

***Structural Equation Modeling of Factors Influencing EFL
Reading comprehension: Comparative study between Egypt
and Germany***

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Table of Contents

Acknowledgment	
Abstract	XVI
Introduction	17
2. Theoretical Background and Literature Review	21
2.1 Reading comprehension definitions	21
2.1.1 Conclusion.....	23
2.2 Reading in a foreign language	23
2.3 Models of reading	27
2.3.1 Bottom-up Model.....	27
2.3.2 Top-down models	29
2.3.3 The Interactive Model.....	30
2.3.4 The Interactive Compensatory Model	31
2.3.5 The Constructive-Integrative Model.....	31
2.3.6 The Simple View of Reading	32
2.4 The relationship between L1 and L2 reading	34
2.4.1 The Linguistic Threshold Hypothesis	34
2.4.2 The Linguistic Interdependence Hypothesis (Developmental Interdependence Hypothesis)	38
2.4.3 The Compensatory Model.....	44
2.4.4 Conclusion.....	49
2.5 Metacognition definition and models.....	51
2.5.1 Flavell’s Metacognition Model	51
2.5.2 Brown’s model of metacognition	53
2.5.3 Good Information Processing Model.....	54
2.5.4 L2 Learning Strategies	57
2.5.5 Definitions of Reading Strategies	58
2.5.6 Classification of L2 reading strategies.....	59
2.5.7 Metacognitive awareness and L2 reading comprehension.....	63

VI Table of contents

2.5.8 Conclusion.....	75
2.6 Reading Motivation.....	77
2.6.1 Reading motivation definitions	77
2.6.2 L1 Reading motivation model.....	78
2.6.3 L1 Reading Motivation Research	84
2.6.4 Motivation and L2 learning.....	91
2.6.5 L2 reading motivation.....	93
2.6.5.1 L2 reading motivation research	95
2.6.6 Conclusion.....	105
2.7 L2 reading motivation and metacognitive awareness	107
2.8 Research hypothesis	108
3. Methodology.....	111
3.1 Study Contexts	111
3.1.1 Egyptian Context	111
3.1.2 German Context.....	113
3.2 Description of the sample	114
3.2.1 Egyptian Sample Characteristics	114
3.2.2 German Sample characteristics	116
3.3 Tools Description.....	117
3.3.1 The Survey of Reading Strategies (SORS)	118
3.3.1.1 Description of the SORS	118
3.3.1.2 The Translation process	119
3.3.1.3 The translation of SORS	122
3.3.1.4 The administration, scoring, and interpretation of the SORS	122
3.3.1.5 Psychometric properties of SORS	123
3.3.1.6 Confirmatory Factor Analysis	123
3.3.1.7 Construct Validity of SORS:	126
3.3.1.8 Reliability of SORS	131
3.3.2 L2 Reading Motivation Questionnaire:.....	131
3.3.2.1 Description of L2RMQ	131

VII Table of contents

3.3.2.2 Translation of L2RMQ.....	135
3.3.2.3 The administration, scoring and interpretation of L2RMQ.....	136
3.3.2.4 Psychometric characteristics of L2 reading motivation questionnaire	136
3.3.2.5 Reliability of L2 reading motivation questionnaire	142
3.3.3 L1 reading comprehension test.....	142
3.3.3.1 The Translation of L1 reading comprehension test	143
3.3.3.2 Reliability of L1 reading comprehension test.....	144
3.3.4 English reading comprehension test	144
3.3.4.1 Reliability of L1 reading comprehension test.....	145
3.4 Data collection procedures	145
3.4.1 Data collection in Egypt.....	145
3.4.2 Data Collection in Germany.....	146
3.5 Structural Equation Modeling.....	147
3.5.1 Steps of constructing SEM.....	148
3.5.2 SEM Programs.....	153
4. RESULTS.....	155
4.1 Description of L2 reading strategies	155
4.2 Description of L2 reading motivation	161
4.3 Structural modeling results	168
4.3.1 Multigroup Confirmatory Factor Analysis.....	171
4.3.1.1 The Measurement Invariance of SORS and L2RMQ	174
4.3.2 Second order factor analysis.....	175
4.3.2.1 Item Parceling	176
4.3.2.2 Second Order Factor Analysis of SORS	177
4.3.2.3 Second order factor analysis of L2RMQ.....	178
4.3.3 The Measurement Models	181
4.3.4 The Structural Models.....	184
5. Discussion.....	192
5.1 Overview of the study	192
5.2 Description of L2 reading strategies	194
5.3 Description of L2 Reading Motivation.....	197

VIII Table of contents

5.4 The Structural modeling	199
5.4.1 Relationship between L1 reading comprehension and L2 reading comprehension	199
5.4.2 L2 reading comprehension and awareness of reading strategy use	201
5.4.3 L2 reading comprehension and L2 reading motivation	203
5.4.4 The relationship between metacognition and reading motivation.....	204
5.5 Conclusion and Limitations	205
5.6 Pedagogical Implications and Future Research	206
6 References	208

List of Figures

Figure 1. Differences between L1 and L2 reading (Grabe& Stoller, 2013).....	25
Figure 2. Representation of the common underlying proficiency (Cummins, 1981).....	38
Figure 3. Psycholinguistic Model of the ESL Reader (Coady, 1979).....	44
Figure 4. Bernhardt compensatory model (from Bernhardt, 2005).....	46
Figure 5. McNeil (2012) L2 reading compensatory model.....	47
Figure 6. Classification of L2 reading strategies (Mokhtari& Reichard, 2002).....	62
Figure 7. Wigfield and Guthrie's (1995) reading motivation model.....	79
Figure 8. Day and Bamford L2 reading motivation model.....	94
Figure 9. Hypothesized model 1.....	109
Figure 10. Hypothesized Model 2.....	110
Figure 11. The translation procedure followed in the study.....	121
Figure 12. Steps required to construct SEM.....	148
Figure 13. Measurement model for the German sample.....	181
Figure 14. Measurement model for the Egyptian sample.....	183
Figure 15. Relative contributions of l1 reading comprehension, reading motivation, metacognition to the l2 reading comprehension in the German sample(model 1).	184

X List of figures

Figure 16. Relative contributions of L1 reading comprehension, reading motivation, and metacognition of l2 reading comprehension in the Egyptian sample (model 2). 186

Figure 17. Relative contributions of l1 reading comprehension, reading motivation, and metacognition to l2 reading comprehension in the german sample (model 3)..... 188

Figure 18. Relative contributions of L1 reading comprehension, reading motivation, and metacognition of l2 reading comprehension in the egyptian sample (model 4)..... 190

List of Tables

Table 1 Egyptian sample size at each academic year.....	115
Table 2 Reading materials preference for Egyptian students	116
Table 3 German sample size at each academic year	117
Table 4 Reading materials preference for German students.....	117
Table 5 Summary for goodness of fit indices.....	125
Table 6 Goodness-of-fit indicators of the SORS in the Egyptian sample	127
Table 7 Standardized factor loadings of SORS items in the Egyptian sample	128
Table 8 Goodness-of-fit indicators of the SORS in the German sample	129
Table 9 Standardized factor loadings of SORS items in the German sample	130
Table 10 Reliability coefficients of the SORS in the Egyptian and the German samples.....	131
Table 11 Reviewed L2 reading motivation questionnaires.....	132
Table 12 Reviewed L2 reading motivation questionnaires	133
Table 13 Goodness-of-fit indicators for L2 intrinsic reading motivation in the Egyptian sample.....	137
Table 14 Standardized factor loadings of items representing motivation in the Egyptian sample.....	137

XII List of tables

Table 15 Goodness-of-fit indicators for L2 intrinsic reading motivation in the Egyptian sample.....	138
Table 16 Standardized factor loadings of items representing L2 extrinsic motivation in the Egyptian sample.....	139
Table 17 Goodness-of-fit indicators for L2 intrinsic reading motivation in the German sample.....	139
Table 18 Standardized factor loadings of items representing L2 intrinsic motivation in the German.....	140
Table 19 Goodness-of-fit indicators for L2 extrinsic reading motivation in the German sample.....	141
Table 20 Standardized factor loadings of items representing L2 extrinsic motivation in the German sample.....	141
Table 21 Reliability coefficients of the L2RMQ in the Egyptian and the German samples.....	142
Table 22 Reliability coefficients of L1 reading comprehension tes the Egyptian and the German samples.....	144
Table 23 Reliability coefficients of English reading comprehension test in the Egyptian and German samples.....	145
Tale 24 Symbols used in SEM path diagramsc.....	150
Table 25 Means and standard deviations of the highly perceived readistrategies in the Egyptian sample.....	156

XIII List of tables

Table 26 Means and standard deviations of the moderately perceived reading strategies in the Egyptian sample.....	157
Table 27 Means (standard deviation in parentheses), the significance of the independent sample t-test and effect size for Egyptian male and female scores on the perceived L2 reading strategies.....	158
Table 28 Mean and standard deviation of the highly perceived reading strategies in the German sample	159
Table 29 1 Mean and standard deviation of the low perceived reading strategies in the German sample	159
Table 30 Mean scores (and standard deviations in parentheses), the significance of the independent sample t-test and effect size for German male and female scores on the perceived L2 reading strategies.....	160
Table 31 1 Mean and standard deviation of the L2 reading motivation scales in the German sample	161
Table 32 Means (and standard deviations in Parentheses), the significance of the independent sample t-tests, and effect size for German male and female scores on the l2 reading motivation scales.....	162
Table 33 Factors reported by German students that enhance their l2 reading motivation	163
Table 34 Factors reported by the German students that reduce their L2 reading motivation	163
Table 35 Means and standard deviations of the l2 reading motivation scales in the Egyptian sample	164
Table 36 Mean (standard deviation in parentheses), the significance of the independent sample t-tests, and effect sizes for Egyptian male and females scores on the l2 reading motivation scales	165
Table 37 Factors reported by the Egyptian students as enhancing their l2 reading motivation.....	166

XIV List of tables

Table 38 Factors reported by the Egyptian students as reducing their L2 reading motivation	167
Table 39 Descriptive statistics of the variables under study.....	169
Table 40 Results of multiple group confirmatory factor analysisc	175
Table 41 Goodness-of-fit indicators of SORS second order factor analysis for the German data.....	177
Table 42 Standardized factor loadings of SORS subscales for the German data	177
Table 43 Goodness-of-fit indicators of SORS second order factor analysis for the Egyptian data.....	178
Table 44 Standardized factor loadings of SORS subscales for the Egyptian data.....	178
Table 45 Goodness-of-Fit Indicators of L2 Reading Motivation Scales for German Data.....	179
Table 46 Standardized factor loadings of L2 reading motivation Scales for German data.....	179
Table 47 Goodness-of-fit indicators of l2 reading motivation for Egyptian data	180
Table 48 Standardized factor loadings of L2 reading motivation Scales for Egyptian data	180
Table 49 Goodness-of-fit indicators of the measurement model for the German and Egyptian samples.....	181
Table 50 Path coefficients of the latent factors for the measurement model of the German sample.....	182
Table 51 Path coefficients of the latent factors for the measurement model of the Egyptian sample	183
Table 52 Standardized values of the model 1 paths, their standard errors, and their statistical significances.....	185

XV List of tables

Table 53 Standardized values of the model 2 paths, their standard errors,
and their statistical significances.....187

Table 54 Standardized values of the model 3 paths, their standard errors,
and their statistical significances.....189

Table 55 Standardized values of the model 4 paths, their standard errors,
and their statistical significance191

Abstract

In most foreign language learning contexts, there are only rare chance for contact with native speakers of the target language. In such a situation, reading plays an important role in language acquisition as well as in gaining cultural information about the target language and its speakers.

Previous research indicated that reading in foreign language is a complex process, which is influenced by various linguistic, cognitive and affective factors. The aim of the present study was to test two structural models of the relationship between reading comprehension in native language (L1), English language (L2) reading motivation, metacognitive awareness of L2 reading strategies, and reading comprehension of English as a foreign language among the two samples. Furthermore, the current study aimed to examine the differences between Egyptian and German students in their perceived usage of reading strategies during reading English texts, as well as to explore the pattern of their motivation toward reading English texts. For this purpose, 401 students were recruited from Germany (n=200) and Egypt (n=201) to participate in the current study. In order to have information about metacognitive awareness of reading strategies, a self-report questionnaire (SORS) developed by Moktari and Sheory (2002) was used. While the L2 reading motivation variable, was measured by a reading motivation survey (L2RMQ) which was based on reviewed reading motivation research. In addition, two reading tests were administrated one to measure reading comprehension for native language (German/Arabic) and the other to measure English reading comprehension.

To analyze the collected data, descriptive statistics and independent t-tests were performed. In addition, further analysis using structural equation modeling was applied to test the strength of relationships between the variables under study.

The results from the current research revealed that L1 reading comprehension, whether in a German or Arabic language, had the strongest relationship with L2 reading comprehension. However, the relationship between L2 intrinsic reading motivation was not proven to be significant in either the German or Egyptian models. On the other hand, the relationship between L2 extrinsic reading motivation, metacognitive awareness of reading strategies, and L2 reading comprehension was only proven significant in the German sample. The discussion of these results along with their pedagogical implications for education and practice will be illustrated in the following study.

Introduction

In today's modern globalized world, knowledge of a foreign language has become an essential skill needed not only for academic success, but for building a successful career. The importance of reading in a foreign language cannot be understated. Just as reading in one's native language (L1) is a crucial component of individual literacy, the ability to read in a second or foreign language is also critical for learning this language. Returning to second and foreign languages, their distinction is worth noting. In second languages, the language is spoken in the immediate environment of the learner, which provides them with opportunities to use the language in daily communication. Foreign languages, however, are not spoken in the learner's immediate environment. In this case, the learner has little to no opportunity to practice the language in natural communication scenarios. However, a number of authors (e.g. Ellis, 2003; Oxford, 1993) refer to both foreign and second languages using (L2). This is based on the fact that the L2 (foreign or second language) is studied after the native language has been acquired at some level. In this present study, L2 will be used to refer to foreign languages.

Written text plays several roles in foreign language learning. It is an essential source of information on the culture and literature of the target language. Written texts also serve as a source of input from which learners can study the target language structure (such as vocabulary and grammar) (Wolf, 1993). In addition, students of a foreign language rarely speak the target language in their daily lives or interact with native speakers of the L2. Thus, the need to master reading skills increases, so that the learner may access authentic written information in the target language. (Eskey, 2005; Rahimi, Sadighi & Dastkheyr, 2009). Furthermore, it can be argued that literary works can not be fully appreciated until they are read in their original language. Many readers also seek to gain information from original sources, rather than from translations (Alderson, Niemen & Huhta, 2016). Additionally, reading in different languages helps readers develop an openness and understanding of other cultures, a highly important trait in a world "*broken by misunderstanding that leads to unbelievable trauma and bloodshed*" (Bernhardt, 2011, p.5). Given these reasons, L2 reading ability plays an important role in language learning. Studying the factors that might influence this skill is therefore important for understanding its development improving learners' L2 reading competence.

L2 reading comprehension is a complex, dynamic, and multidimensional process. It involves the interaction between readers and contextual factors, where readers construct meaning through interaction with the text and its context. In this process, various variables influence readers' performance. These factors can be categorized into:

1. Background characteristics, such as age, sex, and L1 proficiency level
2. Psychological characteristics, such as motivation and self-esteem
3. Cognitive characteristics

18 Introduction

4. Social-contextual characteristics, which refer to the influence of society and learning environment on students (Grabe, 2009; Phakiti, 2006; Zhang, 2016).

Due to the complexity and variability of factors that influence L2 reading, a debate developed between whether L2 reading is a reading or a language problem. This question was first raised by Alderson (1984) in an article concerning sources of L2 reading problems. He indicated that foreign language teachers tend to believe that students encounter reading problems in their target language due to also being poor readers in their L1. The transfer effect between L1 and L2 reading is one distinguishing feature of L2 reading research. For this reason, many researchers have tried to explore the relationship between L1 and L2 reading and identify the relative contribution of L1 reading ability in explaining L2 reading comprehension. For example, Brisbois (1995) examined the relationship between L1 reading, L2 knowledge, and L2 reading comprehension among 131 beginning and advanced native English speakers learning French. L1 reading comprehension was assessed through two tasks: a standardized test and written recall protocols. When using the standardized test scores, results revealed that L1 reading ability explained 5.71% of L2 reading scores. When Park (2013) replicated Brisbois's (1995) study among Korean university students, regression analysis indicated that Korean reading ability explained 24 % of the variance in English reading comprehension.

More recently, Bernhardt (1991, 2000, 2005) presented a compensatory model of L2 reading comprehension. This compensatory model suggested that L2 reading comprehension is influenced by the interaction between three components: L1 reading ability, L2 language knowledge, and some additional unexplained variance (e.g. content effect, comprehension strategies, motivation). In this same direction, McNeil (2012) extended Bernhardt's hypothesized model by adding a fourth component: strategic knowledge, which describes the metacognitive awareness of the reading process. Proficient L2 readers go through various processes, such as monitoring, re-evaluation of guesses, skimming, and scanning. Thus, one important factor in L2 reading comprehension is the metacognitive awareness of readings strategies (Mokhtari& Perry, 2008). Mokhtari, Sheory, and Reichard (2008) defined metacognitive awareness in reading as "*readers' knowledge about themselves as readers, their knowledge about the reading process, their understanding of a given reading task, and the strategies they use to monitor and enhance comprehension*" (P. 44). It is a mixture of conscious awareness and monitoring of the reading process. Many experts on second-language reading have pointed out a positive correlation between L2 reading comprehension and awareness of reading strategy use in English reading tasks. For instance, Phakiti (2003) investigated the cognitive and metacognitive strategies used by 384 Thai university students studying English as a foreign language (EFL). Results indicated a positive correlation between both cognitive and metacognitive reading strategies, and EFL reading comprehension ($r = .391$ and $.469$ respectively). In addition, these two strategies accounted for 15-22% of the variance in EFL reading ability. Along with metacognitive awareness, it is important to consider L2 reading motivation when understanding the development of this reading skill.

19 Introduction

Motivation acts as an energizer of students' cognitive abilities, encouraging students to engage in reading in effortful and strategic ways (Logan, Medford & Hughes, 2011).

According to Cambria and Guthrie (2010), a good reader should have "skill and will" to read. Skills refer to phonemic awareness, phonics, word recognition, vocabulary, and simple comprehension. Will describes the personal desire to read. Unfortunately, most research on L2 reading has not sufficiently investigated affective factors (the "will" component), when compared to cognitive and linguistic factors (the "skill" component). This has led to a lack of full understanding of the L2 reading process (Grabe, 2009; Han, 2011).

Although researchers have investigated the relationship between metacognitive awareness, motivation, L1 reading comprehension, and L2 reading comprehension, few studies (e.g. Zhang, 2016) have incorporated all of these variables together in one L2 reading model. Thus, the main purpose of the present study was to simultaneously test the relationships between metacognitive awareness of L2 reading strategies, L2 reading motivation, L1 reading comprehension, and L2 reading comprehension. In order to achieve this goal, structural equation modeling (SEM) was chosen for analysis of the collected data. Application of the structural equation modeling is especially useful in psychology research. In particular, SEM is a flexible statistical method that accounts for measurement errors, a feature not estimated in other statistical methods (e.g. multiple regression or analysis of variance). In addition, SEM is able to estimate the relationship between several latent and observed variables, which allows researchers to address several complex research problems (Geiser 2013; Wang & Wang, 2012).

The sample used by this study consisted of Egyptian and German university students native in Arabic and German (respectively) who were learning English as a foreign language. The choice of the English language was due to several reasons. Among them include the fact that English is becoming dominant in many aspects of life. It is the language of most international organizations and most scientific research, technical terms, international conferences, and electronic databases involve English. World-famous newspapers, television stations, films, airlines, multi-national corporations, and 90% of the material published on the Internet use English as their primary language. Many Arab countries have also seen a considerable increase in the number of private English language institutes, private schools offering intensive English courses (beginning as early as kindergarten), and private schools with international programs. Due to the increasingly dominant influence of English, a greater number of youth are currently seeking to learn English. English is taught as a foreign language in schools and universities in nearly every country (Al jarf, 2008). Taken together, English language proficiency has become a highly-valued lifelong skill required for students to access the resources needed for academic and vocational success (O'Sullivan, 2004).

Following the general introduction, **Chapter 2** provides a review of relevant literature. The first section presents definitions of reading comprehension, followed by a description of the distinctive features of L2 reading. The second section sheds light on the relationship between L1 and L2

20 Introduction

reading through a discussion on the Threshold Hypothesis, Interdependence Hypothesis, and the Interactive Model. The third section explores the different models of metacognition and their role in language learning and L2 reading comprehension. The fourth section addresses the role of L1 and L2 reading ability in reading comprehension. The fifth section discusses the relationship between L2 reading motivation and metacognitive awareness of reading strategies. The sixth and final section presents the hypothesized models of the relationships between metacognitive awareness, motivation, L1 reading comprehension, and L2 reading comprehension.

Chapter 3 presents the methodology used through five separate sections. The first section sheds light on the German and Egyptian educational systems. The second section presents the characteristics of the two samples. The third section describes the contents of the tools used in the current study, the translation procedures, the psychometric properties of the measurement tools, the statistical techniques used (CFA, SEM), and the data collection procedures.

Chapter 4 is divided into two main sections. The first provides the descriptive results regarding L2 reading motivation and perceived L2 reading strategies. The second section illustrates the results regarding the validation of the proposed structural models. A discussion of the most important results, suggestions for future research, and the pedagogical implications of the findings are presented in **Chapter 5**.

2. Theoretical Background and Literature Review

The present study was designed with the purpose of examining the relationships among four variables involved in L2 reading. These variables include: reading comprehension in the first language (L1), metacognitive awareness of L2 reading strategies, L2 reading motivation, and L2 reading comprehension.

The **first part** of this literature review presents the definitions of reading and reading comprehension, illustrates the differences between L1 and L2 reading, and introduces prominent reading models. The **second section** discusses the relationship between L1 and L2 reading, as theorized from three points of view: The Linguistic Threshold Theory, the Linguistic Interdependence Hypothesis, and the Compensatory Model. The **third part** reviews the awareness of reading strategies and establishes how this awareness is related to L2 reading. The **fourth part** is devoted to discussing the construct of reading motivation and describes the ways in which it is studied within L1 and L2 reading research. The **fifth section** concerns the hypotheses of the suggested models used to describe the relationship between the aforementioned variables.

2.1 Reading comprehension definitions

During their educational journey, students will deal with a plethora of written materials, both in digital and paper forms. In order for successful learning, they must acquire several skills. Two of the most essential skills they must master include: the grasping of meaning within written texts and the coherent understanding of written texts, also known as reading comprehension (Schiefele, Shaffner, Möller and Wigfield, 2012).

Reading is not statically acquired ability, but rather a set of skills, attitudes, and knowledge. These are developed by the learner throughout their life using their knowledge, experiences, and beliefs (Roeschl-Heils, Schneider & van Kraayenoord, 2003). In addition, reading is also affected by an individual's sociocultural context, which plays an important role in shaping a student's beliefs, attitudes, and motivation toward reading (Ilustre, 2011). Therefore, it can be difficult to construct one comprehensive definition of reading that captures all of the dimensions, processes, and variables influencing its outcome. Reading comprehension definitions vary from simple statements, such as, "*the process of perceiving and understanding written languages*" (Williams, 1996, p183), to more detailed definitions that focus on one or more contributing processes, such as,

"the comprehension that occurs when the reader extracts and integrates various information from the text and combines it with what is already known" (Koda, 2005, P.4).

According to National Institute of Child Health and Human Development (NICHD) (2000), reading comprehension refers to a construction of meaning of texts achieved through the interaction between readers' own ideas and the ideas transmitted by the text. This process is influenced by readers' vocabulary as well as the active use of reading strategies, and readers should

22 Theoretical background & literature review

be encouraged to set a purpose for reading that guides them in choosing the appropriate reading strategy. Snow (2002) defines reading comprehension as a process of extracting and constructing meaning through the active engagement of the reader with written texts. According to this definition, reading comprehension is a cognitive process that requires the active engagement of the reader with the text to create meaning from text.

Other definitions which emphasized the role of the reader during the reading process. For example, Grabe and Stoller (2013) defined reading comprehension as the ability to construct meaning from printed text and give a suitable interpretation of the newly acquired information. While Zhang (2010) conceptualized reading as a process of hypothesis construction in which readers interact with text, formulate predictions, use their previous knowledge to confirm or reject their hypothesis about the text. Eskey (2005) defined reading comprehension as an active, purposeful, and creative mental process in which the reader constructs the meaning of the text based on text information, relevant prior knowledge, feelings, and opinions that the reader brings with to reading task. In this process, readers actively engage in reading using various knowledge sources, either linguistic sources (through bottom-up processes) or schematic sources (through top-down processes) (Alyoussef, 2006). Accordingly, reading comprehension can be defined as the effortful process of the search for and construction of meaning, for which reader is responsible. It is a multifaceted activity where motivational components interact with cognitive and metacognitive processes to influence the development of comprehension of texts (He, 2008).

Taken together, reading comprehension requires that the readers interact with the text to extract its meaning and build his or her own comprehension of text. Successful comprehension of text is achieved through interaction between the reader, the text, and the reading activity. Furthermore, these interactions take place in a sociocultural context that influences both the reader's interest and the purposes of reading.

Another perspective of reading comprehension highlights the importance of a text's elements in the reading process. For example, Bernhardt (1991) indicated that reading comprehension is the active integration of new incoming information with a reader's previous knowledge. It is an interaction between text-based and reader-based components. On the other hand, Zoghi, Mustapha & Maasum, 2010 suggested that text comprehension depends not only on the interpretation of linguistic symbols, but also on using all text features (such as graphs and photos) to build a cohesive meaning of the text.

Grabe and Stoller (2013), however, indicated that an accurate definition of reading comprehension should also include the processes required in order to achieve reading. They indicated that fluent reading comprehension should be a rapid, efficient, interactive, strategic, flexible, evaluative, and purposeful process.

23 Theoretical background& literature review

2.1.1 Conclusion

Previously mentioned definitions revealed that reading comprehension is a complex process requiring students to dedicate time and effort in order to successfully achieve it. It is not merely an activity of text decoding, but rather requires higher order abilities to reach the meaning of the text.

Reading occurs through the interaction between various cognitive and linguistic skills. It begins with word recognition (which integrates new information into the reader's previous knowledge) and concludes with the creation of a coherent mental representation of the text. This process is motivated by the student's individual purpose for reading, which can impede or promote readers' reading engagement as well as determine the type of reading strategies that students will employ. However, the reading activity occurs in a certain educational and sociocultural context, which contributes to the shaping of students' beliefs, attitudes, and motivations toward reading.

Although these definitions were developed essentially to explain reading comprehension in a native language, they can be applied to L2 reading as well. L2 researchers depend on theories, instructional techniques, and practices for reading instruction adopted from L1 reading research, as the latter has a longer history of elaborated research. On the other hand, there are many common aspects of reading between L1 and L2 reading, and most are related to the cognitive processes underlying language learning. For example, all readers set goals for their readings, use reading strategies while reading, use their limited storage capacity of working memory, use their background knowledge to make inferences about texts, and so on. However, these processes vary in how they function across languages. For this reason, assuming that L1 and L2 reading are completely similar processes is a misleading assumption (Bernhardt, 2003; Grabe, 2009; Grabe& Stoller, 2013). The next section will present some of the differences that exist between L2 and L1 reading.

2.2 Reading in a foreign language

In most foreign language learning contexts, there are only rare chance for contact with native speakers of the target language, it is neither the language of instruction nor the official spoken language. In such a situation, developing L2 reading skills is of great importance. L2 reading plays a crucial role in vocabulary acquisition, grammar learning, and the gaining of cultural information. It also allows students access to a variety of L2 materials (e.g., books, magazines, newspapers, internet material, and websites) (Cecal, 2015; Jafari& Shokrpour, 2012). Learners use these materials either for personal enjoyment, academic work, or to gain everyday information from around the world.

Reading in a foreign language is more challenging than reading in a native language as it requires interaction between several cognitive processes, an interaction between first and second languages (Grabe, 2009; Hong-Nam& Page, 2014; Tsai, 2012), the contribution of several linguistic and cognitive processes (Li& Wang, 2010; Alderson et al., 2016; Sayg, 2012), and a greater consumption of time and effort (Pang, 2008). Koda (2007) described L2 reading as a cross-

24 Theoretical background & literature review

linguistic activity that involves frequent interactions between native and target languages. In this same manner, the development of L2 reading is influenced by both the mastering of the target language and the influence of the previously acquired native language. This can either facilitate or hinder the process of reading (i.e. the transfer effect, which will be discussed in the following sections). In the same realm, Zhang and Wu (2009) described L2 reading as an interactive process of meaning construction in which readers count on various resources and use several strategies with the goal of reading comprehension. Yukselir (2014) has pointed out that L2 reading comprehension is the result of interactions between text, context, reader characteristics, reader background, reading strategies, the native language, and the target language. Alternatively, Bernhardt (2011) integrated the contextual and psychological components of L2 reading by defining it as a complex social and psycholinguistic activity in which reading components and language components interact together and which should be treated as a new and different type of literacy.

Although reading is a universal activity, and the underlying cognitive processes remain consistent, limited linguistic resources can create a difference between L1 and L2 reading (Grabe, 2014). Koda (1994) put forth three features distinguishing reading in a native language from reading in a second language:

1. The L2 reader has previous reading experience from their native language.
2. The L2 reading is cross-linguistic
3. Readers can develop reading proficiency before acquiring oral proficiency.

Grabe and Stoller (2013) proposed that differences between L1 and L2 reading can be categorized in three different categories, namely: linguistic and processing differences, individual and experiential differences, and socio-cultural and institutional differences. Figure (1) summarize these differences

25 Theoretical background & literature review

Linguistic and processing differences	Individual and experiential differences	Socio-cultural and instructional differences
<ul style="list-style-type: none">• Differing amounts of linguistic knowledge at initial stages of L1 and L2 reading• Greater metalinguistic and metacognitive awareness in L2• Varying linguistic differences across any two languages• Linguistic interaction between L1 and L2	<ul style="list-style-type: none">• Differing motivations for reading in the L2• Differing amounts of exposure to L2 reading• Differing kinds of texts in L2 contexts• Differing language resources for L2 readers	<ul style="list-style-type: none">• Differing socio-cultural backgrounds of L2 readers• Differing ways of organising discourse and texts• Differing expectations of L2 educational institutions

Figure 1. Differences between L1 and L2 reading (Grabe & Stoller, 2013)

Linguistic and processing differences between L1 and L2 readers comprises the following points:

1. Differing amounts of lexical, grammatical, and discourse organization-related knowledge at the starting point of learning each language

Students begin gaining knowledge of their native language at a very young age through interaction with their socio-cultural environment. However, they still lack a developed conceptual knowledge of the world. In a different manner, L2 learners begin learning their second language at an older age, with, despite little or no linguistic knowledge of the target language, already-developed advanced conceptual knowledge. This background knowledge allows learners to make inferences about texts and compensate for a lack of linguistic knowledge (Grabe, 1991; Pang, 2008.). Thus, many L2 students face problems with inferring the meaning of new words due to the few linguistic resources they possess. Additionally, a lack of knowledge regarding discourse organization may also hinder a student's comprehension of text. Although the student might understand words and sentences, the lack of both knowledge on discourse and understanding of the way in which different texts proceed may cause comprehension problems.

2. Greater L2 metalinguistic and metacognitive awareness

Knowledge of a native language is an almost tacit knowledge that one might not be able to explain how it works explicitly. L2 knowledge, which students mostly acquire through classroom instruction, allows L2 learners to develop strong L2 metalinguistic and metacognitive awareness. In most L2 academic contexts, students begin learning to read in L2 once they have already developed literacy skills and conceptual knowledge in their L1. Consequently, they have greater awareness of the reading process and reading strategies.

26 Theoretical background& literature review

3. Varying linguistic differences across languages

The variation in linguistic features between first and second languages can influence reading comprehension. For example, Arabic words can be read more slowly than English words, as they are more morphologically complex, and hold embedded grammatical information. As a further example, there exists a difference in writing direction, as Arabic is written from right to left while English is written from left to right. Other linguistic features, such as cognates (shared vocabulary), and the level of transparency of a language may positively or negatively influence reading rates and reading fluency.

4. The linguistic interaction between the two languages

In L2 reading, there is an inevitable interaction occurring between previously acquired L1 reading skills and the target language being learned. These interactions, otherwise known as L1 transfer effects, can either support L2 reading comprehension or interfere with the new reading situation and lead to a misunderstanding of the text (Grabe& Stoller, 2013). This relationship between L1 and L2 reading will be discussed in greater detail in section (2.4)

Further individual differences between L1 and L2 readers that influence L2 reading comprehension include:

1. Differing motivations for L2 reading

Due to the different contexts in which L1 and L2 reading take place, it is expected to find a different pattern in learners' motivation, interests, and attitudes toward reading. These differences are shaped by academic demands from the instructional system, sociocultural influence, and former educational practices. Although these factors are important in determining students' willingness and engagement in reading, they lack sufficient study in the field of L2 reading. The topic of reading motivation and its relation to L2 reading will be discussed in section (2.6)

2. Differing amount of exposure to L2 reading materials

L1 readers deal with L1 texts daily, either within academic or non-academic contexts. However, many L2 students might not have the chance to frequently read L2 texts alongside their academic texts.

3. Different types of texts in L1 and L2 contexts

The limited exposure to texts written in the foreign language is related to the level of difficulty of these texts. In many L2 contexts, students tend to read relatively simple texts. In addition, L2 learners are less likely to be exposed to the full range of texts' genres, as many of these texts are read outside school contexts and not required as academic tasks. These differences in reading material length and authenticity might lead to a lower level of L2 proficiency.

27 Theoretical background& literature review

4. Different L2 language resources

One of the major differences between L1 and L2 reading is the use of certain linguistic resources unique to L2 reading. Among these are bilingual dictionaries, glossaries, translations, and cultural background resources in L2 contexts. Eskey notes that within this context “*learning to read in a second language not only entails mastering a new language in its written form, but also learning to engage in a new set of social practices that may conflict with those the reader is used to*” (Eskey, 2005, p.570).

Sociocultural and institutional differences

Aside from the linguistic and individual differences that distinguish L2 reading, there are cultural and social issues removed from the classroom context. These factors are:

1. Varying sociocultural backgrounds of L2 readers: L2 students may face difficulties in assimilating texts that discuss topics culturally different from their native cultural background. On the other hand, L2 readers better comprehend L2 texts that are culturally compatible with their native culture (Abu-Rabia 1996).
2. Differing ways of text and discourse organization: students should be aware of differences in discourse organization between the two languages.
3. Differing expectations of educational institutions: this factor deals with the influence of educational institutions, the amount of funding available for instructor training, and the educational resources that shape students’ learning experiences and attitudes toward reading.

To conclude, the differences between L1 and L2 reading originate from different cognitive, linguistic, affective, and sociocultural sources and reflect the interdisciplinarity nature of L2 reading research.

2.3 Models of reading

Definitions of reading vary according to researchers’ views on reading and its development in reading research. Correspondingly, various reading models have been suggested to explain this process. These models developed from initial models describing reading as a hierarchical process (i.e. bottom up and top down models) into models built based on accumulated research findings. These current, research-based models describe the interaction between the reader and the reading process. The following lines will review the two types of initial reading models.

2.3.1 Bottom-up Model

Bottom-up models present reading as a text-driven process occurring in a "series of discrete stages" where the reader is a passive receptor of incoming textual information (Singhal, 2008; Stanovich, 1980). According to this model, reading is a mechanical process for creating a piece-by-piece mental translation of text. Here the central role of the reader is to decode the visual input of text (Grabe& Stoller, 2013; Phakiti, 2006). In Bottom-up models, reading begins with the interpretation

28 Theoretical background & literature review

of the smallest linguistic units of text, their grouping into words (word recognition), the mapping of words into clauses and sentences, and the final accumulated interpretation of words into an understanding of sentences. This progresses to the full comprehension of a paragraph and, finally, a reader's understanding of the text's message. (Angosto, Sánchez, Álvarez, Cuevas & León, 2013; Burt, Peyton & Adams, 2003; Ozek & Civelek, 2006). These models speculate that there is little or no interaction between a reader's background and the text, and also suggest that reading occurs in a hierarchical fashion in which the attainment of any higher process depends on the accomplishment of previous lower order processes (Murtagh, 1989).

In the framework of the bottom-up model, Gough (1972) suggested a reading model that describes an efficient reader as fluent decoder who does not use contextual clues at all. This model indicates that reading is hierarchical process relying on letter-sound correspondences. A good reader should therefore be able to identify all letters of a word to extract the meaning of the word. They should also know all words in order to understand the entire meaning of the sentence. According to this model, good readers rely primarily on linguistic information provided by the text, and do not guess words. Gough considered word guessing a sign of reading problems, which occur only when the reader fails to decode a word quickly (in Nicholson, 1993).

This model emphasizes the importance of word recognition for reading success. This can be a problem for L2 learners (such as Egyptians and Germans), who might possess limited knowledge of vocabulary. This limited knowledge might lead L2 readers to rely more on local textual reading strategies rather than global ones. The shortcomings of Bottom-up models can be summarized in the following points:

- 1- Bottom-up models suggest that the core of the reading process is word by word decoding, which would require great time and effort, and turns reading into a tedious process for readers.
- 2- Word by word decoding would lead to an overloading of Short-Term Memory with an amount of information that exceeds its storage capacity. Consequently, large amounts of information might be forgotten quickly.
- 3- These models ignore the contribution of a reader's background knowledge. They presume that readers are merely receptors of a text's information and do not play an active role in the reading process. This assumption contradicts the Schema theory, whose research results indicate that previous knowledge influences students' retrieval of information and reading comprehension. For example, Bensoussan (1998) found that 23% of English as a foreign language (EFL) learners' incorrect answers to comprehension questions were caused by activating inappropriate schemata.
- 4- These models do not explain how higher-level process influence lower levels. They presume that reading occurs in a linear fashion from lower to higher order processes, which does not reflect the true nature of reading (Ahmadi, Ismail & Abdullah, 2013; Grabe & Stoller, 2013).

2.3.2 Top-down models

These models characterize reading as reader-driven and place great importance on readers' knowledge, interests, and reading strategies. In these models, the reader, rather than the text, is the heart of the reading process. According to this view, the reading process is driven by higher-level processes which direct the flow of information through lower-level processes, contrary to the previous model, which indicates that word decoding is the main source of extracting textual information. In these models, the reader has a more active role, as reading outcome depends on the hypotheses built and tested by readers. A reader forms hypothesis about the text and samples information from the text to confirm, modify, or reject these hypotheses. In this process, readers use the fewest and most relevant elements of texts and do not decode every single term present. (Singhal, 1998; Stanovich, 1980). In other words, the text does not have a meaning in itself, but rather a meaning that is constructed by the reader.

One of the prominent top-down models is the Psycholinguistic Guessing Game Model. It was first proposed by Goodman in 1967. According to the Psycholinguistic Guessing Game Model, readers "attack" the text with expectations before reading, activating their schematic knowledge of the world and text components in order to generate intelligent guesses regarding the text meaning. This process is directed primarily by readers' goals, expectations, and the strategic processing controlling the comprehension process. To formulate their guesses about texts, readers employ three levels of a cue system: the graph phonetic level (recognition of visual and phonetic characteristics of input), the syntactic level (knowledge of syntactic rules), and the semantic level. (Eskey, 2005; Goodman, 1967; Tavakoli, 2014).

According to this model, the reader does not have to read the entire text for comprehension. The According to Goodman (1973), skilled readers use few linguistic cues in order to make their predictions and generate hypotheses regarding the text, they rather choose the required information to create their hypothesis about the text.

Reading starts at the sentence level; readers use both their background knowledge and information from a text to test whether new information fits their predictions about the reading materials. Goodman suggests that readers' errors do not interfere with comprehension, because readers read for the whole meaning of text and not for the identification of specific words. In fact, Nicholson (1993) demonstrated in his experiments that children faced trouble in predicting the meaning of certain words when they were replaced by a simulated error, yet they were still able to understand the text at the discourse level.

Top-Down models have faced a number of criticisms:

- 1- Fluent readers can recognize words in a few hundred milliseconds. Consequently, according to this model, generation of hypotheses should occur in a shorter time, which seems unlikely to happen.
- 2- These models do not provide sufficient explanation for the reading processes of poor readers.

30 Theoretical background & literature review

- 3- The number of possible hypotheses generatable by semantic and syntactic clues can place a great load on memory (Murtagh, 1989; Stanovich, 1980).
- 4- There is insufficient evidence for the claim that readers guide their eye movements toward specific elements of texts. Eye movement research had indicated that fluent readers achieve high comprehension not because they make fewer eye fixations or read fewer words of texts, but because they can identify most words rapidly and automatically (Grabe, 2009). In this regard, Stanovich (1981) described skilled readers to be “efficient processors” because they are able to process complete text using few cognitive resources.
- 5- These models underestimate the role of bottom-down processes and do not reveal how they interact with higher-order processes.

2.3.3 The Interactive Model

The two aforementioned models represent extreme opposite standpoints that researchers currently do not adopt. Rather, they are viewed as complementary to each other during the process of reading. Kintsch (2005) explains,

“both top-down and bottom-up processes are integral parts of perception, problem-solving, and comprehension. Without sensory input (bottom-up) we could neither perceive, nor comprehend, nor think. However, perception, comprehension, and thought would be equally impossible without a memory or knowledge component (top-down). It makes no sense to ask whether one is more important than the other: nothing happens without both. So, the question for the theorist is not top-down or bottom-up, but how do these processes interact to produce fluent comprehension.” (P.126)

This model is based on the assumptions that both bottom-up and top-down processes are equally important, and that word recognition makes use of both processes equally (Seng & Hashim, 2006; Grabe 1991). The term ‘interactive’ refers to two types of interactions:

- 1- General interaction between the reader and the text where the reader uses prior knowledge to build meaning from text.
- 2- The interaction between lower-level automatic linguistic skills and higher-level comprehension skills (Grabe, 1991; Tavaloki, 2014).

Although this model would appear to be a compromise solution, research has shown that neither inference nor context information has an influence on automatic word-recognition. In addition, eye movement has consistent automatic patterns which even a fluent reader does not control (Grabe, 2009). Due to these limitations, recent research refers to restricted interactive models such as Perfetti Verbal Efficiency Model. These models posit that information is shared across various processes, but that as processes become more automatic, they rely less on the information found across different levels. Rather, they then tend to rely more on information from within the same level. For example, word recognition entails interaction between phonological, orthographic, and

31 Theoretical background & literature review

semantic information, but does not rely on other information resources, such as inferencing or contextual clues.

The previously reviewed models describe the basic assumptions of how reading works. Although these models can serve as a primary foundation for understanding the reading process, they simplify the reading process, ignore other contributing variables, and disregard the interaction between educational/social contexts and reading. Therefore, they do not represent the most current views on reading.

The following section presents the reading models currently adopted by most reading researchers. These are supported by empirical evidence, highlight further features of reading mechanisms, and acknowledge the interaction between reading and other related variables.

2.3.4 The Interactive Compensatory Model

In 1980, Stanovich first proposed the Interactive Compensatory Model of reading as a result of the debate between Bottom-Up and Top-Down models. This model is based on the interactive models previously mentioned, but also include an added compensatory mechanism. Stanovich indicated that reading is essentially a bottom-up process and that the reader only uses top-down techniques when they face problems in decoding the input information (Nicholson, 1993). Stanovich (1980) further argued that higher-level processes do not necessarily depend on the completion of lower-level processes. In addition, in some situations, poor readers can even rely more on inferencing than good readers, contradicting the top-down hypothesis that "reading becomes more conceptually driven as fluency develops".

The essence of the compensatory hypothesis is that

"a deficit in any knowledge source results in a heavier reliance on other knowledge sources, regardless of their level in the processing hierarchy. Thus, according to the interactive-compensatory model, the poor reader who has deficient word analysis skills might possibly show a greater reliance on contextual factors." (Stanovich, 1980, P.63).

The Interactive Compensatory Model considers reading bi-directional in nature, involving the interaction between bottom-up and top-down processes (Tavakoli, 2014). Therefore, readers with poor word recognition skills can compensate for this weakness by relying on, for example, contextual clues. On the other hand, in fluent reading contexts, readers' lower level processes operate automatically, and they then depend less on contextual clues (Grabe, 2009).

2.3.5 The Constructive-Integrative Model

This model was proposed by Kintsch and van Dijk in the mid-1970s. They introduced the propositional analysis as an essential base for meaning construction. The Constructive-Integrative Model suggests that a text's meaning is constructed by combining linguistic input with a reader's knowledge in a coherent representation of text. Accordingly, this model illustrates that there are two types of text representation: text models and situation models.

32 Theoretical background & literature review

The text model refers to the text's content. It is the representation of the main and supporting ideas discussed in the text. It is conceptualized in two levels: sentence-level ideas (microstructure) and discourse level (macrostructure). The text-based representation of text refers to the linguistic level of the text's representation; the words and sentences are the "raw material" for building a text-based representation of text. These sentences are connected together in one network of text ideas, and some of these ideas are retained in the network while others might fade. The retention of ideas depends on the role they play in explaining new information or in supporting inferences. When readers use certain ideas repeatedly to create meaningful connections in the network, this repetition helps to keep the ideas active and protect them from fading, while less used information tends to be excluded from the network. Once the readers begin to integrate the text model with their own background knowledge and begin interpreting information based on their goals, interests, attitudes, prior knowledge, and task purpose, the **situation model** is created. In a situation model, the text loses its individuality in order to become part of a larger structure. It reflects the readers' ability to understand the author's message and to give his or her own explanation of information.

The naming of the model reveals the most prominent features of building a mental representation of the text's content: construction and integration. The construction process entails several operations: activating words' meanings, inferencing, and using background knowledge in order to create the propositional structure of the text content. It refers to an automatic bottom-up processing of activated connections. In this phase, the reader generates information from the text through word recognition, syntactic parsing, and proposition construction. While in the integration phase, the reader builds a situation model of text representative of the reader's own understanding of the text content. In this phase, background knowledge plays an important role in connecting the extracted propositions. These propositions are consolidated by adding them into a coherent representation as part of text situation model. Any irrelevant or weakly activated information are subsequently deleted. (Kintsch, 1988; Grabe, 2009; Lenhard, Baier, Endlich, Schneider & Hoffman, 2013).

2.3.6 The Simple View of Reading

Gough and colleagues (Gough & Tunmer, 1986; Hoover & Gough, 1990) presented the Simple View of Reading to illustrate the principal factors influencing reading comprehension among children. This model describes reading as a product of word recognition and comprehension abilities and is based on a statistical assessment argument. It suggests that reading comprehension is predicted by a simple equation: $R = D \times C$; where R is reading comprehension, C is word recognition ability as measured by decoding, and D is comprehension ability as measured by listening comprehension. Decoding refers to the ability to interpret printed letters into phonetic codes, while linguistic comprehension is defined as the series of procedures that use lexical information to reach sentence and text comprehension (Hoover & Gough, 1990; Grabe, 2009; Proctor, Carlo, August & Snow, 2005).

Other researchers (Dreyer & Katz, 1992) have suggested that the relationship between word decoding and listening comprehension is additive ($R = D + C$) rather than multiplicative. Dreyer

33 Theoretical background& literature review

and Katz tested their modified version of the Simple View of reading, using the data from 137 English-speaking third-grade students. Regression analysis results indicated that the sum of both word decoding and listening comprehension account for much variance in reading comprehension.

In all cases, the product score of decoding and listening comprehension measures is used in a regression equation in order to predict students' reading comprehension. The model assumes that when readers have achieved a high level of decoding skills, listening and reading comprehension will be highly correlated. Therefore, each skill is presumed to be essential for reading comprehension yet, on its own insufficient for successful reading. According to this view, there are other variables affecting reading comprehension. However, the essential sources that shape reading are word recognition and comprehension abilities (Grabe, 2009).

The previous section revealed that, in the field of reading, great effort has been made towards the goal of defining and studying the reading process. It is clear that a comprehensive model of reading is difficult to test. Although reading models were developed in the context of L1, they have also been used to explain L2 reading, owing to the absence of a suggested reading model dedicated to explaining L2 reading. Additionally, it is believed that L1 and L2 reading share the same essential processes. However, only one general descriptive model has been proposed to explain L2 reading, first by Bernhardt 1991. (1991; 2000; 2011). However, the motive of this model was primarily to explain the relationship between L1 and L2 reading, as this represents one of the most debatable areas in L2 reading. The next section will begin by presenting the two-leading hypothesis describing the relationship between L1 and L2 reading abilities and will conclude with an overview of Bernhardt's Compensatory model.

2.4 The relationship between L1 and L2 reading

Beginning with Alderson in 1984, many L2 researchers have raised the question of whether difficulties in L2 reading are indeed an issue of reading or rather related to language problems. Consequently, many L2 researchers began investigating the relationship between L1 reading skills and L2 reading. As indicated in the previous section, the transfer effect between L1 and L2 reading is a distinguishing feature of L2 reading. As a result, it is this relationship that is largely studied in L2 reading research. Alderson proposed that L2 reading difficulties are both a language and a reading problem. However, it is possible that it can be more of a language problem in students with low L2 proficiency levels. (Alderson, Nieminen & Huhta, 2016).

Two hypotheses have been suggested to deal with the possibility of cross-language transfer: The Linguistic Interdependence Hypothesis (or reading universal hypothesis) and the Linguistic Threshold Hypothesis (or short circuit hypothesis). Understanding the nature of cross-language transfer enables us to identify the conditions under which readers face difficulties, or, alternatively, act as a facilitator for reading

2.4.1 The Linguistic Threshold Hypothesis

Clarke (1979) first introduced the notion of a "language threshold", or language ceiling, within a hypothesis suggesting that the key factor in reading activities is language (Bernhardt & Kamil, 1995). It can be defined as the level at which the relationship between L1 and L2 reading ability increases and at which the transfer of reading skills occurs (Lee & Schallert, 1997). This hypothesis further suggests that learners must first develop sufficient knowledge of L2 vocabulary and grammar before they are able to transfer their previously acquired L1 reading skills. Otherwise, a lack of L2 knowledge could short circuit the transfer of L1 reading ability (Van Gelderen, Schoonen, Stoel, De Glopper, & Hulstijn, 2007). Alderson (1984) also indicated that good L1 readers would be able to read well in L2 once they acquired a certain threshold of L2 language ability. Alderson believed that the transfer of L1 reading skills does not occur automatically. There is a certain level of L2 knowledge that must be acquired before L1-L2 transfer can occur. According to Alderson, "*Poor foreign language reading is due to reading strategies in the first language not being employed in the foreign language, due to inadequate knowledge of the foreign language. Good first-language readers will read well in the foreign language once they have passed a threshold of foreign language ability*" (Alderson, 1984, P.4).

This hypothesis claims that L2 reading problems are mainly caused by limited L2 linguistic knowledge, which then results in a '*short circuit*' in L2 reading comprehension skills. Accordingly, even L1 proficient readers may encounter problems when reading in L2, if they fail to reach the required linguistic threshold. However, to date, this language threshold has not been determined. The concept of a threshold is rather vague. Alderson asked, whether this threshold refers to the minimum level of L2 language ability at which L1 reading ability starts to transfer? Or whether it refers to the level at which L1 reading ability becomes more important than L2 proficiency? Or does it refer to the level at which L1 reading ability is the only predictor of L2 reading? (Alderson, 1984). In fact, it is difficult to assign a certain level that students should reach in order to begin

35 Theoretical background & literature review

transferring their L1 reading skills, and this threshold level varies from one task to another. When students read a simple text that matches their L2 proficiency level, they will be able to transfer their L1 reading skills to the new task. However, when students do not have the required L2 knowledge, they are below their threshold level and are not able to benefit from L1 reading resources. Thus, it is difficult to determine a certain threshold level, as it depends on the different demands of tasks; the more demanding the task is, the higher the linguistic threshold (Lee & Schallert, 1997).

Yamashita (2001) suggested the existence of three levels of the linguistic threshold: the fundamental, the minimum, and the maximum level. In the fundamental level, L2 knowledge is limited and does not contribute to explaining L2 reading. There is no relationship between L2 knowledge and L2 reading ability. In the minimum level, L2 knowledge begins to contribute to explaining L2 reading. However, L1 reading ability still remains incapable of transferring to L2 reading. In the previous levels, the variation of L2 reading can be explained by L2 language ability. When students reach the maximum level, both L2 language ability and L1 reading ability contribute to explaining L2 reading. In this level, the contribution of L1 reading ability increases, while the role of L2 knowledge declines. In this level, readers have developed native-like L2 reading ability. Therefore, a variation of L2 reading is explained solely by L1. However, no empirical research has supported the existence of this level.

L2 reading researchers have investigated the concept of the Threshold Hypothesis by investigating the relationship between L2 knowledge, L1 reading ability, and L2 reading comprehension. Carrell (1991) conducted a study to investigate the role of L1 reading ability and L2 language proficiency in L2 reading comprehension among 45 English learners of Spanish and 75 Spanish learners of English. Regression results indicated that both predictors explained 35% of Spanish reading for English native group and 53% of English reading in the Spanish native group. Interestingly, their relative importance varied between foreign and second language learners. For foreign language learners, L2 (Spanish) proficiency explained a larger portion of variance than L1 reading ability did, whereas for second language (English) learners, the opposite result was found. Carrell indicated that this difference could be attributed to several reasons, such as different environments (foreign, second language), differences in the directionality of learning (L1 English to L2 Spanish vs. L1 Spanish to L2 English), small sample size, or differences in proficiency levels (the proficiency levels of Spanish speakers ranged from intermediate to advanced, while the proficiency levels of English speakers ranged from beginner to intermediate).

Bossers (1991) investigated the relationship between L1 reading, L2 language proficiency, and L2 reading comprehension among 50 native Turkish learning Dutch. The results revealed that both language proficiency and L1 reading explained about 73% of the variance in L2 reading; L1 reading explains 19% and L2 proficiency explains 54% of L2 reading. Bossers further explored the difference between the proficient and less proficient L2 students. He found that L2 knowledge was a significant predictor of L2 reading among the least skilled readers while L1 reading did not

36 Theoretical background & literature review

reach a significance level. On the other hand, L1 reading was the only significant predictor of L2 reading among the most skilled readers.

In a sample of American students at the United States Air Force Academy learning Spanish ($N=167$), Bernhardt and Kamil (1995) examined the relationship between L1 and L2 reading. The sample represented different Spanish proficiency levels: beginning, intermediate, and advanced. Researchers administered two tests of English reading comprehension and one test of Spanish reading comprehension to 130 students studying Spanish. The results indicated that L1 reading explained 10-16% of L2 reading variance, while L2 proficiency accounted for 30-38% of the variance in L2 reading. Hence, L2 reading difficulties can be considered both a reading and a language problem.

A similar result was found by Taillefer (1996) who tested the Threshold Hypothesis in a sample of 53 French university students. The participants were divided into two groups: low and high L2 proficiency. Students were asked to read English texts and to answer agree-disagree questions (e.g. "Would the author agree or disagree with the following points?") and then create a summary of the text. Regression analysis indicated that L1 reading ability and L2 proficiency were significant predictors of L2 reading. Both variables explained 15% of reading to scan and 35% of receptive reading. Nonetheless, results also revealed that L1 reading ability explains more variance than L2 language proficiency on less demanding tasks.

Taillefer conducted further regression analysis based on L2 proficiency level. Results revealed that in the high proficiency group, L1 scanning competence was the only significant predictor of L2 scanning proficiency and accounted for 42% of its variance. In the low proficiency group, none of the variables could significantly predict L2 scanning proficiency. For the receptive reading task, highly proficient L2 readers appeared to depend more on their L2 proficiency than L1 reading ability. Both variables explained 20% of L2 reading variance. In the low proficiency group, neither of the two variables were significant. Results indicated that both L1 reading ability and L2 proficiency significantly affect L2 reading comprehension, but with different degrees according to the task nature. Due to the non-significant effect of variables in the low proficient group, Taillefer could not fully support the developmental pattern of relationships between L1 and L2 reading variables, and thus the results of the highly proficient group only partially support the Threshold Hypothesis.

However, other researchers have tried to prove the existence of Threshold Hypothesis by comparing the correlation coefficients between high and low proficiency students. Lee and Shallert (1997) found a difference in the relationship between L1 and L2 reading according to L2 proficiency level among Korean students from middle and high schools ($N=809$). The authors used three measures: an English language proficiency test (vocabulary and grammar), an English reading comprehension test, and a Korean reading comprehension test. Regression analysis indicated that L1 reading and L2 proficiency were significant predictors of L2 reading comprehension. They were able to account for 62% of the variance of L2 reading comprehension.

