0.015	7.908	<.0001
English Language x Int. Portuguese Reader	0.03	0.054	0.712	0.048
English Language x Sup. Portuguese Reader	0.007	0.042	0.173	0.863
English Language x Intermediate Passage	-0.08	0.017	-4.768	<.0001
English Language x Superior Passage	-0.10	0.022	-4.564	<.0001
Int. Portuguese Reader x Intermediate Passage	-0.03	0.014	-2.402	0.0162
Sup. Portuguese Reader x Intermediate Passage	-0.06	0.011	-5.86	<.0001
Int. Portuguese Reader x Superior Passage	-0.09	0.020	-4.623	<.0001
Sup. Portuguese Reader x Superior Passage	-0.10	0.015	-6.48	<.0001
English Language x Int. Portuguese Reader x Intermediate Passage	0.04	0.022	1.979	0.047
English Language x Sup. Portuguese Reader x Intermediate Passage	0.07	0.017	4.481	<.0001
English Language x Int. Portuguese Reader x Superior Passage	0.10	0.029	3.476	<.0001
English Language x Sup. Portuguese Reader x Superior Passage	0.07	0.023	3.056	0.002

Note. Int. = Intermediate. Sup. = Superior.

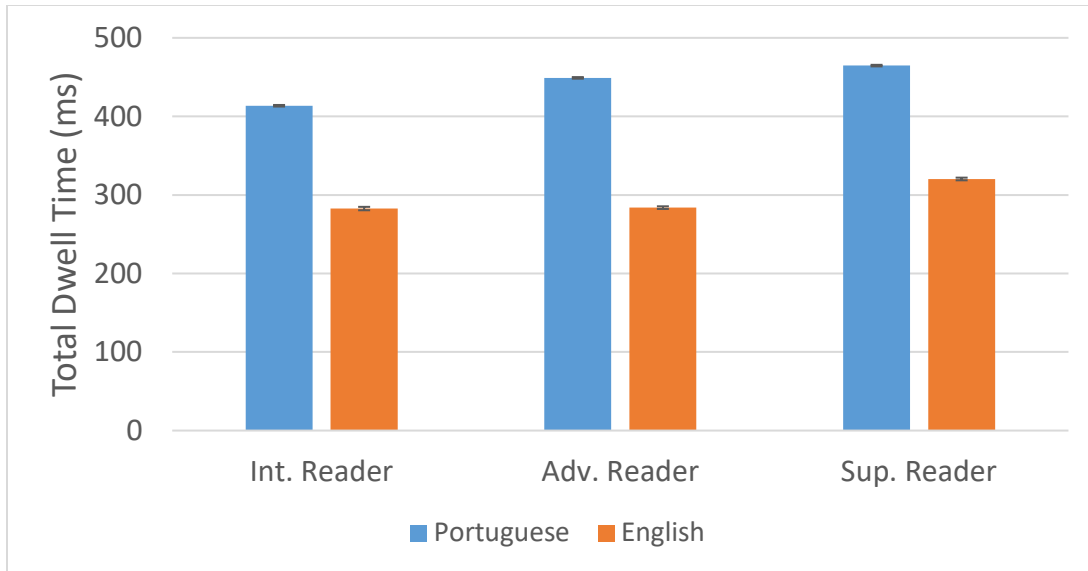


Figure 9. Total reading time results among the two languages and proficiency levels.

In sum, readers showed slower reading rates in Portuguese, however, this is not related to the fact that they have different proficiency levels, since the proficiency level interactions were not significant. Nevertheless, it is expected of readers to read slower in their L2 as opposed to reading in their L1. In the present study, an Intermediate Portuguese reader demonstrated a comparable reading behavior and speed as a Superior Portuguese reader. Therefore, we did not find significant discrepancies between these proficiency groups.

Discussion

Proficiency Level Effect

The results from this study are relevant and can contribute to language acquisition research. They indicated that it was not possible to tell whether there was no difference between the influence of the participants' proficiency levels in their reading of the L2, and the viable explanations for the lack of significance in the proficiency level effect are outlined below.

First, the participants recruited for this study were all above the 300 level, since they were recruited from classes on that level. The ACTFL Proficiency Guidelines are represented in an inverted pyramid model, which indicates that as speakers of a language move up in the Proficiency Scale, their knowledge of and capacity to use the language expands, which in turn can make it harder to make a fine-grained enough distinction between these speakers in general, specially between close-up sublevels (i.e., Intermediate-high and Advanced-low). Of the 37 participants in this study, we had 6 Intermediate-level readers, 13 Advanced-level readers, and 18 Superior-level readers of Portuguese, as determined by the Reading Proficiency Test. Thus, it is possible to conclude that the population was almost too homogeneous with respect to their language and reading proficiency to really see group differences.

The findings for gaze duration cannot only support the Linguistic Threshold Hypothesis, but also the Linguistic Interdependence Hypothesis, which argues that if readers are successful in reading in their L1, their skills and success is reflected in their L2 reading. Since proficiency level effect also did not seem to significantly influence how participants read and understood words in the L2 passages, there is the possibility that they already were skilled readers in their L1, thus positively influencing their L2 reading and disregarding the need to use their

proficiency level to comprehend words in the intermediate and advanced target-language passages.

Second, the Portuguese Reading Proficiency Test is still in the process of being trialed and validated, so the reported reading proficiency levels in Portuguese could not be completely representative of the participants' true levels.

Third, the tests developed and used for the Reading Proficiency Tests and the Eye-tracker could have measured other skills different from those envisioned and planned for this study. Since these tests did not appear to demonstrate a significant effect of proficiency level in L2 reading, we surmise that, possibly, the proficiency groups could not be distinguished by these tests. For instance, they could have measured readers' higher-level problem-solving ability instead of proficiency level effect; that is, if readers were familiar with at least three words on the computer screen, they would be able to find the answer for the question, and thus not need to use their proficiency to read words or answer questions in the L2 at all.

