Chapter 5
Simple View of Reading (SVR) in Different Orthographies: Seeing the Forest with the Trees

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Abstract One of the influential models of reading development may be the Simple View of Reading (SVR), according to which Reading Comprehension can be explained by two important components, decoding (D) and linguistic comprehension (LC) and is expressed as RC = D × LC. Decoding refers to pronunciation of the word and listening comprehension refers to understanding of the text when read by others and listening to the text. This chapter reviews various studies in support SVR from monolinguals, second language learners and conducted in various orthographies of different orthographic depth. Findings from these studies support of SVR and the model is applicable for assessment and intervention by identifying the weak component in the model (e.g., decoding or listening comprehension) and providing systematic instruction to the identified weak component. Future research directions are also provided.

Keywords Decoding · Listening comprehension · Orthography · Reading comprehension · Second language learners

5.1 Introduction

One of the influential models that is useful in the assessment and intervention of reading problems is the Simple View of Reading (SVR) proposed by Gough and Tunmer (1986) and Hoover and Gough (1990), according to which the two most important components of reading are decoding and comprehension. The relationship among decoding, linguistic comprehension, and reading comprehension is expressed as RC = D × LC, where RC is reading comprehension, D is decoding, and LC is linguistic comprehension. Thus, both decoding and linguistic comprehension are important to comprehend the written materials and thus, if D is zero, then RC

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will be zero, and if LC is zero, then also RC will be zero. Various studies have shown that SVR can account for approximately 40–80% of the variance in reading comprehension for readers ranging from 2nd through 10th grade among English speaking children. In addition to English-speaking children, we have tested SVR model with students from Spanish, Chinese, and Hebrew backgrounds as well as in bilinguals by administering decoding, LC, and RC measures at various grade levels. Similar to the findings of English-speaking children, a significant variance in RC has been explained by the two factors: D and LC. However, the percentage of variance is different at different grade levels and in different orthographies and the results are explained in terms of the nature of the orthographic depth – whether it is transparent or shallow. The results have important implications for literacy instruction. In opaque languages like English and Chinese, systematic decoding instruction should be continued for a longer period of time and comprehension instruction can be introduced at earlier time for Spanish-speaking children. Further, different decoding systems have to be applied in Hebrew literacy instruction due to its pointed (vowelized) and unpointed (unvowelized) system of writing.

Literacy, the ability to read and write, is basic for survival and hence research from various specialties have attempted to understand the components of reading and writing. One of the influential models that has practical utility in identifying and remediating reading problems is the 'Simple View of Reading' (SVR) postulated by Gough and his colleagues (Gough & Tunmer 1986; Hoover & Gough 1990). Even though, the concept of SVR is accepted in general, there is still some discussion about decoding whether it includes non-word reading or real word reading and whether it refers to accuracy and also speed. Additionally, the role of vocabulary is also discussed in the context of SVR, whether it should be a separate component (Braze, Tabor, Shankweiler, & Mencl 2007) or vocabulary influences indirectly through word recognition and reading comprehension (Protopapas, Simos, Sideridis, & Mouzaki 2012; Tunmer & Chapman 2012). Similarly, there is discussion about whether to include fluency as an additional component of SVR (See, Adlof, Catts, & Little 2006; Joshi & Aaron 2000). Nevertheless, it is widely accepted that the two important components of reading are decoding and comprehension and much of the variance in reading comprehension can be explained by these two components: decoding and linguistic (listening comprehension, LC). For the diagnostic purposes SVR has been applied to classify poor readers into those with decoding problems but adequate comprehension, exhibiting dyslexia-type syndrome. Aaron, Joshi, and Williams (1999) administered measures of decoding, listening comprehension, and reading comprehension to about 200 students in grades 3, 4, and 6. Applying SVR model, they found that approximately 7% of the students exhibited good decoding ability but their comprehension – both listening and reading – was not on par with their decoding ability, exhibiting hyperlexia-type syndrome. Additionally, about 8% of students were poor in decoding skills but adequate comprehension skills, who could be referred to as displaying dyslexia-type syndrome. Further, another 8% of students had both decoding and

comprehension problems and can be referred to as either low ability readers or Garden variety poor readers. Further, SVR model has also provided support for instructional applications. Contrary to using only one type of reading instruction to all poor readers, Aaron, Joshi, Gooden, and Bentum (2008) first identified the weak component of reading, whether it was decoding or comprehension and then provided systematic decoding and comprehension instruction to both the groups for 12 weeks and compared to another group of poor reader who were receiving the business-as-usual instruction in the schools. After the completion of 12 weeks, those with decoding problems showed significant gains in reading when provided with decoding instruction but did not improve when provided with systematic comprehension instruction. Similarly, comprehension instruction was more helpful for those with comprehension problems. Poor readers who did not receive differentiated instruction did not make any significant gains in reading comprehension. Hence, in order to improve reading among poor readers, first the poor component based on SVR has to be identified and then should be provided with systematic and evidence-based instruction. Thus, SVR is a simple, yet a valuable, model to identify and improve reading problems.