37 Theoretical background & literature review

Simple regression analyses with each predictor revealed that 57% of the variance in L2 reading was accounted for by L2 proficiency, while 30% of the variance in L2 reading was accounted for by L1 reading ability when Participants were classified into 5 groups according to their L2 proficiency level. Correlation analysis revealed low but significant correlations between L1 and L2 reading in the low proficiency groups. In highly proficient groups, the relationship between L1 and L2 reading was stronger. The authors concluded that when students reach a higher level of L2 proficiency, they become able to transfer reading strategies from L1 to L2 reading, which supports the presence of a certain linguistic threshold. These findings are echoed in a one year-longitudinal study conducted by Pichette, Segalowitz, and Connors (2003) on 52 Bosnian students learning French as an L2. Results revealed that for the highly proficient L2 group, the significant predictor of L2 reading ability was L1 reading ability, while in the less proficient L2 group, the significant predictor was L2 language knowledge. Similar results were found by Song (2001) when investigating the relationship between L1 reading skills and L2 reading comprehension among 424 Korean university students. Participants were divided into six groups according to their level of L2 proficiency. Correlation analysis indicated that L1 and L2 reading were weakly correlated in the two lowest level groups ($r = -.13$, $r = .07$), while they were strongly associated for the two highest groups ($r = .62$, $r = .67$).

Morvay (2015) examined the relationship between L1 reading ability, non-verbal L1 skills, and L2 reading comprehension. The participants were 65 Slovakian high school students. The author used the Michigan Listening Comprehension Test to assess knowledge of English grammar through listening, the Gates-MacGinitie Reading Test, and Hungarian National Reading Competency Measure. Correlation analysis indicated that L1 reading comprehension correlated significantly with L2 reading comprehension ($r = .38$). The author conducted a regression analysis on low proficiency and highly proficient readers. Results indicated that L1 reading comprehension was a significant predictor of L2 reading comprehension, but only at a higher proficiency level.

To summarize, previous findings have revealed that there is a low to moderate strength relationship between L1 and L2 reading, while other studies using think-aloud protocols have found strong relationships between the two. The differences in proportions of variance in L2 reading as explained by L1 reading ability could be caused by differences in: the equivalence of the measures of L1 and L2, the levels of L1 skills at time of exposure to L2, the age of the learners, or the heterogeneity of L1 and L2 proficiency levels (Gebauer, Zaunbauer & Möller, 2013). However, other researchers believed that L1 reading ability shares common underlying linguistic mastery with L2 reading, even at the beginning of L2 learning. This perspective is discussed in the following section.

2.4.2 The Linguistic Interdependence Hypothesis (Developmental Interdependence Hypothesis)

According to the Linguistic Interdependence Hypothesis, literacy instruction in one language leads to the development of greater proficiency in independent conceptualization and cognitive tasks. This development is language dependent and transfers across languages. Bernhardt (1991) suggested that L2 readers do not have to replay the "*reading game*" when reading in their native language. On the other hand, Goodman (1970) and Cummins (1981) posited that literary abilities (such as the universal ability to read and write), once learned, can be applicable in an L2 context. Cummins (1981) argued that certain language skills can be transferred and contribute to the development of another language. He criticized the separation between L1 and L2 language proficiency, explaining that considering the two languages as separated leads to the assumption that mastering one language hinders the development of the other, a concept which is incorrect. He illustrated our brain's available space for language as a balloon. If this space is divided between two languages and only one balloon is blown up, this results in a decrease in the available space for the other language. In order for the two languages to develop properly, this space for literacy development should not be separated, and hence L2 learners can benefit from proficiency in one or both languages.

This hypothesis assumes that this transfer occurs due to the existence of a common underlying proficiency for language mastery, also known as the Cognitive Academic Language Proficiency (CALP). This common proficiency refers to the existence of shared literacy skills which, once they are learned, may transfer across languages. While various superficial aspects (such as pronunciation) are distinct and language-dependent, L2 readers only require slight accommodations to the specific features of L2 orthography and grammatical structures. (Goodman, 1970). Cummins (1981) used the dual iceberg analogy to describe the common underlying proficiency. (Figure 2).

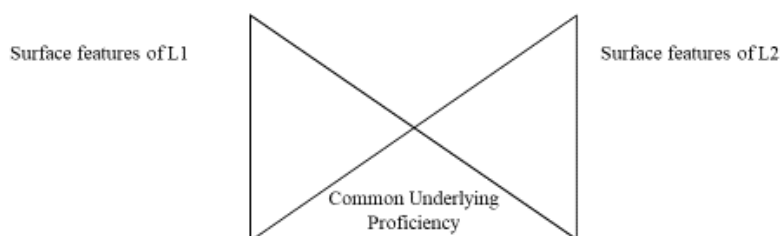


Figure 2. Representation of the common underlying proficiency (Cummins, 1981)

On the surface, two icebergs can be seen, but underneath, they share the same base. He explained that if the reader is well instructed in their L1, this proficiency will transfer to the L2, provided

39 Theoretical background & literature review

there is both suitable exposure to the L2 (either in school or the environment) and adequate motivation to learn the L2. The Common Underlying Proficiency Hypothesis or Linguistic Interdependence Hypothesis imply that reading in the second language depends largely on reading ability in the first language.

Bernhardt and Kamil (1995) summarized Cummins view in the following lines

"This hypothesis posits that language operations such as reading and writing are transferable and intertwined, that is, second language skills are only superficially distinct and that at some fundamental core they are interdependent or are in actuality the same. Further, once a set of language operations has been acquired, they will also be available within second language contexts. According to this hypothesis, when a language operation such as reading and writing has been acquired in a language, the same operation is not 'reacquired' in a second. The operation is simply available upon need" (P.17).

Hence, this universal view of reading entails the existence of a cognitive and neuro-anatomical network that is readily available when reading in different languages. This suggests that reading requires certain competencies, such as reading strategies and metacognitive knowledge of reading, which do not vary across languages (Van Gelderen, et al., 2007; Jiang, 2011).

Based on the Interdependence Hypothesis, Sparks and Ganschow developed the Linguistic Coding Difference Hypothesis, which implies that there is a common language learning mechanism. Consequently, a problem in one component of language will have a negative influence on both L1 and L2 learning. Sparks and colleagues' studies have indicated that L2 learners with stronger L1 skills possess stronger L2 aptitude and L2 proficiency. They also speculate that students who have difficulties in their native language may have a shortage in metalinguistic skills (Sparks, Artzer, Ganschow, Siebenhar, Plageman & Patton, 1998; Sparks, Patton, Ganschow & Humbach, 2009; Sparks, 2012; Sparks, Patton, Ganschow & Humbach, 2012).

Kahn-Horwitz, Shimron, and Sparks (2005) indicated that despite the difference between Hebrew and English orthographies, there was an influence from L1 reading to L2 reading comprehension. Phonological, orthographic, and morphological processes were strong predictors of EFL reading comprehension. Both L1 and EFL reading-related skills contributed to the successful prediction of EFL reading comprehension. In addition, Koda (2007) indicated that at the word-recognition level, L1 can have a transfer effect on L2 reading. This transfer requires that students have already achieved a high level of L1 reading ability (almost automatic word recognition). In addition, this transfer effect does not end at a certain level of L2 proficiency, but rather continues to develop with the development of L2 reading ability.

Another perspective for the relationship between L1 and L2 reading has been suggested by Wallter (2004, 2007). She described the concept of transfer between L1 and L2 as misleading and argued that individuals gain access to an already existing non-linguistic skill. Comprehending texts is not a linguistic skill. Rather, it is a general skill that develops independently from L1 and readers

40 Theoretical background & literature review

therefore gain access to this skill either through L1 or L2 texts. Her argument was based on Gernsbacher's (1990) Structure Building Framework model. This model suggests that reading occurs through three processes

1. Laying the foundation for the mental structure. This is triggered by the first element in the text (e.g. first word or sentence).
2. Mapping new information in a developing structure. When the new information is coherent with the structure, it activates and connects the same memory nodes.
3. Shifting to build a new structure. When the new information does not match the existing structure, a new structure is constructed that is linked to the foundation but not to the previous structure.

Accordingly, skilled readers select appropriate information and build large cohesive hierarchical structures in which each piece of new information activates preceding related elements. On the other hand, poor readers fail to suppress irrelevant information and tend to shift between substructures and build less cohesive, less accessible structures. In L2 reading, when the text is suitable for a learner's proficiency level, they will be more able to build a cohesive mental structure and remember the information effectively.

To summarize, according to the Interdependence Hypothesis, L2 reading can be described as incorporation of twofold language processing abilities (Grabe, 2009). Several longitudinal and cross-sectional research findings have supported the concept that literacy skills developed in one language can strongly predict corresponding skills in another language (Verhoeven, 1990). A number of these research topics are reviewed in the following lines.

Sparks and colleagues conducted a number of longitudinal studies over 10 years in order to investigate the relationship between L1 literacy, oral language skills, and L2 (French, German, Spanish) proficiency. In the first study, results indicated that measures of L1 literacy in elementary school explained 40% of the variance in L2 oral and written L2 proficiency in high school. Additionally, measures of L1 literacy (reading, spelling), receptive vocabulary, and verbal ability in elementary school explained 73% of the variance of L2 aptitude in 9th grade. Correlation between L1 skills and L2 aptitude increased from 1st through 5th grade (Sparks, Patton, Ganschow, Humbach & Javorsky, 2006).

In the second study, the authors found that the most significant predictor of L2 decoding in 10th grade was the measure of L1 decoding skill that was administered in elementary school. The best predictors of L2 spelling were L1 spelling and L1 phonological awareness skills (Sparks, Patton, Ganschow, Humbach, & Javorsky, 2009). Another longitudinal study aimed to determine whether L1 reading and spelling skills in primary school would predict L2 reading and spelling skills in high school. The results indicated that the best predictor of L2 reading comprehension in high school was L1 reading comprehension in elementary school (Sparks, Ganschow, & Patton, 2008).

41 Theoretical background & literature review

Another study conducted by Sparks and colleagues (2012) investigated the contribution of L1 reading in explaining L2 reading comprehension. Predictor variables included measures of L1 skill, L1 academic aptitude, L2 aptitude, and L2 affect. The participants ($N=54$) had been followed from 1st to 10th grade. The authors then reported the results of students at the 10th grade. L1 reading comprehension was measured by the Formal Reading Inventory (forms A and B). In order to measure L2 reading comprehension, students read a one-page letter written in their L2 and answered 10 multiple choice questions in English. Regression analysis indicated that L1 reading achievement is a significant predictor of L2 reading comprehension and explains 6.2% of its variance (Sparks, et al., 2012).

Van Gelderen and colleagues conducted studies on Dutch students to investigate the relationship between L1 and L2 reading skills. The first study was conducted over two years with 281 Dutch secondary school students (from 8th to 10th grade). The authors investigated the role of vocabulary knowledge, grammar knowledge, word recognition speed, sentence verification speed, and metacognitive knowledge in explaining English (L2) reading comprehension. Two SEM models were hypothesized. The first was conducted without regressing L2 reading comprehension on L1 reading comprehension, in the second this relationship was added. Comparison between the two models indicated a significant increase in model fit in favor for the second model. This increase supports L1 reading comprehension as an important predictor ($\beta=.85$) of L2 reading comprehension (Van Gelderen, Schoonen, De Glopper, Hulstijn, Simis, Snellings & Stevenson, 2004).

The second longitudinal study investigated whether the relationship between L1 and L2 reading increases with time. Participants included 389 Dutch students; their reading skills were measured from 8th to 10th grade. Results revealed a significantly positive correlation between L1 and L2 reading comprehension across the three grades. Researchers indicated that this result supports the Transfer Hypothesis. Students used their L1 reading skills in L2 reading from the beginning of L2 learning and continued to do so in the following two years. Van Gelderen's longitudinal studies indicated that L1 reading comprehension could explain about 70% of L2 reading comprehension. In the 8th grade, students did not yet reach high levels of L2 linguistic or grammatical knowledge. However, there was a high correlation between L1 and L2 reading comprehension, which contradicts the Threshold Hypothesis. The sample consisted of 49 Hispanic 6th grade students. Results suggested that L1 reading comprehension in grade five was the best predictor of L2 reading achievement in grade six (Van Gelderen, et al., 2007). This result supports the Transfer Hypothesis as to long-term transfer effect between L1 and L2. From the previous mentioned two studies, it can be noticed that the use of correlational studies may have underestimated the role of L1 reading comprehension in explaining L2 reading comprehension and that the lack of similarity between L1 and L2 reading tasks might be a reason for low/moderate correlation between L1 and L2 reading skills.

42 Theoretical background & literature review

In a longitudinal study conducted on 303 Latin kindergarteners in the United States, Lindsey, Manis, and Bailey (2003) investigated the role of Spanish reading measures (e.g. phonological awareness, rapid serial naming) in predicting English reading skills (phonological decoding in English and word identification). Researchers examined the relationship between the variables at three time-points in kindergarten through 1st grade. Reading comprehension for English and Spanish were measured by the end of the 1st grade. Results revealed that all English variables correlated with Spanish reading measures, and there was a significant correlation between Spanish and English reading comprehension ($r = .61$).

Verhoeven (1990) examined the development of biliteracy in 138 1st grade Turkish students in the Netherlands. One group of children participated in an L2 submersion curriculum in which they received L2 literacy instruction before L1. The other group acquired L1 literacy skills first and then L2 literacy. Results indicated that L2 literacy results tended to be better in transitional classes where L1 is taught first. Moreover, it was found that students in transitional classes developed a more positive orientation toward literacy in L1 and L2.

Gebauer, Zaunbauer, and Möller (2013) conducted a longitudinal study on 220 German students in an English immersion program from 3rd to 4th grade. They assessed reading comprehension and Reading Fluency in both German and English. Reading comprehension in German was assessed by administration of the Hamburg Reading Test for 3rd and 4th graders, while English reading comprehension was measured by the Grasshoppers subtest of the Test of Reading Comprehension. The first test consisted of passages or graphs that students read and used to answer multiple choice questions, while the latter required that students first read a passage and then fill gaps in another text within the same topic. The SEM model displayed a good fit to the data (CFI = .94, TLI = .93, RMSEA = .08). SEM revealed that English reading comprehension in 3rd grade was moderately predictive of German reading comprehension in 4th grade ($\beta = .38$). In addition, German reading comprehension in 3rd grade was a significant predictor of English reading comprehension in 4th grade ($\beta = .21$). These results support Cummins (1998) suggestion that there is a reciprocal transfer effect between L1 and L2 skills and not only a one-way transfer. However, the authors pointed out that their results might be affected by the nature of immersion program from where their sample was derived.

Taken together, the previously-reviewed longitudinal studies revealed the existence of the transfer effect between first and second language reading across time. Other researchers tested this relationship in cross-sectional studies. For example, August (2006) investigated the relationship between both L1 reading and L2 grammar and L2 reading among 55 Spanish ESL university students. The regression analysis revealed that both variables were significant predictors of L2 reading comprehension. However, the contribution of L1 reading was greater than of L2 knowledge. Similarly, Fecteau (1999) found that among 24 French language learners, only L1 reading recall was a significant predictor of L2 reading recall. With regards to L2 proficiency, both variables explained 48% of the variance in L2 reading recall. Fecteau indicated that L1 and L2 reading abilities are strongly interrelated among proficient French learners.

43 Theoretical background & literature review

Correspondingly, Brisbois (1995) examined the relationship between L1 reading, L2 knowledge, and L2 reading comprehension among 131 beginning and advanced French-learning English native speakers. L1 reading comprehension was assessed via two tasks: The Nelson-Denny Reading Test and written recall protocols. When using the Nelson-Denny Reading Test scores, all three variables contributed significantly to L2 reading for beginners. L1 explained 5.71% of L2 reading scores. On the other hand, none of these variables showed a significant prediction of L2 reading for the more proficient students. When using the recall protocol scores, L1 reading was the major contributor to L2 reading for both groups. For the upper-level subjects, L1 reading explained 20.50% of L2 reading variance, while for the beginners, it accounted for 11.09% of L2 reading variance. Brisbois indicated that the results support both the Interdependence and Threshold Hypotheses.

In an Arabic context, Midraj and Midraj (2013) examined the relationship between L1 and L2 reading comprehension among 184 Emirati primary students. The authors developed an L1 and L2 reading comprehension test based on the students' curricula. Both tests contained two reading passages with 25 multiple-choice, fill-in, short answer, and ordering-of-events questions. Correlational analysis revealed a strong positive correlation between L1 (Arabic) reading comprehension and L2 (English) reading comprehension ($r = .68$).

Asfaha, Beckman, Kurvers, and Kroon (2009) examined the relationship between L1 reading comprehension, L2 (English) proficiency, and L2 reading comprehension. The sample consisted of 182 Eritrean primary students with five different L1 languages (Arabic, Kunama, Saho, Tigre, and Tigrinya). Authors used an L1 reading comprehension test, an English reading comprehension test, L1 and L2 (English) language proficiency measures, and an L1 word reading test. Regression analysis indicated that L1 reading and L2 language proficiency accounted for 27% of the variance in L2 reading. When the L1 reading was put first in the equation, the proportions of the variance explained by the two variables were slightly different. L1 reading explained 12%, while L2 proficiency accounted for 15% of L2 reading variance.

Tsai and colleagues (2010) conducted a study on 222 Taiwanese university students. They conducted an L2 language proficiency test (vocabulary and grammar), an L1 reading comprehension test, and an L2 reading comprehension test. Correlational analysis indicated that only the L1 gap-filling test was significantly correlated with L2 reading comprehension ($r = .16$). The author speculated that students in the study may have tended to transfer their knowledge more at the word level than at the text level (Tsai, Ernst & Talley, 2010).

Park (2013) replicated Brisbois's (1995) study among 2666 Korean university students. Regression analysis of the entire sample indicated that Korean reading ability and L2 knowledge explained 54% of the variance in L2 reading comprehension. L1 reading explained 24% of the variance in English reading comprehension. When the sample was divided into poor and good readers, the two variables remained significant predictors of L2 reading comprehension, but the role of L1 varied according to L2 proficiency. L1 reading ability explained 36% and 22% of the variance in L2

44 Theoretical background & literature review

reading comprehension in the low and high proficiency groups. The contribution of L1 reading in explaining L2 reading comprehension was greater than the role of L2 knowledge for the low proficiency group. This result contradicts the Threshold Hypothesis, which states that poor L2 knowledge short circuits the L1 reading process. However, when dividing the sample into seven subgroups according to their L2 proficiency, the correlation coefficients between L1 and L2 reading tended to decrease with improvement of L2 knowledge. The author indicated that the absence of a threshold could be due to the linguistic distance between the two types of languages (English and Korean). On the other hand, Park suggested that the improvement of L2 knowledge compensated for the decrease in the role of L1 reading ability, which reflects a certain compensation between these variables and suggests the existence of an Interactive Compensatory Model for L2 reading. In the next section, I review the Compensatory L2 Reading Model suggested by Bernhardt (1991, 2000, 2005).

2.4.3 The Compensatory Model

Before Bernhardt suggested her model of L2 reading, other attempts to integrate the compensatory concepts in L2 reading existed. Based on work by Goodman, Coady (1979) presented a "Psycholinguistic Model of The ESL Reader" (figure 3). He argued that L2 reading consisted of three interactive factors: conceptual abilities, background knowledge, and process strategies. Coady used the term 'compensate' to describe the relationship between the different components of L2 reading. This reciprocal relationship implies that weakness in some aspects of language can be overcome by strength in another aspect. However, this model was not empirically tested and did not include language as an important dimension of reading.

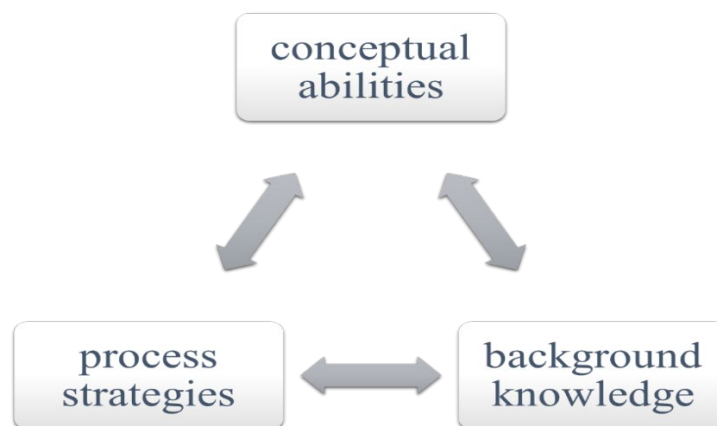


Figure 3. Psycholinguistic Model of the ESL Reader (Coady, 1979)

45 Theoretical background & literature review

Bernhardt (1991, 2000, 2005) adopted interactive concepts into her L2 reading model, providing dual benefits for the field of L2 reading. Firstly, it is the only model that has aimed to describe the L2 reading process. Secondly, it discusses the relationship between L1 and L2 reading without ignoring the possible contribution of other variables.

Bernhardt's Compensatory Model suggests that there are three components that shape L2 reading: L1 reading ability, L2 language knowledge, and unexplained variance (which could consist of content effect, comprehension strategies, motivation, and so on). These components are then plotted over an x-axis of developing proficiency and a y-axis of comprehension. According to this model, L1 literacy is a complex variable entailing a reader's linguistic knowledge, beliefs about reading, and different reading subskills. While L2 knowledge refers to a reader's knowledge of grammatical rules, vocabulary, the impact of cognates, and the distance between the first and second languages. Finally, the unexplained variance refers to individual characteristics that interact with the reading process, such as age, gender, reading strategies, and motivation.

This model suggests that L1 reading ability and L2 knowledge both account for about 50% of L2 reading variance. The compensatory model represents reading as a "*juggling or switching process in cognition*" (Bernhardt, 2005, p.124) where L1 reading ability can compensate for deficiencies in L2 language knowledge. L1 reading ability and L2 reading proficiency compensate for each other, allowing readers to achieve better EFL reading comprehension (Tsai et al., 2010). According to this model, a reader who has difficulties in L1 reading will likely struggle with L2 reading. Additionally, language knowledge sources increase over time as students acquire both greater experience with L2 learning and increased exposure to the target language. Thus, L2 knowledge has a more pronounced role in L2 reading as proficiency increases. Bernhardt (2005) indicated that in studying the relationship between L1 and L2 reading, the question is whether the transfer occurs or not, but rather "*how much transfers, under what conditions, and in which contexts*" (P.138).

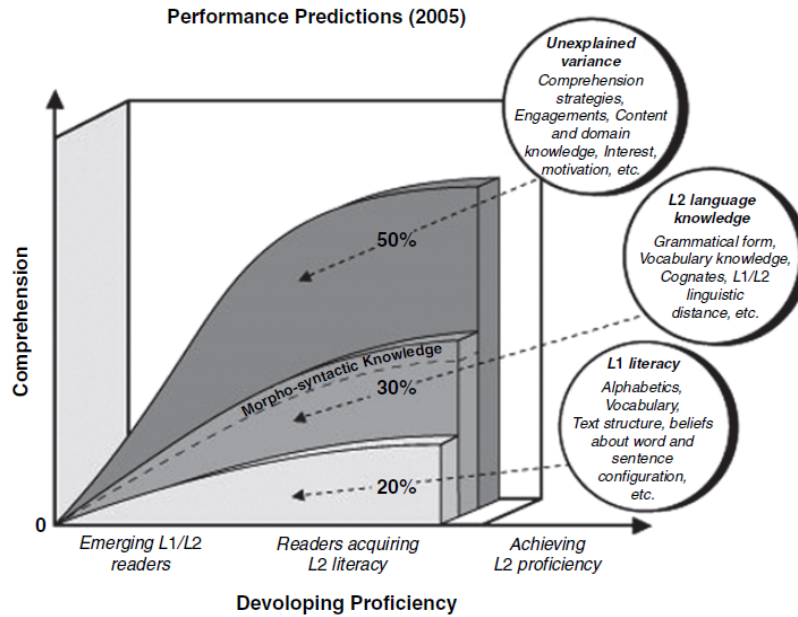


Figure 4. Bernhardt compensatory model (from Bernhardt, 2005)

An extended version of Bernhardt’s Compensatory Model is suggested by McNeil (2012). McNeil’s main interest was to provide more details on the relationship between the suggested components of L2 reading and the ways in which these relationships vary between low and high proficiency readers. After reviewing several studies on metacognition, L1, and L2 reading, McNeil (2012) suggested that metacognitive knowledge can explain about 11% to 72% of the unknown variance in Bernhardt’s Compensatory Model. The discrepancies between the amounts of explained variance could be due to differences in research instruments, L1 language background, or L2 proficiency level. McNeil further indicated that there are two compensatory models, which vary according to learners’ L2 proficiency.

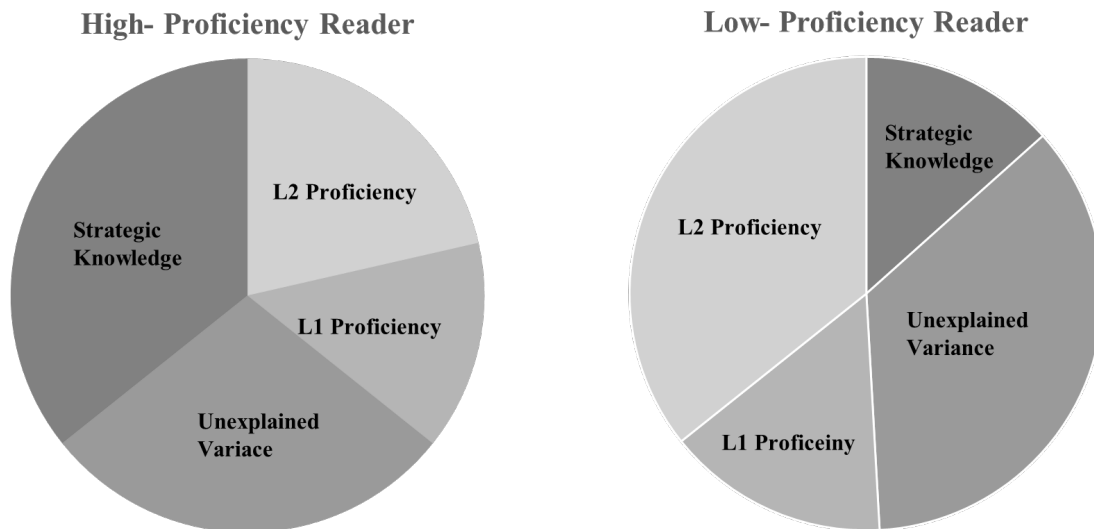


Figure 5. McNeil (2012) L2 reading compensatory model

Figure (5) reveals L2 vocabulary to have the leading role in L2 reading comprehension, explaining greater variance than both L1 reading ability and metacognition in low proficiency L2 readers (Schoonen Hulstijn & Bossers, 1998; van Gelderen et al., 2007). McNeil (2012) further suggested that, among highly proficient students, strategic knowledge has a more pronounced role in explaining L2 reading, while the influence of L1 reading ability remains relatively stable, and the influence of L2 language knowledge decreases.

In this respect, Schoonen and colleagues (1998) examined how metacognitive knowledge and vocabulary might explain L1 and L2 reading comprehension. The participants were 461 students from sixth, eighth, and tenth grades. They found that at grade eight L2 vocabulary knowledge explained 71% of L2 reading comprehension variance, while metacognition explained 5%. At grade 10, the role of L1 vocabulary decreased, only explaining 35% of reading comprehension, while metacognition explained 25% of reading comprehension. Concerning the relationship between L1 and L2 reading, results indicated that L1 reading played a more significant role in explaining L2 reading (38% of variance) when students became more proficient in L2. However, when L2 vocabulary and metacognitive knowledge were added, the shared variance between L1 and L2 reading decreased to about 1% for the 8th-grade students, and less than 1% for the 10th graders. These results suggested that L2 vocabulary and metacognition were stronger predictors of L2 reading than L1 reading. Partial correlation results indicated that vocabulary knowledge played a more important role in L2 reading comprehension in grade 8, as it accounted for 36% out of a total of 37% of variance. However, metacognitive knowledge had a more important role in grade 10, as it explained 37.9% out of a total of 38% of variance (Schoonen, et al., 1998). Contradictory results were revealed by Van Geldern and colleagues' study investigating the

48 Theoretical background & literature review

contribution of L1 reading comprehension, metacognitive knowledge, and L2 reading comprehension, using SEM to analyze longitudinal data. Researchers found that the role of metacognition decreased significantly when adding a regressive path from L2 reading comprehension on L1 reading. Authors indicated that the explanatory power of metacognition was taken over by L1 reading comprehension (Van Gelderen, et al., 2004).

However, another study by Van Gelderen and colleagues compared the relationship between word recognition, processing speed, vocabulary, grammar, and reading comprehension in Dutch (L1) and English (L2). An analysis of longitudinal data (from grade 8 to grade 10) revealed that the predictive strength of the language-specific variables decreased over time. Vocabulary, grammar, and word recognition were significant predictors of English reading comprehension in grade 8 but were not significant predictors in grades 9 or 10. Additionally, the predictive power of metacognitive knowledge increased from 41% to 72% of the L2 reading score variance (van Gelderen, et al., 2007).

These results revealed the complicated nature of comparison between the predictive power of L1 reading and metacognition. Previous studies discussing the Linguistic Interdependence and Short Circuit hypotheses assumed that the predictive strength of L1 reading among higher proficiency readers is a result of the transfer of reading strategies from L1 to L2 reading. In addition, McNeil (2012) also suggested that strategic knowledge involves some of the variance accounted for by L1 reading ability. Consequently, strategic knowledge then becomes the strongest predictor of L2 reading in higher-proficiency students. However, studies by van Gelderen indicated that metacognition has a unique influence on L2 reading, and that it can be considered a separate variable having its own influence on language development independent from L1 reading ability.

Jiang (2011) examined whether L1 reading ability and L2 proficiency could explain L2 reading comprehension as suggested by Bernhardt. The sample consisted of 246 Chinese university students. The author used university admission tests to measure students' L1 reading ability and L2 language proficiency. To measure L2 reading comprehension, two reading passages were used: one from the TOEFL preparation book and another developed by the researcher. Correlational analysis indicated that L1 literacy correlated significantly with both measures of L2 reading comprehension ($r = .24$). Regression analysis indicated that L2 proficiency was the only significant predictor of TOEFL reading scores and accounted for about 21% of the variance in L2 reading comprehension. When using the researcher-developed passage, L1 literacy and L2 proficiency significantly predicted L2 reading and accounted for 41% of the variance in L2 reading. In this model, L1 reading ability accounted for 6% of the variance in L2 reading comprehension.

Yamashita (2002) investigated the relationship between L1 and L2 reading among 241 Japanese university students. The researcher used measures of both L1 and L2 reading abilities (multiple choice tests, filling in gaps) and language proficiency (grammar and vocabulary proficiency tests). Regression analysis indicated that both L1 reading ability and L2 reading proficiency predicted L2 reading comprehension. They explained 40% of the variance in L2 reading. The sample was

49 Theoretical background & literature review

divided into nine groups based on L1 reading ability and L2 language proficiency (high, low, and medium). Comparison between groups' scores revealed that high L1 reading ability compensated for low L2 language proficiency and allowed students to attain higher scores on the L2 reading test. This effect was most obvious in the group of students with high L1 reading ability and low L2 language proficiency. A comparison of scores between the L1High/L2Low and L1Low/L2Medium groups indicated that the decrease in L1 from high to low (first group to second group) was compensated by an increase in L2 proficiency. This allowed the reader to achieve the same level of L2 reading comprehension. The group that obtained the highest score was predictably the one including students with high L1 reading ability and high L2 language proficiency.

Yamashita concluded that L2 readers are able to achieve the highest possible level of L2 reading comprehension due to the mutual compensation between L1 reading ability and L2 language proficiency. Both L1 reading and L2 language competency can compensate for the other. This implies that students with low L1 reading ability and high L2 proficiency should have been able to achieve a high level of L2 reading comprehension, even if the L2 reading task was more demanding. This compensatory mechanism permits readers to achieve the highest possible level of L2 reading comprehension.

2.4.4 Conclusion

L2 reading literature revealed that L1 reading ability and L2 language proficiency together accounted for 35%-70% of L2 reading variance. The relative importance of L1 reading ability and L2 language proficiency appears to depend on the nature of the reading task. In simple reading tasks, readers rely more on their L1 reading ability, while reading tasks that require a search for the meaning result in more dependence on L2 knowledge than L1 reading ability. Although these studies were conducted mainly to support the Linguistic Threshold Hypothesis, findings did not eliminate the role of L1 reading ability. The contribution of L1 reading was proven significant within various levels of proficiency. Thus, the claim that L2 reading is merely an issue of language cannot be fully supported, and the suggestion of a common underlying proficiency for language mastery cannot be ignored or underestimated.

In addition, longitudinal studies support the Transfer Hypothesis, suggesting the possibility of long-term cross-linguistic transfer. Therefore, students with strong native-language skills in phonology, orthography, and semantics achieve higher scores on L2 oral and written proficiency measures.

Although language knowledge can explain more variance in L2 reading comprehension than L1 reading ability, it remains on its own insufficient for shedding light on the entire process. Bernhardt and McNeil suggest that more than half of the variance in L2 reading remains unexplored and can be explained neither by the Threshold Hypothesis nor by the Interdependence Hypothesis separately. Thus, the Threshold Hypothesis and Linguistic Interdependence Hypothesis should not necessarily be considered contradictory views on the relationship between L1 and L2 reading, but

50 Theoretical background& literature review

rather taken together, as both abilities can compensate for the other. This compensation can occur when reading L2 texts and can also interact with other variables (such as metacognition or reading motivation). For these reasons, L2 reading should be considered “*both a language and a reading problem*” (Alderson, 1984, P.24). Furthermore, recent L2 reading research has revealed that metacognition plays a significant role in explaining L2 reading variance (along with L1 reading comprehension). The relationship between L2 reading and metacognition therefore requires further evaluation in different cultural contexts, which is one of the purposes of the current study. The next section discusses the variable of metacognition and its relationship to L2 reading research.

2.5 Metacognition definition and models

Flavell first introduced the notion of metacognition in the 1970s, describing it as a complex process representing an individual's awareness of their role as both "an actor in [their] environment" and a "deliberate storer and retriever of information" regarding their cognitive processes. Since then, metacognition became a rising topic of interest in psychological research.

Flavell (1976) defined metacognition as

"One's knowledge concerning one's own cognitive processes and products, or anything related to them... Metacognition refers, among other things, to the active monitoring and consequent regulation and orchestration of these processes in relation to the cognitive objects or data on which they bear, usually in the service of some concrete goal or objective". (p.232)

According to this definition, metacognition consists of an individual's knowledge of their information processing skills, the requirements of cognitive tasks, and which strategies are suitable for dealing with these tasks. In addition, it includes the executive skills of monitoring and cognitive self-regulation. Although the comprehensive nature of this definition reflects the various facets of metacognition, Brown (1987) indicated two problems with that definition: the difficult distinction between cognitive and metacognitive processes as well as the multifaceted nature of metacognition which might lead to a conceptual blurring of the term.

Contrary, Schneider (1989) and Wellman (1983) saw in Flavell's definition an opportunity for the development of new research approaches toward the investigation of metacognitive phenomena. In this, they could also present different theoretical perspectives in order to explain these different constructs. These efforts aimed to consequently deepen the understanding of the phenomenon of metacognition. However, in order to further develop the theory and proceed with the acquisition of scientific knowledge, it was necessary to first define the different facets examined within this broad, blurred construct, using greater precision and by referencing theoretical models. The next section presents a summary of some models that described the metacognitive construct.

2.5.1 Flavell's Metacognition Model

Flavell's model of metacognition (1979, 1981) is based on the concept of meta-memory as suggested by Flavell and Well in 1977. Flavell extended the concept of metacognition in order to go beyond the context of memory and present a general model of metacognition and cognitive monitoring. In this model, both the monitoring and regulation of cognitive processes are achieved through the action and interaction of four components: metacognitive knowledge, metacognitive experiences, cognitive goals, and cognitive activities. The two central components of the model are metacognitive knowledge and metacognitive experience.

Metacognitive knowledge

Metacognitive knowledge describes the knowledge stored in long-term memory that concerns the factors that interact together to influence both the sequences of cognitive actions and their

52 Theoretical background & literature review

outcomes. These factors are categorized into three groups of knowledge: personal, task, and strategy (Flavell, 1979).

Personal knowledge refers to knowledge and beliefs regarding the self and others as thinkers. It consists of three subcategories: knowledge about one's own ability in different cognitive demands (intraindividual differences), knowledge about differences in ability between persons (interindividual differences), and general knowledge about the characteristics of human cognition (universals of cognition).

Task knowledge consists of knowledge about the quality of available information during cognitive processes, knowledge about the specific cognitive requirements of a task, and knowledge concerning the use of the aforementioned two to successfully accomplish the desired cognitive task (Flavell & Wellman, 1977). Thus, task knowledge contains knowledge and awareness of the factors that have an influence on a certain cognitive task. It also includes the ability to adjust the cognitive process to the requirements of this task and to be aware of the progress, success, and failure of the cognitive process (Flavell, 1981b). Accordingly, task knowledge plays a central role in the selection and regulation of the strategies used to accomplish a cognitive task.

Strategy knowledge encompasses knowledge of the properties and effectiveness of strategies used to achieve cognitive goals/subgoals when performing a certain cognitive task. It evolves from the interaction between personal and task knowledge. The majority of metacognitive knowledge, which is retrieved and used in concrete cognitive requirements, concerns interactions between personal, task, and strategic knowledge (Flavell, 1979, 1981).

Metacognitive experience

Metacognitive experience is a conscious awareness of the cognitive and affective states that accompany individuals when performing a certain cognitive task. It can be defined as cognitive or emotional experience that accompanies and becomes related to a specific cognitive activity (Flavell, 1979 p.906). This awareness involves all kinds of feelings, thoughts, attitudes, and judgments related to the individual as an executive of cognitive tasks, goals, and actions. Metacognitive experience also refers to the interaction of all these variables in specific situations (Flavell, 1981). Metacognitive experiences emerge especially while performing tasks that require: a high level of conscious thinking, the creation of metacognitive judgments, planning, and the evaluation of each cognitive process (Flavell, 1981).

It further represents an individual's awareness and insights of cognitive and affective activities, as well as their assessment of the actual performance required to achieve the desired goal. Metacognitive experiences guide learners in altering (or even eliminating) their goals and aid in the pursuit of new purposes. They also help in activating related cognitive and metacognitive strategies. This can lead to the enhancement, deletion, or revision of metacognitive knowledge in the event that new/unexpected (meta)cognitive phenomena are consciously perceived. (Hacker, Dunlosky & Graesser 1998).

53 Theoretical background& literature review

Goals

Cognitive goals are the goals that are planned to be achieved through the accomplishment of the cognitive process. These goals can be implicit or explicit, self-chosen or defined by the task. They aim to activate and retrieve relevant information from the metacognitive knowledge base. The selection and modification of cognitive actions depends on these objectives as well. Additionally, the development and analysis of goals can also triggered by metacognitive experiences (Flavell, 1981).

Cognitive actions

Cognitive actions or strategies refer to the implementation of certain cognitive techniques during the accomplishment of a specific task. These cognitive activities are embedded functionally within the model components. They are preceded by cognitive objectives or metacognitive experiences derived from metacognitive knowledge and are selected based on metacognitive knowledge. Their implementation generates or activates metacognitive experiences that are influenced by metacognitive knowledge. According to this model, monitoring of cognitive processes occurs through the action and interaction among metacognitive knowledge, metacognitive experiences, tasks' goals, and strategies required for the achievement of tasks (Flavell, 1979).

2.5.2 Brown's model of metacognition

While Flavell focused on his metacognition model of declarative knowledge, Brown and her colleagues emphasized the role of procedural knowledge in accomplishing complex cognitive tasks (such as texts comprehension) (Schneider, 2010). This model implies that there are two interrelated clusters of activities that represent metacognition: knowledge about cognition and the regulation of cognition. Although both components of metacognition are closely related, their manifestations are clearly distinguishable and arise from different conceptual backgrounds.

Knowledge about cognition

Knowledge about cognition refers to an individual's knowledge of their potential as a learner as well as their knowledge of how much of their cognitive resources are suitable for the learning situation. This type of knowledge develops through reflection on one's own learning experiences. When readers are aware of their strengths and weaknesses, they are able to select the appropriate strategies in order to accomplish the required task, based on their perceived ability and the difficulty level of the task (Brown, 1987). Accordingly, there are two types of knowledge about cognition: declarative and procedural knowledge.

Declarative cognitive knowledge consists of facts about the characteristics of one's own cognitive processes and about specific tasks and their requirements for achievement of the set goals (Brown, Bransford, Ferrera& Campione, 1983). This knowledge corresponds conceptually to the knowledge variables of the individual, the task, and the strategies postulated by Flavell in the previous model.

54 Theoretical background & literature review

The second type of cognitive knowledge is procedural knowledge, which includes knowledge on how to use strategies and is represented by a reader's ability to select suitable strategies from their strategy repertoire for the completion of specific tasks. This procedural knowledge leads to the identification of strategies that fulfill the specific requirements of a task and promote its execution. Brown described this knowledge as "*knowing the utility of active intervention*" (Brown, 1980, p.461). Therefore, declarative knowledge refers to a learner's awareness of the strategies that can be used for different tasks (i.e. knowing 'what'), while procedural knowledge refers to a learner's understanding of the ways in which to apply strategies (i.e. knowing 'how').

Regulation of cognition

This cluster of activities refers to self-regulatory techniques that learners use during their active engagement in learning tasks. It consists of several strategies like planning, control, monitoring, regulation, and evaluation of cognitive processes, which help learners to successfully solve learning problems. Metacognitive skills are partly temporally unstable, relatively age-independent, and task- and situation-specific (Brown et al., 1983). These metacognitive mechanisms can be applied in a wide range of problem-solving tasks. However, knowledge of their properties and the conditions of their application is subject to a learning process over the course of which their use is assessed in a variety of situations. This assessment process draws on the results of conscious monitoring and control activities (Brown & DeLoache, 1978).

In the field of reading, Brown outlines a number of processes that effective readers should be aware of as necessary for the full control of reading tasks:

- 1- Setting purposes for reading by identifying the implicit and explicit demands of reading tasks.
- 2- Identifying important aspects of text to reach the intended message from it.
- 3- Monitoring activities to determine whether comprehension is achieved.
- 4- Self-questioning to determine the accomplishment of intended goals.
- 5- Taking remedial actions when a failure in comprehension is detected.

The effective use of these techniques is based on the awareness and knowledge of one's own cognitive system (Brown, Campione & Barclay, 1979).

2.5.3 Good Information Processing Model

The Good Information Processing Model (GIP) (Pressley, Borkowski & Schneider, 1989) was a development from the Good Strategy Use model, which itself aimed to describe the complex interaction between cognitive, strategic, and motivational factors to achieve effective information processing of cognitive tasks. According to the latter model, good strategy users display certain characteristics:

- (1) They have a comprehensive repertoire of cognitive and metacognitive strategies that they can use successfully to deal with complex or new tasks. This repertoire includes the

55 Theoretical background & literature review

monitoring of strategies and the ability to plan the sequence of strategies to monitor and evaluate their implementation.

- (2) They possess declarative, procedural, and conditional knowledge about strategies, which enables them to decide how, when, and where certain strategies should be implemented. This knowledge helps learners know the cost of using certain strategies (i.e. time and effort needed to accomplish a certain task) and, consequently, they are able to effectively plan their learning activities.
- (3) Good strategy users have a general awareness of the fact that successful information processing requires effort, that a specific strategy can be used across situations, and that cognitive actions should be supported by appropriate motivational, volitional, and attention-related framework conditions.
- (4) They use their world and domain-specific knowledge in learning situations, which can render some strategies unnecessary or automatic. This enables the use of more complex strategies of a higher order.
- (5) With practice, a good strategy user can reach automaticity in the execution and coordination of cognitive processes and thus reduce the required cognitive processing capacity.

In a further revision of the model, the Good Information Processing model suggests that there is a strong relationship between a learner's strategy use, domain knowledge, motivational orientation, and general knowledge about the world, and metacognition. Furthermore, all these elements are assumed to interact together. According to Pressley and colleagues (Pressley, et al., 1989), the distinguishing features of the good information processor can be summarized in the following points:

- 1- Good information processors (GIPs) are planful, their actions are guided by well-developed plans that regulate the sequence of their actions. These plans can be automatically activated and retrieved from long-term memory when they are used frequently. GIPs tend to have a full vision of their plan from the beginning to the end of it.
- 2- GIPs monitor their actions to check and evaluate their progress in achieving their learning goals. When GIPs detect problems, they persist to solve this problem and begin to alter their plans and strategies in order to surmount these obstacles.
- 3- GIPs have a large short-memory capacity; although the known limited capacity of short-term memory storage capacity, Pressley and colleagues (1989) suggested that GIPs can retain more information in their short-memory because they have the ability to organize their information into larger chunks of information which allow them to consciously use more information while performing cognitive than other people do.
- 4- GIPs use of strategies becomes automatized. GIPs are active learners; they tend to practice skills that they have acquired. Consequently, the procedural knowledge of knowing when

56 Theoretical background & literature review

and how to use strategies become automatized, and less conscious effort is needed to activate these strategies, which enable GIPs to do other related activities to enhance their learning. That is why GIPs are efficient learners and problem solvers.

- 5- GIPs retrieve and use effectively their prior knowledge when performing several cognitive tasks.
- 6- GIPs have a high level of self-efficacy; they believe in their abilities to accomplish challenging academic tasks. GIPs are confident learners, sometimes they can doubt their competence. However, this doubt motivates them to adapt their strategies and plans in order to achieve their desired goals.
- 7- GIPs have an elaborated vision of themselves in the future, i.e. possible selves which they are motivated to achieve. They believe they can develop their skills to reach their possible selves as competent learners with elaborated conceptual knowledge and a large repertoire of cognitive and metacognitive strategies.
- 8- GIPs seek to always develop their information processing abilities. They create a daily lifestyle full of opportunities that develop their conceptual knowledge and promote the acquisition of different strategies (e.g. reading informative materials or engaging in intellectual conversations).

Similarly, Borkowski and Muthukrishna (1992) illustrated that GIPs should: be aware of various learning strategies, have a developed set of procedural knowledge, monitor and evaluate the success of strategies, be willing to deploy effort in order to achieve their goals, be intrinsically motivated, have mastery of goals, not fear failure and instead consider failures as opportunity to learn, have elaborated multiple detailed images of possible selves, have knowledge of several topics, be able to easily acquire information on any topic, and finally, be surrounded by a supportive social environment that enhances their information processing skills.

The specific predictions of the GIP model of metacognitive knowledge acquisition are used to derive principles for effective pedagogical practice in teaching strategies. These principles were found in all core areas of school learning, i.e. reading, writing, and foreign languages.

According to previous revised models, good readers (either in L1 or L2) should be involved in a continuous process of evaluation and regulation of their text interpretation. They are willing to deploy effort in reading comprehension to achieve a coherent understanding of the text. Hence, readers should be adequately motivated, so that when they face failure in comprehension or detect inconsistency between their interpretation and the texts' information, they seek to detect the source of the problem and solve it.

Following review of 38 studies on native English speakers, Pressley and Afflerbach (1995) described proficient readers as: strategic, constructively responsive, and willing to take conscious steps to comprehend what they read. These steps require careful orchestration of cognitive resources. They suggested that successful readers employ several reading strategies, which are:

57 Theoretical background & literature review

- 1- Scanning text before reading.
- 2- Using contextual clues, such as titles, subtitles, and diagrams.
- 3- Searching for important information while reading and subsequently focusing attention on this information.
- 4- Relating important information to one another in order to comprehend the text.
- 5- Activating and using prior knowledge.
- 6- Revising hypotheses about the meaning of the text based on text information.
- 7- Inferring information from the text.
- 8- Determining the meaning of unknown words.
- 9- Monitoring text comprehension.
- 10- Identifying main ideas of text.
- 11- Applying strategies to remember the text's information (e.g. paraphrasing, repetition, taking notes, summarizing, self-questioning, etc.).
- 12- Understanding relationships between parts of text.
- 13- Identifying text structure.
- 14- Altering reading strategies when comprehension is interrupted.
- 15- Evaluating the quality of text.
- 16- Reflecting on information after finishing reading.
- 17- Planning the use of knowledge gained from the reading.

Pressley and Afflerbach suggested that efficient readers use reading strategies more effectively and flexibly than less efficient readers.

In the field of L2 learning research, Cohen (1998) distinguished two types of language strategies: learning strategies and use strategies. Learning strategies describe techniques that the learner purposefully uses to enhance language learning. Use strategies, however, refer to the techniques used by the learner to enhance their performance in a specific task, such as reading.

When attempting to explain the variation between learners in specific test performances, language test researchers prefer to examine use strategies as opposed to learning strategies (Singhal, 2001; Phakiti, 2003). Thus, this present study addressed the awareness of reading strategy use among Egyptian and German students of the English language. It further intended to address the degree to which their perceived awareness could be related to their English reading comprehension abilities. The following section briefly illustrates L2 learning strategies, followed by definitions of the reading strategies. A review of the available literature on metacognitive awareness of L2 reading strategy use will be presented in an effort to explain the ways in which it relates to L2 reading comprehension.

2.5.4 L2 Learning Strategies

Oxford (2002) defined language learning strategies as, behaviors, actions, or steps which learners use intentionally to make language learning more successful, self-directed, and enjoyable. These strategies help in the storage, retrieval, and use of the target language. In 1999, Oxford suggested

58 Theoretical background & literature review

a taxonomy of L2 learning strategies consisting of six types of L2 learning strategies, which are: cognitive, memory, compensation, metacognitive, affective, and social strategies.

Cognitive strategies are techniques that learners apply for transformation or manipulation of the language. These strategies include note taking, summarizing, paraphrasing, predicting, analyzing, and using context's clues. **Metacognitive strategies** are techniques used by learners to plan, arrange, and evaluate their learning. Oxford (1992) and Pintrich (1999) specified that metacognitive strategies include planning, monitoring, and regulating. Planning refers to those activities which help students plan their use of cognitive strategies as well as activate relevant prior knowledge for the facilitation of comprehension. It includes setting goals, skimming text before reading, and questioning. Monitoring activities aid students in checking whether their understanding agrees with predefined goals and include tracking attention while reading and checking text understanding while reading. Regulatory activities serve to bring the learner back in line with the predefined goal. They include the slowing of reading pace when faced with difficult texts and asking questions to monitor understanding. **Memory strategies** are techniques used to allow learners to remember and retrieve information, such as creating mental images through grouping and association, semantic mapping, and word associations.

Compensation strategies help students overcome shortages of knowledge and limited vocabulary and allow the reader to guess the theme of an article (by inferencing, guessing, or using reference materials such as dictionaries). Oxford clustered compensation strategies into two categories: linguistic clues (guessing meanings from suffixes, prefixes, and word order) and other clues (using text structure information, such as introductions, summaries, conclusions, titles, transitions, as well as general background knowledge) (Shang, 2010).

Affective strategies such as self-encouragement and anxiety-reduction allow students to enhance their learning by better motivating themselves and controlling their anxiety. Finally, **social strategies** refer to strategies that incorporate others into the learning process and promote cooperation with peers, such as: questioning, asking for help, asking for clarification, and feedback.

It can be noticed that Oxford's classification system is comprehensive. She strived to present a perspective that dealt with the language learner as a "whole person", addressing not only the cognitive, but also the affective and social aspects, of language learning.

2.5.5 Definitions of Reading Strategies

When reviewing the literature on reading, several definitions of reading strategies can be found. Cohen (1990) defined them as mental techniques that readers intentionally prefer to use in accomplishing reading tasks. Similarly, Presseley and Afflerbach (1995) defined reading strategies as a reader's deliberate and effortful mental or physical problem-solving techniques when dealing with a text. Baker and Booknit (2004) further defined them as techniques and methods used by readers to make the process of reading more successful.

59 Theoretical background & literature review

In accordance with these definitions, L2 reading researchers also presented similar definitions:

- Abbott (2010) defined reading strategies as mental operations or comprehension processes chosen by readers to make sense of what they are reading.
- Yukselir (2014) defined reading strategies as tactics used by readers to comprehend the intended meaning from the text.
- Tercanlioglu (2004) defined reading strategies as specific actions consciously taken by readers when reading.
- Singhal (2001) defined reading strategies as processes used by the learner to make sense of what they are reading, to enhance their reading comprehension, and resolve comprehension failure.
- Sheory and Mokhtari (2001) described reading strategies as reflective mindful practices that readers use in order to enhance reading comprehension.

To summarize, reading strategies are intentional mental plans, techniques, and actions applied by readers when reading. In other words, a “plan of attack” that readers turn to when trying to comprehend a text, which gives them a sense of control over the reading process (Sheory & Mokhtari, 2008; Mokhtari, Sheory & Reichard, 2008). These strategies serve to enhance comprehension and reflect how readers perceive reading tasks, make sense of what they read, and how they resolve their difficulties with reading (Lee, 2012).

2.5.6 Classification of L2 reading strategies

Several classifications have been suggested for the categorization of reading strategies. Some of these classifications are based on the timing of strategy use (i.e. before, during, or after reading), while others are based on the part of text they process (local vs. global). One of the most acknowledged categorizations of reading strategies is the classification into cognitive and metacognitive strategies. Cognitive strategies are those techniques used to build associations between previous and incoming knowledge in order to enhance learning, such as translating into the native language or note-taking.

Metacognitive strategies, on the other hand, are self-monitoring and self-regulating activities that focus on the process and product of reading. They allow the reader to be aware of whether they comprehend the text, of their ability to identify the reading demands, and of their knowledge of when and how to use a certain cognitive strategy. These metacognitive strategies include visualizing the scene in the text, creating connections between the reader’s background and new information, questioning, summarizing, and focusing on important information, to name a few (Tavakoli, 2014; Zhang & Seehpo, 2013).

L2 reading research has also suggested more detailed classifications of reading strategies based on the students’ awareness and actual use of certain strategies within reading situations.

In her preliminary study on L2 reading strategies, Hosenfeld (1977) asked 42 students of French as a foreign language to think aloud while reading. Results revealed that proficient readers kept

60 Theoretical background & literature review

the passage meaning in mind while reading, skipped unimportant words, and held a positive concept of themselves as a reader. On the other hand, less proficient readers lost the meaning of the sentence, seldom skipped any unimportant words, and had negative concept of themselves as a reader. Accordingly, Hosenfeld classified reading strategies into “main meaning line” strategies, which refers to strategies that readers use to comprehend the text without being hindered by unknown words, and “word-solving” strategies, which are used to identify the meaning of a certain word or phrase. It appears that Hosenfeld’s classification suggests that successful reading depends on the use of strategies that facilitate the flow of the reading comprehension process.

Block (1986) classified reading strategies into general strategies and local linguistic strategies. General strategies focus on high-level reading comprehension processes. It includes predicting content, recognizing text structure, integrating information, questioning, interpreting the text, utilizing general knowledge and associations, reflecting on behavior or processes, monitoring comprehension, self-correcting, and reacting to the text. Local linguistic strategies deal with basic linguistic knowledge. This category includes paraphrasing, rereading, questioning the meaning of a clause or sentence, questioning the meaning of vocabulary, and resolving problems with vocabulary. Block further distinguishes proficient from less proficient use of reading strategies. He indicated that skilled EFL readers use prior background knowledge, decide whether a word meaning is relevant to the overall meaning of a passage, reread the sentence, use syntactic clues to identify word meaning, and evaluate their understanding. Meanwhile, less skilled readers focus on identifying and solving lexical problems (Block, 1992).

A similar classification was suggested by Taillefer and Pugh (1998) following analysis of reading strategies used by 39 EFL French students. Taillefer and Pugh suggested that reading strategies can be classified into two groups: general reading strategies and local problem-solving strategies. They classified the general strategies into sub-categories, such as: dealing with content (e.g. *guessing information, identifying organisation, and learning something*), strategies related to reader response (e.g. *interpreting text and reacting emotionally*), concrete techniques (e.g. *using punctuation, counting number points, and checking comprehension*) and task perception (e.g. *feeling efficient*). Local problem-solving strategies refer techniques related to the linguistic elements of texts, such as “skipping the insoluble, comparing L2 and L1, analysing a word, analysing grammar, and translating”.