Fourth, in spite of Portuguese and English being two different languages and coming from two distinct language branches (i.e., Latin and Germanic, respectively), there is transparency in their orthographic systems (Cao et. al, 2017). In other words, the alphabet of these two languages are not too far apart and the letters are almost identical, with the exception of some written diacritic markers in Portuguese that are not existent in English. Both English and Portuguese are written and read from left to right and the letters of both alphabets are common to speakers of these languages, with the exception of the “ç” (c cedilla) in Portuguese. Since second language learning can be seen as the interaction between the existing L1 system and a new linguistic system, the characteristics of the L1 can influence how L2 is acquired (Bassetti, 2008). Connor (1996) affirmed that the L2 can be more easily acquired if it is closely related to the L1.

Similarly, Jeong et. al (2007), assert that similar grammatical features shared by the L1 and the L2 may contribute to a similar brain activation between the two languages. In other words, the transparency of orthographic systems influences brain activation during reading. In sum, since the alphabets of the two languages involved in this study are nearly the same, it would be possible to conclude that once readers achieve a certain level of proficiency, they would not need to engage in decoding or text interpretation processes that might have to be transferred from an alphabetic L1 to a non-alphabetic L2 (such as Chinese, for instance) or even to a different alphabet (such as Russian, which uses a Cyrillic alphabet).

All things considered, these are some of the possibilities to explain lack of proficiency level effect expected to be evidenced in this study. There are other important discussions to be made regarding the results for each of the dependent variables and they are presented below.

First Fixation Duration

Results for first fixation duration (i.e., letter and word decoding) indicated that letters and words in the Intermediate passages were identified for the first time in shorter periods of time, as opposed to the Advanced and Superior passages. This could reveal the fact that Intermediate texts are normally easier to read because the words are simpler and more frequent; thus making readers take less time to recognize these words (even in the L2). Research has demonstrated eye movement patterns for first fixation duration as related to language acquisition. Juhasz & Rayner (2006) found that as the difficulty of text increases, readers spend more time looking at words (i.e., they fixate their eyes on words for longer periods of time), the number of fixations increases, and they skip fewer words. Another finding suggests that as proficiency increases, readers' decoding process becomes faster (Favreau & Segalowitz, 1982). Thus, it is expected that readers' varied proficiency levels to be directly related to decoding efficiency, which would

result in less word decoding performed by Superior readers as compared to Intermediate readers, for instance. Accordingly, low-proficiency learners take more time to fixate their eyes on a word as compared to high-proficiency learners (Bernhardt, 1986).

Gaze Duration

In this study, when participants looked at and understood words in the L1 passages, they did not spend much time performing this stage of reading. A potential explanation for this finding would be related to the fact that readers do not need to spend great amounts of time trying to understand words in passages in their L1 since they are more familiarized with them, as opposed to words in their L2 that can sometimes be more cognitive-loaded.

Additionally, there was also no significance evidence of proficiency level effect on gaze duration, readers from different proficiency levels read passages in the L2 in similar ways as opposed to the L1, despite their different levels of proficiency. This finding could possibly support the Linguistic Threshold Hypothesis, suggesting that once students achieve a certain level of proficiency, they would know how to move their eyes and how to read a word; that is, readers would need to reach a certain proficiency level to be able to read comfortably in the languages. The findings for gaze duration cannot only support the Linguistic Threshold Hypothesis, but also the Linguistic Interdependence Hypothesis, which argues that if readers are successful in reading in their L1, their skills and success is reflected in their L2 reading. Since proficiency level effect also did not seem to significantly influence how participants read and understood words in the L2 passages, there is the possibility that they already were skilled readers in their L1, thus positively influencing their L2 reading and disregarding the need to use their proficiency level to comprehend words in the intermediate and advanced target-language passages.

Results for gaze duration also indicated that readers took more time to glance at and comprehend words in the Portuguese Superior passage, which can be explained by the difficulty of words in L2 Superior passages, as well as the fact that they are longer and less frequent. Readers are more likely to re-read these words and spend more time trying to comprehend them. Thus, this finding can be closely related to a word frequency effect, a word length effect, or a word predictability effect.

Total Time

Generally, readers read texts in their L1 faster than in their L2, independently of their proficiency level. Results also demonstrated that Advanced Portuguese readers read Portuguese Advanced passages faster as compared to Intermediate and Superior passages. This could be explained by the fact that since the information is so specific in Intermediate passages, readers made sure to really understand and remember what they read to be able to answer the question following the passage, which in turn demands more time from them to read these passages. In similar ways, since L2 Superior passages are normally more complex, it would be normal of readers to spend more time in retrieving information from these passages to be able to successfully answer the question.

Conclusion

Summary

The purpose of this research was to investigate and compare readers' reading behaviors in their first and second languages and the effect of various proficiency levels in their reading performance in the L2. We used eye-tracking technology to analyze reading patterns from 37 native English speakers who also speak Portuguese as their second or foreign language. Results indicate that proficiency level did not evidence a significant interaction between readers' performance in either of the languages (specially in the L2) and we estimate that this finding can be explained by the closeness of English and Portuguese as alphabetic languages. Findings also indicate that participants read slower in Portuguese and faster in English, which is generally typical of reading in L1 as compared to reading in L2.

Limitations

One possible limitation that could explain the lack of discrepancies in reading behaviors and proficiency levels is that the participants in this study were only recruited from classes that do not have very low-level speakers of Portuguese; in fact, students enrolled in these classes have already spent a significant amount of time in a Portuguese-speaking country and learned and used the language for a good amount of time, most likely in the foreign-language setting. Thus, in spite of participants having shown different proficiency levels in their Reading Proficiency Tests in both languages, they could already be levelled in the same stage of the learning process, which would in turn reveal strong reading skills and similar reading patterns in both languages.

Another possible limitation of this study is that the Reading Test we created for and used in the eye-tracker could have measured another ability (i.e., general reading ability or problem-

solving ability) and not the one we were targeting, that is, proficiency level. If time constraint in the eye-tracking portion of the experiment was not a significant consideration, perhaps the Reading Test could also have more Superior passages (and less Intermediate and Advanced passages), which would increase the time participants would spend mounted to the eye-tracker, but could account for more discrepancies in proficiency level effect. The Reading Test may also be conflating proficiency in test taking strategies with reading ability. The eye-tracker, on the other hand, is a measure of reading behavior.

Furthermore, the fact that the Portuguese Reading Proficiency Test is still being trialed is a limitation of this study because there is a possibility that if the test was completely validated, there could have been for more significant discrepancies in proficiency level effect among participants when reading in the L2. In other words, once the process of validation of the Portuguese Reading Proficiency Test is over, it could reflect a more accurate demonstration of proficiency levels according to ACTFL Proficiency Guidelines.