The effectiveness of the SVR model is further explored in this chapter by addressing issues of the contribution of decoding and comprehension at different grade levels, the role of orthography and second language learners.

Hoover and Gough (1990) presented SVR based on English-Spanish bilinguals in grades 1–4 and found that about 50–60% of the variance in reading comprehension was explained by decoding and linguistic comprehension, even though the percentage varied slightly at different grade levels. However, SVR provided an alternate way to identify reading disabilities without administering the traditional IQ measures, which, in most studies, have accounted for only about 25% of the variance.

Tilstra, McMaster, van den Broek, Kendeou, and Rapp (2009) tested SVR model among students in grades 4, 7, and 9. A couple of interesting findings from their study was that the amount of variance decreased at the upper grade levels and also the percentage of variance contributed by decoding decreased at upper grade levels but the variance contributed by comprehension increased with higher grade levels. Both the findings can be explained on theoretical grounds. The amount of variance that SVR can explain at higher grade levels becomes lower as reading comprehension at higher grade levels may require more background knowledge by wide reading and other factors such as syntax and knowledge of idioms. Additionally, decoding contributes more at early grade levels because many students are still at the 'learning to read' stage and at upper grade levels, when students are in the 'reading to learn' stage, comprehension plays an important role. Similar findings were also reported in a study by Joshi, Tao, Aaron, and Quiroz (2012) based on students from 2, 3, and 4.

5.2 SVR in Different Orthographies

The above findings were based on English-speaking participants. Does the same pattern hold true for other orthographies? Before answering this question, it is better to clarify some terms. The world's writing system can be broadly classified into three broad categories based on the smallest written unit – alphabetic, syllabic, and morpho-syllabic writing system. Letter is the smallest written unit in the alphabetic writing system; a syllable is the smallest written unit in the syllabic writing system, and a morpheme (as a character) is the smallest written unit in the morpho-syllabic writing system. Syllabic writing system is further sub-divided into syllables which cannot be further broken down into phonemic representation such as Kana of Japanese and syllables where the phonemic representation can be identified such as Korean Hangul. Examples of alphabetic writing system include English, Spanish, and French and Chinese Kanji is an example of morpho-syllabic writing system. Additionally, orthographies are also classified as transparent or shallow and opaque or deep orthographies and are referred to as 'orthographic depth'. Transparent orthographies have almost 1:1 correspondence between graphemes and phonemes such as Finnish and Spanish orthographies, while opaque orthographies may not have 1:1 correspondence between graphemes and phonemes such as French and English. However, it is better to view this classification as a continuum rather than as belonging to one or the other category. Thus, Finnish and Spanish may be at the one end of the spectrum near the transparency end and English and French may fall at the other end of the spectrum near the opaque end among alphabetic languages. By administering various reading measures in about 13 European orthographies, Seymour, Aro, and Erskine (2003), found that it may take approximately 2 years of formal instruction to master basic decoding skills in English, while it may take only about 1 year of formal instruction in transparent orthographies like Spanish and German.

Due to the interest in the orthographic influences in literacy development, SVR has been applied in different orthographies. For instance, Megherbi, Seigneuric, and Ehrlich (2006) applied SVR among French speaking children in grades 1 and 2 and found that more than 50% of the variance in reading comprehension was explained by decoding and linguistic comprehension. Similar to English speaking children, decoding contributed more at grade 1 and linguistic comprehension contributed more at grade 2. On the continuation scale of orthographic depth, French is considered less opaque than English. Even though SVR has been examined and has been found to be useful in various orthographies, the pattern is slightly different depending on the transparency of the orthography. Among more transparent orthographies such as Greek, Swedish, Finnish, and Norwegian, decoding plays a lesser role at earlier grade levels compared to English speaking children. For instance, in a study by Joshi et al. (2012), the performance of third grade Spanish speaking children resembled the performance of English speaking children in grade 4. The fact that Spanish speaking children had already mastered the basic decoding skills earlier than English-speaking children was explained in