Jiménez, García, and Pearson (1996) categorized reading strategies into three major groups: text-initiated strategies, interactive strategies, and reader-initiated strategies. Text-initiated strategies deal with the linguistic features of texts. For example, focusing on vocabulary, using contextual clues, summarizing, paraphrasing, and rereading. Interactive strategies included inferencing, questioning, and predicting. Reader-initiated strategies consisted of general strategies such as using prior knowledge, monitoring, visualizing, using bilingual strategies like searching for cognates, translating, code switching, and transferring of reading strategies from L1 to L2 reading.

61 Theoretical background & literature review

Anderson (1991) categorized reading strategies into five groups, namely: supervising strategies (e.g. questioning, predicting word meanings or text content), support strategies (e.g. skipping unknown words, using dictionaries, or skimming), paraphrasing strategies (e.g. paraphrasing or translation), strategies used to build coherent texts (rereading, using contextual clues, or using background knowledge) and test-taking strategies (e.g. selecting an answer because the other alternatives did not seem right).

Janzen and Stoller (1998) suggested that English for academic purpose (EAP) students use ten types of reading strategies. These strategies include: setting a purpose for reading, previewing, predicting, asking questions, checking predictions, finding an answer to questions, connecting the text with prior knowledge, summarizing, connecting one part of the text to another, and recognizing text structure.

A recent classification system suggested by Mokhatri and Reichard (2002) for L2 reading strategies (Figure 6) can be clustered into three groups:

- 1- **Global reading strategies**, which refer to general, intentional reading strategies aimed at setting the stage for reading. Examples include setting a purpose for reading, using background knowledge, skimming, using contextual clues, and reviewing text characteristics.
- 2- **Problem-solving reading strategies** consist of strategies that reader uses when text becomes difficult and which provide the reader with an action plan to resolve these reading problems. These strategies include reading slowly and carefully, adjusting reading speed, paying closer attention to what is being read, stopping to think about what has been read, visualizing the information in the text, and rereading to increase understanding.
- 3- **Support reading strategies**, which involve the use of support mechanisms or reference materials to help the reader better understand the text. For example, taking notes while reading, translating difficult parts into the reader's L1, reading aloud, highlighting important information in the text, and using a dictionary.

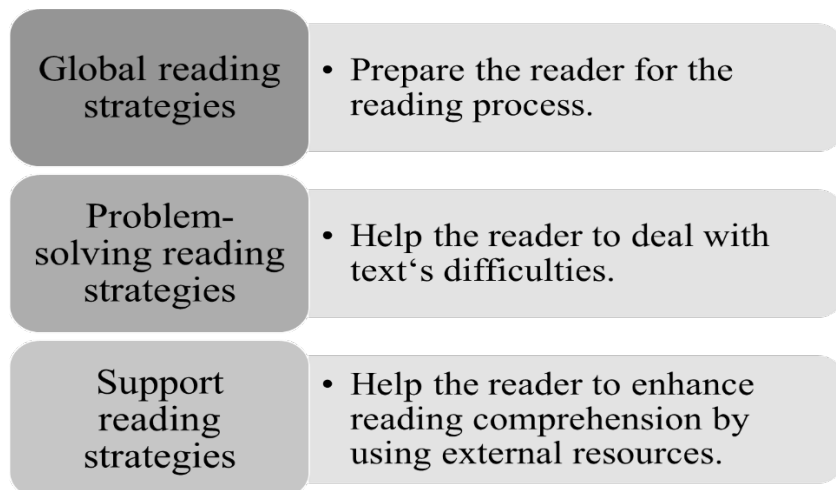


Figure 6. Classification of L2 reading strategies (Mokhtari & Reichard, 2002)

To assess students' awareness of these three categories of strategies, Mokhtari and Sheory (2002) developed the Survey of Reading strategies (SORS), a survey used in the present study. A detailed description of the SORS is presented in the methodology chapter (section 3.3.1).

The previously reviewed classifications reveal that there are several taxonomies for L2 reading strategies. These can vary according to the source of the strategies (text vs. reader), the scope of strategy use (general, local, word, or text), or to their functions (construct meaning vs. monitoring of comprehension).

Strategies in themselves are neither negative nor positive, but rather depend on the efficiency of use in different contexts. If a student does not have sufficient metacognitive knowledge, they may feel confused about which appropriate reading strategies to use and how to monitor their reading (Tavakoli, 2014). Thus, successful strategic readers should be aware of reading strategy use, understand when and why to use them, and be able to use these strategies flexibly (Grabe, 2009; Singhal, 2001; Yukselir, 2014; Zhang & Wu, 2009). Proficient readers with high metacognitive awareness are able to direct their reasoning processes and use effective strategies during reading. Less proficient readers, however, lack the awareness and resources for solving comprehension problems and do not possess the necessary knowledge for evaluation of their efforts in handling these problems (McNeil, 2011; Sheory & Mokhtari, 2001). Consequently, L2 metacognitive awareness of reading strategies has become a topic of much interest among L2 reading researchers, as it is considered a distinguishable characteristic of thoughtful and constructively responsive L2 readers (Sheory & Baboczky, 2008).

In the present study, the SORS was adopted in order to assess the degree of metacognitive awareness in German and Egyptian students when reading English texts. It was used as it consists of several useful L2 reading strategies and had been tested in different cultural contexts (though

63 Theoretical background & literature review

up until this present study, not in German or Egyptian contexts). The following section reviews a number of studies examining the metacognitive awareness of reading strategies and their relationship to L2 reading comprehension. This review is limited to studies examining metacognitive awareness as per Mokhtari and Sheory's classification of L2 reading.

2.5.7 Metacognitive awareness and L2 reading comprehension

Mokhtari and Reichard described metacognitive awareness of reading comprehension as "*the knowledge of the readers' cognition about reading and the self-control mechanisms they exercise when monitoring and regulating text comprehension.*" (Mokhtari & Reichard, 2002, p.1). This definition reflects the fact that metacognitive awareness of reading strategies is a mixture of conscious awareness of the reading process, strategies, and their effective application toward enhancing text comprehension (Zhang & Wu, 2009). Koda (2005) suggested that strategic readers are aware of their cognitive and linguistic resources and direct their attention toward appropriate clues in order to anticipate, organize, and retain text information. These readers are more able to identify their reading problems and allocate the available resources for solving them. Consequently, a lack of strategic knowledge causes students to face problems with reading comprehension, even if they possess sufficient knowledge of vocabulary and decoding skills. For this reason, the study of metacognition has become increasingly important, due to the need for understanding of the ways in which readers plan, monitor, evaluate and utilize available information in order to create meaning from what they read (Mokhtari & Reichard, 2002). The upcoming review of the relevant studies will focus on the nature of L2 readers' metacognitive awareness of reading strategies and its relationship to L2 reading comprehension.

Sheory and Baboczky (2008) used a modified version of the SORS (6-point rather than 5-point Likert scale) to explore Hungarian students' awareness of and perceived use of reading strategies when reading English texts. The participants in the study were 545 Hungarian students majoring in English. Descriptive results revealed students to have an overall moderate awareness of reading strategies ($M= 3.93$). They displayed a high preference for support reading strategies ($M= 4.03$), followed by problem-solving ($M= 4.00$) and global reading strategies ($M=3.83$). Analysis of individual strategies revealed that the most-used perceived strategies were rereading when something is not understood, using tables and figures to understand the text, predicting text content from the title, going back and forth to connect ideas together, and underlining or circling important information. The least-used perceived strategies were paraphrasing, using reference materials, checking text organization, setting a purpose in mind, and checking whether guesses about the text were right. Further analysis revealed no significant differences in strategy use according to perceived L2 proficiency level. Females reported using more strategies than males. Authors indicated that their results revealed that Hungarian students possess good metacognitive knowledge of their use of reading strategies. Furthermore, the overall pattern of perceived strategies indicates that they are careful and strategic readers; they pay great attention to the text they are reading and tend to use strategies of skilled readers.

64 Theoretical background & literature review

To determine the level of awareness of reading strategies as well as identify the most commonly used strategies, Sheory, Kamimura and Freiermuth (2008) studied a Japanese cohort of 237 university students. This study utilized a modified translated version of SORS. Analysis of the mean scores revealed that students attained a moderate awareness of reading strategies ($M= 2.91$). The average scores for the three categories of reading strategies revealed a nearly equal preference for problem-solving and global reading strategies ($M= 3.06, 3.04$ respectively), followed by support reading strategies. An examination of individual strategies revealed that the most perceived strategies used were: using tables and figures to understand the text, predicting text content from the title, paying more attention when text is difficult, using an English-Japanese dictionary to better understand texts, and thinking about current knowledge in order to understand reading material. The least perceived strategies used were: using an English-English dictionary, paraphrasing when text was difficult, taking notes to better understand the text, reading the first and last paragraphs first, and summarizing in English or Japanese. Further analysis revealed significant differences between high and low proficiency students in their perceived use of problem-solving and global reading strategies. The authors indicated that the similarity between the Japanese and Hungarian students from Sheory and Baboczky's (2008) study was related to the high academic level of both groups. The students in both samples had necessarily earned good grades during high school in order to be eligible to enroll in the universities. Thus, they were considered academically-accomplished students who should have possessed a decent level of metacognitive awareness of reading strategies.

Mokhtari conducted two qualitative case studies in order to explore patterns of reading strategies as perceived by L2 readers. The first case study was conducted on seven university students, who were asked to verbalize their personally-used strategies utilized when reading online/printed material. This analysis of think-aloud protocols revealed that students used similar strategies when reading English texts, either online or in printed format. These strategies included: using prior knowledge, critically evaluating reading, predicting text meaning, rereading, and using dictionaries (Poole & Mokhtari, 2008).

The second case study (Mokhtari, 2008) involved three multilingual university students who are literate in three or more languages. Students were asked to answer the SORS and, afterward, read three passages in Arabic, French, and English. While reading, students were asked to verbalize the reading strategies they used. The results revealed that the average perceived strategy use was relatively consistent across the three languages for each participant. This result corresponds to studies by Jiménez, et. al. (1996), and Yau (2009), which proposed that proficient readers have a unitary view of reading. Accordingly, skilled L2 readers are aware of the similarities between languages in such a way that allows them to realize that reading skills used in one language are transferable to another language, regardless of the linguistic distance between languages.

Another interesting finding was that all three participants used strategies more frequently when reading in the language they had least mastered. This result was also found in Alsheikh's (2011) qualitative study conducted on three trilingual proficient readers whose native language was

65 Theoretical background & literature review

Hausa. They were asked to read three passages, one each in English, French, and Hausa. Results from analyzing the SORS and think-aloud protocols revealed that the three graduate students had a high preference for problem-solving reading strategies, followed by global and support reading strategies. On the other hand, the three readers tended to use more strategies when reading in their third language (English) than their second language (French). This corresponds to previous findings indicating that the less proficient a reader feels, the more likely they are to use strategies while reading.

Similar results were found in Mokhtari and Reichard's (2004) study comparing metacognitive awareness of reading strategies between American and Moroccan students. Their sample consisted of 350 university students in the USA and Morocco. The Metacognitive-Awareness-of-Reading-Strategies Inventory (MARS-I) results suggested Moroccan students used more reading strategies than American students. American students reported using visual features (e.g. tables in the text) and visualization of information more than the Moroccan students. The authors explained that reading materials in the USA are more "reader-friendly in terms of organization and presentation. For this reason, the Moroccan students did not pay as much attention to these textual features. In the Moroccan sample, none of the strategies fell in the low usage category. Support reading strategies had the highest mean score, followed by problem-solving and global reading strategies. However, Both US and Moroccan students reported a similar pattern of reading strategies use. Additionally, they had a moderate to high awareness of reading strategies. The authors further explained that the highly multilingual background of Moroccan students (speaking Arabic, French, and Berber) allowed them to transfer their strategic language from one language to another. They suggested that students with high L2 proficiency level use similar strategies to a native speaker of the target language, which minimizes the differences between L1 and L2 readers.

Zhang and Wu (2009) explored metacognitive awareness of reading strategy in a cohort of Chinese high school students ($N=249$), using the SORS survey. Descriptive results revealed that students had an overall high awareness of reading strategies, with a high preference for problem-solving reading strategies ($M= 3.78$), followed by global ($M= 3.63$) and support strategies ($M=3.06$). ANOVA revealed significant differences in strategy use between students. This was found to correspond with English proficiency level, with students possessing a high level of English achievement tending to use more global strategies than the intermediate and low proficiency students. The authors explained that the high awareness of the problem-solving and the global reading strategies disclosed that the students were aware of their reading process and could take remedial actions when facing problems in comprehension. Additionally, students planned their reading by using prior knowledge and trying to predict text content.

Yau (2009) investigated a cohort of 144 Taiwanese high school students, using the SORS to measure students' awareness of reading strategies when reading English texts. Descriptive statistics indicated that problem-solving reading strategies were highly perceived by students ($M= 3.39$), followed by support ($M= 3.22$) and global reading strategies ($M= 3.17$). Students had a moderate overall awareness of reading strategies ($M=3.25$). Correlational analysis indicated a

66 Theoretical background & literature review

significant positive correlation between L2 reading comprehension and both support and the problem-solving reading strategies ($r = 0.25, 0.21$, respectively). The authors also conducted interviews with four students (two high performing readers and two low performing readers). Interviews revealed that high proficiency students were aware of similarities between their native language and English language. On the other hand, the less proficient readers stated that they perceived the two languages as two different systems with no connection between them. In addition, unskilled readers stressed that unfamiliar words and phrases interrupted their understanding and prevented them from making appropriate inferences.

Sheory and Mokhtari (2001) conducted a study comparing the metacognitive awareness of reading strategies between native and non-native English speakers. The sample consisted of 105 university students in the USA. SORS results revealed a significant difference between native and ESL students in overall metacognitive awareness. The ESL students had higher overall metacognitive awareness than the native speakers. Both groups showed the same preference for reading strategies, regardless of reading ability or gender. They highly preferred problem-solving strategies, followed by global and support reading strategies. Significant differences between the native and non-native group were found only in the use of support reading strategies. In addition, both native and non-native students with high reading abilities reported using support strategies significantly more than low achieving native readers. In the ESL group, no significant difference in metacognitive awareness between males and females was found. However, the female mean score of 16 individual strategies was higher than the mean for males.

Using think-aloud protocols, Lin & Yu (2015) examined 36 Chinese university students in order to determine their awareness of their use of L1 and L2 reading strategies. They adopted the reading strategies classification of (Sheory & Mokhtari, 2001). Descriptive statistics indicated that students used more diverse strategies when reading in English than when in reading in Chinese. This result corroborates the findings of a 2006 study by Kong indicating that Chinese adult readers were able to verbalize more reading strategies in English than in Chinese. The authors explained that the process of L1 reading comprehension occurs naturally and automatically, and that students were not consciously aware of the different strategies they used. However, reading English texts requires more time and effort, which leads to the students being more aware of their reading. When reading in English and Chinese, participants showed a preference for support reading strategies, followed by cognitive strategies, and lastly metacognitive strategies. This result contradicts Sheory and Mokhtari's (2001) results, which indicated that support reading strategies were those least used by non-native students. However, the heavy use of the translation strategy (53% of total strategy use) lends support to Seng and Hashim's (2006) results indicating that low proficiency students often used the translation strategy in order to comprehend L2 texts. The ANOVA results revealed that students with high English proficiency used a greater number of (and more varied) strategies than students in the low and intermediate groups. This result suggested that English proficiency had a positive effect on the number and variety of reading strategies among EFL university readers. However, no significant difference was seen between the high and low proficiency readers in terms

67 Theoretical background & literature review

of the frequency of reading strategies. The authors explained that the low proficiency students might have used less useful strategies more frequently (e.g. word-by-word translation), causing an overrepresentation among all reading strategies.

Furthermore, T-test results indicated that the highly proficient readers used more meta-cognitive strategies than the low proficiency group ($t = 2.60, p = .02, d = 1.20$). This result agrees with Jun Zhang's (2001) suggestion that EFL readers with low English proficiency might not be able to use higher level reading strategies, such as meta-cognitive strategies. When analyzing the individual strategies that differentiated the more proficient readers from less proficient readers, results indicated that translating and paraphrasing were significantly represented. Although no significant between-group difference was found in the category of support strategies, one-way discriminant analyses revealed that only the support strategies significantly differentiated the two groups. The authors explained that the large difference in use of translation strategies, upon which the less proficient readers heavily relied, might have canceled out the between-group differences. Qualitative results indicated that the more proficient students preferred paraphrasing a text's information in their own words in order to enhance their understanding, while the less proficient readers relied extensively on translating text from English to Chinese.

In an Arabic context, Malcolm (2009) compared metacognitive awareness of reading strategies between first- and fourth-year Bahraini medical students ($N=160$). The SORS results revealed that the students possessed a high awareness of reading strategies. The mean score of overall awareness for fourth-year students ($M= 3.74$) was slightly higher than that of the first-year students ($M=3.63$). Year one students reported a high preference for problem-solving reading strategies, followed by support and global reading strategies. Year four students also reported high awareness of problem-solving reading strategies, followed by global and support reading strategies.

The strategies most used by year one students were: using text features, reading slowly and carefully, staying focused, paying close attention, rereading difficult texts, and underlining and circling information. The most used strategies by fourth-year students were: skimming to identify text characteristics, using text features, staying focused, adjusting reading speed, paying close attention, rereading the difficult text, and underlining and circling information. ANOVA results revealed that fourth year students used global reading strategies significantly more than first year students. Among these strategies were: skimming to note text characteristics ($F(1, 158) = 19.51; p < .005$), critically evaluating ($F(1, 158) = 18.42; p < .001$), and using text features (e.g., tables) ($F(1, 158) = 9.95; p < .005$). Year one students, however, reported using support reading strategies significantly more than fourth year students, with the most used strategy being: translating and thinking about information in both English and Arabic ($F(1, 158) = 22.40; p < .001$ and ($F(1, 158) = 22.30; p < .001$, respectively)). The author explained that students at the beginning of their studies lack sufficient knowledge for academic reading, and that with the experience they rely less on these strategies and lean toward more metacognitive strategies, such as skimming, using a text's feature and evaluating the text. Malcolm further explored the differences in reading strategies according to the students' English proficiency level. Highly proficient year one students reported

68 Theoretical background & literature review

using the strategies of adjusting reading speed and paying more attention at a significantly greater rate than the low proficiency year one students. Low proficiency students reported thinking more about information in Arabic and English. In year four, the most proficient students reported using the visualization of information strategy more than the less proficient students. Meanwhile, the low proficiency students reported using reference materials (such as dictionaries) more often than their higher proficiency peers.

Using the SORS responses of 16 Turkish university students, Yüksel and Yüksel (2011) demonstrated that Turkish students have generally high awareness of reading strategies ($M=3.70$). The most frequently reported strategies were problem-solving reading strategies, followed by global and support reading strategies. The most frequently used strategies were previewing text before reading, adjusting reading speed, summarizing text information, and re-reading for better understanding. These results are consistent with other findings (e.g. Mokhtari and Reichard, 2004; Sheorey and Mokhtari, 2001), indicating that the use of strategies such as rereading or adjusting reading speed is the choice preferred by non-native readers for effective reading. Global reading strategies, such as using prior knowledge and previewing text before reading, were the next most frequently used strategies. Sheory and Mokhtari (2001) mentioned that these strategies are usually encouraged by teachers as pre-reading activities. On the other hand, readers showed less of a preference for support-reading strategies (such as use of dictionaries), which could be due to the fact that they are time-consuming. A further study was conducted in Turkish, this time using Oxford reading strategies taxonomy, revealed that the most frequently cited strategies were: using title to predict text content, trying to understand each word in the text, continuing reading even when facing difficulty, and changing reading speed depending on text difficulty (Yukselir, 2014). These results support those of Yüksel and Yüksel (2011), demonstrating that students used both global and problem-solving reading strategies.

Hong-Nam and Page (2014) used the SORS to determine awareness of EFL reading strategies in a cohort of Korean university students ($N=419$). Descriptive statistics indicated that the Korean students had medium to high awareness of reading strategy use. They reported problem-solving strategies as the most frequently used ($M=3.76$), followed by global strategies ($M=3.28$), and support reading strategies ($M=3.12$). Inspection of the mean scores of the individual strategies revealed that the most frequently used strategies were paying more attention when text gets difficult, going back on track when losing concentration, thinking about what they read, re-reading to increase understanding, and using reference materials. The least frequently used strategies were critical analysis and evaluation of text, taking notes, reading aloud, translation from English to Korean, and self-questioning. ANOVA results revealed the existence of significant differences in the use of the three reading strategy categories, when analyzing based on self-judgments of students' English proficiencies (beginning, intermediate, and advanced). Further analysis using Scheffe post-hoc tests revealed that the intermediate proficiency students reported higher use of reading strategies than did the other two groups. In addition, students who judged themselves as proficient readers used global and problem-solving reading strategies more than support strategies.

69 Theoretical background & literature review

Significant differences in the use of global and problem-solving reading strategies were found between the three groups. When examining the difference between males and females in the metacognitive awareness of strategy use, no significant difference was found. However, the mean score of females' reported reading strategies was slightly higher than that of males ($M= 3.41, 3.36$ respectively).

Xianming (2007) used a mixed method approach to determine metacognitive awareness and actual use of reading strategies among 74 university students. SORS results revealed the students to have a moderate awareness of reading strategies. The students revealed a high preference for problem-solving reading strategies, followed by global reading strategies. The most frequently used strategies were: using background knowledge, employing context clues, checking understanding, guessing the meaning, skimming and scanning, using tables and pictures, adjusting reading speed, reading slowly and carefully, guessing unknown words, re-reading, stopping and thinking, underlining and circling, translating, and using a dictionary. The least reported strategies were: determining length and organization, noticing what to read closely and what to ignore, analyzing and evaluating the information, visualizing information, thinking about difficulties while reading, reading aloud to help understand what was being read, asking the question of the text, and paraphrasing and note-taking.

Class observations revealed that rereading, underlining and circling, translating, and reading questions before reading the main text were the most used strategies by students. Interviews revealed that, in order to extract the main idea of the text, students used: contextual clues, previous knowledge, translation for understanding of unknown words, and slow/careful reading. They indicated that grammatical structures were not important for reading comprehension, but rather unknown words or phrases. Taken together, it is clear that there exists a great correspondence between students' awareness of reading strategies and their actual use of them. Students can be characterized as strategic readers; they have a high awareness of the reading process and use various strategies to solve any reading problem. At the same time, they deploy effort to construct a global understanding of the text and evaluate their reading comprehension.

In Iranian context, Tavakoli (2014) used the SORS to determine metacognitive awareness of reading strategies among university students ($N=100$). Descriptive results revealed that the most frequently used strategies were support reading strategies, followed by global and problem-solving strategies. The overall mean score revealed Iranian students to be moderately aware of reading strategies. Correlational analysis demonstrated that overall metacognitive awareness of reading strategies significantly correlated with EFL reading comprehension ($r= .52$). Moreover, all three categories correlated significantly with reading comprehension. Support-reading strategies had the highest correlation ($r= .67$), followed by global ($r = .533$), and problem-solving reading strategies ($r = .375$). MANOVA results provided no significant difference between males and females in terms of metacognitive awareness of reading strategies. Inspection of mean scores suggested that females used more global reading strategies than males. Meanwhile, males used more problem and support reading strategies.

70 Theoretical background & literature review

A further study, conducted by Ilustre in 2011, revealed a significant relationship between reading comprehension and metacognitive awareness. The participants in this study consisted of 226 Filipino university students. Descriptive statistics indicated that students used problem-solving reading strategies most highly ($M=3.91$), followed by global ($M=3.63$) and support ($M=3.25$) reading strategies. Per correlational analysis, reading comprehension correlated positively with problem-solving reading strategies ($r= .15$) and correlated negatively with support reading strategies ($r= -.14$). Furthermore, Stepwise regression revealed problem-solving and support reading strategies to be significant predictors of reading comprehension ($\beta = .25$, $\beta =- .25$, respectively). The author explained that the negative relationship between support reading strategies and reading comprehension implies that students perceive these strategies as less useful to their reading; this could be due to the time-consuming nature of these strategies.

Among a sample of Indian students, Madhumathi and Ghosh (2012) used the SORS to examine awareness of reading strategies and its relationship to reading comprehension of English texts. The sample consisted of 52 university students studying engineering. Descriptive results illustrated that students possessed an overall medium-level awareness of reading strategies, with a high preference for problem-solving reading strategies ($M= 3.78$), followed by support ($M= 3.27$) and global reading strategies ($M=3.24$). The most used strategies were rereading when text is difficult, visualizing information, and adjusting reading speed. The least used strategies were translation, thinking about the information in English and/or their native language, and stopping from time to time to think about the text. Researchers argued that students deployed more effort toward solving the reading problem but focused less on evaluating their efforts. This preference for such strategies could possibly be a result of classroom practices in which teachers focus highly on memorization of information. In order to examine the relationship between English reading comprehension and metacognitive awareness of reading strategies, the authors conducted correlational analysis. According to the results, problem-solving, global, and support reading strategies correlated significantly with reading comprehension ($r= .33$, $.33$, and $.29$, respectively). A significant difference between males and females was found only in the use of problem-solving strategies, while no significant difference existed in the other two types of strategies. The author explained that, due to cultural habits, the women did not have as much of an opportunity to engage in outdoor activities. Therefore, they tended to develop reading habits more effectively than males, which increased their awareness of reading strategies.

Park (2015) used the SORS in order to determine the relationship between EFL reading performance and metacognitive awareness of strategy use. Correlational analysis revealed a positive relationship between overall awareness of reading strategies and reading comprehension ($r= .51$). There was no difference between the type of strategies used by skilled and less skilled readers. These results corroborate Grabe's (2009) review of L1 and L2 reading research, in which he claimed that both proficient and less proficient readers might use the same strategies, although with proficient readers using these strategies more effectively.

71 Theoretical background & literature review

On the other hand, Meniado (2016) was unable to find a significant relationship between reading comprehension and metacognitive awareness of reading strategies among Saudi students. The students possessed a moderate level of metacognitive awareness. Furthermore, the problem-solving reading strategies were the highest-reported among the students, followed by the support and global reading strategies. The least-used strategies were using typographical features of the text, and critically analyzing and evaluating the text. Meniado indicated that the study sample consisted of beginner students lacking sufficient experience with the English language. He speculated that this could have been the reason for their moderate awareness of reading strategies. However, a positive correlation between reading motivation and metacognitive awareness was indeed found.

Poole (2005) used the SORS to investigate the difference between males and females in metacognitive awareness of reading strategy use. The participants were 248 foreign-born ESL university students in the USA. Descriptive results indicated that males and females both possessed a moderate awareness of reading strategy use ($M=3.42$). The two groups reported a similar order of preference for reading strategies. In the male group, problem-solving strategies had the highest mean score ($M=3.80$), followed by global ($M=3.35$) and support reading strategies ($M=3.24$). In the female group, problem-solving strategies had the highest mean score ($M=3.73$), followed by global and support reading strategies (with identical mean scores, $M=3.32$). Upon inspection of mean scores of the individual strategies, it was found that the most frequently used strategies among males were paying close attention to reading, rereading for better understanding, trying to stay focused on reading, reading slowly and carefully, and adjusting reading rate. The most frequently-mentioned strategies among females were: re-reading for better understanding, underlining or circling information in text, trying to stay focused on reading, paying close attention to reading, and adjusting reading rate. Notably, both males and females stated nearly identical preferences for reading strategies. Significant differences between males and females were only found in the use of two strategies, namely: noting text characteristics and paying close attention to reading. Poole concluded that the differences in L2 reading strategies might have been more related to L2 proficiency level, task demands, and contextual motivation, rather than gender differences.

Hong-Nam (2014) examined the metacognitive awareness of reading strategies in 96 high school students. According to MARSIS descriptive statistics, most students possessed high to medium awareness of reading strategy use. ANOVA and Scheffe post-hoc results revealed problem-solving reading strategies to be the most highly used, followed by global and support reading strategies. The most-used strategies included: paying more attention when text becomes difficult, going back on track when losing concentration, visualizing information to remember it, reading slowly and carefully, and re-reading to increase understanding. The least preferred strategies were summarizing, self-questioning, discussing with others to check understanding, skimming text's organization and characteristics, and taking notes. When students were divided into three groups according to their scores on a language proficiency test, ANOVA results indicated no significant difference in metacognitive awareness of strategy use between groups. These results confirmed

72 Theoretical background & literature review

Anderson's (1991) and Grabe's (2009) claim that both proficient and less proficient readers use similar comprehension strategies. However, proficient readers apply these strategies more successfully than less proficient do.

Another study (Martínez, 2008) aimed to investigate the nature of metacognitive awareness of Spanish university students, using the MARS scale to identify the most- and least-perceived reading strategies among 157 university students. The mean scores of individual reading strategies ranged from 4.21 to 2.37 which reflected a high to moderate perception of reading strategies. The students showed a preference for using problem-solving strategies, followed by global and support reading strategies. The most highly-perceived strategies were: rereading to increase understanding, paying more attention when text becomes difficult, and getting back on track when losing concentration. The least-perceived strategies were previewing text before reading, reading aloud to enhance understanding, and self-questioning. ANOVA results indicated that female students used three support reading strategies more than males. These strategies were: taking notes, summarizing, and underlining/circling information in order to remember it.

Vaez Dalili and Takavoli (2013) investigated whether there was a difference between Engineering and Humanities students in their awareness of reading strategies. They used the MARS to collect information from 70 Iranian university students. T-test results revealed no significant difference between the two groups in terms of their metacognitive awareness of reading strategies. Descriptive statistics further revealed that the Engineering students had an overall higher mean score of reading strategy awareness ($M=3.39$) than the Humanities students ($M=3.16$). Both groups showed a high preference for global reading strategies, followed by problem-solving and support reading strategies. In addition, the engineering students utilized certain strategies more frequently than those in the humanities. These were: previewing text before reading it, using context clues, predicting text meaning, and staying focused while reading. The strategies used more frequently by the Humanities students were: typographical aids, reading slowly and carefully, adjusting reading rate, reading aloud when text becomes hard, and going back and forth in the text.

Li (2010) also used the MARS to explore metacognitive awareness of reading strategies among 188 Chinese university students. Descriptive statistics indicated that the mean score of awareness of problem-solving reading strategies was the highest ($M=3.22$) followed by global ($M=2.97$) and support reading strategies ($M=2.60$). There was a significant difference between males and females in strategy use, with females using more reading strategies than the males. However, males used six strategies more frequently than females. These strategies were: using prior knowledge, checking how text content fits the purpose of reading, analyzing information, guessing what the text is about, using reference materials, and visualizing information. The author argued that Chinese males tend to be more critical and analytical while reading than females. In addition to gender differences, a significant difference was found between high and low English proficiency students. Students with a high, as opposed to low, proficiency level had a higher mean in 27 out of the 30 strategies.

73 Theoretical background & literature review

Additional studies have been conducted without using the SORS or MARSII in investigating awareness of reading strategies. While not directly comparable to the aforementioned studies, their findings correspond to previously reviewed literature and are worth mentioning. For example, Tsai and colleagues (2010) investigated the differences between reading strategies used in L1 and L2 reading among 222 Chinese university students. Their results indicated that skilled readers used more L2 reading strategies than the less skilled readers. The most frequently used strategies by skilled readers were finding contextual clues, underlining, decoding unknown words, comparing similar meanings in English, and guessing word meanings. The utilization of problem-solving strategies distinguished skilled from less skilled readers in L2 reading (Tsai, Ernst & Talley, 2010).

When analyzing think-aloud protocols of 20 university Chinese students, Yang (2006) found that readers used both cognitive (reading strategies) and metacognitive (monitoring reading comprehension strategies) techniques. Students utilized cognitive problem-solving strategies when they lacked linguistic knowledge. Learners who used contextual cues to build their guesses of word meaning were more successful than students who used their background knowledge to guess the meaning of unknown words.

Zhang and Seepho (2013) explored the use of metacognitive strategies among 33 Chinese undergraduate students. They classified reading processes as: before reading (planning), while reading (monitoring), and after reading (evaluating). Monitoring of reading strategies had the highest correlation with reading comprehension. Regression analysis revealed that planning and monitoring were significant predictors of reading achievement. Descriptive statistics indicated that both high and low proficiency students used the selective attention strategy (which corresponds to the problem-solving strategy in Mokhtari & Sheorey, 2002). According to their results, low proficiency students had fewer monitoring strategies during reading; this could be due to weak metacognitive awareness or poor linguistic knowledge. The self-reflection and self-evaluation strategies were the least used. Interview results revealed that both low and high proficiency students considered these strategies as new to them. Furthermore, they lacked the knowledge of how to evaluate the effectiveness of strategy use. The authors explained that this feeling resulted from the lack of the students' engagement in evaluating their progress during learning. From their perspective, only their instructors were responsible for this evaluation. Zhang concluded from these studies that students with high reading scores tended to use more global strategies, such as guessing meanings, while students with low reading scores tended to use more local strategies. Skilled readers monitored their reading by checking their comprehension to ensure their understanding, while poor readers did not value this strategy and, rather, focused on looking up new words. Both high and low scorers revealed that a lack of lexical knowledge made L2 reading difficult.

Shang (2011) explored the relationship between EFL proficiency level and awareness of strategy use among Taiwanese university students (N=108). He assessed four types of reading strategies: cognitive, metacognitive, compensatory, and test-taking strategies. Results revealed students to have moderate awareness of reading strategies. Test-taking strategies were the most frequently

74 Theoretical background & literature review

used, followed by compensatory, metacognitive, and cognitive strategies. Correlational analysis indicated that only the test-taking and cognitive strategies correlated significantly with EFL reading comprehension. The author explained that Taiwanese learners are typically taught to be rote learners. Rather than learn comprehensively, they are encouraged to primarily focus on mastery of test taking strategies to overcome language deficiencies and obtain high scores on language proficiency tests.

Phakiti (2003) investigated the cognitive and metacognitive strategies used by 384 Thai university students. He classified students into three groups according to their EFL proficiency: high, moderate, and low. Results suggested a positive correlation between cognitive/metacognitive reading strategies and EFL reading comprehension ($r = .391$ and $.469$ respectively). In addition, these two strategies accounted for 15-22% of the variance in EFL reading. The use of cognitive and metacognitive reading strategies differed according to students' proficiency levels. Highly successful readers used a greater number of metacognitive strategies than the moderately and less proficient groups. Highly- and moderately-proficient readers did not differ in their use of cognitive reading strategies. In a further study conducted on 561 Thai university students, Phakiti used SEM to present the relationship between cognitive/metacognitive strategies and EFL reading comprehension. Results indicated that both strategies were highly intercorrelated, and they explained between 11-30% of L2 reading. Phakiti concluded that reading strategies are continual and do not fall into discrete categories but are rather activated when needed. This conclusion falls in line with Grabe's (2009) claim that metacognitive strategies are not the counterpart of cognitive strategies, but that rather readers use reading strategies with varying levels of metacognitive awareness based on their reading goals (Phakiti, 2008).

Ozek and Civelek (2006) investigated the type of reading strategies used by Chinese EFL university students ($N=185$). According to results from surveys and think aloud protocols, the strategies most used by learners were relating title to text content, scarce use of dictionary, guessing the word meaning from the context, skipping unimportant words, reading without translating word-for-word, and thinking aloud during reading.

Maeng (2006) investigated reading strategy awareness of 112 Korean university students. In this study, students tended to use more cognitive strategies while reading, such as: extracting main ideas, inferring, guessing the meaning of unknown words using contextual clues, and summarizing. Both male and female students emphasized fewer metacognitive strategies, among them: paying attention to the title, evaluating text difficulty, self-questioning, underlining or organizing the important information, and self-monitoring. When investigating gender effect on reading strategy use, the researcher did not find any significant differences between males and females.

2.5.8 Conclusion

Research on L1 and L2 reading has emphasized the importance of strategic metacognitive knowledge in the success of the reading process. Skilled readers should be aware of various reading strategies and have the ability to use them flexibly to achieve their reading goals. Therefore, strategic readers not only need to know which strategies to use, but must also be aware of when, why, and how to use them. This strategic knowledge involves various strategies, such as: thinking about reading, planning for reading, monitoring comprehension, taking corrective actions when facing reading problems, and evaluating the reading process and the effectiveness of strategies use.

In the present study, a classification scheme proposed by Mokhtari & Sheorey's (2002) was adopted. This system of classification categorizes reading strategies into three categories: global, support, and problem-solving reading strategies. This classification and its related measurement tool, the Survey of Reading Strategies (SORS), was utilized in several studies within different cultural contexts. These studies lent empirical support for usefulness of the survey and motivated the research to use it to measure metacognitive awareness of Egyptian and German university students.

The reviewed research on metacognitive awareness of L2 reading strategies revealed several consistent trends. First, according to the majority of the research findings, L2 readers displayed a high preference for strategies dealing directly with solving reading problems. On the other hand, L2 readers tended to disregard global and support reading strategies. Readers may have perceived these kinds of strategies as time-consuming and less important for solving reading problems. They may have therefore preferred to focus on strategies that would enhance their understanding of the texts.

Secondly, several studies on gender differences in L2 learning strategies indicated that females outperform males in L2 learning strategies. However, research on reading strategies has not supported a difference in reading strategy use based on gender. Other factors, such as students' values and motivations, task demands, and learning environment might be more related to differences in L2 reading strategy use, as opposed to gender. In effect, a number of studies found that differences in awareness of L2 reading strategies were related to variations in L2 proficiency level or perceived level of reading ability. For example, Mokhtari and Reichard (2002) found that the more readers judge their reading ability as high, the more they use global and problem-solving reading strategies. Sheorey and Mokhtari (2001) also found that students who rated themselves as having higher reading abilities reported using more reading strategies than those who rated themselves as lesser skilled. Furthermore, additional studies revealed that L2 proficiency level influences not only the frequency, but also the type of strategy use. Highly proficient L2 students tended to use more global strategies, such as visualizing information or summarizing, while less proficient students depended more on translation and use of dictionaries.

Finally, a number of studies indicated that native and non-native proficient readers tended to use the same pattern of reading strategies. This could reflect the universal nature of the reading process

76 Theoretical background& literature review

and promotes the idea that proficient L2 readers can attain the same level of reading as native speakers. However, L2 readers often reported using more types of reading strategies than native readers. This might reflect the compensatory role of reading strategies, as L2 readers attempt to compensate for any lack of linguistic knowledge by using a greater number of reading strategies.

The previously reviewed studies provided great insights into the awareness of reading strategy use within different L2 contexts. However, few of these studies investigated the relationship between this strategic awareness and L2 reading comprehension. Therefore, this study serves as a further step toward gaining more in-depth information on this relationship. This will be discussed in the present work, in the context of both previous literature and the data collected from the study samples.

As previously mentioned, L2 reading researchers believe that a learner's motivation plays an important role in the L2 reading process. In addition, Baker and Brown (1984) indicated that a reader's knowledge of themselves is an integral part of metacognitive awareness. This knowledge of oneself includes not only the awareness of cognitive tasks, but also the awareness of affective and motivational processes. Accordingly, students' beliefs and volitions are vital factors that influence their cognitive processes and reading behavior. Students may possess knowledge of various strategies, but they will only use them when they are motivated (Lau& Chan, 2003). Although a number of L1 reading studies have explored the relationship between reading motivation and metacognitive awareness of strategy use, few L2-specific studies have investigated this relationship. Consequently, the researcher attempted to explore the role of L2 reading motivation in the L2 reading process across the two study samples.

The following section discusses the role of reading motivation in L2 reading research and its relationship to metacognitive awareness of reading strategies.

2.6 Reading Motivation

The development and maintenance of reading motivation was the first prerequisite given by the International Reading Association for the development of reading as a skill (Santa, Williams, Ogle, Farstrup, Au, Baker & Paratore, 2000). This statement reflects the fact that reading is not merely a cognitive process, but also a motivated activity, and that the role of motivation in the reading process should not be underestimated.

It wasn't until the 1990s that motivational factors began gaining a place in research on reading, an effort due to work by Wigfield and colleagues (e.g. Wigfield and Guthrie 1997; Baker and Wigfield 1999), who presented a well-established framework for the study of the variables involved in reading motivation. Wigfield and colleagues considered reading an "effortful activity" that readers choose whether or not to accomplish. In this regard, the factors that motivate readers play an integral role in the reader's active engagement and persistence in reading, which eventually has an influence on the learner's academic achievement (Guthrie & Wigfield, 1999; Wigfield, Gladstone & Turci, 2016; Wigfield, Wilde, Baker, Fernandez-Fein & Scher, 1996).

The following section presents definitions of reading motivation, followed by a review of the L1 reading motivation model suggested by Wigfield and Guthrie (1995), as well as a review of prior research on reading motivation. The third section presents the role of motivation in L2 learning in general and L2 reading in particular.

2.6.1 Reading motivation definitions

Stemming from the Latin root "movere", motivation refers to a process that starts with a need and leads to a behaviour that moves an individual toward achieving a goal (Weiner, 1992). Motivation is based on a set of beliefs, values, expectations, and behaviours (such as engagement, persistence, and problem solving). These beliefs, values and expectations are widely affected by social environments and contextual factors (Grabe, 2009). Huang (2012) defines motivation as a theoretical framework that researchers use to justify the direction, power, persistence of individuals behaviours.

Within the domain of reading motivation research, Guthrie and Wigfield (2000) defined reading motivation as

“the individual's personal goals, values, and beliefs with regard to the topics, processes, and outcomes of reading” (P.405).

This definition reveals that reading motivation influences a learner's choices of reading material, their level of engagement in the reading process, and the amount of information they are able to gain from reading. In the same vein, Pitcher and colleagues defined reading motivation as a multifaceted construct impacting readers' choices of reading, as well as their desire to engage in reading. This consequently influences their reading competence, especially when reading for

78 Theoretical background & literature review

academic purposes (Pitcher, Albright, DeLaney, Walker, Seunarinesingh, Mogge & Dunston 2007).

On the other hand, Schiefele and his colleagues (2012) distinguished between two types of reading motivation: current and habitual. Current motivation refers to the extent of the reader's intention to read a particular text in a specific reading situation, while habitual reading motivation refers to the relatively stable individual willingness to initiate reading activities.

Upon conducting a conceptual review of reading motivation, Conradi and colleagues (2013) defined reading motivation as a drive enhanced by an individual's beliefs, attitudes, and goals for reading. They distinguished between two types of reading motivation: intrinsic reading motivation and extrinsic reading motivation. Intrinsic reading motivation refers to the drive to read for internal reasons, while extrinsic motivation refers to reading for the pursuit of external rewards (Conradi, Jang & McKenna, 2013).

2.6.2 L1 Reading motivation model

According to Guthrie and Wigfield (1999, 2000), reading motivation is an integral component of students' reading engagement. They believed that the more a student is motivated to read, the more engaged they are in reading, the more time they spend on reading, and the greater energy they place on the cognitive efforts required for reading. They are therefore better able to comprehend a text than a less motivated reader (Guthrie, Hoa, Wigfield, Tonks, Humenicks, Littles, 2007). According to this model, reading engagement relies on three clusters of factors: social, cognitive, and motivational- engagement in reading cannot be achieved without the three dimensions together. Thus, Guthrie and Wigfield (2000) proposed that engaged readers *“coordinate their strategies and knowledge (cognition) within a community of literacy (social) in order to fulfil their personal goals, desires, and intentions (motivation)”* (p. 403); they focus on extracting meaning from text, avoid distractions, and discuss ideas and text meanings with peers. Disengaged readers, on the other hand, are inactive, prefer to do any activity other than reading, and are willing to avoid spending time or effort in reading as they do not enjoy it (Guthrie & Wigfield, 2000).

Wigfield and Guthrie (1995; 1997) believed that reading motivation is not limited to a certain text, nor can it be represented by one kind of motivation. Therefore, they combined a number of constructs from general motivation research, such as: Self-efficacy, Expectancy-Value theory, Achievement Goal theory and Intrinsic/Extrinsic Motivation Theory, in order to build one single comprehensive model of reading motivation (figure 6) (Wigfield & Guthrie, 1995; Wigfield et al., 1996).

The suggested model aims to answer two important questions asked by modern motivation theories: “Can I do this task?” and “Do I want to do this task and why?” (Eccles, Wigfield, & Schiefele, 1998). This model includes three major categories. The first category is related to

79 Theoretical background & literature review

reading competence and reading efficacy beliefs, which includes reading efficacy, challenge, and work avoidance.

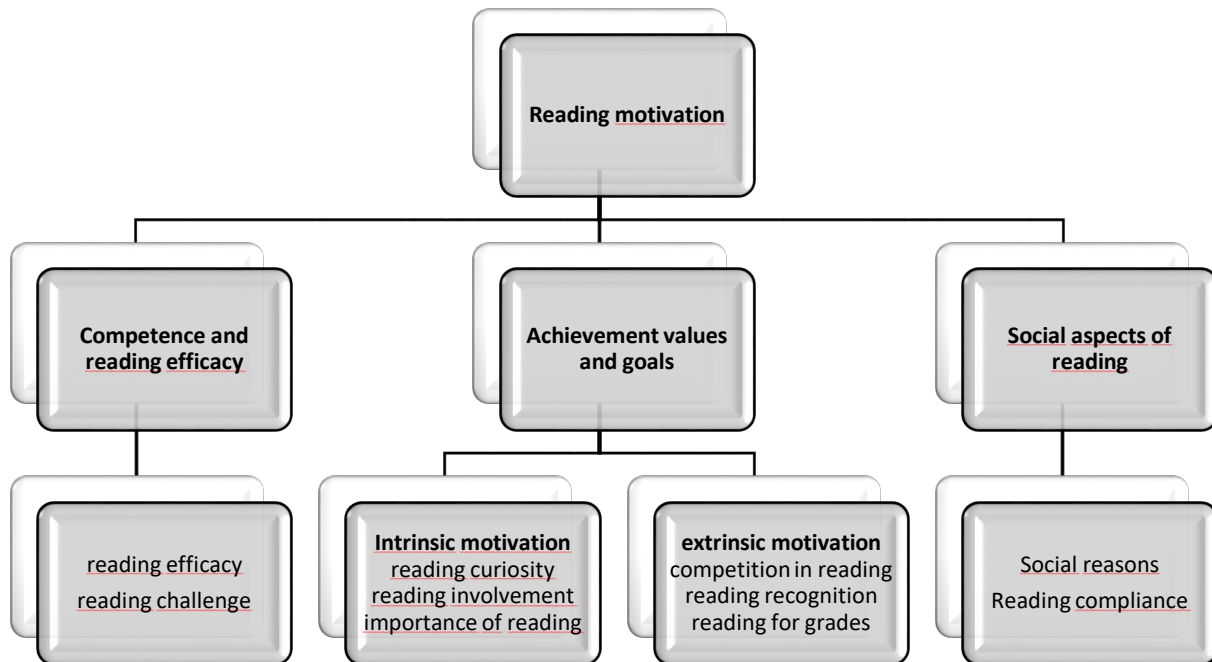


Figure 7. Wigfield and Guthrie's (1995) reading motivation model

The second category consists of reading achievement values and goals and is divided into intrinsic and extrinsic reading motivation. Relying on the assumption that reading is a social activity, the third category accounts for the social aspects of reading. In the upcoming lines a detailed discussion of each motivational construct will be provided.

1-Competence and reading efficacy

This dimension is based on an individual's competence and beliefs on their own efficacy. It implies that reading requires hard work for its mastery. In other words, this dimension answers the question "Can I do this task?", which itself targets individuals' beliefs about their abilities to achieve certain tasks (Eccles, et al., 1998; Bandura, 1997). The subcomponents of this factor are self-efficacy, challenge, and work avoidance.

80 Theoretical background & literature review

Reading self-efficacy is an individual's belief or self-judgment that he or she can be a successful reader. According to Guthrie and colleagues, reading efficacy is a

“feeling that reading behaviors are completely under one's own control... Perceiving that there are choices about when, where, and how to read. Believing that one can read independently. Confident in one's own abilities” (Guthrie, Van Meter, McCann, Wigfield, Bennett, Poundstone & Mitchell, 1996. p.330).

Challenge represents students' willingness to read texts regardless of their difficulty level. Alternatively, it can be defined as the satisfaction experienced by readers when mastering or understanding the complex ideas of a certain text (Guthrie et al., 1996; Guthrie & Wigfield, 1997). On the other hand, work avoidance reflects a student's desire to avoid the reading activity. Avoidant readers have negative affect regarding the texts and reading process itself. They do not focus on peer, family or teacher evaluations of their reading ability. Hence, learners with low self-efficacy beliefs tend to avoid reading difficult or challenging texts, find texts boring, and may report reading as frustrating or painful (Bandura, 1997; Baker & Wigfield, 1999; Guthrie et al., 2009).

Therefore, efficacious readers can be described by the following characteristics:

- 1- They are hard-working.
- 2- They do not avoid difficult texts.
- 3- They have knowledge of reading strategies.
- 4- They persist when dealing with reading difficulties.
- 5- They believe that they are capable of handling complex texts, understanding unfamiliar words, and performing well on reading tasks (Guthrie, Coddington & Wigfield, 2009; Guthrie et al., 2007).

However, in subsequent research, (e.g. Wang & Guthrie, 2004; Guthrie et al., 1999) self-efficacy was not included as an integral part of reading motivation but was rather examined as a distinct and separate construct. In their review on the dimensions of reading motivation, Schiefele and his colleagues (2012) considered reading self-efficacy as a precondition of reading motivation and not necessarily an integral component of it. This was determined by the fact that it refers to the expectancy of reading successfully and not actual the reasons for reading. Additionally, they considered choosing to read a challenging text as a consequence of reading motivation. Furthermore, Wang and Guthrie (2004) indicated that reading self-efficacy should not be considered as part of intrinsic motivation, as it represents an independent theoretical construct. Taboada, Tonks, Wigfield, and Guthrie (2009), and Schaffner and Schiefele (2007) also proposed the idea that self-efficacy is a distinct construct that can influence reading motivation while not being considered an integral component of it. This view was adopted by the present study and reading self-efficacy was therefore not included as a subfactor of reading motivation.

81 Theoretical background& literature review

2-Achievement values and goals

This construct is related to the component of intrinsic/extrinsic motivation in Deci and Ryan's (1985) theory on learning goal orientation (e.g. Ames, 1992) as well as from the concept of task value from within Eccles and Wigfield theory (Baker& Wigfield, 1999). It seeks to answer the question, "Do I want to do this task and why?". According to Wigfield and Guthrie (1995, 1997), this construct consists of intrinsic reading motivation, which includes curiosity, involvement, and importance, and extrinsic reading motivation, which consists of recognition, grades, and competition.

Intrinsic reading motivation refers to an inherent interest in the reading materials; it describes the satisfaction that a learner gains from engaging in the desired task. The trigger of this satisfaction can be either the reading material or the reading activity itself. The component of curiosity is an object-specific intrinsic reading motivation. This references a reader's desire to either explore a new and interesting topic, acquire more knowledge about current topic of interest, answer a question, or compare competing answers or theories (Guthrie, et al., 1996). Learners displaying a high interest in reading disclosed a positive affect for books, preferred certain authors, and had favourite reading topics. On the other hand, students with less interest in reading reported that they did not have a favourite book nor favourite author, and preferred other activities to reading (Guthrie, et al., 2007).

Involvement represents activity-specific intrinsic reading motivation and reflects the positive feelings readers experience when they get lost in a story, witness characters develop, appreciate the language/prose, or enjoy the format of the story (Guthrie, et al., 1996). In this situation, a reader perceives reading as rewarding in itself. Highly involved readers express being "absorbed" by what they read; they enjoy the language, scenes, imagery, and characters of books. They tend to schedule their activities around finding regular times and/or places to read (Guthrie, et al., 2007). This is related to what Csikszentmihalyi described as the 'flow experience', which refers to being completely involved in an activity to the point of losing track of time and not being aware of the surroundings of one's self. Wigfield and colleagues considered this dimension unique to the field of reading (Wigfield, et al., 1996; Wigfield at al., 1998). To be in a flow state, certain conditions need to be met, such as perception of balance between skills and challenge, clear task goals, feedback about success in the task, lack of self-consciousness, and a perception that time passes quickly (Csikszentmihalyi,1997).

Importance refers to the subjective importance that one assigns to reading (Wigfield& Guthrie, 1997). Readers value the reading activity for different reasons, which vary from one individual to another according to their interests and desired goals. Internally-motivated students consider reading an enjoyable activity, rather than a means for external reward or academic success. Thus, readers with high intrinsic motivation can be characterized as

- 1- Having a willingness to create reading opportunities
- 2- Reading more frequently

82 Theoretical background & literature review

- 3- Possessing several personal reasons to read
- 4- Seeking internal satisfaction rather than external rewards (Gambrell et al., 1996; Guthrie et al., 1999; Wigfield & Guthrie, 1997)

To summarize, when readers find personal meaning in reading materials or have learning goals, they will persist more in reading, choose challenging materials, and engage deeply in the reading (Wigfield, Eccles, Rodriguez, 1998).

The second subcategory is extrinsic motivation. It refers to external factors that emerge from outside of the learner and drive him/her to read. In this case, extrinsically motivated readers aspire either to acquire positive outcomes of reading or to avoid negative judgements. They seek to obtain recognition for mastering reading, gain visible rewards, and outperform their peers in publicly acknowledged achievement situations (Ryan & Deci, 2000; Guthrie, et al., 1996; Schiefele, Stutz & Schaffner, 2016; Schiefele et al., 2012; Wigfield & Guthrie, 1997).

Competition is the first dimension of extrinsic reading motivation. It refers to reading for the purpose of outperforming friends or colleagues. Guthrie explained that competition refers to the situation in which readers desire not only to be better reader than their colleagues but also to acquire more information from reading materials than others do (Guthrie, et., 1996).

Recognition refers to a reader's pleasure in being recognized as a successful reader, as well as feeling appreciated by others for their progress in reading. Wigfield and Guthrie (1997) indicated that recognition represents the satisfaction that readers experience when they receive an evident recognition for their success in reading. Both Recognition and competition can be characterized as ego-involvement, as the reader will engage in reading to enhance or maintain his or her feeling of self-worth and self-esteem.

The last dimension in extrinsic reading motivation is reading for grades, which represents the situation in which readers engage in reading to obtain a positive evaluation of their teachers or tutors (Guthrie et al., 1996, p.330).

In summary, extrinsically motivated readers engage in reading due to the prospective results that they desire to achieve. They engage in reading for the sake of outperforming others, showing ability and competence, and avoiding negative evaluations of their reading ability (Horney, Craven & Ali, 2008; Wigfield & Guthrie, 1997; Wigfield, 1997; Wigfield, Eccles, Yoon, Harold, Arbreton, Freedman-Doan & Blumenfeld, 1997).

Cambria and Guthrie (2010) considered extrinsically motivated students as "not good readers". They indicated that extrinsic motivation has a short-term impact on reading. Once the reader has achieved their goal, they will stop reading. This is unlike intrinsically motivated readers, who are willing to deploy more effort and persist when facing a reading problem.

Intrinsic and extrinsic reading motivation should not, however, be considered opposing components of reading motivation. In fact, both types of reading motivation are moderately

83 Theoretical background& literature review

correlated (Guthrie, et al., 2007). Furthermore, Wang and Guthrie (2004) suggested that the combination of extrinsic and intrinsic motivation, rather than one type alone, could lead to effective learning.

3- Social aspects of reading:

This third category presents reading as an activity accomplished in social context. It includes social reasons for reading as well as compliance components. Social reasons for reading refer to the act of sharing information acquired from reading with family and friends. It represents a desire to interact with others who value reading, to exchange information about reading materials, and to help each other achieve better comprehension (Guthrie, et al., 1996; Watkins& Coffey, 2004). The second component in this category is compliance, which refers to reading in order to meet the expectations of others. It represents the external pressure executed by the educational system or social surroundings to engage in the reading process. Wang and Guthrie (2004) considered social aspects of reading as part of extrinsic reading motivation.

It should be noted that the previously reviewed different aspects of reading motivation are not separated from each other. Instead, they are simultaneously activated and reciprocally influence each other. Thus, the student's reading motivation cannot be described as solely intrinsic or extrinsic, rather it is a mixture of both aspects, which varies according to their predominance or strength (Guthrie& Wigfield, 2000).