Future Research

There are some options that could adapt this study to future research. First, future researchers could recruit participants from low- and high-level classes in order to assure a wider variety of data. Second, this research can investigate readers' reading behavior in English as compared to other languages that do not contain a similar structure to English, in order to see whether proficiency level plays a more important role under other conditions. Third, this study could be replicated with ESL students, whose first language is Portuguese and second language is English, to investigate whether proficiency level interacts with their reading patterns. Fourth, an extension of the present study would be to analyze the data generated from how participants read the questions after reading a passage. We found that proficiency levels did not interact with

the way they read the passage, but there is a possibility that it affects how they read the questions. If there really is a problem-solving effect, maybe proficiency could predict how long they take to read and answer the questions, and how accurate they were.

Implications

The present study can contribute to many implications in the field of second language acquisition, reading in a second language, and reading strategies. First, by giving enough meaningful instruction to students on how to recognize and understand words in a second or foreign language, they will eventually become automated readers and will be able to read passages with words of which they know the meaning of and don't need to think about when reading because it is in their subconscious mind. Automaticity in reading is to recognize and process information without consciously thinking about it. According to the reading automaticity theory, instructions to achieve word recognition (i.e., starting with letter recognition, joining letters into phonemes, relating phonemes to sounds, and finally recognizing words in a passage) has to go hand-in-hand with consistent, strong practice to improve and achieve the ultimate goal of automaticity (Samuels, 1997). Thus, in relation to the results of the present study, if readers were given explicit instruction and enough practice, they would generally demonstrate similar reading patterns in L2 reading as opposed to L1 reading after reaching the automaticity level, specially because Portuguese and English are cognate languages (Bernhardt, 2005).

Second, following the Linguistic Interdependence Hypothesis, readers would benefit a lot from knowing how to access the needed L1 reading strategies and knowledge to apply in L2 reading, since skilled readers in the L1 would also be successful in L2 reading (Cummings, 1991). After knowing how to use L1 knowledge to succeed in L2 reading, it is necessary for readers to master processing strategies specific to the L2 if they wish to acquire higher levels of

proficiency in the L2 (Bernhardt, 2005). This idea of using L1 knowledge to increase L2 reading performance is also related to compensatory processing, in which L1 literacy and L2 language knowledge represent about the same amount of influence in L2 reading.

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Appendix A

Eye Tracking Language Background Questionnaire

ICAMRA: Mapping the Path to Advanced Second Language Literacy in Adults Using Eye-Tracking

You are invited to participate in a research project sponsored by the Interdisciplinary Cohort for the Assessment of Multilingual Reading Ability (ICAMRA). This study investigates characteristics that distinguish L1 readers of English who are also L2 readers of Portuguese as a Foreign Language (PFL) and how those characteristics differ across those languages in various proficiency levels through the use of eye-tracking.

Do you agree to take the background survey to see if you are eligible to participate?

Yes

No

Eye Health

The following questions will ask you about your eye health to see if current eye-tracking technology will work with any conditions you might have.

Please select any that apply.

I have glaucoma

I have cataracts

I have eye implants

I have permanently dilated pupils

I need assistive technology (screen reader, magnifier, etc.) to read a computer screen

I need contacts/glasses to read a computer screen

None apply-I can read a computer screen without glasses or contacts.

Sorry, since you have glaucoma, you are not eligible to participate in this study. We thank you for your time.

Sorry, since you have cataracts, you are not eligible to participate in this study. We thank you for your time.

Sorry, since you have eye implants, you are not eligible to participate in this study We thank you for your time.

Sorry, since your pupils are permanently dilated, you are not eligible to participate in this study. We thank you for your time.

Sorry, since you need assistive technology to use the computer and the Web, you are not eligible to participate in this study. We thank you for your time.

Are your glasses/contacts _____?

- single lens for reading
 - single lens for distance
 - no line bifocals
 - lined bifocals/trifocals, layered lens, or regression lens
-

These glasses/contacts will not work with current eye-tracking technology. Do you have a pair of single lens glasses/contacts you can wear for the study?

- Yes
 - No
-

Can you read a computer screen and the Web **without difficulty**?

- Yes
 - No
-

Sorry, since you can't read a computer screen and the Web without difficulty with your contacts and/or eyeglasses on, you are not eligible to participate in this study. We thank you for your time.

How old are you?

▼ 17 or younger (1) ... 60 or older (44)

Sorry, since you are not at least 18 years old, you are not eligible to participate in this study. We thank you for your time.

What is your given name?

What is your surname?

How many years of formal education do you have?

- Less than High School
 - High school graduate
 - Some college
 - 2 year degree
 - 4 year degree
 - Professional degree
 - Doctorate
-

Choose one of the following:

- Male
 - Female
 - Prefer not to answer
-

In which country were you born?

▼ Please select below... (1) ... Other (195)

Please indicate when you'd be available for the next step of the study.

	Mornings (8am-10am)	Midmorning (10am-12pm)	Early afternoon (12pm-2pm)	Late afternoon (2pm-4pm)	Evening (4pm-7pm)
Monday	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tuesday	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wednesday	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Thursday	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Friday	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Saturday	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

How can we contact you to set up an appointment? (Select all that apply)

Email _____

Text Message/Phone Call _____

Other _____

The following questions will ask you about the languages you speak.

What language(s) do you speak or read?

Select all the languages speak natively or non-natively and/or have studied either formally or informally to any degree.

- English
- ASL
- Arabic
- Chinese (Mandarin)
- Chinese (Cantonese)
- Dutch
- Finnish
- French
- German
- Haitian Creole
- Hindi
- Italian
- Japanese
- Korean
- Norwegian
- Persian
- Polish

- Portuguese
- Russian
- Spanish
- Swedish
- Tagalog
- Urdu
- Vietnamese
- Other: _____

Please rank the languages you know **in order of dominance (1= Most Dominant/Strongest):**
Drag and Drop.