terms of the transparency of Spanish orthography. In many of the transparent orthographies studied thus far, the findings of Seymour et al. (2003) have been found to be true as decoding contributes less even at earlier grade levels compared to English and LC starts contributing more even from early grade levels again compared to English. For instance, in the study by de Jong and van der Leij (2002) with Dutch speaking children, much of the variance in RC was explained by LC after grade 1. Similar results have also been reported among Greek-speaking children (Protopapas et al. 2012); Italian children (Tobia & Bonifacci 2015); in Portuguese (Cadime et al. 2017) and in Finnish (Torppa et al. 2016). Hoien-Tengesdal and Hoien (2012) validated SVR in Norwegian and Swedish orthographies, where they found about 50% of the variance is explained by D and LC. The earlier version of Turkish orthography was heavily influenced by Persian and Arabic orthographies till 1928 when Mustafa Kemal Atatürk, first president of Turkey, changed the script to Latin. Turkish orthography is transparent and SVR has been validated by Babayiğit and Stainthorp (2011) in Turkish also. Virtually, in all the orthographies presented till now, decoding and linguistic comprehension can explain about 50% of the variance, while IQ scores explain only 25% of the variance for RC, thus, SVR is a better model to apply for the identification as well as intervention of reading difficulties by identifying the weak component and then providing appropriate evidence-based systematic and explicit instruction.

5.3 SVR in Non-European Orthographies

The above review referred to alphabetic languages of varying orthographic depth, mostly from European languages. Would the SVR be applicable in other non-European languages? We explored this hypothesis by applying SVR to Hebrew and Mandarin Chinese. Hebrew is a Semitic language and has two forms of writing – vowelized and unvowelized. Children in early grade levels are introduced words with the vowels present (vowelized) and after about grade 3, vowels are removed (unvowelized) and students are expected to read without the presence of vowels. (To illustrate this concept of vowelized and unvowelized from the perspective of English orthography, children will be exposed to words like CAT, CUT, and COT, with the vowels present in early grade levels and after about grade 3, students will have only CT for CAT, CUT, and COT and students have to read the word mainly based on the context). We (Joshi, Ji, Breznitz, Amiel, and Yulia 2015) explored whether SVR is also applicable for Hebrew orthography by administering various decoding, listening comprehension and reading comprehension measures for students in grades 2–10. It was found that between 37% (at Grade 6) to 70% (at Grade 4) of the variance in RC were explained by decoding and linguistic comprehension. Further, decoding made more contribution at early grade levels and LC made more contribution to RC at upper grade levels. These findings are similar to what is reported in English and other alphabetic languages. Due to the nature of Hebrew orthography, decoding contributed for a longer period of time

compared to many of the transparent orthographies such as Spanish, Finnish, and Italian. Nevertheless, D and LC explained much of the variance in RC in Hebrew orthography. SVR was also found to be applicable in another Semitic language – Persian (Sadeghi, Everatt, & McNeill 2015). Both Persian and Hebrew are written from right to left and similar to Hebrew, in Persian also vowels are omitted in the written text from the beginning of upper elementary grade levels.

Mandarin Chinese is considered a morpho-syllabic writing system, where the basic unit is a character which is a syllable and contains a morpheme; it is quite different from many other writing systems. In one of our studies (Joshi et al. 2012), it was found that SVR can also be applied to Mandarin Chinese as character recognition (decoding) and listening comprehension accounted for much of the variance in RC even in Chinese. However, due to the complexity of the character recognition with various stroke patterns, word recognition (decoding) contributes more even at the fourth grade level. Similar results in Cantonese Chinese have also been reported by Yeung, Ho, Chan, Chung, & Wong (2013).

Akshara orthography, derived from the Brahmi script, mostly used in the Indian subcontinent, is sometimes considered as alphabetic, syllabic, alpha-syllabic, abugida. However, recently, there is a push for akshara orthography to be considered as a separate category (Share & Daniels 2015). SVR was tested in two of the akshara orthographies – Kannada and Telugu – among children from the slum areas of metropolitan cities in India. The results showed that even though about 50% of the variance in RC was explained by D and LC, decoding plays an important role even at upper grade levels (Nakamura, Joshi, & Ji in press; Nakamura, Koda, & Joshi 2014). The results were attributable to the complex writing of aksharas. Even though, akshara orthography is highly transparent, each akshara is visually complex and even a 'dot' (.) can change the sound and meaning.