In order to assess the proposed reading motivation model, Wigfield and colleagues developed the Motivation for Reading Questionnaire (MRQ). The initial version of the MRQ contained 82 items. Wigfield and Guthrie (1997) tested the proposed model using data from 105 fourth and fifth grade students. The results excluded 28 items, and the refined version of the MRQ consisted of 54 items. The most reliable dimensions were self-efficacy, challenge, work avoidance, curiosity, involvement, recognition, competition, and social reasons for reading. Factor analysis revealed that a three-factor model best fit the sample data. The first factor consisted of Social, Efficacy, Curiosity, Involvement, Recognition, and Challenge. The second factor consisted of Compliance, Grades, Recognition, and Importance. The third factor consisted of Competition and Work Avoidance. They explained that children read for different but interrelated reasons which clustered into two categories: intrinsic and extrinsic reasons.

In a follow-up study, Wigfield and colleagues used the 54-item version of the MRQ to further explore childrens' reading motivation and its relation to reading frequency and performance. The sample consisted of 650 fifth and sixth graders. They used the 54-item version of the MRQ. Results indicated that the most reliable scales were: competition, importance, social, challenge, recognition, curiosity, grades, efficacy, and enjoyment. The less reliable scales were: compliance and work avoidance. Based on exploratory factor analysis, a six factor solution was found. These factors were social, competition, work avoidance, challenge-curiosity, efficacy-recognition, and compliance-grades-importance. Regression analysis revealed that involvement, efficacy, recognition, and compliance were positive predictors of reading performance (Wigfield, Wilde;

84 Theoretical background & literature review

Baker, Fein & Scher, 1996). Although authors indicated that the scales derived from factor analyses were more meaningful, as they reflected childrens' responses to the questionnaire, they believed it would also be appropriate to deal with the separate dimensions, as they had been proven to be reliable (Wigfield, et al., 1996).

Baker and Wigfield (1999) tested the eleven motivational dimensions among 371 fifth and sixth-grade students in the USA. They conducted three separated confirmatory factor analyses. The first CFA was conducted on the items representing self-efficacy, challenge, and avoidance. Results supported a three-factor model for representation of these dimensions. The second CFA involved curiosity, involvement, importance, recognition, grades, and competition. A six-factor model reached the best-fit indices. The final CFA, dealing with for social and compliance scales, confirmed the two-factor model. All scales had good internal consistency, aside from the work avoidance scale. On the other hand, Watkins and Coffey (2004) assessed the 11 reading motivation dimensions in two different samples of elementary school students. Across the two samples, an eight-factor model was the most adequate for representation of the data. These factors were: social, grades-compliance, curiosity, competition, involvement, reading work avoidance, and recognition.

Therefore, it can be deduced that the MRQ is a comprehensive tool, as it covers a wide variety of motivational factors (Lin, Wong & McBride-Chang, 2012; Schiefele & Schaffner, 2016). In addition, it was tested in several studies (e.g. Baker and Wigfield, 1999; Wang & Guthrie, 2004; Wigfield & Guthrie, 1995; Bozack, 2011) and demonstrated relatively reliable results. The following section reviews L1 reading research aimed at investigating the relationship between reading motivation and reading achievement.

2.6.3 L1 Reading Motivation Research

Several studies have shown that reading motivation not only exerts pronounced influence on the reading process but also that each facet presents a different pattern of relationships with reading comprehension.

Baker and Wigfield (1999) conducted a study on the structure of the MRQ, exploring its relationship with reading comprehension as measured by a standardized reading test. The sample consisted of 371 fifth and sixth-grade students in the USA. They conducted two separated analyses according to students' ethnicities. Correlational analysis revealed that challenge, involvement and work avoidance correlated significantly with Africans' reading comprehension ($r = .22, -.34, \text{ and } .20$ respectively). In the Caucasian sample, self-efficacy, challenge, work avoidance, curiosity, involvement, recognition, grades, and compliance correlated significantly with reading comprehension ($r = .25, .20, -.25, .23, .21, .23, .25$ and $.23$ respectively). On the other hand, researchers found significant differences between males and females in all motivational constructs, aside from competition and work avoidance. Females had significantly higher mean scores than boys on nearly all motivational factors. Cluster analysis revealed students to be clustered into seven groups according to their motivational characteristics, which were: low/very low reading

85 Theoretical background & literature review

motivation, low competitiveness/efficacy/recognition, low importance, competitive and work avoidant, low competitiveness and work avoidant with high importance and compliance, and highly motivated. The authors indicated that the previous results revealed the multifaceted nature of reading motivation, emphasizing that students should not be described as either high or low in motivation, but rather possessing a mixture of motivational characteristics. They further indicated that the relationship between reading comprehension and reading motivation is not “simple and direct”, but is instead influenced by several factors, such as: type of assessment tool, gender, ethnicity, and socioeconomic status of the child.

In order to explore the influence of ethnicity on reading motivation, Guthrie, Coddington, and Wigfield (2009) conducted a study on the motivational profiles of 245 Caucasian and African American fifth grade students in order to explore the relationship with L1 reading comprehension. The motivational profiles combined intrinsic motivation, reading avoidance, reading efficacy, and perceived difficulty. Correlational analysis revealed that, among the Caucasian sample, there was a significant correlation between reading comprehension and intrinsic motivation ($r = .29$). However, this was not found in the African American group. On the other hand, avoidance, perceived difficulty, and reading efficacy all showed significant negative correlation with reading comprehension in both samples. To investigate the predictive power of intrinsic motivation and avoidance in explaining reading comprehension, the authors conducted a hierarchical multiple regression analysis, which revealed that, in the African American sample, only avoidance was a significant predictor, and accounted for 6% of the variance in reading comprehension. In the Caucasian sample, avoidance was able to explain 1% of the variance in reading comprehension once intrinsic motivation was accounted for, which was not significant. However, the final beta value for intrinsic motivation was statistically significant. These results revealed that intrinsic reading motivation plays a more important role for Caucasians than for African American students.

To address the role of ethnicity effects on level of reading motivation, the researchers created four groups of motivational characteristics based on the median of each motivation variable. These groups were: avid readers (high on intrinsic, low on avoidance), apathetic readers (low on intrinsic, low on avoidance), ambivalent readers (high on intrinsic, high on avoidance), and adverse readers (low on intrinsic, high on avoidance). Multivariate analysis of variance yielded no statistically significant effect of ethnicity on level of reading motivation.

Another study that aimed to compare two different ethnic groups in terms of L1 reading motivation was presented by Wang and Guthrie (2004). They conducted a study to investigate the relationships between intrinsic motivation, extrinsic motivation, amount of reading, and text comprehension among Chinese ($N = 197$) and American ($N = 187$) students. Correlational analysis of American data revealed reading comprehension to be positively correlated with involvement ($r = .21$), preference for challenge ($r = .22$), curiosity ($r = .06$), grades ($r = .07$), and recognition ($r = .06$). Reading comprehension was negatively correlated with competition ($r = -.06$), compliance ($r = -.05$), and social reasons ($r = -.15$). In the Chinese sample, reading comprehension correlated

86 Theoretical background & literature review

positively with curiosity ($r = .3$), involvement ($r = .16$), preference for challenge ($r = .26$), recognition ($r = .07$), social reasons ($r = .04$), competition ($r = .04$), and compliance ($r = .08$).

SEM results revealed that, in both samples, intrinsic motivation had a direct positive effect on text comprehension ($\beta = .64$ in the USA sample and $\beta = .73$ in the Chinese sample), while extrinsic motivation had a negative direct effect ($\beta = -.57$ in the USA sample and $\beta = .68$ in the Chinese sample). Wang and Guthrie concluded that intrinsically-motivated readers are more involved in the details of reading materials due to their high level of curiosity. They are more willing to understand the text they are reading. When they face challenging texts, they seek to solve problems and cope with difficult tasks in order to achieve a full understanding of the text. Consequently, these readers achieve a deep understanding of texts. Extrinsically-motivated readers aim to achieve external rewards and avoid negative outcomes. Their main concern is not learning from text. They therefore may be more likely to use strategies at only superficial levels. Wang and Guthrie indicated that extrinsically-motivated readers are most likely to have low scores on reading comprehension tests. In addition, the high correlation between intrinsic and extrinsic motivation implies that children read for multiple reasons. They can read both for enjoyment and for acquiring external rewards.

Similarly, a 2006 study by Unrau and Schlakman investigated the relationship between grade, gender, ethnicity, and motivation and reading achievement. The sample consisted of 1,032 Hispanic and Asian students in the USA. They conducted their study across two academic years, from the sixth to eighth grades. Correlational analysis revealed reading comprehension scores to negatively correlate with curiosity ($r = -.11$), grades ($r = -.08$), and social ($r = -.16$) in the Hispanic sample. In Asian group, reading comprehension correlated positively with involvement ($r = .23$) and challenge ($r = .12$), and no significant negative correlation were found.

SEM revealed no significant direct effect from either intrinsic or extrinsic motivation on reading achievement in Hispanic sample. In contrast, in the Asian sample, SEM revealed a significant positive direct path from intrinsic motivation ($\beta = .55$) as well as a significant direct negative path from extrinsic motivation ($\beta = -.47$) to reading achievement. Multiple group SEM analysis revealed that the effect of intrinsic motivation on reading achievement for Hispanic students was smaller than for Asian students ($\beta = .19$), while the effect of extrinsic motivation in both groups was not significant. For testing the ethnicity effect on reading motivation and reading comprehension, the authors conducted a SEM analysis using the whole sample, coding the ethnicity variable as a binary variable (Asian=1, Hispanic=0). Results demonstrated that ethnicity (which should be interpreted as an indicator of Asian background) had a small statistically significant positive direct effect on intrinsic motivation ($\beta = .07$), but not on extrinsic motivation. Ethnicity also predicted reading achievement ($\beta = .13$), which reflected that Asian students performed better than Hispanic students.

Guthrie, Wigfield, Metsala, and Cox (1999) conducted two studies for the exploration of the relationships between reading motivation, reading efficacy, and reading amount and reading

87 Theoretical background & literature review

comprehension. Reading motivation consisted of two components. The first described an intrinsic motivation mastery goal, which consisted of challenge, curiosity, and involvement. The second referred to an extrinsic motivation-performance goal consisting of recognition and competition. The first study used a sample of third and fifth grade students ($N= 266$). Results revealed that reading motivation, when analysed either separately or as a composite construct of intrinsic and extrinsic motivation, significantly predicted reading amount but not reading comprehension, whereas reading amount was a significant predictor of reading comprehension. Therefore, the authors suggested that reading motivation cannot directly predict students' reading comprehension. Rather, it influences reading comprehension indirectly through reading amount. A second study was conducted on students from the eighth and tenth grades ($N= 17,424$). In contrast to the previous study, reading motivation was measured by two questions. The first question asked the students whether they took certain subjects, such as math or English, because it was required or because they wanted to study it. The second question asked the students about the amount of effort they deployed when studying these subjects. Results indicated that both reading amount and reading motivation were significant predictors of reading comprehension. Guthrie and colleagues explained that the predictive influence of reading motivation that appeared in the older sample could be due to the nature of the assessment tool used to measure reading motivation. This was theorized as the measure of reading motivation used in the second study was more related to the effort that students were willing to deploy in classroom English lessons. Another possible reason for this significant prediction is that the role of motivation as a predictor of achievement increase with age (Eccles, et al., 1998).

In an interview-based study, Guthrie and colleagues held interviews with (31) fourth-grade students in the USA. These qualitative investigations revealed that intrinsic motivation, as measured by interest, choice, and involvement, was a significant predictor of reading comprehension. On the other hand, efficacy and social motivation could not significantly predict reading comprehension. The authors additionally indicated that the data derived from the interview-based measure of intrinsic motivation significantly predicted growth in reading motivation over a 3-month period. However, self-reported motivation could not predict reading comprehension growth (Guthrie, et al., 2007). Likewise, Anmarkrud and Bråten (2009) did not find self-efficacy to be a significant predictor of reading comprehension of social studies texts among Norwegian ninth-grade students. However, a reading task value, as measured by usefulness, importance, and intrinsic interestingness of reading comprehension, was a significant predictor of reading comprehension.

In a longitudinal study conducted by Becker, McElvany, and Kortenbruck (2010) on a sample of third- and sixth-grade German students, the relationship between reading both motivation and reading amount, and reading literacy was studied. Their results revealed that intrinsic motivation had an extended positive influence on reading, while extrinsic motivation had a negative effect on reading comprehension. In other words, students who read because they enjoyed the activity developed better reading skills than students who read for external reasons. Intrinsic motivation of

88 Theoretical background & literature review

students in grade 4 was strongly predicted by their achievement in grade 3, which implies that past success makes individuals enjoy the activities at which they are good. They then tend to be more engaged in these activities in the future. In contrast, Grade 3 reading achievement negatively predicted Grade 4 extrinsic motivation; these results would imply that past reading failure results in higher extrinsic motivation. Consequently, these students will only read when they have to, which in turn leads to poorer reading skills.

A further longitudinal study conducted by Retelsdorf, Köller, and Möller (2011) confirmed the positive effect of intrinsic motivation on reading growth. Using 1508 secondary school students from fifth to eighth grade, they attempted to identify the effects of intrinsic reading motivation (as measured by reading enjoyment and interest in reading) and extrinsic reading motivation (as measured by competition) on reading performance. Results revealed that reading interest (curiosity) had a positive effect on reading growth, even when controlling for reasoning ability, decoding skills, family background, and reading self-concept. They indicated that students who perceived reading as an effective tool for acquisition of information about interesting topics, would have higher levels of reading performance growth. Reading enjoyment (involvement) seemed to have a positive effect on reading performance, while competition had a negative influence. These results imply that students who consider reading as a means to fulfill their curiosity toward certain topics will acquire higher levels of reading performance growth.

Adding to this, Logan and colleagues (2011) compared the effect of intrinsic motivation on reading comprehension between good and poor readers. The sample consisted of 111 fourth to sixth grade English students. Results revealed that intrinsic motivation explained significant variance in the growth in reading comprehension in the low reading ability group. In the higher reading ability group, however, it was not able to explain any variance (Logan, Medford & Hughes, 2011). In other words, students with a low reading ability might possess a high level of intrinsic motivation and may tend to persevere with difficult materials due to their interest, satisfaction, or desire to develop their abilities. In contrast, good readers might be satisfied with their competence level and believe they do not need further support from intrinsic motivation.

Park (2011) conducted a reanalysis of PIRLS data for fourth-grade students (N= 4,826) in the USA. Exploratory factor analysis revealed two major motivational facets, based on their internal and external orientations. The internally-oriented construct included intrinsic motivation and self-referenced perceived competence. The externally-oriented facet was represented by extrinsic motivation and peer-referenced perceived competence. Hierarchical linear modeling results revealed that extrinsic motivation had a negative relationship with reading performance, while intrinsic motivation had a positive relationship with reading achievement. However, the effect of extrinsic motivation varied depending on the level of intrinsic motivation. An analysis of interactions between the two constructs indicated that a moderate level of extrinsic motivation was related to higher reading achievement only when students have a high or medium level of intrinsic motivation. A low level of intrinsic motivation led to a highly negative relationship between

89 Theoretical background & literature review

extrinsic motivation and reading performance. However, high intrinsic motivation lead to better reading performance regardless of extrinsic motivation level.

In Chinese context, number of studies have revealed that poor readers possess lower levels of motivation. For example, in their studies on seventh-grade Chinese students, Lau and Chan (2003), Lau (2004) found that intrinsic motivation, extrinsic motivation, social motivation, and self-efficacy all had positive correlations with Chinese reading comprehension. However, intrinsic motivation had the strongest correlation with reading comprehension and strategy use. In addition, the only significant difference between poor and good readers on motivational factors was in intrinsic motivation. Poor readers possessed lower intrinsic motivation than good readers. In another study, Law (2009) found intrinsic motivation significantly correlated with reading comprehension in a sample of fifth-grade students in Hong Kong. However, intrinsic motivation was not a significant predictor of reading comprehension, and Law suggested that motivation could have an indirect effect on reading comprehension through metacognitive awareness. On the other hand, extrinsic motivation seemed not to be an effective motivator for Chinese students. In Law's (2008) study on second-grade students, results revealed a non-significant negative relation between extrinsic motivation and reading comprehension. Nevertheless, when considering literacy at home, parental support and children's and parents' perceptions of instructional practices additionally impacted reading comprehension. When fit into a regression model, extrinsic motivation contributed significantly and negatively to reading comprehension.

While in German context, Stutz, Schaffner, and Schiefele (2016) developed a questionnaire to investigate the role of motivation among elementary school students as well as its relationship to reading comprehension and reading amount. This was entitled the Reading Motivation Questionnaire for Elementary students (RMQ-E). The sample consisted of 1497 elementary school students from grade 1 to grade 3. Exploratory and confirmatory factor analysis revealed three dimensions for reading motivation: curiosity, involvement, and competition. While achievement and recognition failed to constitute dimensions for extrinsic motivation. Reading comprehension was evaluated by a shortened version of ELEF standardized reading comprehension test for Grades 1–6 (Lenhard & Schneider, 2006). Results revealed that involvement was a significant predictor of reading comprehension at all three levels (word – sentence - text), whereas competition had negative or no significant influence. In this sample, curiosity did not have any significant correlation with reading comprehension measures. The authors explained this result could be due to the fact that elementary school students still possess a low level of reading competence, and that they are still focusing on learning how to read and write. Therefore, they may be less able to fulfill their interests by reading specific interesting texts.

Schiefele and Schaffner (2016) conducted another study for validation of their new instrument of reading motivation (the Reading Motivation Questionnaire or RMQ-E). They added two new dimensions: emotional regulation (reading to cope with negative emotions) and relief from boredom. They tested their new instrument on 883 sixth grade students in Germany. Confirmatory factor analysis indicated that the seven suggested dimensions fit the data well. A second-order

90 Theoretical background & literature review

factor analysis showed these dimensions to represent three distinct types of reading motivation: intrinsic, extrinsic, and regulatory reading motivation. In predicting their contribution to reading comprehension, intrinsic motivation resulted in a positive effect on reading comprehension, while extrinsic motivation exerted a negative influence. Regulatory reading motivation failed to explain the variance in reading motivation.

To explore the reciprocal relationship between reading motivation and reading performance, Schaffner and his colleagues conducted a cross-lagged panel study over one academic year in Germany. Their sample consisted of 396 students from academic and non-academic educational tracks. Intrinsic motivation was measured by a reading interest scale from the Programme for International Student Assessment. The Results indicated that students in the academic track possessed higher levels of intrinsic motivation and reading competence. Intrinsic motivation tended to decrease from grade 5 to 6 in both tracks. The cross-lagged model revealed that, in the fifth grade of academic track, intrinsic reading motivation had a significant effect on grade 6 reading competence. In addition, grade 5 reading competence had a significant effect on grade 6 intrinsic reading motivation. The effect of intrinsic reading motivation on reading competence was higher than the reverse effect (Schaffner, Philipp & Schiefele, 2016).

This finding differs from results from a 2008 study by McElvany, Kortenbruck, and Becker conducted on third and sixth grade elementary school students. In this study, the cross-lagged effect between reading competence and reading motivation was equally strong between grade three and four. Schaffner and colleagues (2016) explained that this contrast could reveal that older students' reading competences were more influenced by intrinsic motivation than younger learners. On the other hand, instructor feedback on a student's performance could exert a great influence on an elementary school student's intrinsic reading motivation. Intrinsic reading motivation for secondary students, however, depended more on the student's own interests and their peers' reading interests.

Schiefele and colleagues (2016) investigated the reciprocal relationship between reading motivation and reading comprehension on the word, sentence, and passage level. Their sample consisted of 534-second grade and 517 third grade students. They used the curiosity, involvement, and competition subscales from the Reading Motivation Questionnaire for Elementary students (RMQ-E; Stutz, Schaffner, & Schiefele, 2016) for measurement of intrinsic and extrinsic reading motivation. Findings revealed a significant reciprocal relationship between reading involvement and both word and sentence level comprehension. Most interesting was the reciprocal negative relationship between competition and reading comprehension, which was partially supported by the results. However, the only significant portions were the negative effect of comprehension (from the first test) on competition (measured by the second test); the reverse was not. This result indicates that a high level of reading comprehension would contribute to lower levels of the competitive aspect of reading motivation. On the other hand, a reciprocal positive relationship between involvement and reading comprehension was found. Taken together, a negative cycle is generated when students perceive their low reading performance, which leads to a rise in

91 Theoretical background& literature review

competitiveness and causes lower levels of the involvement aspect of motivation. This produces a further decline in reading competence (Schiefele, Stutz& Schaffner, 2016).

The previously reviewed studies confirm the validity of Guthrie and Wigfield's proposed model of reading motivation. This model possesses a comprehensive nature and it suggests that reading motivation is not a unidimensional concept, but rather a multidimensional construct in which various internal and external factors interact. The influence of Wigfield and Guthrie's model has not been limited to L1 reading research, however. Several L2 researchers have adopted this model in order to investigate the nature of L2 reading motivation and its influence on reading comprehension. The next section will review the role of reading motivation in L2 reading research and determine whether the same findings on L1 reading motivation can also be applied to an L2 reading motivation research context.

2.6.4 Motivation and L2 learning

Motivation has long been considered as a precondition for success in the learning of a second language. It provides the necessary "impetus" to begin learning an L2 as well as the "driving force" needed to persist in L2 learning (Dörnyei, 2005). Gardner (2000) defined language learning motivation as a composite construct consisting of the desire to achieve a goal, the effort employed in order to accomplish this goal, and the satisfaction of performing this activity.

Historically, theories on L2 motivation went through three distinctive phases: the social psychological period (1959;1990) characterized by the work of Gardner and his research team, the cognitive situated period (during the 1990s) characterized by the integration of educational psychology theories into L2 motivation models, and the process-oriented period (since 2000) characterized by the work of Dörnyei and Ushioda (Dörnyei,2005). Therefore, several models were suggested for identification of different motivational components and their role in language learning. In the following section, a brief summary of the most significant L2 learning motivation theories is presented.

2.6.4.1 Integrative/instrumental motivation:

The most dominant model in the field of L2 learning is Gardner and Lambert's (1972) Socio-Educational model. In this model, Gardner and his colleagues suggested that L2 learning motivation can be classified into two orientations: either integrative or instrumental. Integrative motivation is defined as a combination of attitudes toward the target language, interest in foreign languages, and integrative orientation. It implies a learner's desire to communicate and integrate with a certain second language community. An instrumental orientation deals with the practical gains of learning an L2, such as acquiring a decent job. The socio-educational model argues that integrative motivation is essential for sustaining long-term success when learning a second language (Gardner 2001a; 2001b; 2009).

The socio-educational approach dominated the field until the 1990s. At this time, with the development of language learning all over the world, the concept of integrative motivation as

92 Theoretical background & literature review

presented by Gardner faced number of critics. First, the concept of integrative motivation could not be applied to foreign language learning contexts, where no target group exists for learners to want to integrate with, and there are few chances for learners to interact with native speakers of the target language (Schmidt, Boraie & Kassabgy, 1996). Secondly, Gardner pointed out that integrative motivation plays a more prominent role than instrumental motivation in language learning. However, a number of studies (e.g. Clément, Dörnyei & Noels, 1994; Schmidt, et al., 1996; Warden & Lin, 2000) have found that instrumental motivation in EFL could be stronger than integrative motivation and that the construct of integrativeness maybe not appropriate for explaining learners' motivations. On the other hand, the model clearly indicated the relationship between integrative orientation and language achievement. However, it neglected the nature of the relationship between instrumental orientation and language acquisition when integrative motivation is weak. As a result, researchers proposed other frameworks to explain language-learning motivation.

2.6.4.2 Self Determination Theory:

Noels, Pelletier, Clément, and Vallerand (2000) extended L2 learning motivation research by adopting the Self-determination Theory of Deci and Ryan (1985). According to the Self-determination Theory (SDT) an individual's behavior is directed by two types of motivation: intrinsic and the extrinsic motivation (Pirih, 2015; Wang, 2008).

However, rather than view these two constructs as separate, the SDT theory proposes that they lie on a continuum of self-determination. Ryan and Deci (2000a, 2000b) suggested four types of extrinsic motivation. The first, external regulation, is the least autonomous form of extrinsic motivation; an individual achieves a certain task for external demand or reward. The second, introjected regulation, represent external rules that learner follows to both maintain his or her feeling of worth and avoid feelings of guilt. The third, identified regulation, represents doing engaging in an activity for its perceived usefulness to the individual. The fourth, integrated regulation, represents the most autonomous form of extrinsic motivation. It is the performance of an activity due to its internalization to individual needs and identity. Noels (2001) suggests that it is difficult to distinguish between integrated regulation and intrinsic motivation.

Vallerand and colleagues proposed three types of intrinsic motivation (IM). The first consists of IM knowledge which refers to the enjoyment of learning and exploring new information. The second, IM Accomplishment, refers to enjoying the accomplishment of a hard or challenging task. The third was defined as IM Stimulation, which arises from feelings stimulated by the performance of a certain task (e.g. admiring a writer's writing style) (Vallerand & Ratelle, 2002). Intrinsically motivated behaviors satisfy an individual's needs for competence and achievement (Mao, 2011). It is worth noting that these three components correspond to the construct of intrinsic reading motivation suggested by Wang and Guthrie (2004); IM knowledge corresponds to curiosity; IM accomplishment corresponds to challenge; and IM stimulation corresponds to involvement.

93 Theoretical background & literature review

In a series of studies conducted by Noels and colleagues (e.g. Noels, et al., 2000; Noels, 2001), results revealed instrumental motivation to be closely related to external regulation, while integrative motivation correlated with both intrinsic motivation and identified regulation. Gardner (1985) indicated that the equivalence between integrative/instrumental orientation and intrinsic/extrinsic motivation is not accurate, as both of them are extrinsic.

2.6.4.3 L2 Motivational Self-System:

Dörnyei (2005, 2009) proposed the L2 motivational self-system, based on the ‘possible selves’ concept of Markus and Nurius (1986), as well as the self-discrepancy theory (Higgins, 1987). According to this model, L2 learning motivation involves an ideal L2 self, an ought-to L2 self, and the L2 learning experience. The ideal L2 self represents the ideal characteristics that the individual wishes to possess, while ought-to L2 self represents characteristics that the individual wishes to possess due to their representation of the expectations placed by significant others. Dörnyei seeks to explain L2 motivation in a globalized world where English is the lingua franca and thus associated with global culture. This stands in contrast to the idea of a specific national culture that a learner intends on integrating into, as proposed by Gardner (Dörnyei, 2005; 2009).

The previously-reviewed models revealed that L2 researchers believed in the important role of motivation in the process of language learning. Consequently, a number of researchers began examining its role in specific language domains, such as listening and reading.

2.6.5 L2 reading motivation

Language learning theory acknowledges that highly motivated language learners better acquire a target language, also recognizing that motivation plays a key role in sustaining long term efforts in language learning (Lamb, 2007). Although the relationship between motivation and learning a second/foreign language is well-established, few studies have examined this relationship in the specific field of reading.

The only proposed model, to the researcher’s knowledge, that describes L2 reading motivation was that proposed by Day and Bamford (1998) and Day (2002) (figure 8).

94 Theoretical background & literature review

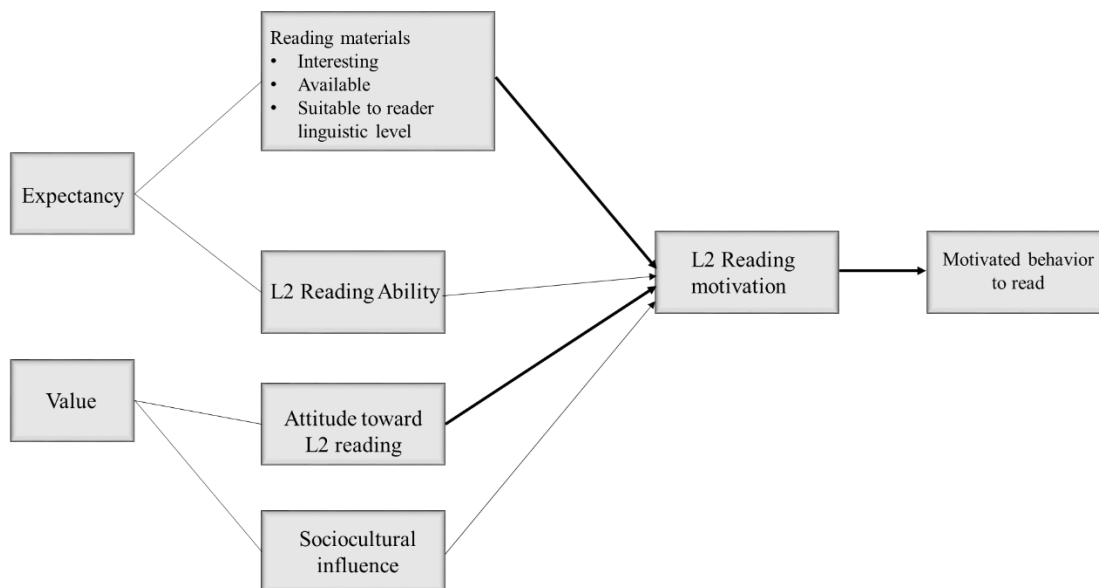


Figure 8. Day and Bamford (1998) L2 reading motivation model

According to this model, L2 reading motivation consists of two components: value and expectations. Day and Bamford suggested that the readers choose to read when they have positive expectations of successfully achieving the reading task. If the reader does not expect to accomplish the reading task, they will not engage in the reading activity. These expectations are shaped by two subcomponents: reading materials and perceived L2 reading ability (Day & Bamford, 1998).

The second component refers to the value that readers assign to the reading activity. It is related to the attitudes toward reading in an L2 and the sociocultural environment. Day and Bamford identified four sources of L2 reading attitudes: L1 reading attitudes, previous L2 reading attitudes, attitude toward the L2's culture and people, and L2 classroom environment (Day & Bamford, 1998).

Day and Bamford suggested that L1 reading attitudes either positively or negatively transfer to L2 reading. However, this relationship was not supported in Takase's (2007) study where motivated L1 readers were not motivated to read in L2. In contrast, Pirih (2015) believes that favorable attitudes toward language, culture, people and the learning environment transfer to L2 reading.

They claimed that appropriate, interesting reading materials and attitudes are more crucial in motivating students than reading ability and the sociocultural environment. However, their model lacks empirical validation and was developed to address the extensive research on reading motivation (Kim, 2011; Takase, 2007; Mori, 2002). Sirin and Saglam (2012) partially agreed with this claim, as they indicated that interesting texts, teacher interaction with students, and support with linguistic problems were crucial factors affecting students' reading motivations. In addition, Takase (2004a; 2004b) revealed that providing students with a wide variety of easy and interesting reading materials contributed to an increase in the students' amount of reading. Based on her case

95 Theoretical background & literature review

study results, Nishino (2007) concluded that providing students with novel, challenging reading materials suitable for their reading ability contributed significantly to sustaining students' reading motivation over a long period of time.

In contrast, Pirih's study on Slovenian elementary school students revealed that students' perception of their reading ability and their confidence in being good readers lead to them being more willing to read. In addition, results revealed a positive influence of family on students' reading behaviors, but not the type of reading materials (Pirih, 2015).

In summary, Day and Bamford believed that L2 reading motivation is defined by a number of factors related to the L2 reading situation: the characteristics of reading materials, the reader's perceived reading ability, the reader's social surroundings, attitudes toward L2 reading, and attitudes toward the L2's culture.

The following section reviews several L2 reading motivation studies conducted to identify the motivational components of L2 reading motivation and to investigate its relationship to L2 reading comprehension.

2.6.5.1 L2 reading motivation research

Although many theories have been developed to explain L2 learning motivation (e.g. Socio Educational model, L2 Motivational Self System), only a small number of studies have examined the role played by L2 reading motivation. Consequently, L2 reading researchers have depended on L1 reading motivation theories, such as Wigfield and Guthrie's (1995, 1997) L1 reading model (Grabe, 2009; Kim, 2011).

One of the first studies to explore the underlying construct of L2 reading motivation was conducted by Mori in 1999. In this study, the author used general L2 learning scales (e.g. Gardner, 1985) among Japanese students (N= 52). Factor analysis revealed L2 reading motivation to consist of six factors accounting for 76.86% of the total variance. These factors were: positive intrinsic value, negative attainment value, negative attainment value of reading novels, grade-related extrinsic utility value of reading, difficulty in reading, and positive extrinsic utility value. Regression analysis revealed that difficulty in reading, grade-related extrinsic utility value of reading, and positive intrinsic value significantly predicted the amount of reading in English. Mori concluded that there were three types of students willing to engage frequently in reading English texts: those who were grade-oriented and who liked reading, those who did not find it troublesome to go to the library to read, and those who enjoyed the reading materials. Mori replicated the study on a larger sample (N=100). Factor analysis resulted in a three-factor model, which account for 58.73% of the total variance in reading motivation. The extracted factors were intrinsic value, attainment value, and negative intrinsic value in novels. Regression analysis revealed none of these factors to predict reading amount (Mori, 2004).

A further study conducted by Mori sought to test Wigfield and Guthrie's model among Japanese university students (N= 447). Factor analysis resulted in a four-factor model, which account for

96 Theoretical background & literature review

56.50% of the variance in reading motivation. The first factor, called the intrinsic value of reading (which accounted for 35% of the variance) consisted of: reading curiosity, involvement, reading avoidance, and reading challenge. This result revealed that there existed some commonality between the constructs, agreeing partially with Wang and Guthrie's (2004) model of intrinsic reading motivation. The second factor was referred to as the extrinsic utility value of reading. Factor three was defined as the importance of reading. The final factor was reading efficacy. Mori suggested that the different aspects of reading motivation could cluster under fewer constructs and be better explained by a more general model, such as expectancy-value theory. This removed the need for an overly specific model of reading motivation. She indicated that four out of the five constructs proposed in expectancy-value theory were identified in her study: expectancy for success (labelled 'reading efficacy' in this study), intrinsic value (labelled 'intrinsic value of reading'), Extrinsic Utility Value (labelled 'extrinsic utility value of reading'), and Attainment Value (labelled 'importance of reading'). In addition, in an EFL context in which students have limited contact with the target language group, their desire to integrate into this community is relatively weak. Consequently, integrative orientation cannot be distinguished from other reasons to read or form a unique factor contributing to reading motivation (Mori, 2002).

Nishino (2005) replicated Mori's study on a sample of Japanese high school students (N= 262). Six factors were obtained, grouped into five sub-components of EFL reading motivation. These subcomponents were: Reading Efficacy, Intrinsic Value of Reading in English, Extrinsic Utility Value of Reading in English, Importance of Reading in English, and Communicative Orientation. Nishino indicated that the constructs found in this study retained some similarities with Day and Bamford's (1998) model. 'Intrinsic value' corresponds to their 'materials' factor (students' perception of the usefulness and attractiveness of the reading materials), reading efficacy can be related to reading ability, and the importance of reading relates to attitudes toward L2 reading.

Takase (2002) explored the relationship between EFL reading motivation and extensive reading. Their sample consisted of 107 female Japanese high school students. Factor analysis revealed that a seven-factor model was appropriate for describing students' data and that it accounted for 51.38% of the total variance. The extracted factors were intrinsic motivation for reading Japanese, extensive reading-related intrinsic motivation, exam-related and instrumental motivation, parental and family attitudes toward reading, and preference for intensive reading. The regression analysis revealed that only extensive reading-related intrinsic motivation was a significant predictor of students' amount of extensive reading. Apparently, extensive reading had a positive effect on students' motivation, as they were interested in reading for its own sake and not merely to obtain external rewards (e.g. grades). Furthermore, Takase conducted interviews with students, which revealed that the students' preference for Japanese books was driven by enjoyment, while students who preferred English books felt more confident when they finish reading. On the other hand, a negative correlation between the amount of reading in Japanese and amount of reading in English was found, which reveals that students may not be as interested in reading in their mother language as in English.

97 Theoretical background & literature review

Another study conducted by Takase (2007) revealed that both intrinsic motivations for L2 reading and L1 reading were significant predictors of the amount read by students. No relationship was found between L1 and L2 reading behavior. Students revealed that reading in Japanese was more interesting while reading in English was more effortful and less enjoyable. Takase explains that intrinsic motivation increases when students have the freedom to choose their reading materials. The interviews with students revealed that parental reading habits did not influence learners' motivation to read. Although students indicated that their L1 reading decreased after elementary school, this did not affect their L2 reading as English was an important subject tested by the Japanese college entrance exam. Takase explained that neither parental reading habits, nor the abundance of books encouraged students to read. Rather, it was the interaction between parents and learners that made the difference.

Tercanlioglu (2001) used the complete MRQ questionnaire to explore Turkish high school students' reading motivation (N=151). Descriptive statistics revealed that curiosity, competition, grades, and challenge had the highest mean scores, while social reasons had the lowest mean score. According to results of correlational analysis, school reading frequency correlated positively with efficacy, curiosity, involvement, recognition, grades, and competition. Frequent personal reading correlated positively with reading efficacy and challenge, and negatively with reading avoidance. In addition, the results revealed that there were no significant differences between females and males in their reading motivations. In contrast to L1 studies (e.g. Eccles et al., 1993), the author found that students' extrinsic motivation decreased when students progressed from the seventh to the ninth grades. This might reflect the idea that when students become more knowledgeable about the English language, they become more personally interested in reading in English.

Lin, Wong, and Chang (2012) conducted a study to compare the motivational patterns of students when reading in their mother language vs. English. The sample consisted of 104 Chinese elementary school students. An adapted version of the MRQ was used in this study, which measured self-efficacy, curiosity, recreation, involvement, grades, instrumentality, social-family aspects, and social-peers' aspects. Two passages (narrative and expository) were used to measure English reading comprehension. Goodness of fit indices of confirmatory factor analysis revealed that the suggested dimensions explained the sample's L2 reading motivation well (CFI= .94, NNFI= .91, GFI = .83, RMSEA= .07). Descriptive statistics revealed that self-efficacy and intrinsic motivation were higher for Chinese reading than for English reading. However, no difference was found between grades and instrumentality across languages. Correlational and regression analysis revealed that only instrumentalism had a significant association with English reading comprehension and uniquely predicted it. The 'recreation' variable had the strongest correlation with Chinese reading comprehension and was the only significant predictor of it. The authors explained that these differences might be due to students' confidence in their L1 compared to L2 reading abilities. Chinese is the official language used in education, media, and social interaction. Consequently, students will have positive beliefs about mastering reading, and will tend to read Chinese texts for entertainment and personal interests. On the other hand, English

98 Theoretical background & literature review

texts might require effortful activity, and students might read mainly for the purpose of practical outcomes (i.e. finding employment).

Fahmi (2016) replicated the previous study with Indonesian university students (N=143). The author included an additional factor, which was reader self-confidence. Factor analysis results revealed that the suggested motivation model had adequate goodness of fit indices (CFI= .94, NNFI= .92, GFI= .83, RMSEA= .07). T-test results revealed significant differences between students' L1 and L2 reading motivations. The results also revealed that L1 measures of self-efficacy and intrinsic motivation were higher than for L2 reading motivation. The author indicated that this could be due to students using their first language more often in social and educational contexts, and therefore feeling more confident about their Indonesian skills. Furthermore, they tended to read in their native language for gaining of information and personal enjoyment, this was seen less when reading in English. On the other hand, L2 instrumental motivation was higher than L1 instrumental motivation, which reflect students' awareness of English as a mean to achieve their purposes, such as applying for an employment, traveling, and attaining higher social status. Fahmi suggested that aspects of intrinsic motivation such as curiosity and involvement might not be as important in learning EFL, when compared to L1 learning. On the other hand, focusing only on instrumental motivation may not lead to long-term success.

Kim (2011) conducted a study in a Korean cohort to examine L2 reading motivation and its relationship to L2 language proficiency and L1 reading motivation. The sample consisted of 259 Korean university students enrolled in an English course. The author developed a motivational questionnaire based on previous work (Wigfield & Guthrie, 1997; Mori, 2002; Takase, 2007). The motivational constructs measured were intrinsic motivation, extrinsic motivation, importance of L2 reading, avoidance of L2 reading, and L2 reading efficacy. English reading proficiency was measured by academic grades in reading classes. Principal axis factoring resulted in a four-factor solution that accounted for 53.39% of the variance in English reading motivation. The extracted factors were learning goal-oriented motivation for L2 reading, intrinsic motivation for L2 reading, avoidance of L2 reading, and utility value of L2 reading. Descriptive statistics revealed that learning goal motivation and utility value had the highest mean score, which reflects that students tended to read more for practical reasons. Correlational analysis revealed weak positive correlations between learning goal-oriented motivation for L2 reading and: utility value of L1 reading ($r = .15$), intrinsic motivation ($r = .17$), avoidance of L1 reading ($r = -.16$), and L1 and L2 intrinsic motivation ($r = .18$). For L2 reading proficiency, there was a significant positive correlation between reading proficiency and: learning goal-oriented motivation ($r = .14$) and intrinsic motivation ($r = .35$). A negative correlation existed between L2 reading proficiency and avoidance of L2 reading ($r = -.27$).

Han (2011) explored reading motivation in Chinese university students (N=188). The author developed a reading motivation questionnaire based on the MRQ, MRQ-R (Wang & Guthrie, 2004; Wigfield, 1997), and RMEQ (Mori, 2002, Takase, 2007). Exploratory factor analysis revealed that a three-factor solution described students' results and accounted for 47.5% of the total variance in

99 Theoretical background & literature review

reading motivation. The three factors were: intrinsic motivation in FL reading, utility value in FL reading, and academic value in FL reading. Utility value referred to students' motivation to read in order to gain information and apply for employment. Academic value reflected the students' desire to perform well in English classes and exams. Correlational analysis revealed intrinsic motivation to be correlated with EFL reading comprehension ($r=.31$), while extrinsic motivation had no significant correlation with reading comprehension.

Blay, Mercado, and Villacorta (2009) used an abbreviated version of the MRQ to measure Filipino students' motivation and its relationships to reading comprehension. The sample consisted of 260 female fourth-grade students. The brief version of the MRQ measured five aspects of reading motivation: challenge, curiosity, involvement, social competition, and compliance. Descriptive statistics revealed that involvement had the highest mean score ($M=3.29$), followed by curiosity ($M=3.15$), while competition had the lowest mean score ($M=2.64$). However, regression analysis revealed that only the challenge and competition aspects were significant predictors of reading comprehension. In contrast, Alsheikh and Elhoweris (2011) found that, among UAE high school students' motivations for reading ($N=513$), the intrinsic and extrinsic values of reading were significant predictors of students' achievement scores in English. Intrinsic motivation explained 16% of the variance in students' scores while extrinsic motivation explained 13.5%.

Aziz and colleagues (2015) explored the relationship between reading comprehension and reading motivation. The sample consisted of 32 Indonesian first-grade vocational school students. The authors used an adapted version of the MRQ to measure reading efficacy, reading challenge, reading curiosity, reading involvement, the importance of reading, reading compliance, reading for grades, and integrative orientation. Results revealed a high correlation between students' reading motivation and reading comprehension ($r=.85$).

To investigate the changes in students' reading motivation, Daftarifard and colleagues conducted a study on 101 Iranian university students, using Mori's (2002, 2004) reading motivation questionnaire. This questionnaire measured four components: the intrinsic value of reading, extrinsic value of reading, the importance of reading, and reading efficacy. Descriptive statistics revealed importance of reading and reading efficacy to have the highest mean scores. In addition, only extrinsic motivation and reading importance changed within the semester. In post-test analysis, students were less extrinsically motivated and greater appreciated reading for their own personal interests (Daftarifard, Shirkhani & Lavasani, 2014).

Dhanapala (2008) conducted a study on two groups of Sri Lankan and Japanese students. The study was conducted on undergraduate students from Sri Lankan ($n=123$) and Japanese ($n=124$) universities. The author used the MRQ questionnaire from Wang and Guthrie (2004). Correlational analysis revealed that, for the Sri Lankan students, L2 reading comprehension had a positive correlation with L2 reading amount ($r=.26$) and a negative correlation with L1 reading amount ($r=-.18$). The amount of reading in both L1 and L2 did not correlate with L2 reading comprehension in the Japanese sample. Furthermore, L2 reading comprehension strongly

100 Theoretical background & literature review

correlated with curiosity ($r=.79$), involvement ($r=.77$), preference for challenge ($r=.60$), recognition ($r=.79$), grades ($r=.28$), and competition ($r=.66$) in the Sri Lankan sample. For the Japanese students, L2 reading comprehension was weakly correlated with curiosity ($r=.22$), preference for challenge ($r=.18$), recognition ($r=.19$), and grades ($r=.19$). These results revealed that reading motivation had stronger influence on Sri Lankan students' reading comprehension than for the Japanese students.

Dissimilarly, Meniado (2016) did not find a relationship between reading comprehension and reading motivation among Saudi students. The author explained that this result could be due to students' limited linguistic ability or limited exposure to interesting English reading materials. Also, problems might have occurred when applying the questionnaires. For example, students may have felt lazy and jumped to the questions directly without reading the texts, or they might have answered the reading motivation survey by circling randomly.

Komiyama (2013) investigated reading motivation in ESL learners. The sample consisted of 2,018 students of different native languages enrolled in 53 ESL programs. Exploratory factor analysis suggested a five-factor model, which accounted for 44.1% of the variance in reading motivation. The identified factors were intrinsic motivation (curiosity, involvement, challenge), extrinsic drive to excel, extrinsic academic compliance, extrinsic test compliance, and extrinsic social sharing. In this study, the three intrinsic constructs suggested by Wang and Guthrie emerged as one factor. Similarly, the competition and recognition constructs also clustered into one factor, as did grades and compliance. Confirmatory factor analysis indicated that the suggested model presented satisfactory goodness of fit (CFI= .81, RMSEA= .06, SRMR= .05). It is worth noting that intrinsic motivation accounted for more than 50% of the variance explained by the five factors together. This result reveals that intrinsic motivation plays a significant role in shaping EAP students' motivation. The second key factor was the extrinsic drive to excel. The two underlying concepts of this construct are recognition and competition, which have been previously found to play a significant role in L2 readers' motivation (e.g. Dhanapala, 2008; Tercanlioglu, 2001).

Replicating Komiyama's study, Salikin and colleagues investigated reading motivation in Indonesian freshman EFL students. The results revealed that students' extrinsic reading motivation was higher than intrinsic motivation. The authors explained that the low rate of intrinsic motivation could be due to a lack of L2 vocabulary, which might have made students feel anxious and less willing to read English texts. On the other hand, students expressed a desire to read English texts matching their interests. Among the extrinsic motivation constructs, social sharing was the weakest motivator. Students revealed that they read for the positive comments they would receive from their teacher and friends, to outperform their colleagues in reading, and to improve their reading grades (Salikin, Bin-Tahir, Kusumaningputri & Yuliandari, 2017).

Sani, Ariffin, and Shaik-Abdullah used Komiyama's (2009) motivation questionnaire (MREQ) (which is an adapted version of MRQ) to investigate Malaysian English reading motivation. The sample consisted of 319 Malaysian students enrolled in an EFL course. Exploratory factor analyses

101 Theoretical background& literature review

resulted in a four-factor model. These factors were: intrinsic motivation, test motivation, recognition, and compliance. Descriptive statistics revealed that students' extrinsic motivation was higher than intrinsic motivation (in contrast to Mori, 2002 and Takase, 2007). Test motivation had the highest mean score among extrinsic subscales, followed by compliance. No significant differences in intrinsic or extrinsic motivation were found between the different proficiency groups.

Among a sample of Turkish university students (N=66), Bilikozen and Akyel (2014) investigated the relative contribution of prior knowledge, topic interest, linguistic proficiency, gender, motivation to read, and metacognitive awareness in explaining reading comprehension. The students' reading comprehension was measured by recall protocols as well as a reading motivation questionnaire adapted from Wigfield & Guthrie (1995) study. Motivational dimensions included reading efficacy, curiosity, involvement, challenge, grades, social, and competitiveness. The authors excluded metacognitive awareness from regression analysis after conducting correlational analysis and finding no significant relationship between it and reading comprehension. Hierarchical regression analysis indicated that linguistic proficiency, motivation to read, and prior knowledge accounted for 54% of the variance in reading comprehension.

Unlike to previous studies (e.g. Mori, 2002; Nishino 2005), which emphasized the role of general intrinsic motivators, JoahnaMante-Estacio (2012) suggested that some contextual (learning environment, textual) factors could also contribute to students' reading motivation. The author developed "The Dimensions of Bilinguals" Motivation to Read in English Questionnaire (DBMREQ) survey based on Mori's (2002) and Wigfield and Guthrie's (1997) questionnaires and tested it among 646 high school students in the Philippines. Factor analysis revealed six factors accounting for 38.48% of variance in reading motivation.

The first factor was 'Social and Learning Environment'. It reflected the influence of instructional context on students' motivation and students' willingness to communicate with others. The second factor was external motivation, which reflected external factors affecting students' motivation to read. The third factor was the 'mastery orientation', which combined efficacy, challenge, involvement, and curiosity. The fourth factor, 'pressure', represented the negative feelings and anxiety that a reader might experience during reading. The fifth factor was labeled the 'performance orientation'. It consisted of items reflecting competition and recognition. The sixth and final factor was 'familiarity with the content and format of the text'. This factor indicated that the reader enjoyed reading when the text content and format were familiar to the reader.

Estacio found that the social and learning environment factor, which is extrinsic in nature, was the strongest motivational factor, as it explained nearly half of the variance in reading motivation. These findings contradicted those of previous studies (e.g. Mori, 2002; Nishino 2005) that emphasized the role of intrinsic motivation. Estacio indicated that results agreed with previous research on the multifaceted nature of reading motivation. However, the strength of the

102 Theoretical background & literature review

motivational factors might vary considerably according to the differences in sample age, culture, grades, and gender.

In 2010, Erten, Topayaka, and Karakaş developed the Foreign Language Reading Attitudes and Motivation Scale (FLRAMS) based on previous research on L1 and L2 reading motivation (e.g. Wigfield and Guthrie, 1995; Mori, 2002; Yamashita, 2004). Their study sample consisted of 443 undergraduate students enrolled in a one-year English program. Principal component analysis revealed a four-factor solution to best describe the data. This analysis accounted for 58.70% of the total variance. The suggested factors were the intrinsic value of reading, reading efficacy, the extrinsic utility of reading, and foreign language linguistic utility. This last factor reflects the usefulness of reading when developing language acquisition. This was considered by the authors to be an extended type of extrinsic motivation unique to foreign language learning (where the main source of linguistic input is printed materials). They concluded that learners' reading motivation could be explained using Extrinsic vs. Intrinsic motivation, Expectancy Value Theory, and Self-efficacy.

Ölmez (2015) used the FLARMS to investigate Turkish students' reading motivation and its relationship to reading comprehension. Descriptive statistics revealed foreign language linguistic utility to have the highest mean, followed by extrinsic and intrinsic motivational values of reading. Correlational analysis revealed no significant correlation between reading comprehension and reading motivation constructs. The author explained that this result could be due to the FLARMS measuring general reading motivation, while reading comprehension scores can be related to situational motivation. Sentürk's study (2015) partially agreed with previous results, as she found that Turkish university students had high mean scores on the extrinsic value of reading, followed by foreign language linguistic utility. She described students in her sample to have neutral attitudes towards reading in English, as well as low levels of intrinsic motivation. They therefore tended not to deploy significant effort in reading.

Jafari and Shokrpour (2012) conduct a mixed method study to explore Iranian students' reading motivation when reading expository texts. For the quantitative portion of the study, the authors used a sample consisting of 95 university students majoring in medicine. They used a modified version of the MRQ, as well as four passages from the reading section of a practice TOEFL test to assess students' reading comprehension. The measured motivation factors were curiosity, involvement, integrative orientation, grades, avoidance, reading efficacy, challenge, reading importance, and reading compliance. Descriptive statistics revealed that reading curiosity had the highest mean, followed by involvement and reading importance. Reading challenge had the lowest mean, which reveals that although students were intrinsically motivated to read, they did not prefer to read challenging texts. These results contrasted with Kim's (2011) results, which found that extrinsic motivation was the highest stimulus for students to read English texts. This difference could be due to differences in the amount of exposure to English, students' field of study, and the status of English. Correlational analysis revealed positive relationships between reading comprehension and: reading curiosity ($r = .21$), reading involvement ($r = .51$), reading importance

103 Theoretical background& literature review

($r=0.4$), and reading efficacy ($r= .06$). Also, the authors held interviews with eight students including both skilled and poor readers. Results indicated that five constructs played important roles in learners' motivation to read: intrinsic motivation, extrinsic motivation, perceived importance, self-efficacy, and the motivational effect of grades on self-efficacy. Interview results revealed that low achievers were more extrinsically-motivated than high achievers. In addition, the skilled readers revealed that extrinsic motivation, such as teacher encouragement, also played a significant role in motivating them to read. Low-achieving readers indicated that that poor grades influenced them to give up reading and doubt their ability to read English texts.

Again in 2012, Sayg used a mixed method approach to investigate both students' reading motivation and the instructors' perception of the factors that affect it. The sample consisted of 273 Turkish university students. Interviews were held with 15 English instructors. To measure L1 and L2 reading motivation, the author created a survey based on Wang & Guthrie's MRQ as well as Yamashita's questionnaires. Factor analysis revealed that a six-factor model best explained students' L2 reading motivation and accounted for 61.7% of the variance. The extracted factors were personal reasons for reading, social recognition, anxiety, comfort, value, and information. Regression analysis revealed that L1 reading motivation was not a significant predictor of L2 reading achievement. However, L2 reading motivation was significant predictor of L2 reading achievement among pre-intermediate and upper-intermediate students. On the other hand, interviews with instructors revealed two main factors affecting students' motivation: instructional factors and personal factors. English instructors highlighted the importance of triggering students' curiosity and promoting a reading-positive attitude. On the other hand, they revealed that students required additional support for understanding difficult vocabulary, in addition to needing strategies for dealing with reading tasks. This result was echoed in another study conducted by Cho and colleagues. After conducting interviews with teachers and students participating in a reading program, they concluded various contextual and individual factors to influence students' motivation and affect their achievement in learning English. Among these factors were how appealing and difficult the reading materials were. Challenging and interesting books piqued students' reading motivation. In addition, the authors indicated that one of the students was helping his colleague in understanding the interview questions by translating them. In addition, this student mentioned that he also helped his younger sister with her linguistic skills; he read for her and chose books for her. This behavior reflects the social aspects of reading motivation (Cho, Xu& Rhodes, 2010).

Using an action-based research design, Şirin and Sağlam (2012) investigated students' reading motivation and the effect of instructional methods on it. The sample consisted of 30 Turkish university students enrolled in an EFL program. The authors used Wang and Guthrie's (2004) adapted version of the MRQ. Descriptive statistics revealed that extrinsic reading motivation had a higher mean score than intrinsic motivation. Among intrinsic motivation constructs, curiosity had the highest mean, followed by challenge. On the other hand, competition had the highest mean score, followed by social reasons and compliance. After conducting changes in the learning

104 Theoretical background& literature review

environment, interviews revealed that 44.4% of students stated that there was a change in their motivation, while 16.7% found no difference. A further 11.1% stated that their motivation level varied depending on the reading topic, while 22.2% indicated that it depends on the score they receive, and 5.6% revealed it depends on stress. All students indicated an increase in their amount of reading and reading performance. The researchers concluded that interesting texts, teacher interaction with students, and support with linguistic problems were important factors in reading motivation.

Judge (2011) used interviews to identify reading motivation in Japanese students. The sample consisted of nine high school students enrolled in an extensive reading program. Content analysis of interviews indicated 15 categories influencing the students' motivation to read: intrinsic motivation, extrinsic motivation, integrative orientation, instrumental orientation, motivational intensity, ethnocentricity level, familial factors, teacher-student relationships, identity issues, autonomy, L2 anxiety, linguistic confidence, a need for cognition, love of literacy, and willingness to communicate. Learners revealed that their positive attitude toward L1 reading transferred to English reading as well. They tended to read because they enjoyed reading, they felt proud when finishing an English book, appreciated the importance of reading for their academic and professional success, and were interested in diverse cultures.

Protacio (2012; 2017) used a qualitative approach to determine which factors contribute to students' reading motivation for ESL in the USA. The first was the 'sociocultural environment', which reflects family and friends' influence on a student's reading behavior. Students are motivated when parents encourage them to read and when they exchange their readings with peers. A second factor was 'integrative orientation', which occurred when students perceived reading as a way to create relationships with their American peers and acquire more information about American culture. The third was 'instrumental orientation', describing how the students were aware of the importance of reading in developing their linguistic skills. The fourth, 'perceived competence' explained that, when students had a high estimation of their reading ability, they were more motivated to read. Finally, the fifth factor, reading materials, revealed that students were motivated to read when reading materials matched their interests and were appropriate for their linguistic level. Additionally, still within this ESL context, Proctor and his colleagues conducted a study on English language learners with disabilities. They used an adapted version of the MRQ and reading performance tests from the instructional program. Regression analysis indicated that only reading efficacy was a significant predictor of students' reading comprehension (Proctor, Daley, Louick, Leider& Gardner, 2014).