	Dominance
_____ English	
_____ ASL	
_____ Arabic	
_____ Chinese (Mandarin)	
_____ Chinese (Cantonese)	
_____ Dutch	
_____ Finnish	
_____ French	
_____ German	
_____ Haitian Creole	
_____ Hindi	
_____ Italian	
_____ Japanese	

- _____ Korean
 - _____ Norwegian
 - _____ Persian
 - _____ Polish
 - _____ Portuguese
 - _____ Russian
 - _____ Spanish
 - _____ Swedish
 - _____ Tagalog
 - _____ Urdu
 - _____ Vietnamese
 - _____ Other:
-

How old were you when you started to learn the language?

English	▼ 0 (1) ... 25 or older
ASL	▼ 0 (1) ... 25 or older
Arabic	▼ 0 (1) ... 25 or older
Chinese (Mandarin)	▼ 0 (1) ... 25 or older
Chinese (Cantonese)	▼ 0 (1) ... 25 or older
Dutch	▼ 0 (1) ... 25 or older
Finnish	▼ 0 (1) ... 25 or older
French	▼ 0 (1) ... 25 or older
German	▼ 0 (1) ... 25 or older
Haitian Creole	▼ 0 (1) ... 25 or older
Hindi	▼ 0 (1) ... 25 or older
Italian	▼ 0 (1) ... 25 or older
Japanese	▼ 0 (1) ... 25 or older
Korean	▼ 0 (1) ... 25 or older
Norwegian	▼ 0 (1) ... 25 or older
Persian	▼ 0 (1) ... 25 or older
Polish	▼ 0 (1) ... 25 or older
Portuguese	▼ 0 (1) ... 25 or older
Russian	▼ 0 (1) ... 25 or older
Spanish	▼ 0 (1) ... 25 or older
Swedish	▼ 0 (1) ... 25 or older
Tagalog	▼ 0 (1) ... 25 or older
Urdu	▼ 0 (1) ... 25 or older
Vietnamese	▼ 0 (1) ... 25 or older
Other:	▼ 0 (1) ... 25 or older

What do you consider to be your native language(s)?

- English
- ASL
- Arabic
- Chinese (Mandarin)
- Chinese (Cantonese)
- Dutch
- Finnish
- French
- German
- Haitian Creole
- Hindi
- Italian
- Japanese
- Korean
- Norwegian
- Persian
- Polish
- Portuguese

- Russian
- Spanish
- Swedish
- Tagalog
- Urdu
- Vietnamese
- Other:** _____

The following question(s) will gather more information about how you learned _____.

How did you learn _____? Check all that apply.

- Informally (native language, from family, living abroad, friends, independent study, etc.)
- School
- Mission
- Study Abroad
- Other, please specify how and for how long:

Informal Language Learning

Please list the years and months you spent in each INFORMAL _____ language environment.

	Years

A family/home in which _____ is spoken.	▼ 0 to 6 months (1 ... 11 or more)
A country where _____ is spoken.	▼ 0 to 6 months (1 ... 11 or more)
A work environment in which _____ is spoken.	▼ 0 to 6 months (1 ... 11 or more)
With friends who spoke _____	▼ 0 to 6 months (1 ... 11 or more)
Through the independent study of _____	▼ 0 to 6 months (1 ... 11 or more)
Other, specify:	▼ 0 to 6 months (1 ... 11 or more)

Please provide any other comments on how you learned _____ if the previous questions did not cover it:

School (formal education, language classes, etc.):

Please list the years and months you spent in each _____ language learning environment.

	Years	Months

Elementary school	▼ 0 (1 ... 6 or more)	▼ 0 (1 ... 12)
Middle School/Junior High	▼ 0 (1 ... 6 or more)	▼ 0 (1 ... 12)
Highschool	▼ 0 (1 ... 6 or more)	▼ 0 (1 ... 12)
Undergraduate	▼ 0 (1 ... 6 or more)	▼ 0 (1 ... 12)
Graduate	▼ 0 (1 ... 6 or more)	▼ 0 (1 ... 12)
Postgraduate	▼ 0 (1 ... 6 or more)	▼ 0 (1 ... 12)
Other, specify:	▼ 0 (1 ... 6 or more)	▼ 0 (1 ... 12)
Other, specify:	▼ 0 (1 ... 6 or more)	▼ 0 (1 ... 12)

Please provide comments on your study of _____ in schools (if any).

Mission information:

Where did you serve your _____ -speaking mission?

How many months did you speak _____ on your mission?

0 2 5 7 10 12 14 17 19 22 24

Months ()	
-----------	--

Please provide comments on your mission in _____ (if any).

Study abroad

Which country did you go to study _____?

How long did you stay in the country where you studied _____

- Term (Spring/Summer)
 - Semester (Fall/Winter)
 - Other _____
-

Please provide comments on your study abroad in _____ (if any).

What is your level of speaking proficiency in _____

10 — I can interact and negotiate to resolve abstract and complex matters on a wide variety of topics in a variety of situations with NO PATTERN of linguistic errors.

9

8 — I can hold complex conversations and tell detailed stories in the past, present and future time frames accurately with both my pronunciation and grammar.

7

6

5 — I can hold simple conversations through asking and answering questions related to my daily life.

4

3

2 — I can produce memorized words & phrases and formulaic utterances about personal topics.

1 — Very Little

What is your level of reading proficiency in _____?

- 10 — I can follow the flow of ideas and infer meaning from unfamiliar, abstract topics in complex language in informational texts.
- 9
- 8 — I can identify the underlying message and MOST supporting details across major time frames in texts.
- 7
- 6
- 5 — I can understand the main idea and key information short straightforward texts.
- 4
- 3
- 2 — I can recognize letters and understand lists of words & phrases by general topic.
- 1 — Very Little

Appendix B

Portuguese Reading Passages

1) Normas de segurança para o uso do toboágua:

Sempre descer com os pés a frente do corpo, após a pessoa anterior haver descido completamente.

É proibido brincar na área da piscina do toboágua.

É proibido pular ou mergulhar do toboágua.

É permitido apenas uma pessoa por vez no toboágua.

É proibido o uso de brinquedos no toboágua.

2) Atenção!

Precisa-se de voluntários!

Precisamos de 4 voluntários para auxiliar nossa equipe na Mesa de Informações na Feira e no Centro de Exposição de Cães.

Turnos disponíveis: Sábado, 19 de Março, das 8 horas às 12 horas e Domingo, 20 de Março, das 12 horas às 16 horas.