Korean orthography, referred to as Hangul, is considered a transparent alpha syllabary, where the basic unit is at the syllable level but the phonetic element can be identified in the syllable. Even in Korean orthography, SVR has been found to be applicable as demonstrated by Kim, Park, and Wagner (2014).

5.4 SVR Among Second Language Learners

Even though the first major study to validate SVR was based on the data from English-speaking children with Spanish background (Hoover & Gough 1990), recently several studies have reported that SVR is also applicable to second language learners. Geva and Farnia (2012), in a longitudinal study of grades 2–5 from the same school systems in Canada, found that SVR is applicable for both monolingual English speakers (EL1) and those who were learning English as a second language (ELL) from various first language background. The amount of contribution of D and LC were about the same for the groups and decoding was more important at early grade levels. However, LC contributed more to RC earlier among EL1 compared to ELL.

Erbeli and Joshi (submitted) divided seventh graders into less skilled and advanced readers and administered various decoding and listening comprehension measures. Results from the Structural Equation Modeling (SEM) showed that about 60% of the variance in RC was explained by D and LC measures for both skilled groups, LC contributed much earlier for the advanced skill readers than the lower skilled readers. This finding demonstrates that in addition to decoding, additional skills such as good vocabulary, background knowledge and syntactical knowledge are required for comprehension.

The above two studies were related to English as a second language and English is generally considered as having a deep orthography. However, studies have produced similar results when learning a second language which has a transparent orthography. Verhoeven and van Leeuwe (2012) examined the applicability of SVR in Dutch as a second language. Dutch is considered a transparent orthography compared to English orthography. The authors found SVR to be valid for both Dutch as the first language (L1) as well as Dutch as a second language (L2). However, similar to the results found in the studies by Geva and Farnia (2012) and Erbeli and Joshi (submitted), even though decoding skills were similar in both the language groups, listening and reading comprehension had lagged behind among L2 participants than L1 participants. In a recent study by Bonifacci and Tobia (2017), it was found that SVR was applicable for Italian as a second language also. Similar to the findings of other studies from different orthographies, LC contributed more to RC from early grade levels in Italian.

5.5 Conclusions

As presented in the chapter, various findings from different orthographies in both monolinguals and second language learners, SVR has found to be valuable in explaining the variance in RC through D and LC. Even though, the researchers have used different types of assessments to measure D, LC, and RC, the results are unequivocal in demonstrating that RC consists mainly of two important components D and LC. For instance, some researchers have used non-word reading tasks and some have used real word reading to measure decoding and similarly some researchers have used different procedures such as cloze techniques, asking questions from the passages to measure LC and RC. Other factors such as working memory, fluency, and vocabulary may explain some of the variance, but the findings are not as clear cut as the two important components of D and LC. Even though some researchers have argued that an additive formula, $RC = D + LC$ can be as useful as the multiplicative model $RC = D \times LC$, which was originally proposed by Gough and his colleagues, the additive formula can be rejected on rational grounds. According to the multiplicative model, if D = zero, then, RC will be zero and if LC is zero, then also RC will be zero demonstrating the importance of both D and LC

components. However, in the additive model, if D is zero, then, theoretically, RC can have some value if the individual has some LC. However, this may not be possible in reality to comprehend passages when read without some decoding ability.

SVR has diagnostic value without using the IQ measures to assess reading difficulties and additional advantage of SVR is that once the weak component is identified, then appropriate systematic instruction can be provided to improve the weak component. Diagnosis based on IQ and achievement discrepancy formula may not have the same advantage. Additionally, SVR model has been found to be applicable based on the studies with monolinguals and second language learners, in orthographies that are transparent or opaque, and in longitudinal studies also (Torppa et al. 2016). Further, SVR also has received support from genetic studies that have shown that decoding and comprehension are influenced by different genetic components (Keenan, Betjemann, Wadsworth, DeFries, & Olson 2006). Future studies may explore the applicability of SVR in bilinguals as well at various grade levels and in different orthographies. Additionally, most of the studies have explained about 50% of the variance in reading comprehension, while the IQ scores, which is used in the assessment of reading problems explains only 25% of the variance. Perhaps future studies can explore contributions of other factors such as working memory, speed, and vocabulary to the SVR model.

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