He (2008) aimed to explore EFL learners' reading motivation using the multiple goals perspective. This perspective suggests that the predominance of a strong goal does not eliminate the influence of other weaker goals. In fact, two strong goals can coexist and together affect the learner's achievement. The researcher used a goal scale adapted from Ames and Archer (1988). The sample consisted of 57 Taiwanese college students. Using cluster analysis, three groups of students were identified: strong-mastery-strong-performance (SMSP), strong-mastery-weak-performance

105 Theoretical background& literature review

(SMWP) and weak-mastery–strong-performance (WMSP). Regression analysis suggested that the group with strong mastery and strong performance goals tended to use more reading comprehension strategies than the other groups. Students with SMSP goal profiles tended to achieve better scores on reading comprehension tasks. The author concluded that combining high-performance and high mastery goals forms the optimal motivation conformation for EFL readers. Students will be motivated to engage in reading for the purpose of outperforming their colleagues. Meanwhile, their ‘mastery goal’ orientation will also motivate them to focus on developing their reading skills.

Huang (2012) used an adapted version of Gardner's Attitude/Motivation Test Battery (AMTB) to explore students' reading motivation. The sample consisted of 156 Chinese non-English-speaking university students. Four motivational constructs were measured: intrinsic motivation, extrinsic motivation, the importance of reading, and reading efficacy. Descriptive statistics revealed that the importance of reading had the highest mean score. This result indicates that students believed that reading is essential for acquiring English as an international language. However, the STD of reading self-efficacy was lower than the importance of reading and intrinsic motivation, which implied that reading efficacy holds great importance for students.

Khan and colleagues used the notion of integrative/instrumental motivation to explore EFL learners' reading motivation. The sample consisted of 40 male college students in Pakistan. The authors developed a motivation questionnaire based on Dörnyei's (2005) L2 learning motivation model. Descriptive statistics revealed that instrumental motivation had a higher mean score than integrative motivation. Students were motivated to read to earn a degree, scholarship, or gain employment (Khan, Sani & Shaikh-Abdullah, 2016).

Using Dörnyei's L2 Motivational Self System (2005), Moskovsky and colleagues explored Saudi university students' reading and writing motivation. The sample consisted of 360 Saudi university students majoring in English. The authors developed a questionnaire based on previous L2 leaning motivation studies. The motivational constructs measured were: Ideal L2 self, Ought-to-be self, and L2 learning experience. To measure students' language proficiency, reading and writing materials from an (IELTS) practice book were used. Series of regression analyses revealed that ideal L2 self predicted proficiency score directly and indirectly through positive L2 learning experience and intended learning behavior. Interestingly, correlation between ideal L2 self, positive L2 learning experience, and intended learning behavior were negative, meaning that low ideal self, positive learning experience, and intended effort would result in higher L2 proficiency scores. The authors explained that this result could be due to lack of real action plans to guide the students' behavior, and that learners' positive attitudes and intentions do not guarantee high achievement (Moskovsky, Assulaimani, Racheva & Harkins, 2016).

2.6.6 Conclusion

Though reading (either in L1 or L2) is an interactive process which requires the active engagement of the reader to build a coherent understanding of the reading material, reading motivation is

106 Theoretical background& literature review

understood to play important role in guiding readers' engagement, not only at the beginning of the reading process but also during and after the reading activity.

Numerous quantitative and qualitative L1 and L2 reading studies have provided evidence for the multifaceted nature of reading motivation. The various aspects of reading motivation can be clustered under two broad categories: intrinsic and extrinsic reasons for reading. The components of intrinsic reading motivation are related to the reader's desire to expand their knowledge base and enjoy the activity of reading. The components of extrinsic motivation, on the other hand, are related to the desire for proving competence and gaining positive appraisal from the others. However, some aspects are unique to L2 reading motivation, such as the importance of reading to enhance vocabulary knowledge or to develop other linguistic skills (e.g. listening or writing in the L2).

In contrast, a number of researchers (e.g. Wang& Guthrie, 2004) have suggested that intrinsic and extrinsic motivation should not be studied as separate constructs, but together, as they can occur simultaneously. Both motivation subtypes mutually influence each other to generate different levels of motivation towards reading. The contribution of both intrinsic and extrinsic motivation in explaining reading performance is indeed stronger when they are analyzed simultaneously. This could be due to a suppression effect, given the high correlation between intrinsic and extrinsic motivation (Schiefele, et al., 2012; Schaffner, et al., 2016).

In a comprehensive review of L1 reading research, the majority of the studies revealed that intrinsic motivation has a positive influence on reading comprehension, while extrinsic reading motivation has either no or negative influence on reading comprehension. However, this relationship is less consistent in the context of L2 reading motivation, as a number of studies have demonstrated extrinsic reading motivation to have a positive relationship with L2 reading comprehension. This difference could be related to the nature of foreign language learning, which mostly occurs in an academic context. Consequently, students might develop more external reasons for reading L2 texts (such as earning good grades), rather than developing internal motives.

Hence, readers who are intrinsically motivated ascribe personal meaning to the reading process, They are oriented toward mastery of goals and are expected to achieve high scores on reading comprehension tests, frequently engage in reading activities, persist in solving reading problems, choose challenging materials, and deeply immerse themselves in reading. In contrast, extrinsically motivated readers consider reading a means to achieve practical gains, read less frequently, avoid challenging reading materials, and are guided by performance goals rather than a drive for mastery.

The previously reviewed studies revealed that both reading motivation and metacognitive awareness correlate with L2 reading comprehension and are therefore expected to influence the development and progress of students' reading. Although all prior studies have examined the influence of each variable separately, few researchers have investigated the relative contribution of the variables of reading motivation and metacognitive awareness. The following section will present the studies discussing the interplay between these two variables.

2.7 L2 reading motivation and metacognitive awareness

In his compensatory model of L2 reading, McNeil (2012) suggested that strategic knowledge plays an important role in explaining the variance of L2 reading along with other variables such as reading motivation. In addition, in the engagement model of first language (L1) reading, Guthrie and Wigfield (2000) distinguished engaged readers with their ability to coordinate their strategies and knowledge, within certain community to fulfil their personal goals and interest. This conceptualization of reading emphasizes the contribution of both cognitive and motivational factors.

Although, number of L2 reading researchers revealed the relationship between L2 reading motivation, metacognitive awareness of reading strategies and L2 reading comprehension, few studies have investigated how they are jointly related to L2 reading. For example, Memis and Bozkurt (2013) investigated the relationship between reading level, metacognitive awareness, reading motivation and reading comprehension. The sample consisted of 577 Turkish elementary school students. Results demonstrated a moderate-strength relationship between reading comprehension and metacognitive awareness ($r = .44$); and internal ($r = .30$) and external motivation ($r = .34$). Regression analysis revealed metacognitive awareness, internal motivation, external motivation, and reading level to explain 33% of the variance in reading comprehension. Internal motivation was not a significant predictor, however.

Matsumoto, Hiromori, and Nakayama (2013) investigated the relationship between reading motivation, metacognitive awareness of reading strategies, and learners' beliefs among 360 Japanese university students. The researcher used the SORS, and the MRQ (Wigfield & Guthrie, 1997). Results indicated a relationship between reading motivation and metacognition ($r = .65$). Partial correlational analyses indicated that correlation further decreased when eliminating the variable of motivational influence vs. when eliminating the influence of strategy or beliefs. This indicates that motivation strongly affects the relationship between strategy use and beliefs. Regression analysis indicated that interdependence exists between reading strategy use, motivation, and learner beliefs. Extrinsic motivation significantly predicted strategy use, while the main idea strategy predicted motivation.

In yet another study, Law (2009) found intrinsic motivation to significantly correlate with reading comprehension in a sample of fifth-grade students in Hong Kong. However, intrinsic motivation was not a significant predictor of reading comprehension. As a result, Law suggested that motivation might have an indirect effect on reading comprehension through metacognitive awareness.

Two studies (Shang, 2016; Zhang, 2016) used path analysis techniques to explore the impact of metacognitive awareness on reading comprehension. Zhang (2016) used SEM to explore the relationship between reading motivation and reading comprehension. Results revealed that while reading strategies had a direct effect on and accounted for 5% of the variance in reading comprehension, reading motivation had an indirect effect on reading comprehension (through

108 Theoretical background & literature review

reading strategies). Shang (2016) proposed a regression model of the relationship between metacognitive awareness, motivation, and hypermedia annotation on hypertext comprehension. His results revealed that online metacognitive strategies significantly predicted motivation and that motivation in turn directly affected hypertext comprehension.

A 2012 study by Tsai investigated the relationship between EFL reading comprehension, reading motivation, and reading strategy use. The sample consisted of 422 Taiwanese university students. Results revealed that skilled readers had a higher level of reading motivation and used a greater number of metacognitive reading strategies than the less skilled readers. EFL reading comprehension correlated significantly with both reading motivation ($r = .33$) and reading strategy use ($r = .24$). Regression analysis revealed that reading motivation, reading strategies, and learning styles significantly predicted EFL reading comprehension, explaining about 13% of the variance.

To conclude, the reviewed literature revealed that reading in a foreign language is influenced by a variety of variables. These variables are not only linguistic, but also of an emotional and cognitive nature. Although the relationship between L1 and L2 reading have long been studied in different contexts, few data are available concerning the relationship of L2 reading motivation and L2 metacognitive awareness of reading strategy use, and their possible contribution in explaining variance of L2 reading. Thus, the purpose of this study was to determine the validity and strength of the relationship between L1 reading comprehension, L2 reading motivation, L2 metacognitive awareness of reading strategies, and L2 reading comprehension according to two suggested structural equation models. The upcoming section presents the underlying hypothesis of the suggested models.

2.8 Research hypothesis

The primary purpose of the present study was to examine the influence of L1 reading comprehension (German/Arabic), L2 metacognitive awareness of reading strategy use, and L2 reading motivation on students' (German/ Egyptian) reading comprehension in the English language. Based on results drawn from the previous research, two hypothesized recursive models (Figure 9 and Figure 10) were suggested to illustrate the relationships among the study variables.

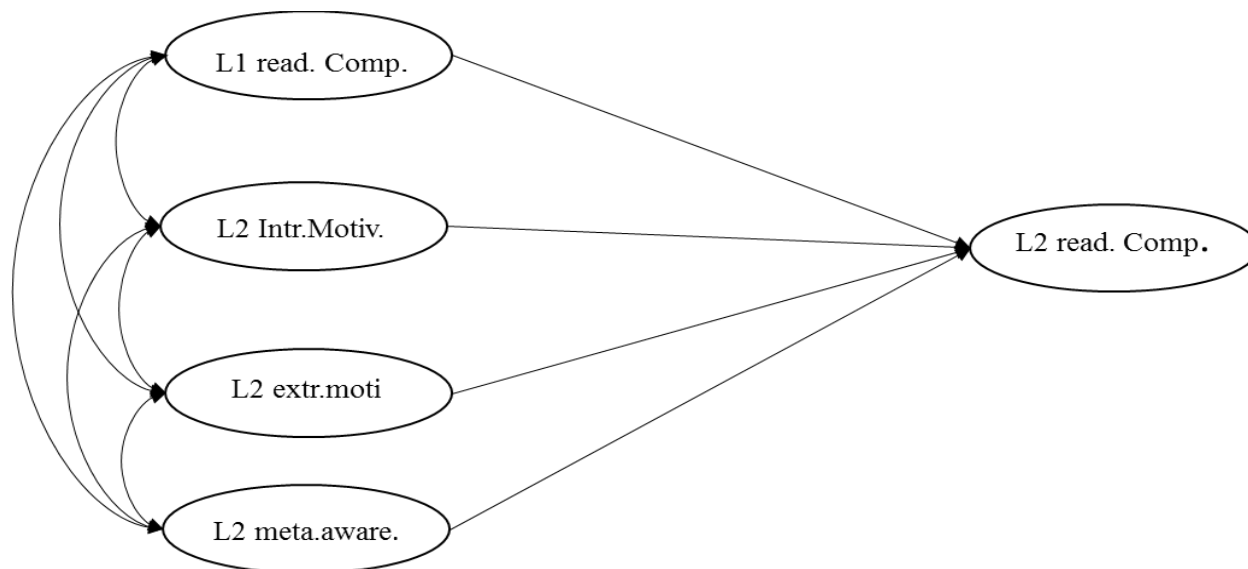


Figure 9. Hypothesized model 1

The proposed hypotheses for the suggested structural equation models were

Hypothesis 1: L1 reading comprehension has a positive influence on L2 reading comprehension

This hypothesis is based on previous L2 reading research (e.g. Van Geldern et al., 2007; Yamashita, 2002 which revealed that reading in native language has a significant relationship with L2 reading and plays significant role to explain variance in L2 reading comprehension. In addition, this hypothesis goes along with the compensatory view for L2 reading suggested by Bernhardt (1991, 2000, 2005) and McNeil (2012).

Hypothesis 2: L2 intrinsic reading motivation has a positive influence on L2 reading comprehension.

This hypothesis is related to reviewed L1 and L2 reading literature (e.g. Guthrie, et al., 2009; Han, 2011; Jafari & Shokrpour, 2012; Park, 2011; which emphasize the positive influence of intrinsic reading motivation in the reading process either directly or indirectly via its relationship with other variables such as reading amount.

Hypothesis 3: L2 extrinsic reading motivation has a positive effect on L2 reading comprehension

Although number of L1 reading research indicated that extrinsic reading motivation correlated negatively with reading comprehension, L2 reading research findings have revealed that extrinsic reading motivation might influence positively the L2 reading process (e.g. Dhanapala, 2008; Schmidt, et al., 1996; Warden & Lin, 2000).

110 Theoretical background& literature review

Hypothesis 4: L2 metacognitive awareness has a positive influence on L2 reading comprehension

This hypothesis is based on previous research that revealed the importance of metacognitive awareness of reading strategies as a distinctive characteristic of proficient reader and as a precondition for successful reading comprehension (Madhumathi and Ghosh, 2012; Phakiti,2003; Pressely& Afflerbach, 1995).

The second hypothesized model suggests an additional path for the indirect effect of L2 reading motivation, which would be through L2 metacognitive awareness of reading strategy use as shown in figure (10)

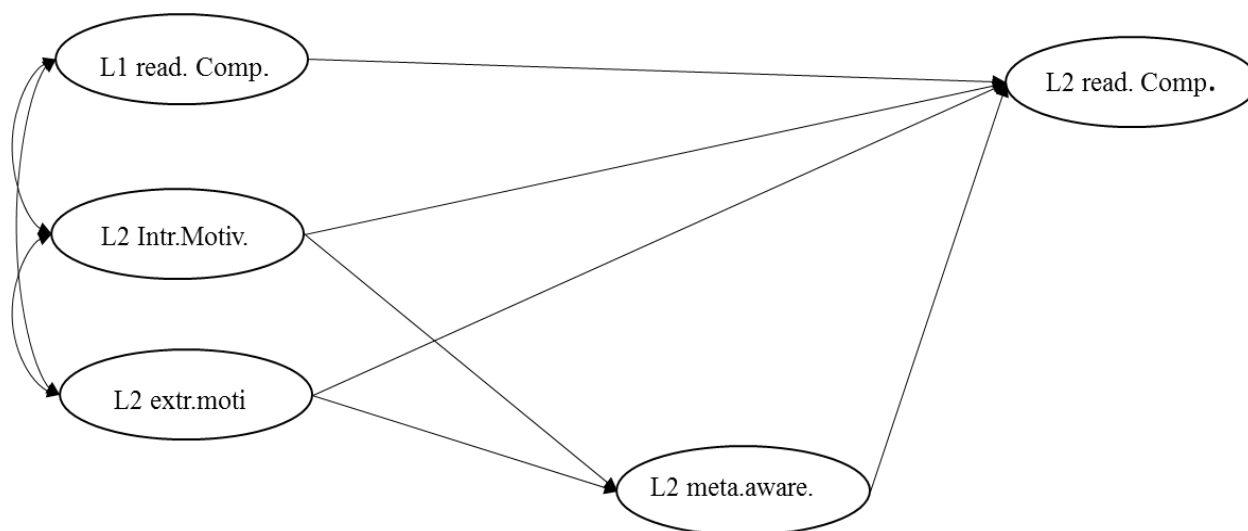


Figure 10. Hypothesized Model 2

Hypothesis 5: L2 intrinsic reading motivation has a positive influence on L2 reading comprehension, as mediated through metacognitive awareness of L2 reading strategies

Hypothesis 6: L2 intrinsic reading motivation has a negative influence on L2 reading comprehension, as mediated by metacognitive awareness of L2 reading strategies.

These two hypotheses are based on a number of researchers' suggestions (e.g. Park, 2015) that the relationship between reading motivation and reading strategy use is in need of further study. In addition, other researchers (e.g. Lau& Chan, 2003) have suggested that reading motivation can indirectly influence the reading comprehension process through the awareness of reading strategy use.

3. Methodology

The upcoming chapter will present the methodology followed in this study. The current study involves structural equation modeling (SEM) intended to identify the relationship between L1 reading comprehension, L2 reading motivation, and metacognitive awareness of L2 reading strategies on learners' EFL reading comprehension in two different cultural contexts (Egypt and Germany). These final models aim to reveal the extent to which the relationships between the variables vary from one cultural context to the other.

As the this study is conducted within two distinct cultural contexts, it is important to ensure the translational validity of the instrument. That is, to ensure that the measurement tools target the same variables and that their content, whether in Arabic or German, possesses equivalent meaning. Therefore, the translational process plays a significant role in the current study.

The following chapter will be organized as follows: Section 3.1 will describe the characteristics of the study sample in Egypt and Germany. Section 3.2 will present the psychometric characteristics of the instruments used in the study. Section 3.3 summarizes the procedure of data collection.

3.1 Study Contexts

The present study was conducted within two different contexts: in Germany, which is a European country speaking an Indo-European language, and in Egypt, which is an Arabic country situated in the northeast part of Africa that speaks a Semitic language. The common feature between these two countries, according to the present study, is that they are monolingual countries in which English is learned as foreign language. The following two sections will present a description of both study contexts.

3.1.1 Egyptian Context

Egypt is a monolingual society where Arabic is the only official spoken language. In daily life, Egyptians speak a dialect of Arabic not identical to Standard Arabic, neither in vocabulary nor in grammatical structure. When children enter elementary education, they begin learning Standard Arabic.

The Arabic language can be written in two different manners. The first one is voweled, which is highly shallow, and the second is unvoweled, which is deep due to the absence of detailed phonological information (as short vowels are deleted). When reading texts written in classical Arabic it is important to pay attention to diacritics (small signs added above or under a letter that can change the pronunciation of the letter) as it can change the meaning of the sentence and the grammatical function of each word (Fender, 2008). Unvoweled texts are more time demanding and require longer fixations, which is why reading Arabic texts may require a longer time than

when reading in English. Arabic orthography is more transparent when text is vowelized either with short vowels or diacritical marks (Hansen, 2008; Hussein, 2014).

Although Standard Arabic is not used in daily Egyptian communication, it remains the official language of religious sermons, news, speeches, novels, and schoolbooks. Some children begin learning Standard Arabic before or during school through learning the Quran (the Islamic holy book) in Mosques or privately at home. This case is known as Diglossia which refers to a situation where two types of the same language are used for socially distinct functions (Saiegh-Haddad, 2003).

The educational system in Egypt is centralized, with the ministries of Education and Higher Education being responsible for setting the educational policy for the whole Egyptian republic. There are three scholastic educational stages in the Egyptian educational system: primary (6 years), preparatory (3 years), and secondary (3 years). The first two stages are obligatory, they represent the basic education level that all children must have in order to provide children with basic educational needs, knowledge, and practical skills needed to help students to pursue their future endeavors. In this stage, students learn standard Arabic (reading, writing, and grammar), mathematics, science, religion (either Islamic or Christian) and other subjects including English language (Egyptian ministry of education, n.d.). After students successfully finish the preparatory education level, they have two options for secondary education: either they enroll in vocational secondary schools, or in general secondary school. In Egypt, the majority of parents encourage their children to enroll in the latter type because vocational learning is undervalued in Egypt and general secondary schools allow students to easily enroll in university.

Students begin learning English as a foreign language in the first grade. The Egyptian ministry of education considers learning English as an essential lifelong learning skill that all students should acquire in order to help them in their future career and as well as for self-development in a globalized world. This concern is reflected in the National Curriculum Framework for English as a Foreign Language (EFL) Grades 1–12:

“The learning of English opens up the world for our children and youth. It gives them the ability to become active participants in the knowledge making society and raises their awareness of the multilingual and multicultural world they live in. (...) English is the principal international language of diplomacy, knowledge, business, and tourism. Thus, it has a dominant position in international media, in science, and in modern technology. A high percentage of world publications in science, technology and commerce is published in English. That is why learning English as a foreign language is assuming an increasing importance worldwide as well as in Egypt both within and outside the school system” (El-Araby, et al., 2012, P.4).

3.1.2 German Context

Germany is also a monolingual society, where German is the official spoken language. German is an Indo-European language which is written from left to right. It consists of 26 basic letters, and four special letters (3 umlaut letters and one ligature).

Contrary to the nature of the educational system in Egypt, in Germany the educational system is decentralized. Each state in Germany is responsible for forming its own educational policy. However, the federal ministries of Education, Cultural Affairs and Science also play a role in setting the educational policy guidelines. Compulsory education begins when children are six years old and continues until they are 18 years old. The educational system consists of five major educational levels, each of these levels in turn comprises different educational institutions or programs:

1. Elementary education.
2. Primary education accomplished through elementary school “Grundschule”)
3. Lower secondary education (Sekundarbereich I) students join one of the following schools: Hauptschule, Realschule, or Gymnasium.
4. Upper secondary education (Sekundarbereich II) in this level students join either upper secondary school or vocational school.
5. Tertiary education.

The elementary level includes the day nursery (Kinderkrippe), the kindergarten (Kindergarten), the day care centre (Kindertagespflege) as well as the pre-school classes at primary schools. Attending these institutions is not compulsory in Germany (Bavarian ministry for education and cultural affairs, n.d.).

The primary school (Grundschule) extends from grade 1 to 4, it is the only educational institution that is attended by nearly all pupils together. After accomplishing the primary school, children are guided to secondary level according to transfer regulations. The transfer recommendation is based upon several criteria: the annual progress scores of all subjects, the average grade from the subjects German, mathematics, and local history and geography, and assessment of social behavior. Primary education is nearly identical in all the German states (Dreyer, n.d.).

In Bavaria, secondary education includes different types of schools: middle school (Mittelschule), secondary modern school (Realschule), Commercial college (Wirtschaftsschule), and Grammar school (Gymnasium). All these different secondary schools share the purpose of developing students’ potentials, so they can achieve their academic and professional success in life “*Viele Wege führen zum Ziel*”. In order to enrol in university, students should obtain the “Abitur”, which is the general higher education entrance qualification certificate. Students can obtain their Abitur either by enrolling in grammar school (Gymnasium) or secondary modern school (Realschule).

Grammar school (Gymnasium) covers grades 5 to 12. This school provides students with an in-depth general education that qualifies them to enrol in university, or for a dual academic and vocational credential. The “Realschule” covers grades 5 to 10 and it provides students with a

theoretical and practical education. The Realschule ends with a final examination provided by the ministry of culture and students are awarded the *Realschulabschluss*, an intermediate school leaving certificate. Students with high academic achievement can switch to a Gymnasium after they graduate from Realschule to obtain their Abitur (Bavarian ministry for education and cultural affairs, n.d.).

In Bayern, children start to learn English as a foreign language from the third grade. Despite a multilingualism policy adopted in the European educational systems which encourages learners to master two foreign languages; English language remains the dominant foreign language. Learning English as a foreign language is favored by all the European countries, and European citizens judge that the foreign language they master is English (Busse & Walter, 2013; Mejer, Boateng, & Turchetti, 2010). According to the last statistics published by “The Statistical Office of the European Union”, more than 60% of German students in primary school study English as foreign language, while in the secondary and upper secondary levels 94.5% of students are learning English in schools (Eurostat, 2018).

Studying foreign languages plays an important role in the European context as the continuing integration of different nationalities in Europe requires young people to be able to deal competently with linguistic and cultural diversity. Additionally, living with immigrants, the increasing mobility of the population, and growing international contacts, mean that children in Germany encounter many different languages and grow into a multilingual world which requires learning languages other than their native language. In addition, economic globalization requires that youth be able to adapt to mobility in the context of personal life, training and work. Thus, foreign language learning in schools establishes the basis for the acquisition of multilingualism and lifelong foreign language learning in all countries (Kultusminister, 2013).

3.2 Description of the sample

The sample of the present study comprised Education students from the faculty of Education at the Suez Canal University in Ismailia, Egypt as well as students from the Julius-Maximilians University in Würzburg, Germany. The initial total sample consisted of 407 university students including 207 Egyptian and 200 German university students. After revising students' responses for data screening, six Egyptian students were excluded from the analysis as they did not fully answer the whole tests, making the final total sample 201 students. Egyptian students were recruited with help of their tutors, while German students were recruited through advertisement in the Julius-Maximilians University's campus as well as using the psychological research website of Psychology department at the Julius-Maximilians University (SONA). Further details will be discussed in the following sections.

3.2.1 Egyptian Sample Characteristics

The Egyptian sample was selected from students at the faculty of Education in Suez Canal University. The sample comprised Education students from the English department. I have personal experience with students at the faculty of education due to studying and working in this

institution for nearly ten years; Education students deal more frequently with different types of English texts. Contrary to the other departments in the faculty, Education students take all courses in Arabic aside from one course of English readings.

Students enroll in university once successfully finishing secondary school with at least a 86% success ratio. This success ratio changes every year. To be qualified to enroll in the English department, students should pass the secondary school with at least a 95% success ratio in their English exams. The duration of study at the faculty of education is 4 academic years (8 semesters). During their study, Education students learn various subjects: psychology, pedagogy, and different English subjects (e.g. literature, linguistics... etc.). Unless they choose to have other jobs, graduated students teach the English language to intermediate and secondary school students.

To achieve the purposes of the present study, students were recruited from the four academic years in order to have a sufficient representation of this population as well as to have enough of a sample to build the targeted path model of relationships between variables. Students were recruited by tutors with whom the researcher has contacted and asked to inform the students about the purpose of the study and whether wish to participate.

Table 1

Egyptian sample size at each academic year

Academic Year	First	Second	Third	Fourth	Missing
Total	82	32	57	29	1
Females/males	67/15	28/4	54/3	22/7	1

The total Egyptian sample consisted of 201 students, 85.5% (N=171) are females, while 14.5% (N=29) are male Education students. It can be noticed that females are more predominant than males, this can be due to the fact that males typically prefer other departments such as mathematics or science rather than specializing in teaching languages such as English. The mean age of students ($M= 20.00$, $SD= 1.25$), and the mean years of students' experience with studying English as a foreign language is ($M= 13$, $SD= 2.69$).

Students were asked about their English readings and whether they read English materials other than academic ones; 77% of students indicated that they read non-academic English materials while 20% indicated they do not do any free English reading. Six students did not answer the question. The researcher was interested in knowing what kind of reading materials students preferred to read. Table (2) summarizes the type of readings students preferred.

Table 2

Reading materials preference for Egyptian students

Reading material	Frequency
Magazines	1
Novels	30
Online reading	70
Not specified	100

It can be noticed that the most frequent type of reading materials was online reading. This can be due to the wide use of internet and smartphones among youth. They consequently find it easier to have access to electronic English reading materials. In addition, while I collected the data, a number of students told me that they find online reading more interesting for them and they prefer to read short and easy topics such as those published in blogs, e-magazines, or on social media.

3.2.2 German Sample characteristics

The German sample was recruited from students at the Julius-Maximilians University. The sample was composed of students studying psychology at the university. Students enroll in university upon successfully finishing secondary school and obtaining their Abitur. Successful participation in courses is certified with credit points awarded according to the European Credit Transfer System (ECTS). Their duration of study depends on the time required for the students to achieve the required ECT points to graduate. Generally, for a successful graduation, a total of at least 180 ECTS points are usually required (Julius-Maximilians University, 2019).

Students were recruited by distributing flyers at the university campus, and by advertising the study on the website of the psychology department dedicated to advertising psychological studies (SONA). Students who participated in the study were rewarded 10 euros for their participation.

The total German sample consisted of 200 students, 79.8% (N=158) were females, while 20.2% (N=40) were male Education students. Two participants did not indicate their gender. Similar to the Egyptian sample, females were more predominant than males. The students' mean age ($M=22.20$, $SD=2.55$), and the mean years of students' experience with studying English as a foreign language is ($M=9.90$, $SD=2.91$).

Table 3

German sample size in each academic year

Semester	First/Second	Third/fourth	Fifth/sixth	Seventh/eight	More than eight	Not specified
Total	49	58	48	38	2	5
Females/males	40/9	48/10	40/8	27/11	2males	5

Students were asked about their English readings and whether they read non-academic English materials; 74% of students indicated that they read non-academic English materials while 25% indicated they do not do any free English reading. Two students did not answer that question. The researcher was interested in knowing what kind of reading materials students preferred to read, table (4) summarizes the type of readings students preferred.

Table 4

Reading materials preference for Egyptian participants

Reading material	Frequency
Magazines	2
Novels	23
Magazines and novels	1
Online reading	20
Magazines and online reading	14
Novels and online reading	33
All	30
Not specified	77

Contrary to the Egyptian sample, I found a wide diversity in students' preferences for reading non-academic English materials.

3.3 Tools Description

Four instruments were used for measuring the variables under study. To measure L1 reading comprehension, the "LESEN 8-9" (Bäuerlein, Lenhard & Schneider, 2012) was used. This was used in order to measure German reading comprehension. A translated version was also used to measure Arabic reading comprehension. The second test consisted of three English passages extracted from *Asian and Pacific Speed Readings for English Learners* (Quin, Nation & Millet, 2007) for measurement of participants' EFL reading comprehension ability. The third measure was an EFL reading motivation questionnaire (L2RMQ) which aimed to assess the different facets

of students' EFL reading motivation. It was itself based on several L2 and L1 reading motivation questionnaires (e.g. Mori, 2002; 2004; Wigfield & Guthrie, 1995; Wang & Guthrie, 2004). Finally, in order to measure students' awareness of reading strategies and their perceived frequency of using these strategies, the *Survey of Reading Strategies (SORS)* was used (Mokhtari & Sheorey, 2002).

The next section will present a detailed description of each instrument. This description is composed of a description of the instruments' content, the translation process, the administration and scoring of instruments, and the psychometric properties measures.

3.3.1 The Survey of Reading Strategies (SORS)

The Survey of Reading Strategies (SORS) is based on Mokhtari & Reichard's (2002) Metacognitive-Awareness-of-Reading-Strategies Inventory (MARSI), which aims to assess adults' metacognitive awareness of reading strategies while reading in their native language. In the same realm, the SORS measures the type and frequency of reading strategies that adolescents use while reading L2 materials (Mokhtari & Sheory, 2002). The SORS was translated into the Arabic and German languages in order to avoid misunderstanding of survey statements and to assure conceptual and linguistic equivalence. The following sections contain a description of the SORS, the establishing of translation validity for German and Arabic SORS versions, and the psychometric characteristic of SORS in the current study

3.3.1.1 Description of the SORS

The SORS (Mokhtari & Sheorey, 2002) is an adapted version of the MARSI survey (Mokhtari & Reichard, 2002) a survey that aims to measure native English-speaking readers' awareness of reading strategies when reading. Mokhtari and his colleagues were motivated to develop a specific inventory for studying the metacognitive awareness of reading strategies among L2 readers due to research evidence of a positive relationship between students' metacognitive awareness of reading and academic success. Additionally, motivating was the absence of published instruments designed specifically to assess L2 students' metacognitive awareness of reading strategies and the fact that existing instruments do not cover some important strategies in L2 reading, such as translation.

Mokhtari and Sheory (2002) have made three modifications to the MARSI for it to be used with English learners:

- 1- They refined the language of items for them to be easier to understand by non-native English speakers.
- 2- They added two strategies which are not used in L1 reading but often used in L2 reading (translating from one language to another, thinking in native and second languages while reading).
- 3- They removed two strategies (summarizing and discussing what one reads with others).

Following these modifications, they pilot tested the SORS among 147 ESL learners studying in two universities in the USA. The results indicated the overall reliability of the instrument was high, which indicates that the survey has a good level of internal consistency.

Although it was initially developed for ESL learners, other researchers (e.g. Ilustre, 2011; Tsai, 2012) have found that the SORS is suitable for investigating the metacognitive awareness of reading strategies in foreign language contexts as well. The SORS consisted of five-point Likert 30 statements. Option (1) reflects the non-use of the strategy (“I never do this”) while option (5) stands for high use of the strategy (“I always do this”)

Three categories of reading strategies are measured by the SORS, namely, global, problem-solving, and support reading strategies. A description of each category and the number of items is given below

Global reading strategies: Consist of 13 items which reflect intentional planned techniques that readers employ to monitor their reading (e.g. “I have a purpose in mind when I read”, “I think about what I know to help me understand what I read”, “I take an overall view of the text to see what it is about before reading it”).

Problem- Solving reading strategies: Consist of 8 items representing the techniques that readers use to surmount obstacles they face in understanding textual information (e.g. “I try to get back on track when I lose concentration”, “When the text becomes difficult, I reread to increase my understanding”).

Support reading strategies: Composed of 9 items reflecting strategies related to activities or tools that readers use to better comprehend the text (e.g. “When reading, I translate from English into my native language. I use reference materials (e.g. a dictionary) to help me understand what I read.”) (Mokhtari& Sheory, 2002).

3.3.1.2 The Translation process

Translation is not merely a process of finding the right synonyms for words, rather its purpose is to maintain equivalence between the original and the translated versions. Equivalence refers to the “comparability of measures obtained in different cultural groups.” (Harkness Moher& Van de Vijver, 2003, p.14). The differences between languages and their related expressions, idioms, and grammatical rules means translation of measurement tools can lead to conceptual bias that affects the validity of the study results (Douglas& Graig, 2007; Harkness, et.al., 2003). For that reason, the translation process should be achieved carefully to ensure that the content of the measurement tools is the same, as well as to stimulate responses which have comparable meanings across different populations (conceptual equivalence) (Cha, Kim& Erlen, 2007). There are three

translational approaches that are used to ensure that research tools have equivalent content, namely: one way or forward translation, double translation or backward translation, and translation by committee.

One-way translation or Forward translation

According to this method, one translator translates the tool from its original language to the target language. The translators should be fluent in both languages and have knowledge of psychological constructs that instrument will measure. However, if the researcher did not revise all translated versions or the translator had no experience with the cultural context of the study, much information can be lost in literal translation (Mcgorry, 2000). Relying on one translator might be less expensive and more time saving, yet it can cause other problems with the accuracy of the translation, as the translator does not have an opportunity to discuss and improve the translation (Harkness, 2003).

Back translation

It is also called double translation; this method was first suggested by Brislin (1970) and considered to be a very popular method of translation. Back translation is an iterative process that requires several bilingual translators, it occurs in several steps as follow:

- 1- A translator independently translates the instrument from its original language to the target language.
- 2- A second translator translates the translated instrument from the target language to its original language.
- 3- Comparison between the two versions to examine concept equivalence.
- 4- When error is detected, another translator retranslates the mistaken item in the back translated version.

This procedure goes on until the translators agree that the two version are equivalent and have no mistakes. The main shortcoming of this method is the need for considerable number of competent translators who have enough knowledge of required languages, related cultures, and technical concepts of the research area (Cha et al, 2007). In addition, this technique assumes that there is always an equivalent word in the target language (Douglas& Graig, 2007), “*what goes in ought to come out*” (Harkness, 2003, P.41).

The Collaborative Approach

Collaborative translation approach has two forms: committee and expert team approach. The difference between the two approaches is that in the committee approach the translators jointly perform much of the translation work. While in the expert team approach, team members may be geographically distant from each other, so they work individually forming a virtual team.

In committee or expert team approach, two or more translators engage in the translation process and each generates a separate translation of the measurement tool. Afterward, the translators make a review meeting to discuss the different versions and agree on one translated version to be used

in the study. The members of the committee should agree on one translated version which is more closely related to the original tool (Harkness, 2003).

This method is more effective than one-way translation as it allows for interaction between the various skills and expertise required for reaching an optimally translated version, while also providing more than one translation for research tools. On the other hand, the committee approach is less time consuming and less expensive than back translation (Douglas & Graig, 2007; McGorry, 2000). Harkness (2003) summarized the translation process in five initial stages that a researcher should follow regardless of the technique the researcher adopts, which are: translation, review, judging, pretesting, and documentation.

When using any of the above-mentioned techniques, translators must not focus on creating a word by word translated version, rather he or she should maintain the conceptual equivalence of the translated version. For example, the German expression "*Das Leben in vollen Zügen genießen*" literally translated would be "*enjoy life in full trains*" however the true meaning of it is "*Enjoy life to the fullest*" or "*fully enjoying life*". The maintenance of content rather than literal equivalence is called the "Decentering" approach. Decentering is a translation process in which translators do not translate every word, rather, they construct an equivalent version that holds the same meaning of the original source (Harkness, 2003). Consequently, researchers may face some problems when trying to set equivalence in translation. These problems can be categorized into vocabulary, grammatical-syntactical, idiomatic, experiential and conceptual equivalence problems

Problems with vocabulary occurs when a word does not exist in the target language. This problem can be solved by using comparable word or group of words. Idiomatic problems occur when researchers translate the instrument literally (word for word). Therefore, translators must be familiar with the meaning of idioms to maintain the linguistic equivalence of the instrument.

The differences in grammatical rules can lead to grammatical-syntactical problems. This problem occurs when there are long passages to translate. The main problems are related to the order of words, verb nuance, and tense. The experiential equivalence difficulty happens when the translator lacks cultural knowledge of the target language. Consequently mistakes will occur when translating certain expressions literally (Cha et al., 2007).

In the present study, I used expert team approach in order to create equivalent versions of the measurement tools. Figure (11) summarized the steps used for the translation of the measurement tools used in the current study

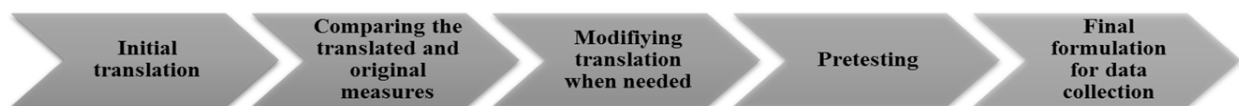


Figure 11. The translation procedure followed in the study

3.3.1.3 The translation of SORS

In the present study, the expert team approach was used, rather than forward or back translation. It was found that this approach was more suitable due to its flexibility, as it does not require the personal meeting of the translation team. In addition, this method helped to reduce bias by generating more than one version for the translated measure.

The translation of the SORS to the German language was achieved through the following steps:

- 1- The SORS was translated by the researcher from English to German.
- 2- The original and the translated versions were given to three members of the department of educational psychology at the faculty of humanities at Würzburg university in order to revise the translated version, as well as to an expert translator who has studied Germanistics in Germany, lived there for two years and works as a German Tutor in Egypt.
- 3- Based on the previous revision, the researcher performed the required modifications and discussed the final translation with Prof. Dr. Wolfgang Lenhard.
- 4- The translated version was presented to students from Würzburg university studying psychology in order to make sure that the items were clearly understood by them.
- 5- The researcher discussed the items with the students and asked whether there were ambiguous words or expressions.

3.3.1.4 The administration, scoring, and interpretation of the SORS

The SORS can be administered individually or in a group setting. The administration time varied between 10- 20 minutes. Once explained the purpose of the inventory and the meaning of each response option, students read each statement carefully and choose the appropriate response according to their perceived use of reading strategies.

Afterward, the individual scores of each strategy were recorded and summed to obtain a total score for the entire instrument, as well as a separate total score for each type of reading strategy (i.e. global, problem-solving, and support reading strategies). These scores served to identify the level of overall metacognitive awareness of reading strategies and perceived use, as well as identifying which group of strategies L2 readers reported using while reading L2 texts.

The students' scores were interpreted following the guidelines provided by Mokhtari, Sheory and Reichard (2008). They identified three levels of reading strategy use: high ($M= 3.5$ or higher), moderate ($M= 2.5-3.4$), and low ($M= 2.4$ or lower). The overall mean score reflects how often students report using the strategies mentioned in the inventory, while the average for each subscale reveals which group of strategies students report using while reading L2 materials.

The version used in the present study was translated from English to the Arabic and German languages. Although there was an Arabic version of the SORS provided by the authors with whom I corresponded per e-mail, several Arabic words were replaced by other synonyms more often used in Egyptian Arabic texts.

3.3.1.5 Psychometric properties of SORS

In order to assess the construct validity of the measures used in the study; a multiple sample CFA was conducted. The CFA aims to measure the configural invariance of the measurement models across the two populations. Accordingly, the number of factors and the underlying factor-indicator relationships are the same. However, all model parameters are freely estimated in each sample (Kline, 2011).

3.3.1.6 Confirmatory Factor Analysis

To assess the construct validity of the measurement tools used in the present study, confirmatory factor analysis was used. Factor analysis is a statistical method which analyzes the covariance matrix between a set of observed variables for the purpose of modeling how and to what extent these variables share variance with underlying latent variables (or factors) (Byrne, 2012).

There are two types of factor analyses: exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). The difference between these two techniques is that in CFA, the researcher has previous theoretical or empirical experience with the construct under study, so they assign the relationship between the observed and the latent factors according to a previously specified model. In this model, the relationships (or regression paths) between the observed variables measurement and the latent factor are called “Factor Loading” (Geiser, 2013).

Since the late 1990s, there has been wide use of CFA among psychologists in the area of scale development and construct validation. CFA plays an important role not only in the assessment of validity of research tools, but also represents half of the way in building a structural equation model (Brown, 2006; Jackson, Gillapsy& Stepenson, 2009). In order to judge whether the tested model (either in CFA or structural equation modeling) fits the sample or if there is a need for respecification of the suggested model, researchers use statistical tests called goodness of fit indices.

There are three types of goodness of fit indices that researchers use to assess the quality of their hypothesized models, namely, absolute fit indices, incremental fit indices, and parsimony fit indices. The absolute fit indices indicate the model fit based on comparing the suggested model with no model at all. In other words, it determines how well the model fits the sample data. The Chi-square test (χ^2) and the root mean square error of approximation (RMSEA) belong to this category of fit indices. The incremental fit indices also called the comparative fit indices determine the model fit based on comparing the tested model to a more restrictive baseline model (Browne, MacCallum, Kim, Andersen, & Glaser, 2002; Narayanan, 2012). In the current research these two types of goodness of fit indices were used to evaluate the models under study. In the following lines, a brief description is given of the most frequently reported goodness of fit indices in current research.

The Chi-Square Test (χ^2)

The Chi-Square Test assesses the discrepancy between the sample and the model estimated variance/covariance matrices. A nonsignificant χ^2 is desired to accept the null hypothesis (H0: there is no difference between the model estimated variances/covariances and the observed sample variances/covariances). Although the chi-square test is one of the most popular fit statistics, there are some difficulties related to it. One of the problems related to this test is its sensitivity to sample size. The probability of rejecting a model increases when sample size increases as well, even if the differences between the sample and the model estimated variance/covariance matrices are minor. Also, this test assumes multivariate normality, and deviation of normality may lead to the rejection of the model even if the model is well specified. Another shortcoming of this test is that when the number of model variables increase, χ^2 increases as well. Consequently, a significant χ^2 should not be a reason to judge that a model does not properly fit the data (Kelloway, 2015; Narayanan, 2012; Wang & Wang, 2012).

The Root Mean Square Error of Approximation (RMSEA)

The Root Mean Square Error of Approximation or RMSEA is considered to be “*one of the most informative criteria in covariance structure modeling*” (Byrne, 2012, p.73). The RMSEA is a measure of approximate model fit, it reflects the extent to which a model, with unknown but optimally chosen parameter estimates, will fit the population covariance matrix. Hu and Bentler (1999) suggested that a value of .06 shows a good fit while values greater between .08 and .10 indicate poor fit, while Kline (2011) indicates that values less than .10 indicate acceptable model fit. The value of RMSEA tend to decrease when the sample size and the number of parameters increase (Wang & Wang, 2012).

Root Mean Square Residual (RMR) and Standardized Root Mean Square Residual (SRMR)

The Root Mean Square Residual (RMR) represents the square root of the difference between the residuals of sample covariance matrix and the hypothesized covariance model. Since the RMR is calculated with unstandardized variables, its range depends on the scales of each variable, if these scales are not equal, it will be difficult to interpret the value of RMR. The standardized RMR (SRMR) resolves this problem, as it is based on transforming the sample and the predicted covariance matrices into correlation matrices. Accordingly, the SRMR is a measure of the mean absolute correlation residuals (Kline, 2011). The Values of SRMR which are below .08 reflect a good fit of the model (Hu & Bentler, 1999).

The Comparative Fit Index (CFI)

The comparative fit index (CFI) compares the hypothesized model with the null model that assumes that the covariance of the observed variables is zero. It can be defined as “*the ratio of improvement in noncentrality (moving from the null to the specified model)*” (Wang & Wang, 2012, p.18). The CFI performs well even with a small sample size. The values of CFI range from 0 to 1, values closer to 1 indicate good fit. A value greater than .90 is needed to ensure that the mis-

specified models are not admissible. However, a revised cut-off value greater than .95 is advised to be used as indication of good fit (Hu& Bentler, 1999). In addition, the value of CFI depends on the correlation between the variables. If the average correlation is not high, then the value of CFI will also not be high (Wang& Wang, 2012)

The Tucker–Lewis Index (TLI)

The Tucker and Lewis, or the non-normed fit, index (NNFI) measures the relative improvement in the model by comparing the hypothesized model to a baseline or independent model which assumes that all variables are uncorrelated. This index is less sensitive to the sample size. The same cut-off values of CFI apply to this test as well (cut-off value greater than .95 indicates good fit), a TLI value less than .90 suggest a need to respecify the tested model (Kline, 2011). Although, Hu and Bentler (1999) have recommended these cutoff values for goodness of fit indices, these values should not be taken as "golden rules" in all modeling situations. Thus, it is safer to base the evaluation of the overall model fit based on several types of fit indices (Marsh, Hu& Wen, 2004; Narayanan, 2012). Table (5) summarizes the aforementioned goodness of fit indices

Table 5

Summary for goodness of fit indices

Indicator	Description	Cut-off value for good fit
Chi square test (χ^2)	Assesses the discrepancy between the sample and fitted covariance matrices	p-value > .05
Root mean square error of approximation (RMSEA)	A parsimony-adjusted index, it favours models with fewer parameters.	RMSEA < .08
(S)RMR (Standardized) Root Mean Square Residual	Index of the difference between the residuals of the observed and predicted covariance matrices.	SRMR < .08
Comparative fit index (CFI)	Index that compares the fit between the tested model and independent or null model	CFI \geq .90
Tucker–Lewis Index (TLI)	Index that compares the fit between the tested model and baseline or independent model	TLI \geq .90

In this study, the application of CFA served to ensure the construct validity of the measurement tools used. In addition, as the measurement tools were applied within two different contexts, it was necessary to ensure the same construct was measured across groups. Thus, the use of a strict procedure such as the CFA gives evidence for the structural equivalence of the study variables (Van de Vijver, 2018).

3.3.1.7 Construct Validity of SORS:

Although the SORS is used in number of studies, none of these studies have conducted statistical analysis to measure the construct validity of the survey. In this study, I conducted a first order CFA in order to investigate the construct validity of the SORS in both its versions (Arabic and German). This statistical analysis was conducted using the **R** program with help of the LAVAAN package. To estimate the CFA using the LAVAAN package, certain functions and syntaxes were used. First, for specification of the relationship between the latent factor and its indicator, the following syntax was used:

```
latent variable =~ indicator1 + indicator2 + indicator3
```

This syntax entails three default functions. Firstly, it fixes the factor loading of the first indicator in order to fix the scale of the latent factor. Secondly, it automatically adds the residual variances. Thirdly, it by default sets correlations between all indicators.

The next step was to fit the confirmatory factor analysis model. In this step the function **cfa** was used as follows

```
fit <- cfa(name of the model, data=name of the dataset)
```

After fitting the model, the researcher should use the **summary** function to obtain a summary of the results of the tested CAF. The generated output is similar to other outputs from different SEM programs. It contains various information about the model, the number of observed variables, the estimator used to obtain parameters values, the goodness of fit indices, and the factor loading values.

As the sample size was not large enough to conduct a CFA using the 30 items, three separates CFAs were conducted on each scale of the SORS. The results of the three CFAs revealed that the tested model fit the sample data as shown by the goodness of fit indices in table (6)

Table 6

Goodness-of-fit indicators of the SORS in the Egyptian sample

Indicator/Construct	Global reading strategies	Problem-solving reading strategies	Support reading strategies
CFI	.92	.97	1
TLI	.91	.95	1
RMSEA	.04	.04	0
SRMR	.05	.04	.04

The previous results revealed that the tested model fits the sample data, as the goodness of fit indices are within accepted range values (RMSEA < .08; SRMR < .08; CFI \geq .90; TLI \geq .90). Concerning the χ^2 test, it was not significant ($p > .05$) for both the problem/solving (23.84, $df = 18$) and support reading strategies (23.44, $df = 25$) which reveals that these suggested models fits well the sample data. Although the Global reading strategies scale had a significant χ^2 value (90.89, $df = 64$), the other goodness of fit indices were acceptable which indicate that the tested model fits well the data. The next table presents a closer examination of the model by examining the factor loading of each item onto the related latent factor, in order to verify the significance of relations between the indicators and the corresponding latent construct of the reading strategies category.

Table 7

Standardized factor loadings of SORS items in the Egyptian sample

Latent factor	Indicator	Estimate	Standard Error	z value
Global reading strategies	1	.33	.07	4.66*
	2	.47	.06	7.35*
	3	.36	.07	5.07*
	4	.38	.07	5.39*
	5	.38	.07	5.44*
	6	.45	.06	6.71*
	7	.43	.06	6.38*
	8	.48	.06	7.53*
	9	.39	.07	5.73*
	10	.38	.07	5.51*
	11	.61	.05	10.92*
	12	.48	.06	7.40*
	13	.46	.06	6.95*
Problem-Solving reading strategies	1	.38	.07	4.90*
	2	.44	.07	5.93*
	3	.36	.07	4.66*
	4	.46	.07	6.10*
	5	.36	.07	4.65*
	6	.52	.07	7.33*
	7	.44	.07	5.81*
	8	.55	.07	7.82*
Support reading strategies	1	.37	.07	4.83*
	2	.43	.07	5.56*
	3	.44	.07	6.03*
	4	.40	.07	5.33*
	5	.38	.07	5.09*
	6	.52	.07	7.54*
	7	.39	.07	5.00*
	8	.32	.08	4.03*
	9	.50	.07	7.04*

* $p < .001$

The first column represents the estimated parameter value for each indicator. The second column is composed of the standard errors for each estimated parameter, while the third column represents the Walid test which refers to the result of dividing the parameter value by its standard

error. Results indicated that all factor loadings estimates are statistically significant different from zero ($p < .001$) (lavaan: latent variable analysis, n.d.).

Previous results indicated that standardized factor loadings vary from .32 to .55 and that all the loading coefficients are statistically significant ($p < .001$, z value > 1.96). Hence, it can be concluded that according to the results of first order CFA, the suggested hypothesized model fits the data well and the SORS instrument is valid to use.

To test the construct validity of SORS in the German sample, the same previous analysis was conducted. Three separate CFAs for each reading strategy category were used. Table (8) presents the goodness of fit indices for each construct

Table 8

Goodness-of-fit indicators of the SORS in the German sample

Indicator/Construct	Global reading strategies	Problem-solving reading strategies	Support reading strategies
CFI	.95	.97	.97
TLI	.93	.95	.96
RMSEA	.04	.03	.02
SRMR	.05	.04	.05

The previous results revealed that the tested model fit the sample data, as the goodness of fit indices achieved the accepted range values (RMSEA $< .08$; SRMR $< .08$; CFI $\geq .90$; TLI $\geq .95$). Concerning the χ^2 test, it was not significant for both the problem/solving and support reading strategies ($\chi^2(\text{df}) = 20.01(16)$, $28.84(26)$ respectively) which reveals that these suggested models fits well the sample data. Although the Global reading strategies scale had a significant χ^2 ($\chi^2(\text{df}) = 84.28*(62)$), the other goodness of fit indices were within the accepted threshold which give support that the tested model fits well the data.

The next table presents the factor loading of each item onto the related latent factor, to verify the significance of relationships between the indicators and the corresponding latent construct of each reading strategies category.

Results indicated that all factor loadings estimates were statistically significant different from zero ($p < .001$), which make the null hypothesis, stating that the parameter equals zero in the population, can not be accepted

Table 9

Standardized factor loadings of SORS items in the German sample

Latent factor	Indicator	Estimate	Standard Error	z value
Global reading strategies	1	.28	.07	3.65*
	2	.43	.06	6.32*
	3	.53	.06	8.57*
	4	.38	.07	5.31*
	5	.51	.06	7.91*
	6	.54	.06	8.59*
	7	.37	.07	5.15*
	8	.54	.06	8.78*
	9	.43	.07	6.19*
	10	.54	.06	8.69*
	11	.56	.06	9.18*
	12	.39	.07	5.47*
	13	.46	.06	6.70*
Problem- Solving reading strategies	1	.58	.07	8.37*
	2	.59	.07	8.48
	3	.39	.07	5.03*
	4	.46	.07	6.26*
	5	.32	.08	3.70*
	6	.26	.08	3.16*
	7	.53	.07	7.65*
	8	.25	.08	2.89*
Support reading strategies	1	.33	.08	3.85*
	2	.27	.08	3.13*
	3	.15	.09	1.65
	4	.58	.07	7.44*
	5	.46	.08	5.71*
	6	.29	.08	3.41*
	7	.56	.07	7.22*
	8	.25	.08	2.96*
	9	.20	.08	2.26*

* $p < .001$

Previous results indicated that standardized factor loadings varied from .20 to .59 and that all the loading coefficients were statistically significant ($p < .001$, z value > 1.96), aside from the loading coefficient of item 10 in the problem-solving subscale, which was not statistically significant ($p > .05$). Consequently, it was not incorporated in further analysis. According to the results of the first order CFA, the suggested hypothesized model fits the data well and the SORS instrument is valid to use.

3.3.1.8 Reliability of SORS

To assess the internal consistency of the SORS, the program *R* using the “Omega” command was used to calculate both the Alpha (α) and Omega(Ω) coefficients for each scale to assess the measures reliability, table (10) displays the values of the reliability coefficients

Table 10

Reliability coefficients of the SORS in the Egyptian and the German samples

Scale/Reliability coefficients	Alpha value(α)		Omega(Ω)	
	Egypt	Germany	Egypt	Germany
Global reading strategies	.76	.79	.79	.82
Problem-solving reading strategies	.68	.63	.76	.71
Support reading strategies	.64	.55	.72	.63
Total	.87	.84	.88	.86

According to previous results, the subscales of the SORS have acceptable values of measurement stability in both the German and Egyptian contexts.

3.3.2 L2 Reading Motivation Questionnaire:

The L2 Reading Motivation Questionnaire (L2RMQ) assesses adult EFL learners’ reading motivation. It was adapted from several L1 and L2 reading motivation questionnaires (e.g. Mori, 2002; 2004; Wigfield& Guthrie, 1995; Wang& Guthrie, 2004). The L2RMQ was translated into both the Arabic and German languages to avoid misunderstanding of survey statements and to assure conceptual and linguistic equivalence. The following sections discuss the description of the L2RMQ, the establishment of translational validity for the German and Arabic L2RMQ versions, and the psychometric characteristics of L2RMQ in this study

3.3.2.1 Description of L2RMQ

The development of the L2 reading motivation questionnaire (L2RMQ) was inspired by work done by Wigfield and Guthrie (1995, 1997) and their colleagues in the field of L1 reading motivation, as well as by previous research conducted in the area of L2 reading motivation (e.g. Mori 2002, 2004). To develop the (L2RMQ) the researcher reviewed previous research conducted in the area of reading motivation either in first or second languages. The reviewed published research revealed that the majority of L2 researchers have adopted Wigfield and Guthrie’s L1 reading model because it is a comprehensive and well-established model. Tables (11) (12) present the reviewed L2 reading questionnaires.