A idade mínima dos voluntários deve ser 18 anos. \nOs voluntários precisarão pagar pelo estacionamento.

3) Perigo!

VENENO

Área de Risco de Chumbo

É proibida a entrada na área de trabalho sem autorização.

É obrigatório o uso de respirador e vestuário de proteção.

É proibido comer, beber ou fumar nessa área.

4) Prezada Srta. Stone,

Essa é uma mensagem de confirmação da sua reunião de Assessoria de Marketing com a nossa gerente Barbara Stockett no dia 14 de Abril, às 10 horas na nossa sede.

Se você não puder comparecer à essa reunião, por favor nos avise para a nossa reorganização.

Atenciosamente,
Barbara Stockett
Consultoria de Agentes Sociais

- 5) Uma Sala de Ensaio Ideal! Sala de ensaio musical grande com aberturas mensais para uso, bastante espaço para depósito e uma energia excelente e criativa. A sala deve ser vista para ser totalmente valorizada.

Vários horários ainda estão disponíveis (envie um e-mail para mais informações sobre preços e disponibilidade).

Acesso 24 horas por dia + 2 elevadores + Banheiro + Estacionamento + 2 travas de segurança + Sistema de Segurança por vídeo.

Localizada perto das linhas de metrô Times Square, Port Authority e Penn Station.

Entre em contato para mais informações ou para uma visita ao estúdio.

- 6) Primeiras Aulas de Rock: Iniciantes são bem-vindos (East Village)

Sou um guitarrista profissional e professor com 8 anos de experiência. Sou especializado em técnicas de rock, blues, fusion, néo-clássico, jazz, etc.

Violão ou Guitarra.

Alunos iniciantes, intermediários ou avançados são bem-vindos.

Minhas aulas são para aqueles que desejam:

- Aprender o básico
- Tocar músicas das suas bandas favoritas
- Se tornar um guitarrista profissional completo

- 7) Grande Inauguração de um Showroom!

Venha encontrar ideias para a sua cozinha e banheiro!

Armários tamanho padrão ou sob medida. Todos os tipos de madeira, cores e tamanhos.

Medições e orçamento gratuitos. Acessórios de banheiro, torneiras, pias, lavabos, banheiras, vasos sanitários e portas de chuveiro sob medida.

Bancadas, azulejos em cerâmica e pisos de madeira sob medida. Venha visitar nosso novo showroom!

De Segunda a Sexta das 7 horas às 17 horas.

Sábados das 7:30 às 13 horas.

- 8) O seu filho que está no Ensino Fundamental ama ciências?

A Universidade Estadual está feliz em poder oferecer o programa de verão da Academia de Ciências para os futuros alunos da 6^a e 8^a séries, com duração de 5 dias. Inscreva-se agora!

Segundas a Quintas

8:30-14:30 horas: Aulas em sessões.

Sextas

14:30-16:00 horas: Apresentações finais!

- 9) Treine seu idioma! Aprimore suas técnicas de conversação em espanhol e aprenda novo vocabulário. Os participantes já devem estar familiarizados com gramática básica, pronúncia e saudações comuns.

Terça-feira, 7 de Junho de 2016, 18:30-17:30 horas.

Terça-feira, 21 de Junho de 2016, 18:30-17:30 horas.

- 10) Procura-se por pastor alemão\husky

Meu cachorro fugiu do meu quintal e eu não consigo encontrá-lo. Ele é uma mistura de pastor alemão com husky. A maioria do seu pelo é preto e branco. Ele é um cachorro de porte médio e se chama Max.

Se você o encontrar, entre em contato pelo telefone 888-888-8888. Obrigado.

- 11) Estamos à procura de uma casa para alugar ou comprar. Precisa ter 4 quartos ou mais e uma garagem. De preferência em Layton ou no condado de Davis, com um ótimo histórico de aluguel. Pronta para ser ocupada imediatamente. A renda não é um problema para nós porque já temos o dinheiro para o depósito e o aluguel do primeiro mês. Favor entrar em contato com Patty pelo telefone 888-777-6666. O proprietário está vendendo sua casa atual.

12) Venha conhecer as lindas florestas, as alpes altos, as montanhas escarpadas e os lagos espetaculares do Glacier. Com mais de mil quilômetros de trilhas, o Glacier é o paraíso das caminhadas para visitantes aventureiros à procura de isolamento e do deserto. Desfrute dos chalés históricos, das pousadas, do transporte e de histórias sobre os indígenas americanos. Explore o Parque Nacional Glacier e descubra o que está à sua espera.

13) Como Remover Mofo e Bolor

1. Saiba que o mofo, em essência, é causado pela umidade. Se você limpar o mofo, mas não resolver o problema de umidade, então haverá uma nova reincidência mais tarde. Limpe e seque as áreas empoçadas ou danificadas pela água dentro de 24 horas do ocorrido, a fim de evitar o surgimento de mofo.
2. Se a área mofada tiver quase 1m² ou mais, chame um profissional. Se o problema de mofo for muito sério (com mais de 1m²), é melhor chamar um profissional para remoção e limpeza. Eles serão capazes de usar agentes de limpeza altamente eficazes e terão uma proteção adequada contra a inalação dos esporos.
3. Considere jogar fora os materiais porosos ou absorventes. Se o mofo for muito grave, talvez seja preciso descartar esses materiais, como é o caso das telhas velhas. Como o mofo consegue penetrar nas pequenas rachaduras e poros desses materiais, pode ser difícil removê-lo completamente. Nesses casos, a limpeza inibe apenas temporariamente o crescimento dos fungos. A menos que você remova esses materiais completamente da sua casa, o mofo continuará a reincidir.
4. Não pinte ou calafete uma superfície mofada. Esse é um tratamento superficial e ineficaz. Se a parede ou azulejo em questão já tiver recebido pintura ou calafetagem antes, a nova camada do produto não resolverá muita coisa; ela vai acabar descascando e soltando, pois simplesmente não haverá uma superfície limpa para que possa aderir.
5. Use equipamento de proteção adequado durante a limpeza. Como o mofo contém esporos, que são partículas transmitidas pelo ar, é muito importante usar proteção adequada ao limpar as superfícies mofadas. Na maioria dos casos, o mofo é inofensivo, mas há muitos tipos diferentes de fungos, alguns dos quais podem se tornar um perigo para a saúde em casos mais severos.

14) Como Enfaixar um Tornozelo Torcido

Método 1: Preparando-se para enfaixar o tornozelo

1. Escolha a sua bandagem. Para a maioria das pessoas, a melhor escolha de bandagem de compressão é a feita em tecido elástico.

- Qualquer marca de bandagem elástica servirá. No entanto, as mais largas costumam ser mais fáceis de usar.

- Bandagens de tecido elástico são confortáveis por conta de seu material. Além disso, elas também são reutilizáveis.

2. Prepare a bandagem. Se a bandagem elástica não estiver já enrolada, enrole-a firmemente.

- Faixas de compressão servem bem ao redor do pé e do tornozelo e, por isso, pode ser útil que a bandagem esteja bem fechada no início do processo, diminuindo a necessidade de esticá-la e reajustá-la durante sua realização.

3. Posicione a bandagem. Se você estiver enfaixando o próprio tornozelo, pode ser mais fácil posicionar a bandagem rolada no interior do pé. Por outro lado, caso esteja enfaixando o tornozelo de outra pessoa, pode ser mais fácil colocá-la do lado de fora.

- Em qualquer situação, é essencial que a ponta esteja voltada para fora do pé, de modo que a porção enrolada fique para fora durante todo o processo.

- Por exemplo, se você pensar na bandagem enrolada como se fosse um rolo de papel higiênico e o pé como se fosse uma parede, a bandagem deve estar orientada com a folha próxima à parede.

4. Se necessário, aumente o acolchoamento. Para um maior apoio, você pode colocar uma gaze sobre qualquer lado do tornozelo antes de enfaixá-lo. Almofadas em forma de ferradura e extraídas de espuma ou feltro também podem ser usadas para dar mais estabilidade às faixas de compressão.

15) Como Torrar Amêndoas Fatiadas

Método 2: Na boca do fogão

1. Aqueça uma frigideira no fogo baixo ou médio. Prefira uma panela de fundo triplo para alcançar resultados melhores. Ainda que não seja necessário, algumas pessoas gostam de acrescentar um pouquinho de manteiga para dar mais sabor.
2. Despeje as amêndoas na frigideira. Quando ela estiver aquecida, espalhe as castanhas numa camada uniforme no fundo da panela.
 - Mexa ou sacuda a frigideira com frequência (a cada 30 segundos) para que elas não queimem.
3. Tire as amêndoas da frigideira quando estiverem tostadas. Ou seja, após 3 ou 5 minutos. /n/t
 - Retire-as do fogo antes de ficarem com as bordas douradas, do contrário vão começar a queimar.
 - Coloque-as imediatamente em outro recipiente para esfriar.

16) Como Montar num Cavalo

Parte 3: Equitação americana básica

1. Aprenda a cavalgar com a rédea direta de oposição. Guiar o cavalo no estilo inglês é um pouco diferente de guiá-lo no estilo americano.

Aqui, você usará uma técnica chamada rédea direta de oposição.

- Nela, o cavaleiro deixa as rédeas mais soltas e os comandos são transmitidos por intermédio de toques leves no pescoço do cavalo. Use-se a rédea direta de oposição na maior parte do tempo quando se cavalga ao estilo americano.

- Para virar à direita, leve as rédeas para a direita. Da mesma maneira, leve-as para a esquerda para virar à esquerda.

- Sempre segure as rédeas com a mão esquerda e use a direita para segurar o pito.

- Como na equitação inglesa, deve-se reforçar os comandos com todo o corpo.

Além das mãos, comunique-se com o animal através das pernas e da bacia.

2. Em situações de emergência, segure as rédeas como na equitação inglesa.

Se for necessário fazer uma curva apressadamente ou se o animal não estiver

respondendo aos comandos, pegue as rédeas com ambas as mãos temporariamente.

Cuidadosamente, puxe a rédea esquerda para a virar à esquerda, ou à direita para virar à direita.

3. Ande com o cavalo. Comece andando devagar. Na equitação americana também é possível apertar ou chutar levemente o cavalo para que ele ande. Aqui também o jóquei precisa imitar com a mão os movimentos da cabeça do cavalo, mas não é necessário esticar tanto o braço, posto que as rédeas ficam bem mais soltas do que no estilo inglês.

4. Marche com o cavalo. Enquanto ele estiver andando, aperte-o delicadamente com as pernas para que ele comece a marchar. O trote é raramente usado na equitação americana.

- A marcha é um passo lento e constante, um pouco mais rápido que a andadura normal do cavalo, mas não tão acelerado quanto o trote.

- Neste ritmo, o jóquei pode permanecer sentado tranquilamente. Elevar-se da sela é raramente necessário na equitação americana.

17) Hoje não podemos mais pensar o Brasil como um país “pobre”. O Brasil já é um país de renda média, que realizou sua revolução capitalista. É uma sociedade na qual a apropriação do excedente econômico não mais se realiza através do controle direto do Estado, mas por meio dos lucros realizados no mercado pelos empresários; é uma sociedade capitalista tecnoburocrática porque a classe profissional se tornou igualmente importante na partilha do excedente econômico, sob a forma de ordenados elevados. Entretanto, não obstante o razoável grau de desenvolvimento econômico que já alcançou, o Brasil é ainda um país que até hoje não logrou integrar toda a sua população no mercado de trabalho. A análise clássica da “dualidade básica” da economia brasileira foi realizada por Ignácio Rangel em 1957. O país já conta com um setor capitalista industrializado e tecnologicamente sofisticado, mas esse setor ainda não foi capaz de absorver toda a mão de obra disponível, de forma que uma parte dela se mantém mal empregada ou subempregada. O segundo setor não pode ser chamado “tradicional” porque está ligado ao sistema capitalista e é funcional para ele. Mas é um país no qual a desigualdade econômica continua elevada, ainda que tenha se reduzido desde a transição democrática de 1985, e principalmente porque sua sociedade ainda está marcada por uma heterogeneidade estrutural.