Table 11

Reviewed L2 reading motivation questionnaires

study	Sample	Dimensions of L2 reading motivation
Alsheikh& Elhoweris, 2011.	513 High school students	<ul style="list-style-type: none"> • Intrinsic value (curiosity, involvement). • Extrinsic value (grades, compliance). • Attainment value of reading. • Self-efficacy
Apple, 2005.	85 University students	<ul style="list-style-type: none"> • Instrumental orientation. • Attitudes toward L1 reading. • Interest in l2 language and culture. • Language learning beliefs.
Erten, Topakaya& Karakaş, 2010.	443 University students	<ul style="list-style-type: none"> • Intrinsic value of reading. • Reading efficacy. • Extrinsic utility of reading. • Foreign language linguistic utility.
Estacio, 2012.	646 High school students	<ul style="list-style-type: none"> • Social and learning environment, • External motivation, • Mastery orientation in reading. • Pressure. • Performance orientation. • Familiarity with the content and form of the text.
Han, 2011.	203 University students	<ul style="list-style-type: none"> • Intrinsic motivation in FL reading. • Utility value in FL reading. • Academic Value in FL reading.
Huang, 2006.	212 University students	<ul style="list-style-type: none"> • Encouragement to read in English for pleasure. • Self-perception of English reading ability. • Experience in an English-speaking country.
Kim, 2011.	259 University students	<ul style="list-style-type: none"> • Learning goal-oriented motivation for L2 reading. • Intrinsic motivation for L2 reading. • Avoidance of L2 reading. • Utility value of L2 reading.
Mori, 1999	52 University students	<ul style="list-style-type: none"> • Positive Intrinsic Value. • Negative attainment value. • Negative attainment value of reading novels. • Grade related extrinsic utility value of reading. • Difficulty in reading. • Positive extrinsic utility value.

Table 12
Reviewed L2 reading motivation questionnaires

Study	Sample	Dimensions of L2 reading motivation
Mori, 2002	447 University students	<ul style="list-style-type: none"> • Intrinsic value of reading. • Extrinsic utility value of reading. • Importance of reading. • Reading efficacy.
Mori, 2004	100 University students	<ul style="list-style-type: none"> • Intrinsic value. • Attainment value. • Negative intrinsic value in novels.
Mori& Gobel, 2006	453 University students	<ul style="list-style-type: none"> • Integrativeness. • Intrinsic value. • Amotivation. • Attainment value.
Nischino, 2005	262 High school students	<ul style="list-style-type: none"> • Reading Efficacy. • Intrinsic Value of Reading in English. • Extrinsic Utility Value of Reading in English. • Importance of Reading in English, • Communicative Orientation.
Sani, Ariffin& Shaik-Abdullah, 2014.	319 University students	<ul style="list-style-type: none"> • Intrinsic motivation. • Extrinsic test motivation. • Extrinsic motivation recognition. • Extrinsic motivation compliance.
Takase, 2002.	81 High school students	<ul style="list-style-type: none"> • Intrinsic motivation for reading Japanese. • Extensive reading related intrinsic motivation. • Exam related and instrumental motivation. • Parents and family attitudes toward reading (in general). • Preference for intensive reading
Takase, 2007.	107 High school students	<ul style="list-style-type: none"> • Intrinsic motivation for L2 reading. • Parents 'involvement in and family attitudes toward reading. • Entrance exam-related extrinsic motivation. • Fondness for written materials. • Internet-related instrumental motivation & negative attitude toward extensive reading.

Based on a review of prior L1 and L2 reading motivation research and questionnaires, it was found that a majority of previous research was initially guided by Wigfield and Guthrie's (1995, 1997) classification, and results either fully or partially agreed with their suggested classification of reading motivation. Thus, in the current research, the L2 reading motivation was categorized into intrinsic and extrinsic components.

The L2RMQ assessed adult L2 readers' perceived reading goals when reading texts in the English language. It consisted of 37 statements on a five-point Likert scale. Option (1) meant that the statement does not reflect reader's incentive to read ("Totally disagree") while option (5) ("Totally agree") stood for a fully representative item of students' motives for reading texts written in English. In addition, two open ended questions were added to give the students the opportunity to express freely their motives to read and which reasons demotivate them from reading.

Two categories of L2 reading motivation are explored by the L2RMQ, intrinsic and extrinsic L2 reading motivation. A description of each category and its subcomponent is given below

Intrinsic Reading Motivation:

Intrinsic motivation refers to inherent interest in the reading materials and reading itself, it is represented by three components:

Curiosity: Refers to the desire to read of a certain topic of interest. Students are interested in reading certain topics or admiring the writings of certain writers (Guthrie et al., 2007). In an L2 reading context, students might be curious about reading books in the target language, or reading about the cultures of English-speaking countries. This motivational component is represented by 8 items (e.g. "*I like to read because I always feel happy when I read things that are of interest to me*", "*I enjoy reading books about people in different countries*").

Involvement: Represents the satisfaction that readers experience when reading interesting reading materials. Highly involved readers lose track of time while reading and can even make bounds with the imaginary characters from a book (Guthrie et al., 2007). This factor is represented by 7 items (e.g. "*If I am reading about an interesting topic, I sometimes lose track of time.*", "*I feel like I made friends with people in good books.*")

Challenge: Reflects students' willingness to read difficult materials and demonstrates that they do not avoid reading challenging texts (Guthrie et al., 2009). This factor is represented by 5 items (e.g. "*If a book is interesting, I don't care how hard it is to read*", "*I like hard, challenging books.*").

Extrinsic Reading Motivation

Extrinsic reading motivation represents external factors that stimulate students to read in order to achieve specific outcomes from their reading activity. It is represented by:

Competition: Represents students' desire to read to outperform their colleagues. Their main goal of mastering reading is to achieve a better performance than their friends (Wigfield & Guthrie, 1997). This factor is represented by 5 items (e.g. *"I like being the best at reading, I am willing to work hard to read better than my friends"*).

Grades: Refers to reading for improved academic achievement and positive evaluation from their teacher (Guthrie et al., 1999). In L2 contexts, this component can be related not only to academic achievement but also to the desire to acquire good grades in language exams (e.g. TOEFL, IELTS). This factor is represented by 4 items (e.g. *Reading English can help me to get good grades, I read in English to get high cores on TOEFL or IELTS exams*).

Recognition: Represents a student's satisfaction of being recognized as good reader. Students seek to be identified as a competent reader among their colleagues or family (Wigfield & Guthrie, 1997). This factor is represented by 5 items (e.g. *"I like having my friends sometimes tell me I am a good reader."*, *"I like to be asked about my readings, so I can show off my knowledge."*).

3.3.2.2 Translation of L2RMQ

To translate the L2RMQ from English to German and Arabic, an expert team approach was used, rather than forward or back translation. This approach was found to be more suitable as it did not require the personal meeting of the translation team, helped to reduce bias, and ensured conceptual equivalence of translated measures. The translation of the L2RMQ to the German language was achieved through the following steps:

- 1- The L2RMQ was translated by the researcher and a multilingual translator from English to German.
- 2- The original and the translated items were given to three members of the department of educational psychology at the faculty of humanities in Würzburg University to revise the translated version, as well as to an expert translator who had studied Germanistics in Germany, lived there for two years, and currently works as a German Tutor in Egypt.
- 3- Based on the previous revision, the researcher did the required modifications and discussed the final translated with Prof. Dr. Wolfgang Lenhard.
- 4- The translated version was presented to students from Würzburg University studying psychology to ensure that the items were clearly understood by them.
- 5- The researcher discussed the items with the students and asked whether there were ambiguous words or expressions.

The translation of the L2RMQ to the Arabic language was done following the same steps:

- 1- The L2RMQ was translated by the researcher from English to Arabic, which is the researcher's native language, as well as by an expert native Arabic translator.
- 2- The original and translated versions were given to Arabic and English tutors in Egypt to review the translated versions and verify the grammatical and linguistic construct of the items.
- 3- The translated version was presented to students from the faculty of Education in Suez Canal University to ensure that the items were clearly understood by the targeted study sample
- 4- The researcher discussed the items with the students and asked whether they found difficulties in understanding and responding to the items.

3.3.2.3 The administration, scoring and interpretation of L2RMQ

The L2RMQ can be administrated individually or in a group setting. The administration time varied between 10-30 minutes. The researcher began by explaining the purpose of the questionnaire, how to answer the questionnaire, and the meaning of each scale response using the example presented in the instruction section. Afterward, students read each statement carefully and chose the appropriate response according to their perceived L2 reading goals

The individual scores of each item were recorded and summed to obtain a total score for each motivational subscale (e.g. curiosity, grades...etc.) as well as a separate total score for each type of reading strategy (i.e. intrinsic and extrinsic reading motivation). These scores revealed the students' level of reading motivation, as well as identifying whether students are more inclined to be intrinsically or extrinsically motivated. Baker and Wigfield (1999) have indicated that a mean score midpoint of 2.5 can be used to estimate students' level of motivation. A mean score of items above 2.5 reflects a high level of motivation on this dimension.

In terms of construct validity and reliability of L2RMQ, the following section discusses the psychometric proprieties of the questionnaire according to data collected from German and Egyptian contexts.

3.3.2.4 Psychometric characteristics of L2 reading motivation questionnaire

To assess the validity of the L2 reading motivation questionnaire, two separate factor analyses were conducted on intrinsic reading motivation and extrinsic reading motivation. Table (13) reveals the goodness of fit indices for the model of L2 intrinsic reading motivation as measured by Involvement, Curiosity, and Challenge

Table 13

Goodness-of-fit indicators for L2 intrinsic reading motivation in the Egyptian sample

Indicator	CFI	TLI	RMSEA	SRMR
Value	.97	.96	.03	.04

The previous results revealed that the tested model fits the sample data as the goodness of fit indices achieved the accepted range values (RMSEA < .08; SRMR < .08; CFI \geq .90; TLI \geq .95), despite of the significance ($p < .05$) of the chi square test (90.15, $df = 69$). The below table presents a closer examination of the model fit by presenting factor loading of each item to verify the significance of relationships between the indicators and the corresponding latent construct of intrinsic motivation.

Table 14

Standardized factor loadings of items representing L2 intrinsic motivation in the Egyptian sample

Latent factor	Indicator	Estimate	Standard Error	z value
Involvement	1	.53	.06	8.58*
	2	.56	.06	9.49*
	3	.37	.07	5.34*
	4	.50	.06	7.95*
	5	.43	.06	6.36*
	6	.47	.06	7.33*
Curiosity	1	.55	.06	9.30*
	2	.51	.06	8.16*
	3	.51	.06	8.16*
	4	.56	.05	9.81*
Challenge	1	.55	.05	9.42*
	2	.71	.04	14.91*
	3	.52	.06	8.72*
	4	.60	.05	11.12*

$p < .001$

Previous results indicated that standardized factor loadings varied from .37 to .71 and that all loading coefficients were statistically significant ($p < .001$, z value > 1.96). According to the results of first order CFA the suggested hypothesized model fits the data well.

After conducting the CFA for the L2 intrinsic reading motivation model, a separate CFA was conducted to assess the model of L2 extrinsic reading motivation as represented by Grades, Recognition, and Competition. Table (15) reveals the goodness of fit indices for the L2 extrinsic reading motivation model.

Table 15

Goodness-of-fit indicators for L2 extrinsic reading motivation in the Egyptian sample

Indicator	CFI	TLI	RMSEA	SRMR
Value	.94	.91	.05	.05

Although, the chi square test (114.37, $df= 69$) was significant ($p < .001$), the previous results revealed that the tested model fit well the data according to RMSEA and SRMR indicators which were less than .08. However, the CFI and TLI indicators values were $< .95$, which implies that the model has an acceptable overall fit for the sample data.

The next table presents a closer examination of the model fit by presenting factor loading of each item to verify the significance of relationships between the indicators and the corresponding latent construct of L2 extrinsic reading motivation.

Table 16

Standardized factor loadings of items representing the subcomponents of extrinsic motivation in the Egyptian sample

Latent factor	Indicator	Estimate	Standard Error	z value
Grades	1	.42	.08	5.21*
	2	.43	.08	5.46*
	4	.51	.07	6.45*
	4	.26	.08	3.15*
Competition	1	.56	.05	9.63*
	2	.49	.06	7.94*
	3	.51	.06	8.37*
	4	.47	.06	7.48*
	5	.51	.06	8.40*
Recognition	1	.58	.05	10.13*
	2	.54	.05	9.75*
	3	.60	.05	11.54*
	4	.79	.03	21.25*
	5	.72	.04	16.70*

* $p < .001$

Previous results indicated that standardized factor loadings varied from .26 to .79 and that all the loading coefficients were statistically significant ($p < .001$, z value > 1.96). According to the results of first order CFA, the suggested hypothesized model of L2 reading motivation fits the data well and the L2RMQ instrument was valid to use.

The same analysis was conducted for the data collected from the German students. Two separated CFA were conducted for the components of intrinsic and extrinsic reading motivation, table (17) presents the goodness of fit indices for the L2 intrinsic reading motivation dimensions

Table 17

Goodness-of-fit indicators L2 intrinsic reading motivation in the German Sample

Indicator	CFI	TLI	RMSEA	SRMR
Value	.95	.94	.06	.05

The previous results revealed that the tested model fits the sample data as the goodness of fit indices achieved the accepted range values (RMSEA < .08; SRMR < .08; CFI \geq .90). However, the TLI indicator value was < .95 and the chi square value (129.7, $df=$ 68) was significant ($p < .001$), the other indicators proved a good fit of the hypothesized model.

Table 18

Standardized factor loadings of items representing L2 intrinsic motivation in the German sample.

Latent factor	Indicator	Estimate	Standard Error	<i>z</i> value
Involvement	1	.67	.04	14.23*
	2	.67	.04	15.04*
	3	.76	.03	20.68*
	4	.80	.03	24.04*
	5	.47	.06	7.88*
	6	.39	.06	5.91*
Curiosity	1	.76	.03	21.31*
	2	.77	.03	22.39*
	3	.47	.06	7.75*
	4	.80	.03	27.71*
Challenge	1	.70	.04	16.54*
	2	.81	.03	24.99*
	3	.53	.05	9.28*
	1	.57	.05	10.66*

* $p < .001$

Previous results indicated that standardized factor loadings varied from .39 to .80 and all the loading coefficients were statistically significant ($p < .001$, *z* value > 1.96). According to the results of first order CFA, the suggested hypothesized model of L2 reading motivation fits the data well and the L2RMQ instrument is valid to use.

After conducting the CFA for the L2 intrinsic reading motivation model, a separate CFA was conducted to assess the model of L2 extrinsic reading motivation as represented by curiosity, involvement, and challenge. Table (19) reveals the goodness of fit indices for the L2 intrinsic reading motivation model.

Table 19

Goodness-of-fit indicators for L2 extrinsic reading motivation in the German sample.

Indicator	CFI	TLI	RMSEA	SRMR
Value	0.93	0.91	0.06	0.07

The previous results revealed that the tested model only partially fit the sample data, as not all the goodness of fit indices achieved the accepted range values (RMSEA < .08; SRMR < .08). However, the chi square value (107.8, $df=70$) was significant ($p < .01$), the other indicators proved a good fit of the hypothesized model.

The next table presents a closer examination of the model fit by presenting factor loadings of each item to verify the significance of relationships between the indicators and the corresponding latent construct of L2 extrinsic reading motivation.

Table 20

Standardized factor loadings of items representing the L2 extrinsic reading motivation in the German sample

Latent factor	Indicator	Estimate	Standard Error	z value
Grades	1	.37	.08	4.56*
	2	.23	.08	2.60*
	4	.74	.06	11.15*
	4	.77	.06	11.74*
Competition	1	.73	.05	12.85*
	2	.60	.06	9.19*
	3	.43	.07	5.58*
	4	.41	.07	5.21*
	5	.62	.06	9.74*
Recognition	1	.74	.05	14.28*
	2	.62	.05	10.95*
	3	.69	.06	11.59*
	4	.75	.04	15.67*
	5	.65	.06	10.24*

* $p < .001$

The previous table indicated that standardized factor loadings varied from .23 to .77 and that all the loading coefficients were statistically significant ($p < .001$, z value > 1.96). According to the

results of first order CFA, the suggested hypothesized model of L2 extrinsic reading motivation fits the data well.

3.3.2.5 Reliability of L2 reading motivation questionnaire

To assess the internal consistency of The L2RMQ, the program *R* using “Omega” command was used to calculate both the Alpha (α) and Omega(Ω) coefficients for each scale separately, in addition to calculating the reliability for the whole questionnaire, table (21) displays the values of α for L2RMQ within the German and the Egyptian samples.

Table 21

Reliability coefficients of the L2RMQ for the Egyptian and the German samples

Scale/Reliability coefficients	Alpha (α)		Omega(Ω)	
	Egypt	Germany	Egypt	Germany
Involvement	.67	.79	.77	.88
Curiosity	.64	.82	.69	.86
Challenge	.69	.76	.71	.79
Intrinsic motivation	.84	.91	.86	.93
competition	.60	.71	.67	.76
Grades	.84	.58	.86	.72
recognition	.80	.84	.84	.87
Extrinsic motivation	.82	.86	.85	.89

According to previous results, the subscales of the L2MRQ had acceptable values of measurement stability in German and Egyptian contexts.

3.3.3 L1 reading comprehension test

To measure students' L1 reading comprehension, the researcher used the reading comprehension test from “LESEN 8-9” (Bäuerlein, et al., 2012). This reading comprehension test is a paper-based test which was composed of two texts written in the German language. These two texts are presented in expository narrative forms.

The first text, called “*Tarsiers*“, is an expository text which consisted of information about tarsiers, their physical features, and their lifestyle. The text is (706) words long. While the second text is entitled *The Clever Man*, it is a narrative story about a farmer who was a victim of a deceptive merchant who sold him an ill horse. The text is (897) words long. It is a long text with advanced language structure and vocabulary levels, as it is expected that students have a high knowledge level in their L1. Additionally, the narrative text was adapted from old German literature, so it is not expected that the students would have previous knowledge with the texts' content or have read them before. When texts were translated into the Arabic language, the expository text became

(641) words long while the length of the narrative text turned out to be (649) words. However, the translation process maintained the equivalence of meaning as well as difficulty level of language in translated version.

Each Text was followed by 19 multiple choice questions with 5 answer options with only one correct choice. The questions tackled different levels of reading comprehension (text and situation models). Some questions aimed to measure students' comprehension on local level (i.e. the understanding of phrases or words) while others targeted global comprehension of the entire texts and their ability to make inferences from these texts. The answers are scored 1 for correct answers and 0 for wrong ones. The maximum score on the reading test is 38.

3.3.3.1 The Translation of L1 reading comprehension test

To translate the two texts in (Lesen 8-9) from German to Arabic, an expert team approach was used. It was found that this approach was more suitable because it did not require the personal meeting of the translation team, helped to reduce bias, and ensured conceptual equivalence of translated measures.

The translation of texts was achieved through the following steps:

- 1- The texts were translated by the researcher and a multilingual translator from German to Arabic.
- 2- When comparing the two versions. some differences were found. The translator was contacted and the differences were discussed in order to have one translated version.
- 3- After agreeing on one version of translated texts, the original and translated texts were sent to an Egyptian professor in the faculty of languages in Ain Shams University who teaches German linguistics, to review the translation.
- 4- Based on the previous revision, the researcher performed the required modifications and the final version was sent to an Arabic tutor to revise the linguistic format of the texts.
- 5- The translated texts were presented to students from the faculty of Education at Suez Canal University in order to test the ease and comprehension of texts by students.
- 6- The researcher discussed the texts' content with students and asked whether there were ambiguous expressions.

In addition to the aforementioned process some modifications were made to the Arabic version:

- 1- It is not common in Arabic texts to use the number of lines when searching for an answer to certain questions, instead the number of paragraphs is used. For example, in the eighteenth question of the *Tarsiers* text, readers were asked to choose a suitable title for lines 20-26, in the Arabic version instead of mentioning the number of lines the paragraph number was used.
- 2- In the "Clever man" text, the expression "heiß und kalt um den Kopf" does not have a literal equivalent in the Arabic language so it was replaced by "feeling choked".

- 3- The sixth question of the previous text requires that readers choose a synonym for the word “einspännig”, which has no synonym in the Arabic language, so it was replaced by choosing synonym for another word.

3.3.3.2 Reliability of L1 reading comprehension test

To assess the internal consistency of the reading comprehension test, I used *R* program using “Omega” command to calculate both the Alpha (α) and Omega(Ω) coefficients for the entire test, table (22) displays the values of Alpha (α) and Omega(Ω) values of the L1 reading comprehension test.

Table 22

Reliability coefficients of L1 reading comprehension test in the Egyptian and German samples

Sample	Alpha value	Omega Value
Germany	.71	.73
Egypt	.66	.69

3.3.4 English reading comprehension test

EFL reading comprehension was measured by three texts taken from *Asian and Pacific Speed Readings for English Learners* (2007). One of the criteria that Bernhardt (2004) recommended in reading research is using more than one text to measure reading ability in order to avoid that the obtained data becomes “single subject in nature”. These texts were adapted from Quinn and Nation’s (1974) “*Speed Reading: A Course for Learners of English*” which contains 20 passages. These texts are written within the 1000 most frequently used words in English language.

The texts were adapted by staff of the English Language Institute at Victoria University of Wellington. Each text is 550 words long and is followed by 10 multiple choice questions to assess readers’ comprehension of the texts, with each question having four answer options. Some questions required that students make inferences while others were literal questions which did not necessitate inference. The reading passages used in the study were presented in two different types of texts: narrative and expository. The first text, named “James Brook”, was a narrative text about an English man who lived in India in the 1980’s. The second was text called “The Maori” and was an expository text about the indigenous Polynesian people of New Zealand. The last text was entitled “Hong Kong” and was an expository text containing historical information about Hong Kong. The texts had a relatively less complex syntax structure, and they were gender and culture free. The answers were scored 1 for correct answers and 0 for wrong ones. The maximum score on the reading test was 30.

3.3.4.1 Reliability of L1 reading comprehension test

To assess the internal consistency of the reading comprehension test, I used *R* program using “Omega” command to calculate both the Alpha (α) and Omega(Ω) coefficients for the entire test, table (23) displays the values of Alpha (α) and Omega(Ω) values of the L2 reading comprehension test

Table 23

Reliability coefficients of English reading comprehension test in the Egyptian and German samples

Sample	Alpha value	Omega Value
Germany	.73	.76
Egypt	.83	.85

3.4 Data collection procedures

The data collection took place in Egypt and Germany, it was collected personally by the researcher. The next two sections describe the data collection steps in detail.

3.4.1 Data collection in Egypt

The data collection took place in the second semester of the academic year 2017/2018. Data was collected in person in Egypt. Prior to collecting the data, the coordinator of English department in the faculty of Education in Suez Canal University was contact in order to illustrate the purpose of the data collection and facilitate contact with other professors in the department.

Before starting data collection, students from English department in the faculty of education (N=5) were met and given the tests in order to evaluate the accuracy of instructions, response scales format, clarity of items, and the time required to complete the tests. Students demonstrated a good level of comprehension of the texts and the surveys and needed about one and half hours to complete the tests.

Once it was ensured that the tests were relatively understandable for the students, data collection began. Students were recruited during their lectures by the help of their tutors. They were informed that the administration of the tests would take almost an hour and half. The researcher explained to the participants that their answers would be anonymous and would be used for scientific purposes. They were assured that their participation is voluntary and that they have the right to withdraw anytime.

At the end of each lecture, it was explained to students how to answer each test as well as the meaning of each scale option in the questionnaires. During their response on the tests, all students

were personally accompanied in order to potentially provide explanations or clarify misunderstandings when needed.

3.4.2 Data Collection in Germany

The data collection in Germany occurred during the summer semester of 2018 and the winter semester of 2018/2019. Prior to collecting data, an advertisement for the study was placed during psychology lectures at the University of Würzburg.

To ensure that the German version of the surveys were comprehensible by the students, native speakers were present during the data collection. Students attending educational psychology lectures (N=7) were given the tests in order to evaluate the accuracy of instructions, response scales format, clarity of items, and the time required to complete the tests. Students demonstrated a good level of comprehension of the texts and surveys and they needed approximately one hour to complete the tests.

Once it was ensured that the tests were relatively understandable for the students, data collection began. During the summer semester of 2018 and the winter semester of 2018/2019, an “Experimental Practice” course was given to students studying psychology at the University of Würzburg. Students attending the course advertised the study on the university campus using flyers, and also put the study information on Facebook groups. In addition, the study was personally placed on the university website dedicated to advertising the psychological studies (SONA). Data collection required approximately 20 appointments during the two semesters. At some of these appointments, students who attended the “Experimental practicum” participated in the data collection as part of their course.

Students who participated in the study were rewarded 10€ for their participation. They were informed that the administration of the tests would take nearly an hour. The researcher explained to the participants that their answers would be anonymous would will be used for scientific purposes.

At the beginning of each appointment, it was explained to participants how to answer each test as well as the meaning of each scale option in the questionnaires. During their response on tests, students were personally accompanied in order to provide explanations or clarify misunderstandings when needed.

As the main purpose of the present study is to explore the relationships between L1 reading comprehension, L2 reading motivation, metacognitive awareness of reading strategy use, and L2 reading comprehension; the next section will discuss the principles of structural equation modeling (SEM), the steps for build a structural model, and which statistical programs can help create the most suitable model for representation of the sample data.

3.5 Structural Equation Modeling

In the social sciences, researchers are interested in predictive questions, and as the need for understanding complex phenomenon increases, predictive models become more complex. Consequently, structural equation modeling (SEM) has become a very popular method used in nonexperimental research (Kelloway, 2015). Geiser (2013) defined SEM as a statistical method dependent on the analysis of covariance to model complex relationships between latent variables, it can also be seen as simultaneous analysis between several dependent and independent variables.

SEM is a statistical method based on confirmatory rather than exploratory approach to analysis of data representing a structural theory of a certain phenomenon. This statistical method involves:

- 1- That series of regression equations regulate the causal relations under study.
- 2- That these causal relations can be modeled using graphical symbols to ease the conceptualization of the studied model. In other words, SEM provides diagrammatical and mathematical representations explaining how the observed and latent variables are related to each other (Byrne, 2012).

SEM is a flexible statistical method which has many advantages that characterize it from other multivariate techniques. First, it provides estimation for measurement errors, something other statistical methods (e.g. multiple regressions, analysis of variance) do not estimate and they assume that the variables are “perfectly reliable” and free of measurement errors. This estimation of measurement errors provides a more accurate and less biased estimation of the relationship between latent variables. In addition, SEM helps researchers to investigate complex research questions. It allows for the incorporation of several dependent variables simultaneously, estimates direct and indirect total effects, and estimates overall model fit (Geiser 2013; Wang& Wang, 2012).

According to Anderson and Gerbing (1988) the construction of structural models goes through two phases, the measurement model and the structural equations. The measurement model sets the relationships between the observed variables and latent factors using the confirmatory factor analysis. The major purpose of measurement model is to test the factorial structure that regulates the relationships between the observed variables that represent the underlying latent factors and gives evidence on its fit to the sample data. Afterward, the researcher set the structural equations that describe the relationships between the latent factors. These equations define the direct and indirect influences between the latent variables in the model. In other words, a full latent model enables the researcher to simultaneously assess the quality of measurement and to test the predictive relations between the variables (Byrne, 2012; Kelloway, 2015).

SEM handles two types of variables, *exogenous* and *endogenous* variables. Exogenous variables serve as the independent variables in the model which cause the variations in the latent variables and are not influenced by other variables in the model. While endogenous variables are the dependent variables that the model aims to explain or predict, and which are influenced either directly or indirectly by the exogenous variables. On the other hand, endogenous variables that

play dual role (dependent and independent) are called *mediator* or *intervening* variables (Geiser, 2013). According to the directionality of causal paths there are two types of SEM models: a model that identifies the direction of causal paths from only one direction known as a *recursive* model, and a model that comprises a reciprocal effect and is called a *nonrecursive* model (Kline, 2011).

3.5.1 Steps of constructing SEM

When researchers decide to adopt structural equation modeling in order to investigate their hypothesis, they follow some consecutive phases, which are: model formulation or specification, model identification, model estimation, model evaluation, and model modification.

The researcher can re-evaluate and create modified models until he or she reaches the best model which fit the data sample, Figure (12) summarizes the process of building a structural equation model

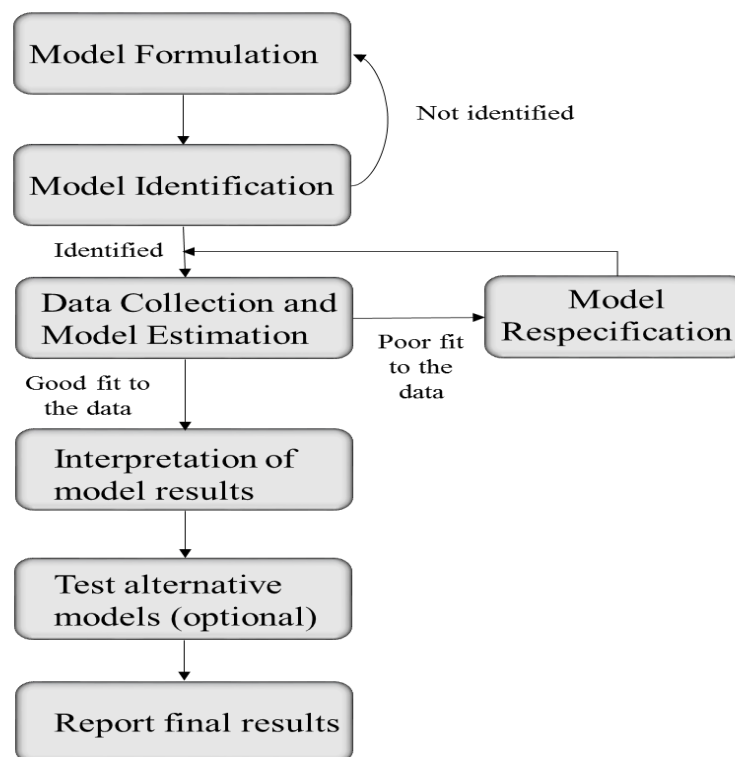


Figure 12. Steps required to construct SEM.

The following section illustrate a detailed description of SEM steps previously mentioned.

Model Formulation (specification)

In this step, the researcher represents their hypothesis in the form of a SEM. They describe the relationships between the latent or observed factors either by drawing a diagram or by using series

of equations which describe the model's parameters. When researchers start to specify their hypothesized models, they have three approaches according to which they build their model:

1- **Strictly confirmatory** in which the researcher suggests only one model based on related theory, collects the required data, and then tests the fit of the suggested model to the collected data. According to the results, the researcher either accepts or rejects the model based on its consistency with the data, without conducting any modification on the model under study.






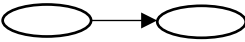



2- **Alternative models** refers to situations where the researcher suggests more than one model (competing models) to be tested. This approach requires that researcher specify the models using suitable theoretical and empirical arguments. The model that best fits the sample data is retained and the others are rejected.

3- **Model generation** is probably the most frequently used approach in SEM. In this case, when the researcher finds that the initial model fits poorly the data, he or she begins to explore the source of misfit in the model, modify it, and finally re-estimates the modified model. The researcher's goal in this case is to find a model which makes theoretical sense, is reasonably parsimonious, and correspondence closely to the data (Byrne, 2012; Klein, 2011).

Some researchers use path diagrams to specify their models by drawing the relationships between variables. These visual models are built using specific graphical symbols to portray the relationships between the exogenous and endogenous variables. The symbols used in the drawing path diagram belong to the McArdle–McDonald reticular action model (RAM), these symbols are considered to be universal in SEM. The following table describes the interpretation of the basic graphical symbols used.

Tale 24

Symbols used in SEM path diagrams

Symbol	Representation
	The rectangle represents the observed variables
	The ellipse represents the latent factors
	The single headed arrow represents the influence of one variable on another
	The double headed arrow represents covariance or correlation between variables
	Path coefficient of an observed variable onto a latent factor
	Path coefficient of latent factor onto another latent factor
	Measurement error for an indicator
	Residual error for a latent factor
	Covariances (in the unstandardized solution) or correlations (in the standardized solution) between exogenous variables

Model identification

Model identification refers to the existence of a unique value for each unknown parameter that can be estimated from the observed data. Accordingly, there are three types of models: **just-identified**, **overidentified** or **underidentified**.

A model can be described as **just-identified** when all the unknown parameters in the model can be estimated by one or more algebraic functions of one or more elements of a variance/covariance matrix of the observed variables. This model perfectly fits the data, as the number of free parameters equals the number of observation ($df_m = 0$). When there is more than one possible estimator for the unknown parameters, then the model is called **overidentified**. An overidentified model possesses more observations than parameters ($df_m > 0$). However, when the number of unknowns exceeds the available equations, then the model is **underidentified**. In other words, there are an infinite number of possible solutions for unknown parameters and thus there are infinite numbers of possible solutions to these unknown parameters. For model estimation, it is

preferable to have an over-identified model; an underidentified model will not provide any solution, while just-identified model implies that only one set of variables would fit the sample data (Wang & Wang, 2012; Kelloway, 2015).

To verify whether the model is identified or unidentified, there are two conditions that should be checked. First, the number of data points should exceed the number of free parameters. Data points refers to the number of elements constituting the variance-covariance matrix which equals $p(p + 1) / 2$, where P is the number of observed variables. The free parameters in SEM refer to the factor loadings, factor variances/covariances, path coefficients, residual variances/covariances, and error variances. Secondly, a measurement scale should be created for latent variables in the model. There are two ways to set the measurement scale: either by fixing one of the factors loading which links a latent factor to its indicator, or by fixing the variance of a latent factor to (1) (Byrne, 2012; Kline, 2011).

Model estimation

The SEM estimation process aims to minimize the differences between the sample variance/covariance and the variances/covariances estimated from the model. When using Σ to refer to population covariance matrix of observed variables, and θ represents the vector of free parameters of a hypothesized mode, the primary hypothesis in SEM will be $\Sigma = \Sigma(\theta)$

Where $\Sigma(\theta)$ is the model variance/covariance matrix implied by population parameters for the hypothesized model. Hence the major goal of SEM is to estimate a set of model parameters θ to generate $\Sigma(\theta)$ so that the difference between the population covariance matrix and model variance/covariance matrix is minimized. Because both Σ and $\Sigma(\theta)$ are unknown, SEM minimizes the discrepancy between the sample variance/covariance matrix, and the model estimated variance/covariance

The variance/covariance matrix of observed variables is used to generate values for free parameters which can reproduce the data. If the model is correct, then the model estimated/implied variance/covariance matrix, will be close to the variance/covariance matrix of observed variables. When a hypothesized model fits the data, this would mean that the model estimated variance/covariance equal (or not very different) to the sample variance/covariance matrix

The Maximum likelihood (ML) is the default estimation method in the majority of SEM programs, and most structural equation models are analyzed with the ML method. The ML estimator has several advantages:

- 1- In a large sample, the ML neither underestimates nor overestimates the population parameters, it is an unbiased and consistent estimation method.
- 2- When the sample size is large, the ML estimates the true value of the population parameters and the distribution of parameter estimates approximates normal distribution.

3- The ML is scale invariant, which means that changes in the scale of observed variable do not lead to different values of ML (Wang& Wang, 2012).

There are fundamental assumptions to use the ML estimation method in structural equation models which are independence of the scores, multivariate normality of the endogenous variables, independence of the exogenous variables and residuals, and accurate specification of the model. The implementation of ML in a computer program is an iterative process, the computer develops a primary solution and through successive analyses of the model equations, the program improves this solution to enhance the overall fit of the model.

ML estimator is a normal theory method which is used for continuous variables with normal distribution. It is less likely to be biased when the normality assumption is violated. When the normality assumption is violated, researchers can conduct transformations for variables which are not normally distributed, remove outliers, apply bootstrap to estimate variance of parameter estimates for significance test, or use other estimation techniques which do not assume multivariate normality like MLM, which is an ML estimator that provides robust standard errors and mean adjusted χ^2 , and MLR which an extension of MLM with robust standard errors and allows for missing data (Kelloway, 2015; Wang& Wang, 2012).

Model Evaluation

A key aspect of SEM is the conducting of an overall model fit estimation on the basic hypothesis, which is to estimate the degree to which the model estimated variance covariance matrix differs from the observed sample variance/covariance matrix. If there are no statistically significant differences between the two matrices, then the null hypothesis that the suggested model fits the data well is not rejected. The evaluation of model fit should be done before the parameter estimation. Most SEM programs provide the researcher with various fit indices to assess the model fit, such as (χ^2 , SRMR, RMSEA, CLI, TLI) an explanation of these indices is in section (3.3.1.6). The SEM tests not only the relations between observed and latent variables like in factor analysis, but it also tests the impact of latent variables on each other.

Model Modification

When the initial fit model is poor, researchers should re-specify and re-analyze the new model. In this case, researchers often use the modification indices suggested by the computer program that they use. However, the re-specification of the model should be theoretically rather than statistically guided. The selection of appropriate sample size is critical in SEM, because SEM is a "large sample approach" (Wang& Wang, 2012, p.391). Using a small sample size in SEM can lead to several problems such as failure of estimation convergence, negative variance, low accuracy of parameter estimation, and other problems which can lead to the rejection of the tested model. However, the determination of an appropriate sample size in SEM is complicated, and there is no absolute standard for a suitable sample size to all situations (Muthén and Muthén, 2002). Based on reviewing simulations studies, rules of thumb were suggested to choose an adequate sample size.

Some researchers suggested that the (N= 100-150) is the minimum required sample size to conduct SEM, while others (Kline, 2011, Wang& Wang, 2012) proposed a bigger sample size (N=200). For models with latent variables it is recommended that sample size is not less than 100.

On the other hand, some researchers consider the ratio of cases per variable to determine which sample size is needed to conduct SEM. A ratio of 5 cases per observed variable or indicator (5:1) can set the minimum requirement for adequate sample size when latent factors have multiple indicators (Chou& Bentler, 1987). Other researchers often use the ratio of cases per free parameter. Five cases per free parameter (5:1) can be considered as a minimum requirement for adequate sample size (Chou& Bentler, 1987). Kline (1998) additionally suggests that this ratio should be in the range of 10 or 20 observation per parameter.

3.5.2 SEM Programs

Computer programs play an important role in SEM. About 30 years ago LISREL was the only available program to conduct SEM. With the development of personal computers and the increase in desire from researchers to apply SEM in their research, several new programs were created (e.g. Amos, EQS, MX...).

When researchers choose a program to conduct SEM, they have three options to deal with SEM tools:

- 1- Batch mode processing is the method when the users enter lines of code in an editor window: This code or syntax describe the causal paths of hypothesized mode, type of data, and required analysis. All SEM computer programs support this mode
- 2- Graphical user interface this technique allows the researcher to draw the model using the standard graphical symbols for model diagrams, when the diagram is finished, the analysis is run in the program
- 3- Wizards mode, in this method the user does not write the code, rather he or she clicks with the mouse on some GUI elements and when the wizard has all the required information it writes the program code.

In the current study, two programs are used to design and test the structural models: *R* and *Mplus* programs. In the following lines a brief description of both programs is provided.

R program

R is an open source statistical program which was initially written by Robert Gentleman and Ross Ihaka from the University of Auckland. It is a developed implementation of S (programming language and computing environment which was developed at Bell Laboratories). Since its introduction in mid 1997, R became one of the most used statistical programs. It runs on all major computer environments including Microsoft Windows, LINUX, UNIX, and MacOS. The latest version of R can be downloaded from <http://cran.r-project.org/>.

R provides a wide variety of statistical analysis tests e.g. linear and nonlinear modelling, classical statistical tests, time-series analysis, clustering... etc. The analytical functions of R can be extended by downloading add-on modules or Packages. Users interact with R in batch mode by entering command syntax in an editor and then using the command Run to execute the file (Fox, 2006; The R Project for Statistical Computing, n.d.). There are two packages which can perform SEM analysis which are the Lavaan (Rosseel, 2012) and SEM (Fox, 2006) packages.

The Lavaan package (Rosseel, 2012) helps users to conduct several analysis path analyses, CFA, SEM, and growth curve models. The latest updated version of this package has several advantages, including various estimators such as ML, MLM, MLMV, MLR, and pairwise ML (PML); estimation of standard errors: standard, robust, and bootstrap, handling of missing data, analyzing categorical data and mixture models, and conducting multilevel SEM (lavaan latent variable analysis, n.d.; Rosseel, 2018). The SEM package (Fox, 2006) is designed to estimate SEM by two-stage least squares (2SLS), and it can estimate model fit by using full information maximum likelihood (FIML) assuming multinormality.

Mplus program

Mplus (Muthén& Muthén, 1998-2017) is a latent variable modeling program which works under the Microsoft Windows environment. The program consists of the Mplus base which can perform all essential types of SEM, and three add-on modules for analyzing additional sorts of latent variables models. Mplus has many advantages:

- 1- It models all different types of variables (e.g. continuous, censored ordinal, nominal).
- 2- It has the ability to handle incomplete, non-normally distributed, and complex survey data.
- 3-It generates complex advanced models like mixture models, Monte Carlo simulation, and SEM with Bayesian approach (Wang& Wang, 2012).

User can interact with the Mplus program in batch mode by writing command syntax to specify the model and the type of data. Another available option is using a language generator (wizard mode), through which the user fills in successive templates with information about the model such as the data set location, the variables name. These details are converted to *Mplus* language in a separate editor window and the user completes this syntax by writing the syntax that specifies the model (Byrne, 2012; Kline, 2011).

There is an available demo version that can be downloaded from <https://www.statmodel.com/demo.shtml>, this version has all the capabilities of the regular version. However, the demo version is limited to 8 dependent variables, 2 independent variables, 2 between variables in two level analysis, and two continuous latent variables in time series analysis (*Mplus*, n.d.).

4. RESULTS

This chapter presents the results of the current study. These results will be divided into two major sections; the first section will present the descriptive results concerning the nature of L2 reading motivation as well as metacognitive awareness of L2 reading strategy use in both the Egyptian and German samples. The second section will illustrate the results related to the steps followed in order to construct and validate the hypothesized structural equation models of the relationships between first-language reading comprehension (Arabic, German), reading motivation of English as a foreign language, metacognitive awareness of reading strategies used while reading English texts, and reading comprehension of English as a foreign language. The main purpose of this technique (i.e. structural equation modeling) is to present the model which both best fits the sample data and is most consistent with the related literature.

4.1 Description of L2 reading strategies

This section seeks to answer the following questions: *“Which type of reading strategies are perceived by Egyptian and German EFL students when reading English texts?”*

In order to clarify which reading strategies were highly perceived by German and Egyptian university students while reading English texts, descriptive statistics were used to estimate the average scores of each reading strategy category subscale (i.e. the global, problem-solving, and support reading strategies) as well as to estimate the individual reading strategies. Judgment of the frequency level of the perceived reading strategies was guided by Mokhtari, Sheory and Reichard (2008) for the interpretation of SORS scores (Chapter3, section 3.3.5).

In the Egyptian sample, the mean score of the individual strategies ranged from high ($M= 4.26$) to moderate ($M= 2.96$). The majority of the reading strategies fell into the high use category, while only seven strategies were judged to be moderately perceived. It can be noted from table (25) (which represents the ten highest perceived reading strategies) that most of the highly perceived reading strategies belong to the problem-solving reading strategies category. On the other hand, all of the moderately perceived strategies, as reported in table (26), belong to the global and support reading strategies.

The overall average of metacognitive awareness of reading strategies use was ($M=3.72$, $SD= .54$), which reflects a high overall metacognitive awareness of reading strategies, according to guidelines by Mokhtari and colleagues for the interpretation of SORS scores (Mokhtari, et al., 2008).

156 Results

Table 25

Means and Standard Deviations of The Highly Perceived Reading Strategies in The Egyptian Sample (N = 201)

<i>Strategy</i>	<i>Type</i>	<i>Mean</i>	<i>S.D.</i>
<i>Underlining and Highlighting information</i>	<i>Supp</i>	4.26	1.17
<i>Rereading to improve understanding</i>	<i>Prob</i>	4.23	1.09
<i>Paying closer attention to reading</i>	<i>Prob</i>	4.20	1.02
<i>Getting back on track when losing concentration</i>	<i>Prob</i>	4.17	1.13
<i>Visualizing information</i>	<i>Prob</i>	4.12	1.03
<i>Guessing the meaning of unknown words or sentences</i>	<i>Prob</i>	4.10	1.05
<i>Using contextual clues</i>	<i>Prob</i>	3.95	1.2
<i>Checking understanding when reaching new information</i>	<i>Glob</i>	3.90	1.11
<i>Skimming</i>	<i>Glob</i>	3.89	1.19
<i>Adjusting reading speed</i>	<i>Prob</i>	3.80	1.07

*Glob= global reading strategies, Supp= support reading strategies, Prob= Problem solving reading strategies

157 Results

Table 26

Means and Standard Deviations of The Moderately Perceived Reading Strategies in The Egyptian Sample (N = 201)

<i>Strategy</i>	<i>Type</i>	<i>Mean</i>	<i>S.D.</i>
<i>Asking oneself questions about the text</i>	<i>Supp</i>	3.49	1.29
<i>Checking whether the guesses about the text are right or wrong</i>	<i>Glob</i>	3.48	1.27
<i>Taking notes when reading to improve understanding</i>	<i>Supp</i>	3.47	1.35
<i>Critically analyze and evaluate text's information</i>	<i>Glob</i>	3.47	1.10
<i>Using the figures and tables to understand text</i>	<i>Glob</i>	3.45	1.26
<i>Using typographical features to identify important information</i>	<i>Glob</i>	3.36	1.36
<i>Having a purpose when reading</i>	<i>Glob</i>	3.33	1.27
<i>Thinking whether the text's content fit the reading purpose</i>	<i>Glob</i>	2.96	1.31

*Glob= global reading strategies, Supp= support reading strategies, Prob= Problem solving reading strategies

Furthermore, independent sample t-tests were used in order to detect whether there were differences in the mean scores of perceived reading strategies between males and females. As can be seen in table (27) the results revealed that there was a significant difference between males (n= 29) and females (n= 171) only in the global reading strategies. The mean scores values reveal that the male students tend to use more global reading strategies than females do.

158 Results

Table 27

Mean scores (and standard deviation), the significance of the independent sample t-test and effect size for Egyptian male and female scores on the perceived 12 reading strategies

Reading strategy	Gender		t	p	d
	Male	Female			
Global	3.77 (.57)	3.51 (.62)	2.04	.04*	.42
Support	3.73 (.62)	3.72 (.67)	0.07	.94	.01
Problem-solving	4.07 (.63)	4.02 (.61)	0.41	.67	.08

p < .05

In the German sample, the mean score of the individual strategies ranged from high ($M= 4.12$) to low ($M= 2.27$). The majority of the reading strategies fell into the moderate use category, while only four strategies were low perceived as be used by the German students. It can be noted from table (28) (which represents the ten highest perceived reading strategies) that most of the highly perceived reading strategies belong to the problem-solving reading strategies category. Moreover, all of the low perceived strategies reported in table (29) belong to the support reading strategies category, aside from one strategy which belongs to the global reading strategies subscale.

The overall average of metacognitive awareness of reading strategies use was ($M=3 .05$, $SD= .47$), which reflects a moderate overall level of metacognitive awareness of reading strategies according to guidelines by Mokhtari and colleagues for the interpretation of SORS scores (Mokhtari, et al., 2008).

159 Results

Table 28

Means and standard deviations of the highly perceived reading strategies in the German sample (N=200)

<i>Strategy</i>	<i>Type</i>	<i>Mean</i>	<i>S.D.</i>
<i>Adjusting reading speed</i>	<i>Prob</i>	4.25	.84
<i>Paying closer attention to reading</i>	<i>Prob</i>	4.20	.74
<i>Getting back on track when losing concentration</i>	<i>Prob</i>	4.12	.83
<i>Rereading to improve understanding</i>	<i>Prob</i>	4.01	.89
<i>Deciding what to read closely and what to ignore</i>	<i>Glob</i>	3.9	1.05
<i>Reading slowly and carefully</i>	<i>Prob</i>	3.61	.99
<i>Underlining and Highlighting information</i>	<i>Supp</i>	3.45	1.24
<i>Visualizing information</i>	<i>Prob</i>	3.30	1.22
<i>Going back and forth in the text to set relations between ideas</i>	<i>Supp</i>	3.24	1.24
<i>Thinking about information in English and L1</i>	<i>Supp</i>	3.23	1.27

*Glob= global reading strategies, Supp= support reading strategies, Prob= Problem solving reading strategies

Table 29

Means and standard deviations of the low perceived reading strategies in the German sample (N=200)

<i>Strategy</i>	<i>Type</i>	<i>Mean</i>	<i>S.D.</i>
<i>Reading aloud when text becomes difficult</i>	<i>Supp</i>	2.33	1.35
<i>Translating</i>	<i>Supp</i>	2.30	1.30
<i>Reviewing text organization</i>	<i>Glob</i>	2.27	1.29
<i>Asking oneself questions about the text</i>	<i>Supp</i>	2.16	1.10

*Glob= global reading strategies, Supp= support reading strategies, Prob= Problem solving reading strategies

It can be noticed that in both samples, almost all the strategies which are reported to be highly used when reading English texts are the same, and that most of these highly perceived reading strategies belong to the problem-solving category. Independent sample t-tests were used to detect whether there were differences in the mean scores of perceived reading strategies between males and females. As can be seen in table (30) the results revealed that no gender differences could be found in either type of reading strategies between male (n= 40) and female (n=158) German students.

160 Results

Table 30

Mean scores (and standard deviation), significance of the independent sample t-test, and effect size for German males and females scores on the perceived l2 reading strategies

Reading Strategy	Gender		<i>t</i>	<i>p</i>	<i>d</i>
	Male	Female			
Global	2.87 (.59)	2.96 (.62)	.86	.38	.14
Support	2.61 (.51)	2.70 (.56)	.95	.34	.16
Problem-solving	3.60 (.44)	3.66 (.53)	.64	.52	.11

When analyzing the data of the German and Egyptian samples to estimate the difference of the mean scores of the perceived reading strategies, it was found that students in both samples had a high preference for use of problem-solving strategies (Germany ($M=3.64$, $SD=0.51$); Egypt ($M=4.03$, $SD=0.61$)). In the German sample, students had a high preference for global ($M=2.94$, $SD=0.61$) followed by support ($M=2.68$, $SD=0.55$) reading strategies. While in the Egyptian sample, students showed high preference for support reading strategies ($M=3.72$, $SD=0.66$), followed by global ($M=3.54$, $SD=0.62$) reading strategies. In order to examine the significance of these differences, an independent samples t-test was conducted which indicated that the only significant difference between the Egyptian and the German students was in their awareness of the use of the support reading strategies ($t(399) = 1.29$, $p = 0.19$). There were no significant differences between their awareness of the global and the problem-solving reading strategies.

To conclude, the previous results revealed that Egyptian and German university students had high to moderate awareness of the three types of reading strategies as measured by the SORS (Mokhtari & Sheorey, 2002) when reading English texts. The analysis of individual strategies revealed that students in both samples tended to use more problem-solving strategies that dealt directly with problems that might occur during reading, such as rereading to improve understanding, paying closer attention to reading when detecting misunderstanding, going back and forth in the text to set relations between ideas, getting back on track when losing concentration, deciding what to read closely and what to ignore, reading slowly and carefully, visualizing information, and underlying and highlighting information. Students paid less attention to global strategies focused on planning and revising their progress before and after reading, such as guessing information from text title or checking the text organization, also they did not show a preference for use of dictionaries or text translation. In addition, the gender effect on the awareness of the L2 reading strategies was not proven in the German sample. However, in the Egyptian sample, this effect was found only in the awareness of the global L2 reading strategies.

4.2 Description of L2 reading motivation

This section addresses the questions “Which are the most influential L2 reading motivation patterns among the German and Egyptian university students?”

Descriptive statistics were used to determine the mean scores of each motivational construct and to investigate the nature of L2 reading motivation among German and Egyptian EFL students. In the German sample, the descriptive statistics revealed that the German students had an overall higher L2 intrinsic ($M= 10.35$, $SD= 2.51$) than L2 extrinsic reading motivation ($M= 8.24$, $SD= 2.20$), revealing that the German students were motivated to read English texts when they found the reading activity fun and stimulative of their desire to gain information about interesting topics. In addition, it can be noted that the least influential motivator was “competition”, which reflects that students do not seek to compete with their colleagues in reading and that they rather prefer to read because they are rather interested in text’s content.

Table 31

Mean scores and standard deviations of the l2 reading motivation scales in the German sample (N=200)

Motivational construct	Mean	SD
Curiosity	3.64	.92
Involvement	3.36	.89
Challenge	3.34	.93
Competition	2.26	.93
Recognition	3.27	1.01
Grades	2.71	.80

When reviewing the mean scores of the individual items of the L2RMQ, it was found that the highest intrinsic reasons for reading were “*I feel excited to read about interesting topics*” ($M= 3.86$, $SD= 1.09$) (which represents the dimension of curiosity), “*when the text is interesting, I do not care how hard it is*” ($M= 3.79$, $SD= 1.19$) (which represents challenge), “*I love reading English texts*” ($M= 3.74$, $SD= 1.19$) (representing involvement), “*I like reading in English to get information about interesting things and people*” ($M= 3.65$, $SD= 1.11$) (also representing curiosity), and “*I like to challenge myself when reading English texts*” ($M= 3.51$, $SD= 1.15$) (again representing challenge). These results imply that the German students are motivated to read English texts which are thought-provoking and satisfy their reading interest.

The highest reported extrinsic reasons for reading were “*I feel satisfied when someone describes me as a good reader*” ($M= 3.86$, $SD= 1.26$) (which represents recognition), “*Reading English texts will help me to acquire high grades*” ($M= 3.81$, $SD= 1.16$) (which represents reading for grades), “*I like that my professor describes me as a good reader*” ($M= 3.76$, $SD= 1.24$) (which again represents recognition), “*I like that my friends describe me as a good reader*” ($M= 3.46$, $SD= 1.31$)

162 Results

(also representing recognition), and “*Reading English texts is important to better understand various subjects*” ($M= 3.11$, $SD= 1.22$) (which reflects reading for grades). Accordingly, the German students were extrinsically motivated to read by their desire to be recognized as competent readers, and to have better achievement.

In order to inspect the differences in the mean scores of motivational variables between males and females, independent sample t-tests were used. The results in table (32) revealed that no gender differences could be found in either intrinsic or extrinsic motivational construct between males and females students. However, it can be noticed that the female students had higher mean scores than the male students on both intrinsic and extrinsic motivational scales.

Table 32

Mean scores (and standard deviation), the significance of the independent sample t-tests, and effect size for German male and female scores on the l2 reading motivation scales

Variable	Gender		<i>t</i>	<i>p</i>	<i>d</i>
	Male	Female			
Curiosity	3.48 (1.00)	3.68 (.91)	1.24	.21	.21
Involvement	3.16 (.91)	3.42 (.88)	1.62	.10	.29
Challenge	3.30 (1.03)	3.36 (.92)	.39	.69	.06
Competition	2.20 (.93)	2.27 (.94)	.42	.67	.07
Recognition	3.24 (1.06)	3.27 (1.01)	.16	.87	.02
Grades	2.54 (.75)	2.75 (.68)	1.48	.13	.30

In order to gain further details about students' L2 reading motivations, two open ended questions were added to the reading motivation questionnaire. The first question asked the students if there were factors other than those on the L2RMQ that could motivate them to read English materials. The other question asked the students to report which factors reduced their motivation to read English materials. From the entire German sample ($N= 200$), only 90 students answered the two open-ended questions. Following analyses of each student's answers, it was possible to categorize the frequent motivating factors for German students into seven different groups. The next table summarizes the factors that the German students indicated play an important role in their motivation to read English texts.

163 Results

Table 33

Factors Reported by German Students that Enhance their L2 Reading Motivation

Motivator to read	Frequency
Prefer reading original texts	18
Master English language	9
Not all English texts have translated versions	7
Love English language	6
Interesting texts	4
Enjoy reading English texts	3
Communicate with English speakers	3

The students revealed that they preferred reading original texts rather than translated versions. They report that some translated versions are of low linguistic quality and that they may not reflect the true meaning of the original texts. Other students indicated that original English texts contain more details and information than the translated version. Students further indicated that some information sources are only available in the English language, such as a number of news channels (e.g. BBC), various internet blogs, or the international scientific papers required for their studies. Additionally, the students revealed that reading can help them gain more vocabulary and therefore allow them to be able to develop other linguistic competences, such as listening or writing in English. Students were also asked to report which factors decrease their motivation to read English texts, Table (34) summarizes the reasons which the participants indicated as sources of low reading motivation.