Enquanto o setor capitalista não for capaz de absorver toda a “oferta ilimitada de trabalho” existente no Brasil, o país continuará dual. As transferências de renda para os pobres, que vêm sendo efetivas em reduzir a desigualdade, integraram uma massa de

cidadãos no mercado de consumo capitalista, mas não os integraram ainda no mercado de trabalho. O Brasil continua, portanto, injusto e subdesenvolvido.

English Reading Passages

1) We need volunteer walkers!

Our Sunset Park Shelter is in need of people who will walk and exercise our dogs. Come by and meet our lovable pups! You'll be guaranteed lots of kisses. All dogs have been vaccinated.

Contact us at 555-845-6325.

2) Ross School Election Day Bake Sale

Tuesday, March 1st 8 a.m. – 7 p.m.

We need donations!

Baked goods: cakes, pies, breads, cupcakes, pastries, cookies.

Individually wrapped please!

Items can be dropped off on Monday all day or call us to arrange a drop off or pick up.

As always, thank you for supporting Ross School!

Rita Stones 555-825-2147.

3) Daniel, your appointment has been confirmed.

Please review the details of your appointment and contact us if you need assistance.

You are scheduled for your annual physical exam with Dr. Stephen Holmes. Remember to bring a form of payment and/or your proof of insurance.

May 26 at 2:00 p.m.

1100 Montimar

Mobile, AI 2345

Phone: 555-896-1287

4) Just a reminder that your appointment is scheduled for Monday, May 26 at 2:00 p.m.

Please confirm your meeting by clicking the button below. If you are unable to make this

appointment, please call us to reschedule. Please come prepared with your form of payment or insurance card.

Thanks!

5) Become a School Crossing Guard!

Help Your Community While Earning Pay and Benefits!

School Crossing Guards help their children safely cross busy intersections on their way to and from school. They control traffic flow around schools in the morning, at lunch time, and at the end of the school day.

PART TIME JOBS ARE AVAILABLE NOW!

PAY - \$9.88/HOUR TO START, \$12.90/HOUR AFTER 3 YEARS.

6) Monday Arts & Crafts

Come and join in the fun of making simple Arts & Crafts each Monday afternoon. Paper crafts, beading, clay modeling, cartooning and more! Stimulate your creativity, explore new techniques, and help develop your fine motor skills. All ages welcome.

June 6 – August 31, 4:30pm

Brookfield Branch Library

7) The South End Community Health Center is seeking volunteers for their upcoming fundraising event being held Thursday, April 21, from 6-8 p.m. at the Central Square House. Volunteers are needed for two-hour time slots to assist with various activities. Please contact the manager if interested.

8) Stuck inside the snow? Bake a delicious chocolate treat for the Valentine's Day Bake-off on Friday, February 12! Entries are judged and prizes awarded. Send your name, email, and what you are cooking to our manager, and she will send you the details.

9) Want to spread Thanksgiving cheer? The Student Council is looking for 10 volunteers to help the Salvation Army give out hundreds of turkeys and food items to Boston area families. Share the holiday spirit by donating an afternoon to your community!

When: Saturday, November 21, 10:30 am – 3:30 pm.

Where: The Salvation Army Community Center.

10) I lost my wedding ring in Laughlin, Nevada on May 22. It's white gold, and it has 3 diamonds. The diamond in the middle is a princess cut and a little bit bigger than the other two diamonds. It's a size 5 and a half. If you find it, please call me at 801-777-8888. Thank you.

11) Whitney Piano, super condition, fantastic price. It was purchased for my elderly mother who used to be a concert pianist, but she no longer needs it. Plays well, could use fine tuning. One wobbly front leg, does not affect piano. Buyer must pick up at Abby Manor, 222 Center St., Central City.

CALL 1st FOR APPOINTMENT: Keith at 555-444-7777.

12) This Apple Watch comes with the white silicone band and another band in the smaller size. I only used it for a few days, but I like my old watch best, and now I need money ASAP. 1st come 1st served! I'll drive to you. Price is negotiable, but please be realistic. This retails for over \$550, so it's already a steal. Please message me with questions. Thanks!

13) How to Meet a Celebrity

Method 1: Locating the Celebrity From Afar

1. Read tabloid magazines and websites. Gossip magazines and blogs regularly post paparazzi photos of celebrities out and about. Look in the background of the photo. If there is a hotel, it's likely that is where they are staying while they're in town. If it's a specific coffee shop or store, that might be a regular hang-out of theirs.

- Set a Google alert for your favorite celebrity's name. News articles will appear, but so will information about their whereabouts, based on recent paparazzi photos and fan updates.

- Celebrity sighting is a popular hobby. Many people maintain blogs they update regularly with information.

2. Follow Twitter. Many celebrities tweet regularly throughout their day. Following their twitter feed may lead to information on where they regularly go to the gym, go for dinner, or shop. Visiting these places will increase your chances of meeting them.

- Many fans post sightings of celebrities on their twitter feed. Setting an alert to the celebrity's handle may inundate your feed, but could let you know if someone is in your immediate area.

3. Follow Instagram. Uploaded photos from celebrities may produce clues as to where they spend their time. Look in the background of the photo for street signs, shop names, and other identifying characteristics of their location.

- Most celebrity Facebook accounts are run by their publicist, and not updated with information regarding their day-to-day life, but you may find information from comments left by fans.

4. Search through online databases. Many websites exist that provide information on when and where celebrities will be coming for film and television filmings, book signings, public appearances, and speaking arrangements.

14) How to Clean the Oven

Method 2: Cleaning a Non-Self-Cleaning Oven

1. Remove the oven racks. Place them in a sink full of warm water mixed with a few drops of dishwashing liquid to soak.

2. Make a cleaning solution. Load a 1-liter spray bottle with 4 tablespoons of baking soda and fill the rest with water. Shake the spray bottle to moisten and dissolve the baking soda.

3. Spray down the oven. Spray the interior of a cold oven, focusing on the charred and stained areas, until the carbon is completely saturated.

- For particularly dirty ovens, increase the ratio of baking powder to water so that you have more of a paste than a liquid. Spread the paste all over the charred areas.

4. Allow the solution or paste to soak in for at least an hour. After an hour, test to area to see if the charred part has loosened.

- If it's still hard as a rock, douse it again with baking soda solution and allow it to sit for another hour.