Table 34

Factors Reported by The German Students that Reduce their L2 Reading Motivation

Demotivators	Frequency
Difficult vocabulary	21
Difficult complicated texts	26
Time consuming	11
Reading German texts is easier	7
Obligatory reading	6
Boring texts	6
The availability of German translated version	4

164 Results

The students indicated that the major factor demotivating them from reading materials in English were the texts themselves. They revealed that the long and complicated texts containing sundry unknown words represented an obstacle for them. In addition, the students specified that classical texts, such as Shakespearean plays written in old English and the scientific manuscripts that comprise many technical terms, frustrate them while reading. Consequently, these types of texts decrease their willingness to engage in reading and they become more likely to withdraw from reading English materials. On the other hand, students revealed that reading the texts in their mother language is less stressful, less time consuming, and that there are German translations for almost all texts. Therefore, they do not need to read the original English texts.

In the Egyptian sample, the descriptive analysis revealed that the students had nearly similar levels of L2 intrinsic ($M= 11.69$, $SD= 1.89$) and extrinsic reading motivation ($M= 11.62$, $SD= 1.90$). These statistics revealed that both intrinsic and extrinsic factors played almost equal roles in directing the students' desire to read English materials. The students' desire to read interesting English texts about other cultures/different interesting topics was as high as their desire to enhance their achievement.

Table 35

Mean scores and standard deviation of the l2 reading motivation scales in the Egyptian sample (N=201)

Motivational construct	Mean	SD
Curiosity	4.04	.74
Involvement	3.68	.71
Challenge	3.96	.77
Competition	3.60	.80
Recognition	3.94	.87
Grades	4.07	.68

According to the mean scores of the individual items of the L2RMQ, the highest intrinsic reasons for reading were: “*I feel excited to read about interesting topics*” ($M= 4.30$, $SD= .94$) (representing curiosity), “*when the text is interesting, I do not care how hard it is*” ($M= 4.18$, $SD= 1.05$) (which represents challenge), “*I like to challenge myself when reading English texts*” ($M= 4.14$, $SD= 1.12$) (also representing challenge), “*I enjoy reading English texts*” ($M= 4.13$, $SD= 1.01$) (which represents involvement), and “*when I read English texts, I like to visualize what I read*” ($M= 4.08$, $SD= 1.02$) (again reflecting involvement). These results imply that the Egyptian students enjoy

165 Results

reading English texts that are challenging and stimulative of their desire to read new and interesting topics.

On the other side, the highest reported extrinsic reasons for reading were “*I read English texts to improve my achievement*” ($M= 4.37, SD= .89$) (which reflects grades), “*Reading English texts will help me to have high grades*” ($M= 4.32, SD= .95$) (also representing grades), “*I feel happy when someone describes me as a good reader*” ($M= 4.20, SD= 1.11$) (which represents recognition), “*I like that my professor describes me as a good reader*” ($M= 4.13, SD= 1.05$) (again representing recognition), and “*I want to be the best reader among my friends*” ($M= 4.13, SD= 1.06$) (reflecting competition). In view of that, the Egyptian students were extrinsically motivated to read by their desire to be acknowledged as competent readers by their surroundings, and to enhance their achievement.

Independent sample t-tests were used to detect whether there were differences in the mean scores of motivational variables between males ($n= 29$) and females ($n=171$). The results of the t-tests presented in table (36) revealed that there were no gender differences between either the intrinsic or the extrinsic motivational scales. However, it can be noted that the female students had higher mean scores on involvement, challenge, competition, recognition, and grades, while the male students had a higher mean score on the curiosity.

Table 36

Mean scores (standard deviation), the significance of the independent sample t-tests, and effect sizes for Egyptian male and females scores on the l2 reading motivation scales

Variable	Gender		<i>t</i>	<i>p</i>	<i>d</i>
	Male	Female			
Curiosity	4.13 (.59)	4.03 (.76)	.66	.55	.13
Involvement	3.56 (.67)	3.70 (.71)	.99	.33	.19
Challenge	3.87 (.79)	3.99 (.76)	.73	.46	.15
Competition	3.53 (.88)	3.62 (.78)	.53	.59	.11
Recognition	3.71 (.92)	3.99 (.85)	1.66	.09	.32
Grades	3.98 (.74)	4.09 (.68)	.79	.43	.16

In order to acquire further details about students’ L2 reading motivations, two open ended questions were added to the reading motivation questionnaire so that students could freely express the other factors that motivate or demotivate them from reading English materials. From the entire Egyptian sample, only 74 students answered the two open-ended questions. Each student’s answers were personally examined and categorized into ten different groups of frequent motivational factors. Table (37) illustrate the reasons which drive students to read English texts as reported by their answers to the open-ended question

Table 37

Factors reported by the Egyptian students as enhancing their l2 reading motivation

Motivator to read	Frequency
Gain knowledge	12
Master English language	19
Interesting texts	8
Love reading	6
Love English language	5
Desire to communicate with English speakers	5
Enhance Achievement	5
Professional success	5
English is important universal language	5
Travel abroad	4

It can be noted that most of the students read English texts because they wanted to develop their English linguistic skills. Students indicated that reading can help them gain more vocabulary and help them develop other linguistic skills, such as listening or writing. On the other hand, students considered reading as a means to acquire information about different cultures, the lifestyle of other populations, and other topics of interest. Another important reason influencing students' motivation to read English texts was the text content. Students reported that they were motivated to read when the text matched their interests. Other students revealed that their reading motivation was not related to the type of the reading materials but rather driven by their perception of English as universal language of communication, their desire to travel abroad, and their awareness of the importance of English for their professional development.

In addition, students were asked to report which factors decreased their motivation to read English texts. Table (38) summaries the reasons that the Egyptian reported reduce their L2 reading motivation.

167 Results

Table 38

Factors reported by the Egyptian students to reducing their l2 reading motivation

Demotivators	Frequency
Difficult vocabulary	32
Long complicated texts	31
Boring texts	18
No free time for reading	12
Lack of available reading materials	3
Feeling unsuccessful in learning English	3
No chances to communicate in English	3

Students revealed that the major factor demotivating them from reading English texts were the reading materials themselves. Students reported that the greatest obstacle they faced when reading was the difficulty level of texts' vocabulary as well as in understanding long texts, they found difficult to follow. In addition, 18 students indicated that boring texts demotivate them from reading, which goes along with the previous result in which students indicated that interesting texts motivated them to read. They also indicated that texts written with old or sophisticated English were not interesting for them. On the other hand, students indicated that they did not have enough time to read either because of their study at the university or because they preferred to do other activities than reading.

4.3 Structural modeling results

Before testing the suggested models, a descriptive analysis was conducted for the variables used to build the hypothesized models; using the SPSS program in order to check data quality. Means, standard deviations, skewness, and kurtosis statistics for L1 reading comprehension (Arabic, German), L2 reading motivation, L2 metacognitive awareness of reading strategies, and L2 reading comprehension are presented in table (39)

169 Results

Table 39

Descriptive Statistics of the Variables under Study

Variables/statistics	German sample (N=200)				Egyptian sample (N=201)			
	M	SD	Skew.	Kurt.	M	SD	Skew.	Kurt.
Involvement	20.11	5.37	-.19	-.38	22.11	4.24	-.25	-.26
Curiosity	14.62	3.69	-.65	.09	16.24	3.00	-.62	-.33
Challenge	13.36	3.73	-.33	-.38	15.50	3.31	-.52	-.61
Intrinsic motivation	47.88	2.51	-.48	.04	53.86	8.94	-.32	-.50
Grades	10.86	3.22	.02	-.63	16.25	2.74	-.61	-.05
Competition	11.30	4.67	.91	1.23	18.02	4.02	-.41	-.34
Recognition	16.35	5.07	-.24	-.62	15.71	3.51	-.75	-.24
Extrinsic motivation	38.51	10.47	.11	-.51	49.95	8.35	-.50	-.48
Global reading strategies	38.24	9.02	-.14	-.33	46.17	8.12	-.32	-.23
Support reading strategies	24.08	5.00	.29	.23	29.82	5.32	-.63	.33
Problem-solving reading strategies	29.09	4.17	-.26	-.11	32.39	4.76	-.74	.23
Metacognitive awareness	91.14	14.34	-.17	.59	111.84	16.37	-.46	-.20
L1 reading comprehension	32.24	3.60	-1.24	2.88	26.09	4.36	-.38	1.17
L2 reading comprehension	26.50	2.97	-1.70	3.89	23.05	4.85	-1.27	1.65

170 Results

It can be noted that reading variables were relatively negatively skewed, which is expected, as students at university are supposed to have good level of language comprehension. However, skewness scores with an absolute value < 3 and kurtosis scores with an absolute value < 10 were considered acceptable, which indicates that the data are almost normally distributed (Kline, 2011).

In addition, the assumption of multicollinearity between variables was assessed using the variance inflation factor (VIF) that equals $1 / (1 - R^2_{smc})$. In the German and Egyptian data, the VIF values were less than 3 ($VIF < 3$) which reflects that there is no problem of collinearity and that the variance explained by the dependent variables are not overlapping with each other (Gaskin, 2016; Kline, 2011). The data screening revealed that the data meet the assumptions of normality and were adequate to use for conducting SEM using Maximum/likelihood estimation method.

Although the students in both samples were at the university level, which implies their high reading skills, the L1 reading comprehension mean scores for Egyptian was lower than the mean scores of the German students. This lower mean score might be a consequence of the diglossic nature of the Arabic language. As previously mentioned in chapter 3 Standard Arabic is not used in everyday communication. Rather, it represents the official language used in media, schools, and in worship ceremonies. On the other hand, Colloquial Arabic is the dialect that is used in everyday interactions, either face to face contact or through the social media, and this can weaken students' reading comprehension ability for Standard Arabic (Almahrooqi & Denman, 2016; Almahrooqi, Denman & Sultana, 2016).

Another possible reason for the low reading comprehension scores (either in L1 or L2) could be the teaching culture. School classes in Egypt are overcrowded (can reach 60 students in some classes), which forces teachers to focus on providing the students with skills to pass exams rather than the skills they need to master the language.

Although the curricula are designed to promote students' communication skills, neither the teachers nor the students have sufficient time for completion of the linguistic activities in their textbooks. Consequently, the main focus of the teachers is to provide students with grammatical rules and new vocabulary (in the case of English). In addition, the learning approach followed in most Egyptian schools is teacher-centered. The teacher is responsible for the whole teaching process in the class, while the student has limited opportunity to be an active participant. Consequently, the skills of analytical and critical thinking are ignored (McIlwraith & Fortune, 2016).

Before conducting the SEM, further analyses were required, among them multigroup confirmatory factor analysis and item parceling. The first analysis aimed to simultaneously analyze the data of different groups in order to determine the factorial invariance of measurement tools across groups. Item parceling was used to make the model more parsimonious and increase estimation stability. Following these two sections, the remainder of the chapter discusses the steps taken in constructing the structural equation models for the German and Egyptian data.

4.3.1 Multigroup Confirmatory Factor Analysis

In the previous chapter, the results of first order CFA of the measurement tools used in the study were presented, which demonstrated the factorial validity of the SORS and L2RMQ. However, as these analyses were conducted separately for each sample, and because the current study was conducted within two different groups drawn from two different populations, further analysis were conducted in order to test the assumption of measurement invariance of the SORS and L2RMQ scales across the two samples.

The analysis of multigroup invariance serves to provide evidence that a certain measurement and/or structural model remains equivalent across various groups of interest. The measurement invariance implies that the meaning of scores obtained from a certain scale is the same under different conditions. These different conditions might be variability in populations, time of measurement or differences in methods used in test administration (Kline, 2011). There are two types of measurement invariance, measurement invariance over time and invariance across groups. The measurement of invariance over time refers to a longitudinal measurement of invariance which implies that in a longitudinal design, a set of indicators has the same factor structure across different occasions. On the other hand, the measurement of invariance over different groups is related to construct bias. If there is no construct bias (i.e. test measures different constructs across groups), then the measurement is invariant over groups.

The analysis of multigroup invariance serves many scientific purposes; it can be used to examine whether a set of items of a measurement instrument operates equivalently across different samples that differ in gender, age, or culture. In addition, multigroup invariance helps to detect whether the factorial structure of a certain tool or hypothesized model is equivalent across groups. Occasionally, researchers will use the multigroup invariance analysis not to examine the equivalence of the whole tested model, but to test the invariance of a certain path in a causal structure across samples. It should also be noted that the application of multigroup invariance is beneficial for identification of the equivalence of the factorial structure of a measuring tool, not only across various populations but also across the different samples drawn from the same population. Thus, the factorial invariance of a measurement tool consists of two types of invariance analysis, measurement invariance and factorial invariance. The measurement equivalence comprises the invariance of patterns of factor loadings, values of factor loading, item intercepts, and error variances. Structural invariance includes invariance of factor variances/covariances and factor means. If measurement invariance is not found, it is difficult to make comparisons between groups, in other words, the interpretation of the results cannot be generalized across groups.

The testing of factorial equivalence occurs within a set of hierarchical steps. At each stage, the researcher imposes equality constraints on certain parameters while testing the measurement or factorial model, and gradually the tested models become more restrictive. The most commonly tested parameters are factor loadings, factor covariances, structural regression paths, and latent factor means. The following section presents the steps of the testing strategy for multigroup invariance.

The Testing Strategy

The process of testing invariance is cumulative. Once the researcher determines which measures are group invariant, these parameters are gradually constrained, while conducting the other tests for the structural parameters. Based on the level of restrictiveness these models are categorized into weak (constrains on factor loadings), strong (constrains on variables intercepts), and strict (constrains on residual variances) tests of equivalence respectively.

The first step in conducting the factorial equivalence is the separate identification of a baseline model for each group that best fits the data using minimal parameter specifications. The estimation of the baseline model does not entail any between-group constraints, thus the data for each group can be analyzed separately. In contrast, the following models include equality constraints and should be analyzed simultaneously. It is important to note that the baseline model is often group specific, which means that the best fitting model may not be totally identical across groups. Muthén and Muthén (2007-2012) and Byrne (2012) indicated that partial measurement invariance is appropriate for conducting the testing of invariance

Once the researcher has separately estimated the baseline model that best fits the data for each group, the next step is testing **the configural model**. This model is the most basic and least restrictive one to be tested because it does not imply any equal constraints on the model parameters. The configural model tests the same number and patterns of the estimated parameters in the baseline model. However, in this step the researcher conducts a simultaneous analysis of all groups' models. In other words, the researcher conducts a multigroup representation of the baseline models within the same input file.

The testing of configural invariance serves two purposes. First, it allows the researcher to test the separated baseline models simultaneously. Also, the fit of the configural model provides the baseline value against which the subsequent comparisons of models is conducted. If the researcher fails to support configural invariance that would indicate that the items of the measurement tool under study measure different constructs in each group under study. Once the configural model has been established, the researcher starts creating a series of increasingly restrictive models by imposing equality constraints on factor loadings, observed variable intercepts, and residual variances.

Following the testing for configural invariance or pattern invariance, the researcher tests a stronger level of measurement invariance known as the **weak measurement invariance**. The weak invariance or metric invariance refers to the imposition of constraints onto the unstandardized factor loadings of each group in order for them to be equal across the groups. The factor loadings represent the strength of the relationship between the observed indicator and the underlying factor. Consequently, the invariance of factor loading refers to the equivalence of the measurement of latent factors across groups. The hypothesis of equal factor loadings (H_A) is tested by imposing equality constraints on the factor loadings and comparing the constrained model with the previous configural model (H_{form}) using the chi square test. If the χ^2_D is not statistically significant, then the

173 Results

H_A is retained, as the constrained model is not significantly worse than the unconstrained model. If the H_A is rejected, the researcher would adopt a less restricted hypothesis of partial measurement invariance in which the researcher releases some constrained factor loadings that are responsible for the metric noninvariance. In this case, the indicators with different factor loadings are called the differential functioning items.

The next level is to test the **strong measurement invariance**. The strong measurement invariance, or scalar invariance ($H_{\Lambda, \phi}$), refers to equivalence of factor loadings and item intercepts across groups. If item intercepts are variant across groups, it reflects that the participants in at least one of the groups tend to answer systematically higher or lower on the scale items.

The fourth step is testing **strict measurement invariance**. The strict measurement invariance ($H_{\Lambda, \theta}$) refers to equivalence of factor loadings, item intercepts, and error variance. Each of the previous two models is tested by comparing χ^2_D to the less restrictive model with the more restrictive model. However, the test of strict invariance is of little interest. Byrne (2012) indicated that testing factor loadings, variances, and covariances equivalence is the most appropriate approach to address the issue of invariance while testing construct validity or a theoretical construct.

After the measurement invariance is established, the researcher can proceed to a further step by analyzing the structural invariance in order to provide information about the equivalence of the hypothesized model across groups. It is important to note that failure to prove structural variance does not mean that there are problems with the measurement tool used in the study. It is expected that the scales used in a certain study operate equivalently across different groups in order to ensure that the same constructs are measured in the same way; however, the relationships between latent constructs might not remain the same when measured across different groups.

As previously mentioned, at each level of the hierarchical process of testing measurement and structural invariance, a test of χ^2 difference between the models is used to compare the changes in the models. If the χ^2 statistic does not change significantly after adding the restrictions, then the hypothesis of parameter invariance is accepted. Cheung and Rensvold (2002) have warned that the chi-square difference test is affected by the sample size. Consequently, testing invariance using large samples might result in significant value of χ^2_D , though the changes in parameter estimates are trivial. Thus, it is better to inspect the changes in the values of other fit indices. Cheung and Rensvold (2002) revealed that changes in fit indices are affected by the number of factors' model and its complexity. However, The Bentler CFI is less affected by the model characteristics, and a change in CFI less than or equal to .01 implies that the null hypothesis of invariance should not be rejected. However, Meade, Johnson and Braddy (2008) suggested that changes in CFI values less than or equal to .002 indicate that the variation in measurement equivalence is trivial. In addition, they provided a table for variation in the value of the NCI index depending on the number of factors and the related indicators.

4.3.1.1 The Measurement Invariance of SORS and L2RMQ

In order to test the assumption of measurement invariance for both the SORS and L2RMQ, the R program with the “Lavaan” (Rosseel, 2012) and “SemTools” (Jorgense, Pornprasertmanit, Schoemann & Rosseel, 2018) packages were used, which performed a number of multigroup analysis tests in the same sequence as described in the previous section. By using the “*measurement Invariance*” function, a number of models were estimated, and each model was compared to the baseline model as well as the previous model using chi-square difference and CFI difference tests. Table (40) illustrates the results of conducting multiple group CFA to test the assumption of measurement invariance for metacognitive awareness of L2 reading strategies and for L2 reading motivation.

The significance of χ^2 and the CFI difference tests revealed that the assumption of strong and strict invariance was not tenable across the two samples. However, the assumption of metric invariance across groups held for all the tested factors, aside from the L2 extrinsic reading motivation and support reading strategies, which reflects the invariance of the measurement of latent factors across the two samples.

175 Results

Table 40

Results of Multiple Group Confirmatory Factor Analysis

Factor	Model	df	χ^2	CFI	$\Delta\chi^2$	Δ CFI
Global reading strategies	Configural	116	134.7	.97	-	-
	Metric	128	148.6	.97	13.9 (n.s)	.003
	Scalar	140	236.8	.87	88.2*	.10
	Strict	141	345.1	.72	108.2*	.14
Problem-solving reading strategies	Configural	30	40.56	.97	-	-
	Metric	37	52.02	.95	11.4 (n.s)	.01
	Scalar	44	209.1	.52	157.09*	.42
	Strict	45	299.6	.27	90.49*	.25
Support reading strategies	Configural	51	50.71	1.00		
	Metric	59	66.87	.96	16.1*	.03
	Scalar	67	100.9	.86	34.1*	.10
	Strict	68	323.5	0	222.5*	.86
L2 intrinsic reading motivation	Configural	139	271.7	.93	-	-
	Metric	150	285.3	.93	13.50	.001
	Scalar	161	351.7	.90	66.47*	.02
	Strict	164	384.2	.89	32.47*	.01
L2 extrinsic reading motivation	Configural	134	209.7	.94	-	-
	Metric	148	287.6	.90	77.89*	.04
	Scalar	159	436.9	.81	149.3*	.09
	Strict	162	821.2	.55	384.3*	.25

(*) $p < .001$

4.3.2 Second order factor analysis

After conducting the first order CFA, a further analysis for the metacognitive awareness variable was performed in order to measure the higher order of construct validity where the three subscales are hypothesized to measure one latent construct (i.e. metacognitive awareness of reading strategy use). In order to conduct a second order CFA, parcels were created for each subscale in order to

make the model less complex and more parsimonious. The next section discusses the advantages of using item parceling in factor analysis and structural equation modeling.

4.3.2.1 Item Parceling

In recent years, the use of item parceling has started to gain more popularity in the field of psychometric analysis due to its benefits, when compared with depending on individual items. Item Parceling refers to averaging or summing two or more items in one or more units called parcels. These parcels are then used as indicators of the latent constructs. Therefore, the analysis of a hypothesized model will be based on parcels instead of individual items (Bandalos, 2002; Matsunaga, 2008; Wang & Wang, 2012). Using parcels in factor analysis and structural equation modeling has various potential benefits. First, the target latent construct is represented more adequately by parcels rather than single items, as parcels enhance scale communality, increase the common to unique ratio for each item, and reduce random errors. Aggregating individual items into parcels allows the common features among these elements to combine and represent the target construct more effectively.

Secondly, parceling helps to reduce problems of nonnormality, which represents a particular advantage of parceling since the majority of estimation methods used in SEM, such as maximum likelihood (ML), cannot perform properly when data are not normally distributed. The analysis of item parcels rather than individual items "better approximates the linear factor model assumption of multivariate normality" (Bandalos & Finney, 2009, p.270) on which common normal theory-based estimation methods depend (e.g. maximum likelihood (ML)).

Thirdly, the use of item parcels decreases the number of free parameters needed to be estimated in the model. Consequently, this will lead to a "*more optimal variable to sample size ratio and more stable parameter estimates*" (Bandalos & Finney, 2009, p.270). Using parcels as opposed to individual items makes the model more parsimonious and increases estimation stability. "*Item-based solutions are often unstable and take more iterations to converge, yielding relatively large standard errors of the measurement-level parameters*" (Little, Cunningham, Shahar & Widaman 2002, p. 161). Parameter estimation based on analysis of single items may lead to variations in the results and, as a result, researchers encounter difficulties when generalizing findings. In addition, estimating structural models based on parcels improves global model fit.

One important condition for using parceling in modeling is the establishment of unidirectionality of each measurement instrument which requires that the researcher assure that the used measurement tool assess one construct. Bandalos (2002), and Rogers and Schmitt (2004) recommended a reduction of the number of parcels used per factor to 3 parcels, as they found that model fit improves when the number of parcels per factor decreases.

In this study, parcels were created based on their content similarity as well as via the testing of the unidimensional nature of their items using first order confirmatory factor analysis. The following section presents the results of the second order factor analysis of the metacognitive awareness of reading strategy use and L2 reading motivation in the German and Egyptian samples.

4.3.2.2 Second Order Factor Analysis of SORS

To validate the higher order construct of the L2 metacognitive awareness of use of reading strategies (as measured by the SORS), a second order factor analysis was conducted using the item parceling technique. The 30 items of the SORS were grouped into three parcels representing the three categories of the L2 reading strategies (i.e. global, support, and problem-solving reading strategies). The results of the second order CFA revealed that the tested model fit the sample data, as shown by the goodness of fit indices in table (41)

Table 41

Goodness-of-Fit Indicators of SORS Second Order Factor Analysis for The German Data

Indicator	CFI	TLI	RMSEA	SRMR
Value	1.00	1.00	0.00	0.00

Although the χ^2 test was significant ($P < .001$) which gives a sign that the model does not fit the data, the results revealed that the tested model fit the sample data, as the other goodness of fit indices were within the accepted range values (RMSEA $< .08$; SRMR $< .08$; CFI $\geq .90$; TLI $\geq .95$). The next table (42) presents the value of the loadings of each subscale onto the latent factor of metacognitive awareness of reading strategies.

Table 42

Standardized factor loadings of SORS subscales for the German data

Latent factor	Indicator	Estimate	Standard Error	z value
Metacognitive awareness of reading strategies	Global reading strategies	0.92	0.06	14.96*
	Problem-solving reading strategies	0.63	0.05	10.61*
	Support reading strategies	0.58	0.06	9.75*

(*) $p < .001$

Previous results indicated that standardized factor loadings coefficients were all statistically significant ($p < .001$, z value > 1.96). Hence, according to the results of second order CFA, the suggested hypothesized model fit the German sample data well.

The same analysis was conducted for the data collected from the Egyptian university students. The results of the second order CFA revealed that the tested model fit the sample data as shown by the goodness of fit indices in table (43)

178 Results

Table 43

Goodness-of-fit indicators of SORS second order factor analysis for the Egyptian data

Indicator	CFI	TLI	RMSEA	SRMR
Value	1.00	1.00	0.00	0.00

The previous results revealed that the tested model fit the sample data, as the goodness of fit indices were within the accepted range values (RMSEA < .08; SRMR < .08; CFI ≥ .90; TLI ≥ .95), despite the significance of the χ^2 test ($p < 0.001$). The next table presents the value of the loadings of each subscale onto the latent factor of metacognitive awareness of reading strategies.

Table 44

Standardized factor loadings of SORS items for the Egyptian data

Latent factor	Indicator	Estimate	Standard Error	z value
Metacognitive awareness of reading strategies	Global reading strategies	.85	.03	22.12*
	Problem-solving reading strategies	.74	.04	17.40*
	Support reading strategies	.75	.04	17.80*

(*) $p < .001$

Previous results indicated that the standardized factor loadings coefficients were all statistically significant ($p < .001$, z value > 1.96). Therefore, according to the results of second order CFA, the suggested hypothesized model fit the Egyptian sample data well.

4.3.2.3 Second order factor analysis of L2RMQ

To validate the higher order construct of L2 reading motivation (as measured by the L2RMQ), a second order factor analysis was conducted using the item parceling technique. The 37 items of the L2RMQ were grouped into six parcels representing the two categories of the L2 reading motivation strategies (i.e. intrinsic and extrinsic reading motivation). The results of the second order CFA revealed that the tested model fit the sample data, as shown by the goodness of fit indices in table (45).

179 Results

Table 45

Goodness-of-fit indicators of l2 reading motivation scales for German data

Indicator	CFI	TLI	RMSEA	SRMR
Value	1.00	1.00	0.00	.03

The previous results revealed that the goodness of fit indices were within the accepted range values (RMSEA < .08; SRMR < .08; CFI ≥ .90; TLI ≥ .95), also the χ^2 test (6.90, $df=8$) was not significant ($p = .54$) which confirms that the tested model fits well the sample data. The next table presents the value of the loadings of each subscale onto the latent factor of the L2 reading motivation.

Table 46

Standardized factor loadings of l2 reading motivation scales for German data

Latent factor	Indicator	Estimate	Standard Error	z value
L2 intrinsic reading motivation	Involvement	.86	.02	34.17*
	Curiosity	.86	.02	34.36*
	Challenge	.85	.02	32.55*
L2 extrinsic reading motivation	Grades	.48	.06	7.40*
	Competition	.71	.06	11.85*
	Recognition	.82	.06	13.51*

(*) $p < .001$

Previous results indicated that standardized factor loadings coefficients were all statistically significant ($p < .001$, z value > 1.96). Hence, according to the results of second order CFA the suggested hypothesized model fits the German sample data well.

The same analysis was conducted for the data collected from the Egyptian university students. The results of the second order CFA revealed that the tested model fit the sample data, as shown by the goodness of fit indices in table (47)

180 Results

Table 47

Goodness-of-fit indicators of l2 reading motivation for Egyptian data

Indicator	CFI	TLI	RMSEA	SRMR
Value	.98	.97	.06	.03

The previous results revealed that the tested model fits the sample data as the goodness of fit indices were within the accepted range values (RMSEA < .08; SRMR < .08; CFI ≥ .90; TLI ≥ .95) along with the non-significant χ^2 test (14.26, $df= 8$, $p= .07$) . The upcoming table presents the value of the loadings of each subscale onto the latent factor of the L2 reading motivation.

Table 48

Standardized factor loadings of l2 reading motivation scales for Egyptian data

Latent factor	Indicator	Estimate	Standard Error	z value
L2 intrinsic reading motivation	Involvement	.74	.04	17.39*
	Curiosity	.78	.04	19.35*
	Challenge	.74	.04	17.61*
L2 extrinsic reading motivation	Grades	.42	.06	6.48*
	Competition	.74	.05	15.01*
	Recognition	.84	.04	17.83*

(*) $p < .001$

Previous results indicated that standardized factor loadings coefficients were all statistically significant ($p < .001$, z value > 1.96). Hence, according to the results of second order CFA the suggested hypothesized model fits the Egyptian sample data well.

The analysis of SEM models followed the two-step modeling approach recommended by Anderson and Gerbing (1988). According to this approach, a CFA model of related variables is analysed first to determine whether it fits the data. This step reflects the measurement model. The second step involves assessing the relationships between the latent variables, which were freely correlated in the previous step to set the structural model. The model can be modified and re-specified until the researcher reaches the most theoretically-meaningful and statistically-accepted model (Kline, 2012; O'Rourke & Hatcher, 2013). The data for the measurement and structural models were computed using *Mplus 7* (Muthén & Muthén, 1998-2012) program.

4.3.3 The Measurement Models

The measurement model aims to determine the model that best fits the data and ensure that the indicators effectively measure the underlying latent construct (O'Rourke & Hatcher, 2013). The model tested in the current study was composed of five latent factors: L2 reading comprehension (3 indicators), L1 reading comprehension (2 indicators), L2 extrinsic reading motivation (3 indicators), L2 intrinsic reading motivation (3 indicators), and L2 metacognitive awareness of reading strategy use (3 indicators). The measurement model was estimated using the maximum likelihood estimation (ML) method. Table (49) shows the goodness of fit indices for the measurement models of both the German and Egyptian samples.

Table 49

Goodness-of-fit indicators of the measurement model for the German and Egyptian samples

Indicator/Sample	CFI	TLI	RMSEA	SRMR
German sample (N=200)	.97	.96	.04	.05
Egyptian sample (N=201)	.96	.95	.04	.04

Previous results indicated that the measurement models showed an overall good fit, as all the reported indices were within the accepted thresholds suggested by Hu and Bentler (1999), aside from the χ^2 test, which was not significant in the two models ($p < .05$). However, it can be noted that the German measurement model had higher CFI and TLI values than the Egyptian model. Figure (13) illustrates the tested measurement model for the German sample with its standardized path coefficients.

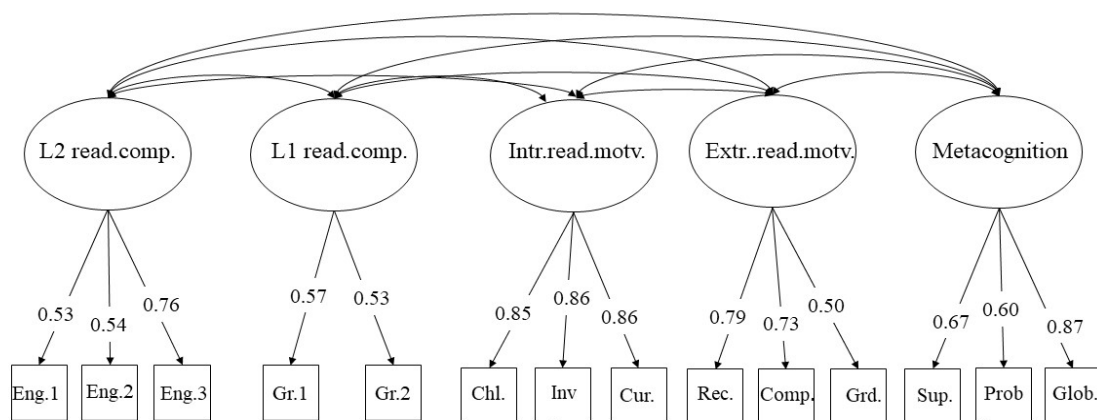


Figure 13. Measurement model for the German sample

182 Results

The next table illustrates the values of the latent factor loadings, the standard error, and the statistical significance of each path.

Table 50

Path coefficients of the latent factors for the measurement model of the German sample

Variable	Factor	Estimate	Std. Error	z value
Metacognitive awareness of reading strategies	Global reading strategies	.87	.04	17.80*
	Problem-solving reading strategies	.67	.05	12.15*
	Support reading strategies	.60	.05	11.30*
Extrinsic reading motivation	Grades	.50	.06	7.80*
	Competition	.73	.05	13.83*
	Recognition	.79	.05	14.96*
Intrinsic reading motivation	Curiosity	.86	.02	34.21*
	Involvement	.86	.02	34.21*
	Challenge	.85	.02	32.76*
L1 reading comprehension	Text1	.57	.08	7.09*
	Text2	.53	.07	6.88*
L2 reading comprehension	Text1	.53	.07	7.69*
	Text 2	.54	.06	7.98*
	Text3	.76	.06	11.55*

(*) $p < .001$

The previous results revealed that the standardized paths coefficients for the measurement model of the German data ranged from .53 to .87, and that all the factor loadings were statistically significant ($p < .001$, z value > 1.96). Thus, it was possible to proceed to the second step and test the proposed structural models.

The next figure illustrates the measurement model of the underlying variables for each factor according to the data collected from the Egyptian sample

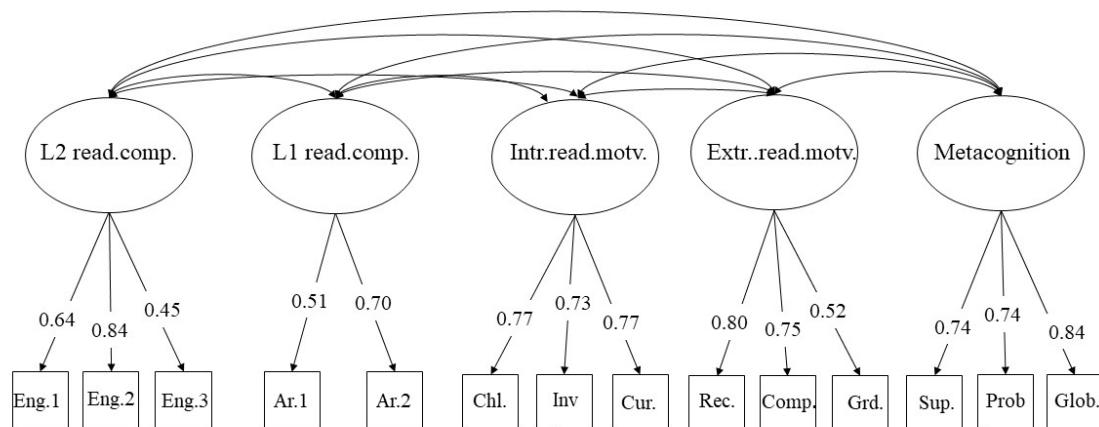


Figure 14. Measurement model for the Egyptian sample

The next table illustrates the values of the latent factor loadings, the standard error, and the significance of each path

Table 51

Path coefficients of the latent factors for the measurement model of the Egyptian sample

Variable	Factor	Estimate	Std. Error	<i>z</i> value
Metacognitive awareness of reading strategies	Global reading strategies	.84	.03	23.91*
	Problem-solving reading strategies	.74	.04	17.66*
	Support reading strategies	.74	.04	17.66*
Extrinsic reading motivation	Grades	.52	.06	8.53*
	Competition	.75	.04	16.76*
	Recognition	.80	.04	18.78*
Intrinsic reading motivation	Curiosity	.77	.04	18.39*
	Involvement	.73	.04	16.45*
	Challenge	.77	.04	18.34*
L1 reading comprehension	Text1	.51	.08	6.20*
	Text2	.70	.09	7.42*
L2 reading comprehension	Text1	.64	.06	10.60*
	Text 2	.84	.05	14.57*
	Text3	.45	.07	6.57*

(*) $p < .001$

It can be noted that the standardized paths coefficients for the measurement model of the Egyptian data ($N=201$) ranged from .45 to .84, and that all factor loadings were statistically significant ($p<.001$, z value > 1.96). After verifying the goodness of fit of the measurement model for the Egyptian and German samples, the second phase was begun by establishing the structural relationships between the latent factors.

4.3.4 The Structural Models

To analyze the following structural models, correlation matrices were not used as input. Rather, raw data was submitted to *Mplus 7* (Muthén & Muthén, 1998-2012). The program then calculated the covariance matrix from these data. The models were estimated using an ML estimator as the default estimation method in the Mplus program due to the potential advantages previously described (chapter 3 section 3.8.1.3). The first two models are simple models with no hypothesized mediating effect to test the direct influence of both the exogenous variables (i.e. L1 reading comprehension, L2 reading motivation, and L2 metacognitive awareness of reading strategies) and the endogenous variable (i.e. L2 reading comprehension). The following path diagram (Figure 15) identifies the hypothesized relationships between the study variables using the German data

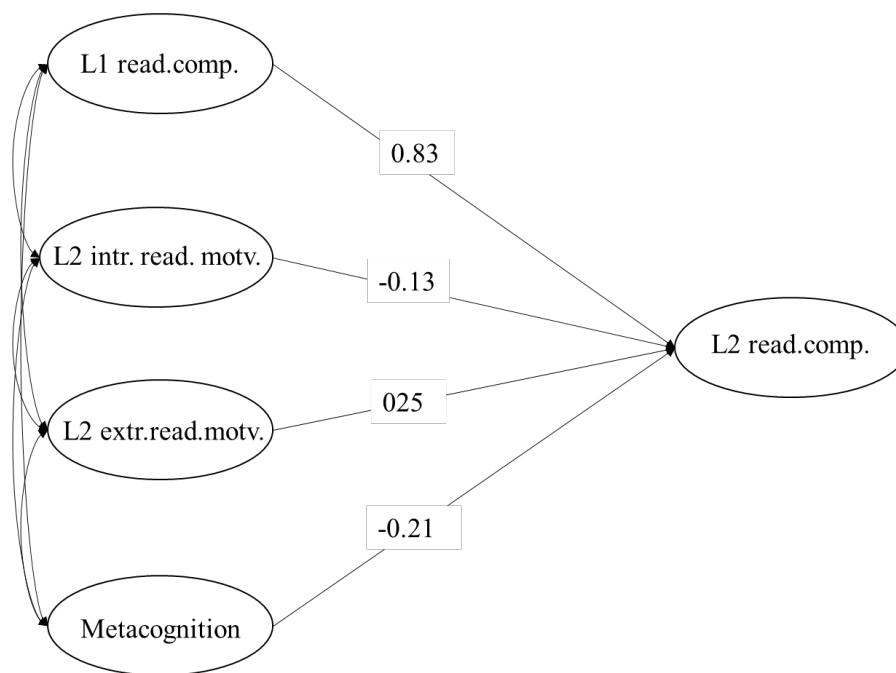


Figure 15. Relative contributions of L1 reading comprehension, reading motivation, metacognition to the L2 reading comprehension in the German sample(model 1).

Note: L1 read.comp. = L1 reading comprehension, L2 intr.read.motv.= L2 intrinsic reading motivation, L2 extr.read.motv.= L2 extrinsic reading motivation, Metacognition= metacognitive awareness of reading strategy use.

185 Results

To evaluate the overall estimation of the model fit, the significance of the fit indices provided by the Mplus7 output were inspected. Although the value of the χ^2 test (114, $df=66$) was significant ($p < .05$) and thus the null hypothesis (that there is no difference between the model estimated variances/covariances and the observed sample variances/covariances) could not be accepted; the other fit indicators fell within the accepted cut-off values.

The standardized root mean square residual (SRMSR) was .06, while the root mean square error of approximation (RMSEA) was .06, within a confidence interval range of .04 to .07. In addition, the comparative fit index (CFI) was .95 and the Tucker and Lewis index (TLI) equalled .93. Almost all the previous indicators fell within the accepted threshold. Thus, according to these fit indices, the hypothesized model proved to fit with the data. After evaluating the overall model fit, the next step was to inspect the significance of each suggested path in the proposed model. The next table illustrates the values of the path analysis parameter estimates, their standard errors, and their significances.

Table 52

Standardized Values Of The Model 1 Paths, Their Standard Errors, And Their Statistical Significances

Parameters	Estimate	Std. Error	z value
(L1 reading comprehension-L2 reading comprehension)	.83	.10	8.22**
(Metacognition-L2 reading comprehension)	-.21	.10	-1.96*
(Intrinsic reading motivation-L2 reading comprehension)	-.13	.10	-1.32
(Extrinsic reading motivation-L2 reading comprehension)	.25	.11	2.21*

(*) $p < .05$, (**) $p < .001$

The results of the standardized paths coefficients in table (51) reveal that both the L2 reading intrinsic motivation and L2 metacognitive awareness of reading strategies have negative influence on L2 reading comprehension ($\beta^{\text{standardized}} = -.13, -.21$ respectively) whereas L2 extrinsic reading motivation and L1 reading comprehension both have a positive influence on L2 reading comprehension ($\beta^{\text{standardized}} = .25, .83$ respectively).

The only variable that did not provide a statistically significant influence in the hypothesized model was the L2 intrinsic reading motivation. Considering the values of the paths coefficients, it

can be seen that L1 reading comprehension exerts the strongest influence on L2 reading comprehension. The second most significant variable was L2 extrinsic reading motivation (as measured by the L2RMQ). However, metacognitive awareness of L2 reading strategies had a negative effect on L2 reading comprehension.

Finally, according to the reported R^2 value provided by the Mplus output, the present model explains approximately 79.1 % of the variability in L2 reading comprehension.

The following path diagram illustrates the same hypothesized model using the data collected from the Egyptian sample.

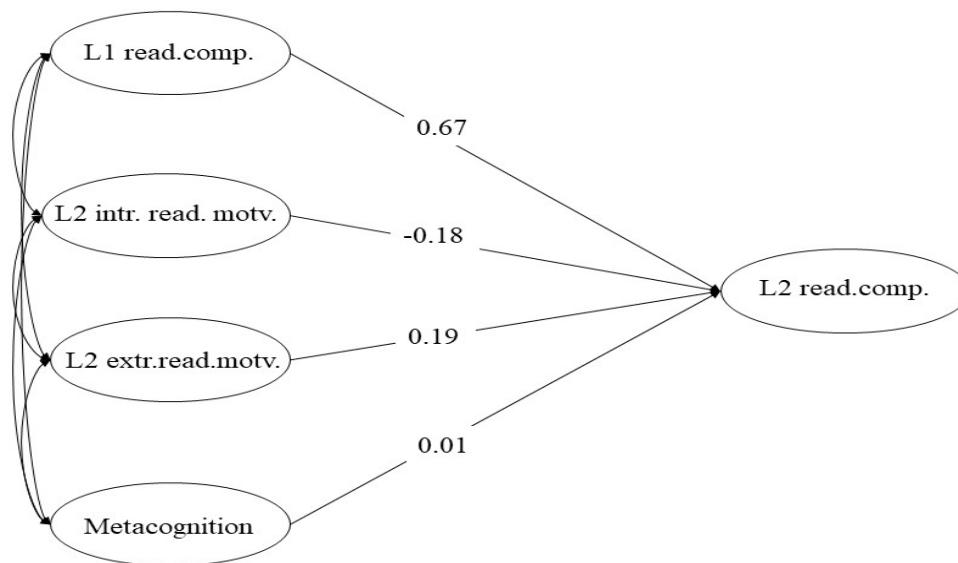


Figure 16. Relative contributions of L1 reading comprehension, reading motivation, and metacognition of L2 reading comprehension in the Egyptian sample (model 2).

Note: L1 read.comp. = L1 reading comprehension, L2 intr.read.motv.= L2 intrinsic reading motivation, L2 extr.read.motv.= L2 extrinsic reading motivation, Metacognition= metacognitive awareness of reading strategy use.

According to various model fit indicators, the hypothesized model proved to fit the Egyptian data well. First, the χ^2 test value (77.86) was not significant ($p= .11$), which reflected that the null hypothesis (concerning the indifference between the model estimated variances/covariances and the observed sample variances/covariances) could not be rejected. Furthermore, the standardized root mean square residual (SRMSR) was .04, which was less than .08 and thus reflected a good model fit.

187 Results

In addition, the root mean square error of approximation (RMSEA) = .03 fell within a confidence interval range of 0 to .05. This RMSEA value reflected a good model fit according to Hu and Bentler (1999). The comparative fit index (CFI) was .98 and the Tucker and Lewis index (TLI) equalled .97. These values were greater than .90, the cut-off value recommended by Hu and Bentler (1999). This proved that the suggested model fit the data sample well. Accordingly, all of the reported fit indices illustrated that the proposed model fit the Egyptian sample data well. The upcoming table illustrates the values of the path analysis parameter estimates, their standard errors, and their significances.

Table 53

Standardized Values of the Model 2 Paths, their Standard Errors, and their Statistical Significances

Parameters	Estimate	Std. Error	Z value
(L1 reading comprehension-L2 reading comprehension)	.67	.10	6.69*
(Metacognition-L2 reading comprehension)	.01	.12	0.13
(Intrinsic reading motivation-L2 reading comprehension)	-.18	.15	-1.24
(Extrinsic reading motivation-L2 reading comprehension)	.19	.16	1.17

(*) $p < .001$

The results of the standardized paths coefficients revealed that L2 reading intrinsic motivation had a negative influence on L2 reading comprehension ($\beta^{\text{standardized}} = -.18$) whereas L2 extrinsic reading motivation, L2 metacognitive awareness of reading strategy, and L1 reading comprehension had a positive influence on L2 reading comprehension ($\beta^{\text{standardized}} = .19, .01, .67$ respectively). Nonetheless, the model results indicated that L1 reading comprehension was the only variable with a statistically significant positive influence on L2 reading comprehension. Thus, only the first hypothesis was confirmed in the two tested models. According to the R^2 value reported by the Mplus output, the present model explains approximately 43.6 % of the variability in L2 reading comprehension.

To test the fifth and the sixth hypotheses, two new paths were added in order to represent the mediation of the influence of the L2 intrinsic and extrinsic reading motivations on L2 reading comprehension through the L2 metacognitive awareness of reading strategy. The following path diagram (Figure 17) identifies the hypothesized relationships between the study variables using the German data

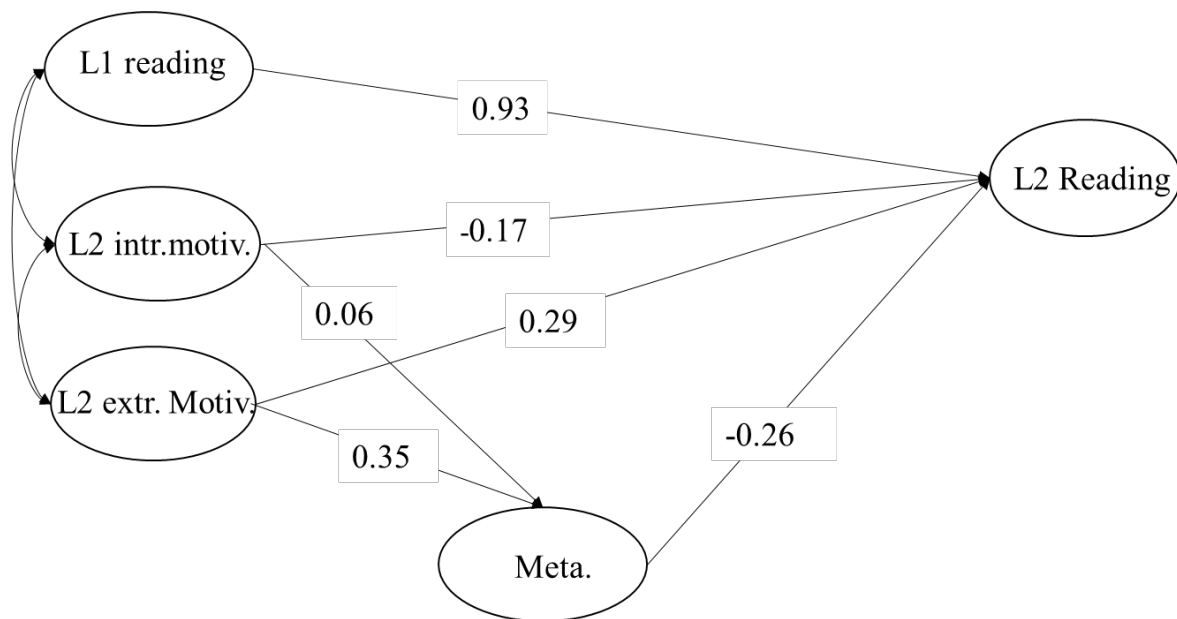


Figure 17. Relative contributions of L1 reading comprehension, reading motivation, and metacognition to L2 reading comprehension in the German sample (model 3).

Note: L1 read.comp. = L1 reading comprehension, L2 intr.read.motv= L2 intrinsic reading motivation, L2 extr.read.motv.= L2 extrinsic reading motivation, Metacognition= metacognitive awareness of reading strategy use.

In order to evaluate the overall estimation of the model fit, the significance of the fit indices provided by the Mplus7 output were inspected. The value of the χ^2 test of model fit (108.65, $df=67$) was significant ($p < .05$) which implied that there was a difference between the model estimated variances/covariances and the observed sample variances/covariance. However, when viewing the other fit indicators in order to judge the model fit, it was found that they all gave evidence of a good fit of the hypothesized model.

The standardized root mean square residual (SRMSR) was .06, while the root mean square error of approximation (RMSEA) = .05, within a confidence interval range of .03 to .07. In addition, the comparative fit index (CFI) was .95 and the Tucker and Lewis index (TLI) equalled .94. All indicators fell within the accepted threshold. Thus, according to these fit indices, the hypothesized model proved to fit with the data, according to the different overall model fit indicators. The next table illustrates the values of the path analysis parameter estimates, their standard errors, and their significances.

189 Results

Table 54

Standardized values of the model 3 paths, their standard errors, and their statistical significances.

Parameters	Estimate	Std. Error	z value
(L1 reading comprehension-L2 reading comprehension)	.93	.11	7.93**
(Metacognition-L2 reading comprehension)	-.26	.09	-2.83**
(Intrinsic reading motivation-L2 reading comprehension)	-.17	.11	-1.14
(Extrinsic reading motivation-L2 reading comprehension)	.29	.12	2.33*
(Intrinsic reading motivation-Metacognition)	.06	.08	.73
(Extrinsic reading motivation-Metacognition)	.35	.09	3.88**

(*) $p < .05$, (**) $p < .001$

The results of the standardized path coefficients revealed that both L2 intrinsic reading motivation and metacognitive awareness of L2 reading strategies had a negative influence on L2 reading comprehension. Whereas L2 extrinsic reading motivation and L1 reading comprehension had a positive influence on L2 reading comprehension. In addition, the L2 extrinsic and intrinsic reading motivations had a positive influence on the metacognitive awareness of reading strategies.

When looking at the values of the paths coefficients, it can be seen that L1 reading comprehension provides the strongest influence on L2 reading comprehension. The second most significant variable was L2 extrinsic reading motivation as measured by the L2RMQ. Lastly, the metacognitive awareness of L2 reading strategies played a negative role in influencing L2 reading comprehension, and for every one unit increase in metacognitive awareness, the expected decrease was -0.26 units.

In this model, there was one indirect effect of L2 extrinsic reading motivation on L2 reading comprehension as mediated by metacognitive awareness of reading strategies. The estimated indirect effect of L2 extrinsic reading motivation (as reported in the Mplus output) equalled - 0.09. The standard error for the indirect effect provided by Mplus was .04 ($z = -2.18$). Therefore, the indirect effect was significant ($p < .05$) according to these criteria.

Within the present model, 85.7 % of the variability in L2 reading comprehension and 14.1% of the variability in metacognitive awareness of reading strategies can be explained.

The following path diagram (figure 18) illustrates the same hypothesized model using the data collected from the Egyptian sample.

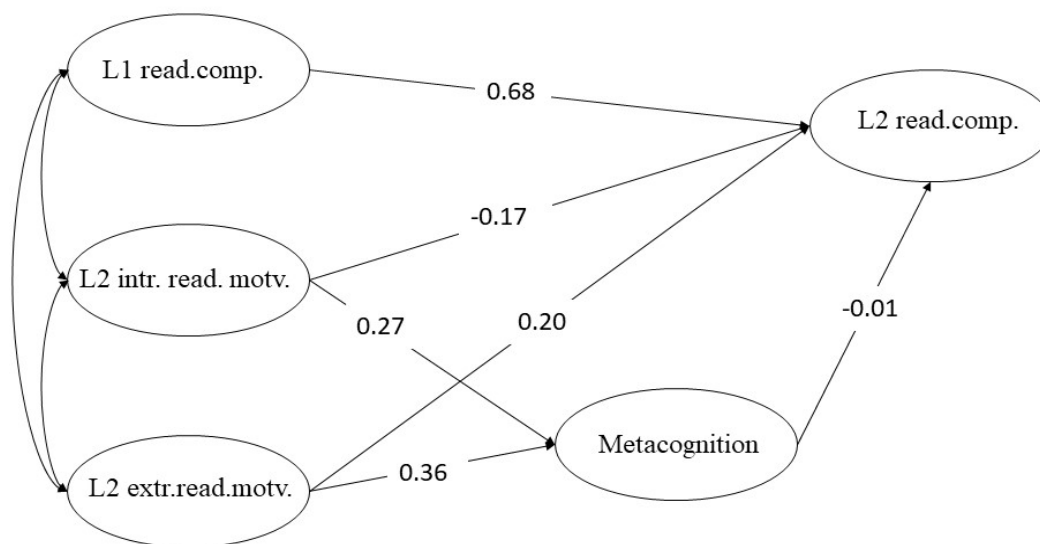


Figure 18. Relative contributions of L1 reading comprehension, reading motivation, and metacognition of L2 reading comprehension in the Egyptian sample (model 4).

Note: L1 read.comp. = L1 reading comprehension, L2 intr.read.motv.= L2 intrinsic reading motivation, L2 extr.read.motv.= L2 extrinsic reading motivation, Metacognition= metacognitive awareness of reading strategy use.

According to number of overall model fit indicators, the hypothesized model proved to fit the Egyptian data well. First, the χ^2 test value (77.93) was not significant ($p = .13$) which indicated that the null hypothesis (concerning the indifference between the model estimated variances/covariances and the observed sample variances/covariances) could not be rejected. In the current model, the RMSEA = .03, which fell within a confidence interval range of 0.00 to 0.05. The standardized root mean square residual (SRMSR) was .04. In addition, the comparative fit index (CFI) was .98 and the Tucker and Lewis index (TLI) equalled .97. Thus, according to these fit indices (which fell within the accepted cut-off value for model fit) the hypothesized model proved to fit with the Egyptian sample data.

191 Results

Table 55

Standardized values of the model 4 paths, their standard errors, and their statistical significances.

Parameters	Estimate	Std. Error	z value
(L1 reading comprehension-L2 reading comprehension)	.68	.10	6.72**
(Metacognition-L2 reading comprehension)	-.01	.11	-.10
(Intrinsic reading motivation-L2 reading comprehension)	-.17	.14	-1.17
(Extrinsic reading motivation-L2 reading comprehension)	.20	.16	1.23
(Intrinsic reading motivation-Metacognition)	.27	.11	2.37*
(Extrinsic reading motivation-Metacognition)	.36	.11	3.21**

(*) $p < .05$ (**) $p < .001$

Results of paths coefficients revealed that both L2 reading intrinsic motivation and L2 metacognitive awareness of reading strategies had negative influences on L2 reading comprehension, whereas L2 extrinsic reading motivation and L1 reading comprehension had a positive influence on L2 reading comprehension. In this model, L1 reading comprehension remained the the only variable with a statistically significant influence on L2 reading comprehension. According to the R^2 value reported by the Mplus output, the present model explains approximately 43.9 % of the variability in L2 reading comprehension.

To conclude, previous modeling results revealed that L1 reading comprehension, whether in a German or Egyptian context, was a strong and significant predictor of L2 reading comprehension. This fully supports the first hypothesis in both samples. However, the relationship between L2 intrinsic reading motivation was not proven in either the German or Egyptian models. This reveals that L2 intrinsic motivation does not play any significant role in influencing L2 reading comprehension. On the other hand, the relationship between L2 extrinsic reading motivation, metacognitive awareness of reading strategies, and L2 reading comprehension was only proven significant in the German sample.

5. Discussion

The following sections will present a discussion of the main findings of the current study. The first section will present a general overview of the study (5.1). The second section (5.2) will discuss the results concerning the students' metacognitive awareness of the use of reading strategies when reading English texts. The third section (5.3) will discuss the descriptive results of the L2RMQ, which I used to examine the nature of L2 reading motivation. The following section (5.4) will discuss the results of the validation of proposed structural models which regulate the relationship between the exogenous variables (i.e. L1 reading comprehension, L2 reading motivation, and L2 metacognitive awareness of reading strategies) and the endogenous variable (i.e. L2 reading comprehension). The last section (5.5) will present some suggested future research in the field of L2 reading as well as pedagogical implication for the results of the current study.

5.1 Overview of the study

Reading is a crucial skill that all individuals must acquire for their academic, professional, and personal growth. For this reason, many psychologists and educators are paying great attention to research on reading in order to discover which factors might promote or hinder reading ability. For many years, most of these efforts were dedicated to the explanation of learners' reading ability in their mother language. However, due to the development of modern communications, there is a growing interest in research targeting the variables affecting reading in a second or foreign language. In this current study, the foreign language under study is the English language, as it represents more than a learned foreign language in schools. It is becoming an international language of communication and it is the language of science, commerce, and entertainment. Thus, learning of the English language is becoming very important in our modern globalized world.

One of the core issues in the field of L2 reading are the relationship between acquired L1 reading skills and L2 reading, whether these two abilities are interrelated or separated, and to what extent L1 reading skills contribute to the promotion or hindrance of L2 reading. On the other side, reading researchers believe that there are several cognitive and emotional variables that influence L2 reading comprehension, other than linguistic factors. Although this study is a cross-sectional one, it can shed light on some interesting findings in L2 research, which may then be addressed in future research.

193 Discussion

In the current study, I sought to investigate the differences between Egyptian and German students in their perceived usage of reading strategies, as well as to explore the pattern of L2 reading motivation among students from the two samples. Furthermore, I tested two structural models of the relationship between L1 reading comprehension, L2 reading motivation, L2 metacognitive awareness of reading strategies, and reading comprehension of English as a foreign language in two different cultural contexts.

In order to have information about metacognitive awareness of reading strategies, a self-report questionnaire (SORS) developed by Muktari and Sheory (2002) was used. Accordingly, the adopted classification of the reading strategies was of three types: global reading strategies, support reading strategies, and problem-solving reading strategies. While the L2 reading motivation variable, was measured by a reading motivation survey (L2RMQ) which was based on reviewed L1 (e.g. Wigfield & Guthrie, 1995, 1997) and L2 reading motivation research (e.g. Mori, 2002; Takase, 2002).

In Egypt, the data collection took place in the second semester of the academic year 2017/2018. Data was collected in person after contacting the coordinator of English department in the faculty of Education in Suez Canal University in order to illustrate the purpose of the study. Students were recruited during their lectures by the help of their tutors. They were informed that the administration of the tests would take almost an hour and half and that their responses will be used only for scientific research. The data collection in Germany occurred during the summer semester of 2018 and the winter semester of 2018/2019 at the University of Würzburg. The students were recruited by advertising about the study on Facebook groups, SONA website, and using flyers on the university campus.

The participants in both contexts were asked to answer two multiple choice tests to measure their L1 and L2 reading comprehension, the SORS, and the L2RMQ surveys. After collecting the required data, it was analyzed using SPSS, R, *MPlus* programs to test the study hypothesis. The results revealed that the L1 reading comprehension in both samples had the major contribution in explaining the L2 reading comprehension for German and Egyptian university students. The role of metacognitive awareness of reading strategies varied from nonsignificant to negatively correlated with L2 reading comprehension. Concerning the role of reading motivation, only L2 extrinsic reading motivation was positively correlated with L2 reading comprehension according to the German data. These results and other descriptive ones will be discussed according to related literature and personal observation in the following sections.

5.2 Description of L2 reading strategies

The analysis of the mean scores of the SORS revealed that the average score of overall use of the reading strategies was ($M= 3.72$) in the Egyptian sample. According to the guidelines provided by Mokhtari and his colleagues (2008), this average score implies that Egyptian students have a high awareness of the reading strategies. This result agrees with a number of previous studies such as those of Malcolm (2009) and Zhang and Wu (2009), which indicated that students in Bahrain and Japan have high awareness of L2 reading strategies.

On the other side, the average score of the overall awareness of reading strategies for the German students was ($M=3.05$) which, according to guidelines by Mokhtari and colleagues (2008), implies that the German students have a moderate awareness of their reading strategies when they read English texts. This result goes along with findings from number of previous studies conducted in different EFL contexts such as in Hungary (Sheory& Baboczky, 2008), Japan (Sheory, et al., 2008), and Taiwan (Yau, 2009) which indicated that L2 readers have a moderate awareness of reading strategies.

The moderate and high awareness of L2 reading strategy use was explained in previous research (e.g Malcolm, 2009; Sheory& Baboczky, 2008; Sheory, et al., 2008) as a distinctive characteristic of academically advanced students (i.e. university students) who must have read great amount of several academic texts that developed their awareness of the reading strategies either in L1 or L2.

A possible explanation for the high awareness of the reading strategies among the Egyptian students is their limited L2 linguistic background compared to the German students. When students were asked about the reading materials they read frequently (chapter 3 section 3.2.1, 3.2.2) almost 50% of the Egyptian students who answered this question indicated that they read online materials more frequently. In fact, these online materials could have merely been some posts on social media (as revealed by several students), which are themselves not enough to develop their linguistic knowledge. On the contrary, the German students revealed a great variety in their reading preferences, revealing that they have more access to various English reading materials and consequently might have a stronger linguistic background than the Egyptian students. Accordingly, the Egyptian students in the current study might have increased their metacognitive awareness to compensate their low proficiency level and enhance their comprehension. This result supports previous findings (e.g. Alsheikh, 2011; Lin & Yu, 2015; Hong-Nam& Page, 2014; Mokhtari, 2008) claiming that L2 readers tend to use more reading strategies when they read in the language that they are less proficient in it.

With regards to the means of each subscale of the survey, the students in both samples showed a high preference for using the reading strategies which belonged to the problem-solving category (German $M=3.64$; Egypt $M= 4.03$). This high preference for use of problem-solving reading strategies by EFL readers was also found in other previous studies conducted in different learning contexts; for English as both a foreign language (e.g. Hong-Nam& Page, 2014 Sheory& Mokhtari, 2008; Sheory et al., 2008; Zhang& Wu, 2009) and as a second language (e.g. Sheory& Mokhtari,

195 Discussion

2001). The high preference for problem-solving reading strategies might be due to the fact that these techniques are direct, simple, and less cognitively-demanding techniques, which encourages the students to apply them in order to enhance their reading comprehension. Like the other EFL students in the previous studies, the German and the Egyptian university students in the current study often read English academic materials that require paying great attention to its content in order to extract the required information and achieve academic success. For this reason, students use the problem-solving strategies more frequently to improve their reading comprehension of these academic texts.

Furthermore, when reading texts in a foreign language, the readers expected to face some unfamiliar words or culturally-related expressions which might influence the readers' understanding of the text. Consequently, the L2 readers tended to read L2 texts more slowly and more carefully in order to ensure that they fully understood the correct meaning of the text (Alhaqabani& Riazi, 2012; Block, 1992).

When analyzing the mean scores of the individual strategies, five strategies were found to be commonly reported as highly used by the German and the Egyptian students in both samples. These strategies included: *rereading to improve understanding*, *getting back on track when losing concentration*, *paying closer attention to reading*, *adjusting reading speed*, and *underlining and highlighting information*. All of these strategies, except for the last one, are problem-solving reading strategies. The high preference for these techniques supports the previous assumption that the students in the current study devote their efforts to remain focused on the content of the reading material. In addition, they prefer to use direct cognitive strategies that do not require sophisticated techniques to be used while reading. For example, strategies like rereading to improve the comprehension of the text or adjusting reading speed are less cognitively demanding compared to other strategies such as paraphrasing or using background knowledge, which require using additional sources and deploying more effort while reading the English texts. In fact, they perceive the use of external resources or translating as time-consuming strategies, which they are then less likely to use. The results of the present study support the findings of several previous L2 reading studies such as Sheory and Baboczky (2008), Malcolm (2009), Mokhtari and Reichard (2004), Madhumathi and Ghosh (2012), Hong-Nam and Page (2014), and Poole (2005), which revealed that readers in different English as a foreign language learning contexts are more likely to use the same reading strategies that were reported by the German and the Egyptian university students.

Compared to the problem-solving reading strategies, perception of the usage of both the global and the support reading strategies was less frequent. A possible explanation is that the global and support reading strategies might be more demanding than the problem-solving strategies and more time-consuming (Ilustre, 2011; Yüksel & Yüksel, 2011). However, some individual strategies were reported among the highest used reading strategies, among them: *deciding what to read closely and what to ignore*, *underlining and highlighting information*, *checking understanding when reaching new information*, and *skimming*. These strategies are not cognitively demanding compared to other global or support reading strategies (such as paraphrasing or critically analyzing

the text content) and they are important for the students in order to improve their understanding of the reading materials (Shang, 2010).

When administrating the SORS, I asked some of the German students about their low preference for strategies such as using dictionaries, translating English texts to German, or reviewing texts' organization; they indicated that they found that the implementation of these strategies is time consuming and not relevant to understanding the text. They further indicated that the external materials make them shift their attention between looking up words and trying to understand the text at hand, which might confuse them and reduce the efficiency of the meaning construction process. The Egyptian students, however, reported high use of contextual clues and guessing to discover the meaning of the unknown words or sentences, which might be considered as an alternative to using external reference materials. Therefore, neither the German nor the Egyptian students revealed a high preference for the translating and dictionary-consulting strategies.

Among the moderately perceived strategies in the Egyptian sample were "*using typographical features*" and "*using the figures and tables*" to enhance their understanding of the text. A possible reason is that the students were not familiar with these types of reading aids, as they are not commonly used in Arabic texts. Thus, their limited use of such aids when reading L1 texts might make the students underestimate the role of the typographical features in comprehending the texts.

The results of this current study did not support the common tendency for females to be more strategic L2 learners than males. The differences between the reported means in both samples of each subscale for male and female were relatively small, which did not give strong evidence that either males or females display higher awareness of the reading strategies. When analyzing the significant differences between the means of perceived reading strategies, no differences were found between the males and the females in both samples, except for one significant difference between the Egyptian male and female students on the global reading strategies. This result corroborates studies by Hong-Nam and Page (2014) on Korean university students and by Tavaloki (2014) on Iranian university students. These studies did not demonstrate any significant difference between the males and the females within the three subscales of the SORS. However, this result contradicts that of Sheory and Baboczky (2008), which claims that "*whatever their cultural or educational background, female learners (as opposed to males) tend to use general learning strategies as well as reading strategies with high frequency*" (p.172). One possible explanation for the lack of gender effect might be the unequal distribution of males and females in both samples, or as Poole (2005) concluded, that the that differences in L2 reading strategies might be "neutralized for advanced students" and be more related to other factors such as task demands or contextual motivation, rather than a difference in gender.

Taken together, the students in both samples can be described as strategic readers who are aware of the L2 reading process and the use several of reading strategies to overcome any reading problems. Their main concerns are to ensure that they have accurately understood the text at hand and to take remedial actions when they encounter reading problems. The most frequently used

strategies perceived by both the German and Egyptian students reflect the type of behaviors that distinguish good readers. This has indeed been reported in number of L1 and L2 reading studies (e.g. Block, 1992; Koda, 2005; Lin & Yu, 2015; Pressely & Afflerbach, 1995; Sheory & Mokhtari, 2001; Zhang, 2001). For example, Block (1992) indicated that skilled EFL readers decide whether a word meaning is relevant to the overall meaning of a passage, reread the sentence, use syntactic clues to identify word meaning, and evaluate their understanding. Pressely and Afflerbach (1995), after reviewing 38 studies on native English speakers, described skilled readers as strategic, constructively responsive, and taking conscious steps to comprehend what they read. As they read, they use a plethora of reading strategies such as: utilizing contextual clues, taking notes to remember the text, and predicting important information from text extract and subsequently paying great attention to it.

5.3 Description of L2 Reading Motivation

In the present study, I measured a number of dimensions for the L2 reading motivation to understand which factors might motivate the German and Egyptian university students during L2 reading. These factors were chosen based on the review of a number of L1 and L2 reading research studies and conducting a CFA to validate the adopted L2 reading motivation construct. Accordingly, L2 reading motivation is divided into intrinsic reading motivation, which implies engaging in reading in order to enjoy the activity itself; and extrinsic reading motivation, which indicates engaging in L2 reading in order to achieve some potential gains. The L2 intrinsic reading motivation comprises three subcomponents: curiosity, which refers to engaging in reading to acquire new knowledge; involvement, which refers to the excitement and fun gained from engaging in reading; and challenge, which refers to the desire to read challenging texts. On the other hand, the L2 extrinsic reading motivation consisted of three subcomponents: competition, which refers to reading in order to outperform others; recognition, which implies the desire to be characterized as a competent reader; and grades, which indicate reading in order to better achieve.

According to the descriptive statistics of the L2 reading motivation questionnaire used in the current study (L2RMQ), the German and the Egyptian students have an overall higher level of L2 intrinsic reading motivation than L2 extrinsic reading motivation. This result contradicts those of Kim (2011), Dhanapala (2008), and Salikin and colleagues (2017), studies which revealed that EFL readers (in Korea, Sri Lanka, Japan, and Indonesia, respectively) have higher level of extrinsic reading motivation than intrinsic reading motivation. In these studies, the authors indicated that the learners were interested in L2 reading because they wanted to achieve a practical goal such as studying abroad or having good grades in language proficiency tests such as the TOEFL. The authors pointed out that Asian students considered mastering the English language as an essential tool for their career and academic progress. However, the descriptive results for the items of the L2RMQ revealed that some internal and external motivators are almost equally important in enhancing the Egyptian and the German students' L2 reading motivation. For instance, in the German sample, the mean score of the highest reported intrinsic reason for reading ("*I feel excited to read about an interesting topic*" ($M= 3.86$)), representing a dimension of curiosity, was equal

to the mean of the highest reported extrinsic reason for reading, which was “*I feel satisfied when someone describes me as a good reader*” ($M= 3.86$), a reason representing reading for recognition. In the Egyptian sample, the highest intrinsic reason for reading was also “*I feel excited to read about an interesting topic*” ($M= 4.30$) (representing a dimension of curiosity). This was almost equal to the highest reported extrinsic reason for reading: “*I read English texts to improve my achievement*” ($M= 4.37$), which reflects grade-based motivation. Thus, it seems that the learners in the present study seek to read English materials because they want to learn about certain topics of interest, they enjoy being knowledgeable, and they are interested in acquiring external gains from reading English texts.

Furthermore, I examined the descriptive statistics for the motivational subscales of the intrinsic and extrinsic motivations in order to identify which of the six subcomponents were perceived by the students as most powerful to trigger their L2 reading motivation. Among the German students, curiosity had the highest mean score, while the Egyptian students rated it as the second highest reason for reading motivation (after grades). This high preference gives the impression that the students are curious readers who read to gain new knowledge (such as understanding the culture and lifestyle of other countries), to have more information about certain topic of interest, and due to their enjoyment of reading English texts. This finding supports those of Tercanlioglu (2001); Lin, Wong, and Chang (2012); Blay, Mercado, and Villacorta (2009), studies which revealed that ‘curiosity’ had the highest mean score among Turkish high school students, and Chinese and Filipino elementary school students, respectively.

In both samples, the least endorsed dimension of L2 reading motivation was competition. This result implies that the Egyptian and the German university students do not seem to engage in L2 reading in order to outperform their colleagues or to prove their mastery of reading English texts against that of their friends. They may not consider the L2 reading as a subject of competition or a way to prove their academic success, but rather they are motivated by factors other than competition. This result confirms Blay and colleagues’ (2009) claim that competition might have only a minor role in raising motivation to read L2 texts among adult EFL readers.

In the Egyptian sample, reading in order to improve grades had the highest mean score, revealing that the students considered reading English texts as a useful way to enhance their achievement. They put more effort into pursuing academic success and developing their L2 reading skill, but without being interested in competing with their colleagues. However, it should be noticed that the mean scores of all motivational scales were high, which reveals that the Egyptian students perceived personal enjoyment and external gains as equal sources for motivating them to read. On the other hand, the German students showed higher preference for L2 intrinsic motivation scales than for L2 extrinsic motivation. Therefore, they were driven by interest in reading about certain topics and by their enjoyment of reading challenging texts, rather than in order to seek external feedback.

Taken together, the German and the Egyptian students reported an overall high level of intrinsic reading motivation. They are more likely to read English texts because they are interested in the reading activity itself and they are less interested in competing with their colleagues.

When testing for gender effect on the L2 reading motivation, no differences between males and females on any of the reading motivation scales were found. Nevertheless, the descriptive analysis revealed that the females have higher mean scores for all the reading motivation scale than the males. This result corroborates findings by Tercanlioglu (2001) and partially supports results from Alsheikh and Elhoweris (2011). In the first study, Tercanlioglu studied EFL Turkish students' reading motivation and did not find any gender effect on the L2 reading motivation scales, while Alsheikh and Elhoweris found significant differences between Emirati males and females on the extrinsic L2 reading motivation. The authors explained that females were more extrinsically motivated than males to master the English language in order to have better chances in education as well as employment, while the male students could easily obtain good jobs in "a male dominant society" (P.7).

5.4 The Structural modeling

In this study I used structural equation modeling to test the relationships between L1 reading comprehension, L2 reading motivation, metacognitive awareness of reading strategies use, and L2 reading comprehension among a sample of German and Egyptian university students.

Based on relevant literature, the English reading comprehension was hypothesized to be associated with these linguistic, emotional, and cognitive variables. In addition, it was hypothesized that L2 intrinsic and extrinsic reading motivation have a direct effect on metacognitive awareness of reading strategy use. The results revealed that the hypothesized models had an overall good goodness of fit indices, however not all the tested relationships between the variables were as hypothesized.

5.4.1 Relationship between L1 reading comprehension and L2 reading comprehension

To investigate the relationship between L1 and L2 reading comprehension, I first used the aggregated scores from multiple-choice tasks to represent the latent construct of reading comprehension in native (Arabic/German) and English languages. Secondly, I conducted SEM analysis using the covariance structure for these latent constructs. Across all tested structural models in the current work, I found that the contribution of L1 reading comprehension in explaining L2 reading comprehension is significant and large, and in some models, L1 reading comprehension was the only significant predictor of L2 reading comprehension. Interestingly, this result remains consistent across different native languages. In the Egyptian sample, Arabic reading comprehension was the only significant variable in the suggested models.

This result reveals that, despite pronounced differences in orthography and writing system between Arabic and English, L1 reading comprehension ability has the strongest relationship to L2 reading

200 Discussion

comprehension when comparing the motivational and metacognitive variables. This finding contradicts those of other researchers (e.g. Akamstu, 2003; Karim, 2003; Van Gelderen, et al., 2004), who claim that the strength of transfer effect between language depends on the similarity of writing system and the greater the linguistic distance between L1 and L2 the less transfer is expected to occur. However, studies by Abu-Rabia (2001; 2003) conducted on English as a foreign language students with Arabic, Hebrew, and Russian first languages revealed that most L1 reading skills tend to transfer to L2 reading situations and that the differences in orthography type (shallow/deep or Roman/Semitic) does not weaken or hinder the relationship between L1 and L2 reading abilities.

The strong relationship between L1 and L2 reading comprehension across the two contexts and two different languages can be explained in accordance with Bernhardt's (2005) suggestion that the investigation of the relationship between L1 and L2 reading should not be about whether there is a transfer effect between the native and the second or foreign language, but rather it should be about how strong this transfer is and in which contexts it occurs. A number of prior L2 reading studies (e.g. Van Geldern et al., 2007; Yamashita, 2002) revealed that L1 reading comprehension contributes significantly to the development of L2 reading skills, despite students perhaps not having sufficient grammatical skills or vocabulary knowledge, and can compensate for low L2 language proficiency

A possible explanation for the transfer effect between the L1 and L2 reading comprehension is the participants' characteristics. L2 reading researchers (e.g. Bernhardt & Kamil, 1995; Cummins, 1986) have suggested that adult students are more prone to transfer their acquired native language reading skills to the second language reading situation. In this study, the students in both samples were adult learners who reached a high level of education and had a relatively high level of L1 proficiency. They therefore surpassed a threshold level which may have embedded the transfer of reading skills between the two languages. In addition, they had many years of experience with their native and foreign language. This experience of reading in both languages promotes the transfer of skills between first and second language reading. The relationship between L1 and L2 reading also increases over time, making L1 reading ability a strong predictor of L2 reading comprehension (Bernhardt & Kamil, 1995; McNeil, 2012; Van Geldern et al., 2007). Furthermore, the students in both samples were enrolled at the university level, which requires continuous research for different learning resources as well as the reading of scientific articles mostly written in English. This continuous exposure to reading materials may promote the transfer of reading ability between L1 and L2 reading situations (Cummins, 1986).

Taken together, previous research and the current findings indicate that L2 learner characteristics (i.e. age, years of language learning experience, proficiency level, and frequent exposure to L2 materials) play important role in promoting the transfer effect between L1 and L2 reading. In other words, the more experience L2 readers have with reading, the stronger the relationship between their L1 and L2 reading skills becomes.

201 Discussion

This strong relationship between reading comprehension scores can be due to the nature of the reading tests used to assess L1 and L2 reading comprehension. Both L1 and L2 reading comprehension are tested using multiple choice tasks. These tasks require that readers evaluate texts on a microproposition level and to judge what information is required to answer a question. The similarity in design, comparable text genres, and similarity in answering format can play role in the strong relationship between L1 and L2 reading scores in the current study (Van Gelderen, et al., 2004).

Another feature of the measurement tools which might influence the relationship between the L1 and L2 reading comprehension is the level of task difficulty. Multiple-choice questions are relative simple tasks; they are not highly cognitively demanding tasks which promotes the transfer effect between L1 and L2 reading “*L1 reading ability would be more prominently involved in L2 reading in the case of a more simple task*” (Bossers, 1992, p.184). Taillefer (1996) and Bossers (1992) indicated that the importance of L1 reading ability varies according to the difficulty level of the reading tasks; in less demanding tasks such as scanning the text, the relative contribution of L1 reading in predicting the L2 reading comprehension would be higher than reading for meaning.

5.4.2 L2 reading comprehension and awareness of reading strategy use

Regarding the effect of awareness of reading strategy use on L2 reading comprehension, it was found that this variable has a minor effect on English reading comprehension. According to the German data, the metacognitive awareness of reading strategy use explains only ... Of L2 reading comprehension variance, while in the Egyptian models this variable had no significant effect at all on the L2 reading comprehension. The results are inconsistent with findings from previous research which examined the relationship between metacognitive awareness of reading strategies and L2 reading comprehension. For example, Yau (2009) found a weak positive correlation between problem solving reading strategies, support reading strategies, and L2 reading comprehension in a sample of Taiwanese high school students. While Tavaloki (2014) indicated a significant relationship between L2 reading comprehension and the support, global, and problem-solving reading strategies, these relationships varied from strong to weak among Iranian university students. In addition, Madhumathi and Ghosh (2012) and Park (2015) found a significant positive relationship between general awareness of reading strategies and L2 reading comprehension among Indian and Korean university students, respectively. The relatively small contribution of metacognitive awareness in explaining reading comprehension also contradicts speculation by Grabe and Stoller (2013) on the role of metacognitive awareness of reading strategies. They suggested that as L2 learners have reading experience accumulated through interaction with texts written in their native language, they will have a great awareness of reading strategies and that reading strategies will have a leading role in L2 reading situation.

Several possible reasons might explain the minor role of metacognitive awareness in influencing L2 reading comprehension.

202 Discussion

Although the Egyptian students showed a high awareness of reading strategies, it appears that this awareness is not enough to influence their English reading comprehension and that there are other factors influencing their L2 reading performance. In Egypt, because of the large number of students in classes, teachers often do not have enough time or resources to provide students with language related strategies or discuss their mistakes and provide students with alternative plans to complete a task successfully. Rather, they provide students with strategies to help them pass exams and focus on memorization rather than analytical strategies. Consequently, the Egyptian students might not be aware enough of the requirements of reading tasks and might not develop an adequate repertoire of reading strategies to help them enhance their reading comprehension.

On the other hand, the negative or non-significant effect of the metacognitive awareness of reading strategy use could have been caused by the measurement tool used in the present study. Paris (2002) indicated that the methods used in measuring metacognition, such as: think-aloud protocols, ratings of strategies, or surveys, might elicit responses which are different from the actual used metacognitive strategies. The responses on these measurement tools are at risk of being contrived, as the subjects might report using some strategies in order to avoid looking ignorant or to look like a more intelligent and strategic learner. They might report that they use a plethora of strategies or decision-making techniques in order to appear intelligent or present themselves in a positive way.

The current results are in line with number of correlational studies. For example, a study by Anderson (1991) found no significant differences between high and low proficiency readers in their use of reading strategies. It seemed that L2 learners use the same strategies regardless of their proficiency level. Also, the results indicated that no strategy or group of strategies significantly contributed to successful reading comprehension. However, Ilustre (2011) found that the use of support reading strategies negatively predicts L2 reading comprehension in Filipino students. Additionally, Meniado (2016) found no statistically significant relationship between L2 reading comprehension and metacognitive awareness of reading strategies among Saudi students. Furthermore, studies by Phakiti (2008) and Zhang (2016) using structural equation modeling to measure the relationship between variables influencing L2 reading comprehension revealed that the awareness of strategy use accounts for 5-3% of the variance in L2 reading comprehension among Chinese and Thai EFL students.

Taken together, the findings from this study indicate that a student's preference for less cognitively demanding reading strategies seems to have a minor effect on, or even negative contribution to, reading comprehension of English texts. Therefore, a student might need to develop an awareness of more sophisticated strategies, such as summarization. On the other hand, measuring a student's awareness of reading strategies alone might not be enough to give evidence on the actual use of these strategies. Rather, it should be coupled with a measuring of the efficiency of the application for these strategies in real L2 reading situations.

5.4.3 L2 reading comprehension and L2 reading motivation

Although intrinsic reading motivation has always emerged as a significant predictor of L1 reading comprehension, in neither the German nor in the Egyptian structural models did it prove to have any significant relationship with L2 reading comprehension. This non-significant relationship between L2 intrinsic reading motivation and L2 reading comprehension contradicts various L1 reading research studies that indicate that intrinsic reading motivation has a positive effect on reading comprehension (e.g. Baker & Wigfield, 1999; Guthrie, et al., 2009; Park, 2011; Wang & Guthrie, 2004). However, the findings from the L2 reading research were inconsistent with the relationship between L2 reading motivation and the L2 reading comprehension. For example, Han's (2011), Jafari and Shokrpour (2012) studies on Chinese and Iranian university students revealed a positive correlation between L2 reading comprehension and L2 intrinsic reading motivation and found no significant correlation between the L2 extrinsic reading motivation and the L2 reading comprehension. Additionally, Park (2015) and Ölmez (2016) found no significant correlation between L2 reading comprehension and L2 reading motivation (i.e. intrinsic and extrinsic) among Korean and Turkish students.

A possible explanation for the non-significant effect of intrinsic motivation, and the positive effect of extrinsic motivation, on reading comprehension is the age of the participants. As students became older, they might have less enthusiasm for learning a foreign language, and the main factor motivating them to pursue L2 learning becomes the fulfillment of academic requirements (Aplin, 1991). In addition, Guthrie and Wigfield (2000) indicated that the intrinsic reading motivation tends to decrease with age and education level. However, Pae (2008) revealed that intrinsic motivation can play important role in L2 learning, but still not a sufficient precondition. In their investigation of L2 learning motivation of Taiwanese students, Warden and Lin (2000) found that students have higher level of instrumental motivation than integrative motivation. They revealed that the importance of learning a foreign language is centered on future requirements rather than the importance of the language itself. Schmidt and his colleagues (1996) also pointed out that EFL Egyptian university students are mainly instrumentally and externally motivated to learn the English language. They are motivated to learn English by the desire to have a good job or to work for international companies. Taken together, the influence of L2 intrinsic reading motivation on L2 reading comprehension tends to decrease as students become older, while the L2 extrinsic reading motivation aspect becomes more salient for adult EFL learners due to their awareness of its role in their academic and professional growth.

This result might be also related to the status of the English language in the modern globalized world in which we live. Nowadays, the English language has become the international language of communication around the world. The majority of scientific research, the technical terms used in different fields, international conferences, the most famous films or TV programs, are mostly in the English language. Therefore, students in an EFL context set their learning or reading goals based on the practical gains they can acquire from mastering English. They become externally motivated to read English materials in order to develop their language skills and to be able to

compete in the job market as well as academia. Consequently, these external motivations might have been internalized and become stronger than the intrinsic reading motivation in developing the student's reading comprehension.

Another possible explanation for the lack of correlation between the L2 reading motivation and the L2 reading comprehension is the nature of the L2RMQ items. The scales used in the current study measures constructs related to habitual or general L2 reading motivation, which might not influence the students' reading comprehension for the particular texts used in the present study. Situational motivation might have a stronger relationship with L2 reading comprehension than general L2 reading comprehension. On the other hand, the L2 reading motivation might have an indirect relationship with reading comprehension through situational reading motivation (Ölmez, 2015; Schaffner & Schiefele, 2007). The answers of the German and the Egyptian participants on the open-ended questions, concerning factors which motivate or demotivate them to read supports this explanation. The German and Egyptian students revealed that their L2 reading motivation is influenced by the reading materials characteristics. Students reported that the difficulty level of texts' vocabulary as well long or complicated texts they found difficult to follow. In addition, 18 students indicated that boring texts demotivate them from reading, which goes along with Takase (2004a; 2004b) claims that providing students with a wide variety of easy and interesting reading materials contributed to an increase in the students' amount of reading and consequently their reading motivation. In addition, Nishino (2007) indicated that providing students with interesting reading materials suitable for their reading ability contributed significantly to sustaining students' reading motivation over a long period of time. Taken together, L2 reading motivation might be more related to reading situation factors such as type of texts rather than being habitual in its nature.

To conclude, in the current study, L2 intrinsic reading motivation did not prove to play a significant role in motivating the German and the Egyptian students studying English as a foreign language. However, L2 extrinsic reading motivation seems to play a more pronounced role in encouraging the students to perform better on reading comprehension tasks.

5.4.4 The relationship between metacognition and reading motivation

One of the objectives of this study was to test the possible relationship between metacognitive awareness of the use of reading strategies and L2 reading motivation. Results revealed a significant positive path between L2 extrinsic reading motivation and awareness of reading strategies. This result implies that students who reported higher scores in extrinsic motivation were more likely to be aware of their use of reading strategies. Students who read to accomplish external purposes, such as passing an exam or being recognized as a good reader, seemed to possess a greater awareness of reading strategies. This finding differs from results of studies by van Kraayenoord (1999) and Zhang (2016) which indicated that reading motivation does not have a direct relationship with reading comprehension, and that it can play an indirect role in explaining variance in reading comprehension (via metacognitive awareness). In contrast, other prior research had revealed similar results supporting the current findings. For example, Memis and

205 Discussion

Bozkurt (2013) found a positive relationship between extrinsic reading motivation and metacognitive awareness of reading strategies ($r = .34$) among Turkish students. Additionally, Matsumoto and colleagues (2013) found extrinsic reading motivation to significantly predict reading strategy use among a sample of Japanese students.

Regarding metacognitive awareness of the use of reading strategies, L2 extrinsic motivation appeared superior in influence on L2 intrinsic motivation. This might be related to students' evaluation of the benefits from engaging in the reading process. When discussing the role of L2 reading motivation, no significant path was revealed to exist between intrinsic reading motivation and L2 reading comprehension, which implies that the students in this present study engaged in L2 reading for the purpose of practical gains (such as academic achievement or employment) rather than for the joy of reading itself.

Another possible factor which might influence the relationship between L2 reading motivation and metacognitive awareness is the nature of the reading tasks. Suarez Riveiro, Cabanach, and Arias (2001) indicated that students are generally not guided by the same type of goals in all learning situations, they change their goals according to the type of learning task and the outcomes they desire to achieve. In addition, Vrugt and Oort (2008) suggested that the use of tasks uninteresting to or insufficiently challenging for the student leads to the students altering their goals and focusing on external rewards, such as high grades. Taken together, it is possible that the reading tasks used in the present study influenced the students' perception of L2 intrinsic reading motivation, which reduced the role of L2 intrinsic reading motivation. Additionally, it might have influenced the students in such a way as to discourage the use of reading strategies.

5.5 Conclusion and Limitations

In the brainstorming phase of this study, my main purpose was to explore the relationship between reading comprehension for English as a foreign language, reading comprehension in native language (German/Arabic), and metacognition. By digging deeper in L2 reading literature, I realized that there are many suggestions to investigate the role of reading motivation in L2 reading. However, few researches did investigate this relationship or the nature of L2 reading motivation. Furthermore, limited number of previous studies have examined the relationship between these variables simultaneously in one single causal or structural model. Accordingly, the current study aimed to test suggested SEM which regulate the relationships between L1 reading comprehension, metacognitive awareness of reading strategies, and L2 reading comprehension among two samples from Egyptian and German university students.

The evaluation of the measurement and the structural models using several goodness of fit indices (e.g RMSEA, CFI, TLI) revealed that the hypothesized models have overall adequate fit to the data sample.

Concerning the relationships between the tested variables, the path significance results revealed that reading in native language had the strongest relationship with L2 reading comprehension which might indicate that reading is a universal skill and achieving a high L1 proficiency level

plays important role in developing students L2 reading ability. On the other hand, difficulties in L1 reading comprehension might causes difficulties in L2 reading as well. However, the data in the current study are limited and further studies on these relationships should be conducted.

According to the information collected from the SORS, the participants in the current study have shown high awareness of L2 reading strategies which they apply during reading English texts. They prefer to use problem-solving strategies such as rereading and paying close attention to reading material. Nevertheless, this awareness did not show a significant relationship with L2 reading comprehension in the Egyptian sample and revealed a negative relationship with L2 reading comprehension according to the German data. This result does not imply that strategic awareness play no role in L2 reading comprehension, rather it reveals that measuring metacognition needs more than self-reported surveys to be adequately measured and using interviews or think aloud protocols might give a more comprehensive picture of the role for the nature of metacognitive awareness and its role in L2 reading comprehension.

Concerning the L2 reading motivation, in the Egyptian sample neither the intrinsic nor the extrinsic reading motivation had a significant relationship with L2 reading comprehension which implies that there are other factors that might motivate them. The answer of the open/ended questions revealed that the students reading motivation is more related to the content of the reading material. They are motivated to read English texts to gain knowledge and they avoid difficult or boring reading materials. Thus, the measurement of L2 reading motivation should account for factors related to the reading situation and which reading materials are available rather than measuring general reading motivation. On the other hand, the German students only extrinsic reading motivation had a positive relationship with L2 reading comprehension. This finding suggests that German students are interested to read English texts in order to acquire practical gains such as enhancing their achievement rather than enjoying the reading activity itself.

However, the limitations of the present study should be considered when interpreting the results. First, the present study was cross-sectional and the data were collected over a short period of time. Thus, it is difficult to assume that all the relationships indicated were indeed causal. A second possible limitation is the use of the self-report surveys when collecting information about students' metacognitive awareness of reading strategies and L2 reading motivation. It is possible that mixed-method research would provide more comprehensive information regarding these two variables. A third potential limitation might be the fact that the samples may have been insufficiently representative of university students in Egypt and Germany. The Egyptian and German students were recruited from one from one university in Egypt and Germany each, also the number of female participants in both samples was larger than males. It therefore could be argued that this sample lacked representativeness.

5.6 Pedagogical Implications and Future Research

The main goal of the present study was to explore the relationship between EFL reading comprehension and certain emotional, cognitive, and linguistic factors. By investigating these

207 Discussion

relationships, a better understanding can be formed of ways in which to increase students' L2 reading comprehension. The findings of this present study offer a few important implications for L2 reading instruction and research.

Firstly, these findings could contribute to the development of instructional strategies for improving reading comprehension in EFL, especially by encouraging them to use their native linguistic resources. Secondly, these results could be used by textbook writers and curriculum developers to design and organize English textbooks by taking into account the relationship between L1 and FL textbooks. For example, including explicit instructions in L2 reading textbooks that refer students back to L1 reading textbooks for related topics which would make enhance the comprehension of English text.

Thirdly, EFL teachers should be made aware of the nature of reading motivations of their students and consequently relate their teaching accordingly. Understanding students' English reading motivation can facilitate English instruction by providing reading material which fit students' needs and interests. For example, teachers could potentially motivate L2 students by emphasising the ways in which the class material can lead to professional and academic success in the future. In addition, it is important to choose English reading materials that match the students L2 proficiency level and match their interests which will help to enhance students' motivation toward reading and consequently would increase their reading comprehension.

Based on the findings and the limitations of the current study, further research which tackle issues related to L2 reading on are suggested in the following lines

- 1- Using additional measurement methods (alongside self-report questionnaires) could provide further information on students' metacognitive awareness of reading strategies and their L2 reading motivations. A replication of the present study using interviews or think-aloud protocols could provide more accurate information regarding these variables.
- 2- Future research could test a more comprehensive model by including other variables, such as L2 proficiency level or vocabulary knowledge, in order to explore the differential roles of L1 reading skills and L2 proficiency in predicting L2 reading comprehension.
- 3- Future studies might produce more positive results when conducted over a longer period of time (as a longitudinal study), rather than collecting the data in a single session.
- 4- The present study investigated general (or habitual) L2 reading motivation. Thus, future research might replicate this study by investigating the relationship between situational L2 reading motivation and L2 reading comprehension.

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Appendix

Appendix A Unstandardized factor loadings of CFA for SORS and L2RMQ	238
Appendix B Unstandardized factor loadings of second order CFA for SORS and L2RMQ	244
Appendix C Survey of Reading Strategies (SORS) German version	246
Appendix D L2 Reading Motivation questionnaire (L2RMQ) German version.....	250

Appendix A

Table A. 1

Unstandardized factor loadings of SORS items in the Egyptian data

Latent factor	Indicator	Estimate	Standard Error	z value
	1	1		
	3	1.33	0.36	3.69
	4	1.12	0.34	3.26
	12	1.06	0.31	3.34
	6	1.16	0.34	3.35
	8	1.42	0.39	3.60
	17	1.20	0.34	3.55
Global reading strategies	27	1.44	0.38	3.72
	15	1.17	0.34	3.42
	20	1.22	0.36	3.37
	21	1.59	0.39	4.00
	23	1.21	0.32	3.70
	24	1.26	0.34	3.64
	7	1		
	9	1.21	0.34	3.53
Problem-Solving reading strategies	11	0.94	0.29	3.20
	14	1.10	0.30	3.57
	16	1.04	0.32	3.20
	19	1.28	0.34	3.77
	25	1.18	0.30	3.91
	28	1.42	0.37	3.83
	2	1		
	5	1.20	0.35	3.42
Support reading strategies	10	1.04	0.29	3.54
	18	1.01	0.29	3.38
	13	0.97	0.29	3.32
	22	1.21	0.32	3.79
	26	1.01	0.31	3.27
	29	0.81	0.27	2.96
	30	1.23	0.33	3.72

(*) $p < 0.001$

Table A. 2

Unstandardized factor loadings of SORS items in the German sample

Latent factor	Indicator	Estimate	Standard Error	z value
	1	1		
	3	1.89	0.62	3.02
	4	2.63	0.82	3.20
	6	2.39	0.75	3.16
	8	2.64	0.82	3.20
	12	1.51	0.52	2.88
	17	1.60	0.56	2.86
Global reading strategies	27	1.44	0.38	3.72
	15	2.11	0.70	3.01
	20	2.67	0.83	3.21
	21	2.16	0.66	3.23
	23	1.51	0.51	2.91
	24	1.87	0.61	3.06
	7	1		
	9	0.85	0.16	5.05
Problem-Solving reading strategies	11	0.56	0.14	3.96
	14	0.58	0.13	4.50
	16	0.62	0.19	3.17
	19	0.54	0.19	2.83
	25	0.80	0.16	4.96
	28	0.53	0.21	2.51
	2	1		
	5	1.18	0.50	2.35
Support reading strategies	10	0.59	0.34	1.71
	18	2.11	0.66	3.20
	13	1.800	0.59	3.03
	22	1.71	0.47	2.46
	26	1.96	0.61	3.19
	29	1.09	0.47	2.28
	30	0.82	0.43	1.91

(*) $p < .001$

Table A. 3

Unstandardized factor loadings of L2 intrinsic reading motivation scale items in the Egyptian sample

Latent factor	Indicator	Estimate	Standard Error	Z value
	1	1		
involvement	2	1.01	0.14	6.91
	3	0.89	0.21	4.22
	4	1.09	0.20	5.24
	5	0.97	0.20	4.68
	6	0.84	0.16	5.04
Curiosity	1	1		
	2	0.95	0.14	6.60
	3	0.88	0.16	5.42
	4	0.89	0.14	6.13
Challenge	1	1		
	2	1.04	0.15	6.74
	3	0.76	0.13	5.63
	4	0.83	0.13	6.19

(*) $p < .001$

Table A. 4

Unstandardized factor loadings of items representing the subcomponents of intrinsic motivation in the German sample

Latent factor	Indicator	Estimate	Standard Error	Z value
	1	1		
Involvement	2	0.94	0.06	14.77
	3	1.21	0.13	8.96
	4	1.32	0.15	8.77
	5	0.76	0.12	5.98
	6	0.69	0.14	4.95
	1	1		
Curiosity	2	1.01	0.09	10.80
	3	0.66	0.10	6.30
	4	1.03	0.09	11.28
	1	1		
Challenge	2	1.25	0.12	10.13
	3	0.72	0.10	6.78
	4	0.80	0.11	7.32

(*) $p < .001$

Table A. 5

Unstandardized factor loadings of items representing the subcomponents of extrinsic motivation in the German sample

Latent factor	Indicator	Estimate	Standard Error	Z value
	1	1		
Grades	2	0.47	0.21	2.19
	3	2.53	0.64	3.91
	4	2.46	0.63	3.90
	1	1		
Competition	2	0.69	0.11	6.14
	3	0.53	0.11	4.57
	4	0.92	0.21	4.33
	5	0.77	0.12	6.27
	1	1		
Recognition	2	0.90	0.13	6.90
	3	0.88	0.12	6.91
	4	1.06	0.13	7.73
	5	0.96	0.15	6.35
	1	1		

(*) $p < .001$

Table A. 6

Unstandardized factor loadings of items representing the subcomponents of extrinsic motivation for the Egyptian sample

Latent factor	Indicator	Estimate	Standard Error	Z value	P value
	1	1			
Grades	2	1.04	0.29	3.51	0.00
	3	1.55	0.41	3.73	0.00
	4	0.90	0.34	2.60	0.00
	1	1			
Competition	2	0.97	0.15	6.31	0.00
	3	1.13	0.20	5.65	0.00
	4	1.06	0.20	5.34	0.00
	5	1.08	0.19	5.68	0.00
Recognition	1	1			
	2	1.22	0.20	6.04	0.00
	3	1.20	0.18	6.44	0.00
	4	1.47	0.16	8.79	0.00
	5	1.32	0.15	8.47	0.00

(*) $p < .001$

Appendix B

Table B. 1
c SORS items for the German data

Latent factor	Indicator	Estimate	Standard Error	Z value
metacognitive awareness of reading strategies	Global reading strategies	1.00		
	Problem-solving reading strategies	0.61	0.09	6.40*
	Support reading strategies	0.53	0.08	6.20*

(*) $p < .001$

Table B. 2
Unstandardized factor loadings of of second order CFA of SORS for the Egyptian data

Latent factor	Indicator	Estimate	Standard Error	Z value
metacognitive awareness of reading strategies	Global reading strategies	1.00		
	Problem-solving reading strategies	0.85	0.08	9.79*
	Support reading strategies	0.94	0.09	9.85*

(*) $p < .001$

Table B. 3
Unstandardized factor loadings of second order CFA of L2 reading motivation for German data

Latent factor	Indicator	Estimate	Standard Error	Z value
L2 intrinsic reading motivation	Involvement	1		
	Curiosity	1.04	0.07	14.86
	Challenge	1.03	0.07	14.62
L2 extrinsic reading motivation	Grades	1		
	Competition	1.70	0.29	5.770
	Recognition	2.13	0.38	5.22

(*) $p < .001$

Table B. 4

Unstandardized factor loadings of second order CFA L2 reading motivation for German data

Latent factor	Indicator	Estimate	Standard Error	Z value
L2 intrinsic reading motivation	Involvement	1		
	Curiosity	1.11	0.11	9.54
	Challenge	1.17	0.12	9.33
L2 extrinsic reading motivation	Grades	1		
	Competition	1.77	0.32	5.45
	Recognition	2.17	0.40	5.41

(*) $p < .001$

Appendix C

Studentendaten

Name:

Alt:

Geschlecht (männlich/ weiblich)

Semester:

Jahre des Lernens Englisch

Hast du jemals Kurse (außer Schule) genommen, um Englisch zu lernen?

Ja

Nein

Liest du englische Materialien außer akademischen Texten?

Ja

Nein

Bitte klären den Typen dieser Texte (Zeitschriften, Romane, Texte im Internet.....)

E-Mail:

Umfrage zu Lesen Strategien

Der Zweck dieser Umfrage ist es, Informationen über die verschiedenen Techniken zu sammeln, die Sie verwenden, wenn Sie englische Texte lesen. Alle nachfolgenden Sätze beziehen sich auf Ihre englischsprachige Lesung. Jede Anweisung wird von fünf Zahlen gefolgt, 1, 2, 3, 4 und 5, und jede Zahl bedeutet:

'1' bedeutet, dass ich das niemals oder fast niemals mache.

"2" bedeutet, dass ich das nur gelegentlich mache.

"3" bedeutet, dass ich das manchmal mache. (Ca. 50% der Zeit).

"4" bedeutet, dass ich das normalerweise mache.

'5' bedeutet, dass ich immer oder fast immer das mache.

Nach dem Lesen jeder Anweisung, wählen Sie die Nummer (1, 2, 3, 4 oder 5), die für Sie gilt.
zum Beispiel

Sätze	niemals 1	2	3	4	immer 5
Ich lese nach dem Mittagessen			X		

Beachten Sie, dass es keine richtigen oder falschen Antworten auf eine der Aussagen zu dieser Umfrage gibt.

N	Satz	Niemals 1	2	3	4	Immer 5
1	Ich habe ein Ziel vor Augen, wenn ich lese.					
2	Ich mache mir beim Lesen Notizen, damit ich besser verstehen, was ich gelesen habe.					
3	Ich überlege was ich schon kenne, damit ich besser verstehe, was ich gelesen habe.					
4	Ich verschaffe einen Überblick über den Text, bevor ich mit dem Lesen beginne um zu sehen, wovon es handelt.					
5	Wenn einer Text schwierig wird, lese ich ihn laut, um ihn besser zu verstehen.					
6	Ich denke darüber, ob der Inhalt des Textes zu meinem Leseziel passt.					
7	Ich lese langsam und gründlich, um sicherzustellen, dass ich verstehe, was ich lese.					
8	Ich untersuche bei einem Text zuerst Eigenschaften wie Länge und Aufbau.					
9	Ich versuche mich zu sammeln, wenn ich bemerke, dass ich die Konzentration verliere.					
10	Ich unterstreiche oder umkreise Informationen im Text, damit ich mich diese Informationen besser erinnern kann.					
11	Ich passe meine Lesegeschwindigkeit je nach dem, was ich lese.					
12	Beim Lesen entscheide ich, was ich genauer lese und was ich ignorieren kann.					
13	Ich benutze Referenzmaterialien (z. B. ein Wörterbuch), um besser zu verstehen, was ich lese.					
14	Wenn der Text schwierig wird, achte ich genauer darauf, was ich lese.					
15	Ich benutze Tabellen, Abbildungen und Bilder im Text, um mein Verständnis zu verbessern.					
16	Ich halte von Zeit zu Zeit kurz an und denke und denke darüber das nach, was ich lese.					
17	Ich benutze dem Kontexthinweise, die mir helfen, dass was ich lese besser zu verstehen.					
18	Ich paraphasiere (formuliere Ideen in meinen eigenen Worten), um besser zu verstehen, was ich lese.					

N	Satz	Niemals 1	2	3	4	Immer 5
19	Ich versuche, mir Informationen zu bildlich vorzustellen oder sie zu visualisieren, um das, was ich lese, besser zu erinnern.					
20	Ich benutze typografische Merkmale wie Fettdruck und Kursivschrift, um wichtige Informationen zu hervorzuheben.					
21	Ich analysiere und beurteile die Informationen, die im Text dargestellt sind.					
22	Ich springe im Text vor und zurück, um darin Beziehungen zwischen Ideen zu entdecken.					
23	Ich überprüfe mein Verständnis, wenn ich neuen Informationen lese.					
24	Wenn ich lese, versuche ich zu vorhersagen, was der Inhalt des Textes ist.					
25	Wenn ein Text schwierig wird, lese ich ihn mehrfaches, um mein Verständnis zu verbessern.					
26	Ich stelle mir Fragen, die ich die anhand des Textes beantworten kann.					
27	Ich überprüfe, ob meine Vermutungen über den Text richtig oder falsch sind.					
28	Wenn ich lese, sage ich die Bedeutung unbekannter Wörter oder Phrasen vorher.					
29	Beim Lesen übersetze ich aus dem Englischen in meine Muttersprache.					
30	Beim Lesen denke ich über die Informationen Sowohl auf Englisch als auch in meiner Muttersprache.					

Appendix D

Lesemotivation Fragebogen

Das Ziel dieser Umfrage ist es, die Gründe zu kennen, die dich dazu motivieren, englische Texte zu lesen.

Jede Anweisung wird von fünf Zahlen gefolgt, 1, 2, 3, 4 und 5, und jede Zahl bedeutet:

'1' bedeutet, dass ich stimme dem Satz gar nicht zu

"2" bedeutet, dass ich stimme dem Satz nicht zu.

"3" bedeutet, dass ich stimme ziemlich dem Satz (Ca. 50%).

"4" bedeutet, dass ich stimme dem Satz zu.

'5' bedeutet, dass ich stimme voll und ganz dem Satz zu

Nach dem Lesen jeder Anweisung, wählen Sie die Nummer (1, 2, 3, 4 oder 5), die für Sie gilt.
zum Beispiel

Sätze	Stimmt gar nicht 1	2	3	4	Stimmt vollständig 5
Ich reise gern in englischsprachige Länder			X		

Beachten Sie, dass es keine richtigen oder falschen Antworten auf eine der Aussagen zu dieser Umfrage gibt.

N	Satz	Stimmt gar nicht 1	2	3	4	Stimmt vollständig 5
1	Ich lese gerne auf English.					
2	Ich denke, Englisch zu lesen kann mir helfen, gute Noten zu bekommen.					
3	Ich möchte der beste englische Leser unter meinen Kollegen sein.					
4	Es macht Spaß, auf Englisch zu lesen.					
5	Ich interessiere mich dafür, über neue Dinge auf Englisch zu lesen.					
6	Ich bin bereit, hart zu arbeiten, um besser zu lesen als meine Freunde.					
7	Ich mag es, auf Englisch zu lesen, um Informationen über Dinge und Leute zu bekommen, die mich interessieren.					
8	Manchmal, wenn ich auf Englisch lese, vergesse ich alles um mich herum.					
9	Ich genieße es, schwierige englische Texte zu verstehen.					
10	Wenn ich auf Englisch lese denke ich oft darüber nach, wie gut ich im Vergleich zu anderen lese.					
11	Ich lese auf Englisch um hohe Werte in TOEFL oder IELTS Tests zu bekommen.					
12	Ich mag es, englische Materialien zu lesen, die mich zum Nachdenken anregen.					
13	Wenn ich über ein interessantes Thema auf Englisch lese, vergesse ich die Zeit.					
14	Ich lese auf Englisch, um einen Universitätsabschluss zu bekommen.					
15	Ich mag es, wenn mein Lehrer sagt, dass ich gut auf Englisch lesen kann.					
16	Ich lese gerne Bücher über Menschen in verschiedenen Ländern					
17	Es bereitet mir Freude, etwas Interessantes auf Englisch zu lesen.					

N	Satz	Stimmt gar nicht 1	2	3	4	Stimmt vollständig 5
18	Ich mag es, wenn andere mich fragen, was ich auf Englisch lese, damit ich meine Kenntnisse zeigen kann.					
19	Ich lese auf Englisch, weil ich mich gut fühle, wenn ich die Fragen der Lehrer richtig beantworten kann.					
20	Ich freue mich, wenn mich jemand als guter Leser bemerkt.					
21	Ich mag die Herausforderung, wenn ich etwas auf Englisch lese.					
22	Ich stelle mir Dinge bildlich vor, wenn ich auf Englisch lese.					
23	Wenn das Buch interessant ist, ist es mir egal, wie schwer es ist					
24	Ich mag es, wenn ich der einzige Student/die einzige Studentin bin, der bzw. die beim Lesen von englischen Texten eine die Antwort weiß.					
25	Beim Lesen von guten Büchern fühle ich mich als ob ich mit den Personen befreundet wäre.					
26	Ich mag es, wenn meine Freunde sagen, dass ich gut auf Englisch lesen kann.					
27	Wenn meine Kollegen besser als ich lesen, neige ich dazu, mehr englische Texte zu lesen.					
28	Ich lese in Englisch, weil es für meine Leistung in verschiedenen Fächern wichtig ist					

Gibt es andere Gründe, warum Sie in Englisch lesen möchte? Bitte klären.

Was sind die Gründe, die Ihr Interesse reduzieren, um in Englisch zu lesen?

Curriculum vitae

Personal Data

Name Hadya Adel Abdelrehim Mohamed
Date of Birth 15 July 1986 in Ismailia, Egypt.
E-Mail hadia_suleiman@edu.suez.edu.eg

Education

2003 – 2007 B.A. of Education, SCU, Ismailia, Egypt.
2008 – 2009 Professional Diploma, Educational Psychology, SCU, Ismailia, Egypt.
2009 –2010 Special Diploma, Educational Psychology, SCU, Ismailia, Egypt.
2013 Master of Education, Educational Psychology, SCU, Ismailia, Egypt.

Teaching Experience

05. 2008 – 2013 Demonstrator of Educational Psychology, SCU, Ismailia, Egypt.
01. 2014 – Now Assistant Lecturer of Educational Psychology, SCU, Ismailia, Egypt.
Summer semester 2018 Course “Empiriepraktika” (Bachelor Psychology)
Winter semester 2018/2019 Course “Empiriepraktika” (Bachelor Psychology)

Other Qualifications

Language skills	Arabic (Native speaker)
	French (Fluent)
	English (Fluent)
	German: (V. Good command)
Computer skills	MS-office (Word, Power-Point, Excel)
	SPSS (Advanced knowledge)
	R (Advanced knowledge)
	Mplus (V. Good Knowledge)
	JASP (Good Knowledge)
	JAMOVI (Good Knowledge)

Publications

Adel, H. (2013). *The causal model of relationships among cognitive, emotional variables and second language motivated learning behavior within the frame of Dörnyei model*. (Master dissertation). Suez Canal University (SCU), Ismailia, Egypt.

Adel, H. (2016). Integrativeness, instrumentality and ideal L2 self as predictors of L2 motivated behavior. *Journal of Faculty of Education*, 1(35).

Adel, H. (2018, July). *Assessing Metacognitive Awareness of Reading Strategy Use, Reading Motivation and their Relation to Reading Comprehension for EFL Arabic Learners*. Poster session presented at the 28th Annual Meeting for the Society for Text & Discourse, Brighton, UK.

Workshops and conferences

2011 Attending a workshop on Using Electronic Scientific Databases, SCU, Ismailia, Egypt.

2012 Organizing Workshop on “Applying Multiple Intelligences in School Context” at Omar ibn Abd elAziz Secondary institute.

2013 Participating at the 1st Young Researchers Conference with oral presentation, SCU, Ismailia, Egypt.

2015 Attending Workshop on Structural Equation Modeling (SEM) in R/Lavaan

2018 Participating at 28th Annual Meeting for the Society for Text & Discourse, July 17-19, 2018 in Brighton, United Kingdom.