- If it's loose enough to chip off, proceed to the next step.
5. Use a scraper to remove the loosened carbon. The type of scraper you would use to chip ice and snow off your windshield works well. Keep scraping until most of the carbon is gone.
 - Wear rubber gloves if you don't want your hands to get black from the soot.
 - Spray the area with more baking soda solution as you go to make the loosening process easier.
 - Sweep out the debris you chipped off. Use a small brush and dustpan.
 6. Spray the oven interior with the baking soda solution again. Allow it to soak in for an additional hour, then use a scrubber to remove the remaining carbon.
 7. Wipe down the oven once more with a solution of half vinegar, half water. At this point the interior of your oven should be clean. If caked-on carbon remains, try the following alternative methods:
 - Use an industrial-strength oven cleaner. These contain chemicals that may be harmful to breathe, so use with caution. They typically instruct you to let the solution soak into the charred sections and then scrub out the oven.
 - Use ammonia. Pour it on the caked-on areas and let it sit for thirty minutes before scrubbing it off with a scrubber and then wiping with a damp sponge.
 8. Clean the oven racks. Scrub the oven racks in the soapy water. Rinse them off and dry them, then replace them in the oven.

15) How to Get Rid of Acne Cysts Fast

Method 2: Developing a Daily Skincare Routine

1. Wash your face twice a day with benzoyl peroxide cleanser. Benzoyl peroxide helps fight acne by reducing oil and bacteria. Wash your face in the morning and evening by dampening your face and applying the cleanser. Rinse off thoroughly and pat your face dry with a clean towel.
 - If you wear makeup, be sure to remove it completely before washing your face. Use makeup removing wipes or solution to help remove all of your makeup.
 - You can buy cleansers containing benzoyl peroxide at grocery stores, beauty stores, and pharmacies.

2. Apply a toner with salicylic acid after you wash your face. Your toner will help remove any last particles of dirt while fighting the acne. Dampen a cotton pad with the toner and gently wipe across your face to apply the toner.

- Salicylic acid can help unplug pores and may prevent clogged hair follicles.
- If you're pregnant, you might try products that contain azelaic acid instead.

These may be safer for pregnant women, though salicylic acid is unlikely to be a risk.

3. Apply a spot treatment with benzoyl peroxide. Once your face is clean, dab some benzoyl peroxide cream or gel onto your acne. This can help reduce the acne more quickly. You can get spot treatments from your dermatologist or over the counter at pharmacies and grocery stores.

4. Moisturize after each wash with a non-comedogenic moisturizer. Your skin needs moisture after you strip it of oil and water. Use non-comedogenic moisturizers that won't block your pores. These should be marked as "non-comedogenic" on the label.

- Common ingredients in non-comedogenic moisturizers include hyaluronic acid, glycerin, and aloe vera.

5. Avoid touching or picking your acne. As hard as it is, try not to touch your face or feel your pimples. Cystic acne can get inflamed when touched, producing more redness and irritation. It may also increase scarring.

- Try sitting on your hands if you feel the urge to touch your face. Distract yourself by chewing gum, taking a walk, or squeezing a stress ball.

- Cystic acne is much harder to pop than normal acne, and doing so will possibly make it worse. Trying to pop cystic acne will also be more painful and more likely to leave a scar.

16) How to Make Curly Fries

Method 2: Using a Deep Fryer

1. Wash and rinse your cut fries in advance. Allowing them to completely air dry will keep the oil from sputtering if you choose to deep fry them. Water can be very dangerous when introduced into oil so the less water you add to the frying oil, the better.

2. Blanch the fries in oil. Blanching is a technique that uses lower-temperature oil for a long duration during frying. This ensures that the potato will be cooked all the way

through. To blanch, heat the oil on a medium-low setting. Add your fries and cook for approximately eight minutes. When the fries make a “screaming” noise, they are ready to come out. The screeching is the sound of air whistling out of the inside as they cook. The fries shouldn’t be browned, but will be edible. Upon removing, allow the fries to drain on a paper towel to remove excess oil.

- When deep frying, use a deep pot or wok with a thick bottom. Fill it halfway with vegetable oil and allow to heat completely before using.

- Frying can be made much easier with the use of a frying thermometer. This will allow you to control the temperature more accurately. When blanching, ideal oil temperature should be 250 degrees Fahrenheit.

3. Allow the fries to rest. Give the fries time to cool before frying a second time. For a quick turnaround, put them on a pan in a single layer inside the freezer. Otherwise, allow them to rest in the fridge overnight in a paper-towel lined sheet.

- No matter the method, allow the fries to come back to room temperature before the second frying. This allows even cooking.

4. Quick-fry the blanched fries. Heat the oil to 325-350 degrees Fahrenheit. Add the blanched fries to the oil in small batches to prevent overcrowding. Cook for three to five minutes or until the fries are golden brown in color. Remove and pat excess oil off using paper towel. Serve immediately.

- Season with kosher salt, garlic salt, or seasoning salt.

17) At different times in our history, different cities have been the focal point of a radiating American spirit. In the late eighteenth century, for example, Boston was the center of a political radicalism that ignited a shot heard round the world — a shot that could not have been fired any other place but the suburbs of Boston. At its report, all Americans, including Virginians, became Bostonians at heart.

In the mid-nineteenth century, New York became the symbol of the idea of a melting-pot America — or at least a non-English one — as the wretched refuse from all over the world disembarked at Ellis Island and spread over the land their strange languages and even stranger ways. \tIn the early twentieth century, Chicago, the city of big shoulders and heavy winds, came to symbolize the industrial energy and dynamism of

America. If there is a statue of a hog butcher somewhere in Chicago, then it stands as a reminder of the time when America was railroads, cattle, steel mills and entrepreneurial adventures. If there is no such statue, there ought to be, just as there is a statue of a Minute Man to recall the Age of Boston, as the Statue of Liberty recalls the Age of New York.

Today, we must look to the city of Las Vegas, Nevada, as a metaphor of our national character and aspiration, its symbol a thirty-foot-high cardboard picture of a slot machine and a chorus girl. For Las Vegas is a city entirely devoted to the idea of entertainment, and as such proclaims the spirit of a culture in which all public discourse increasingly takes the form of entertainment. Our politics, religion, news, athletics, education and commerce have been transformed into congenial adjuncts of show business, largely without protest or even much popular notice. The result is that we are a people on the verge of amusing ourselves to death.