Metacomprehension in L1 and L2 Reading

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Metacomprehension in L1 and L2 Reading: Examining the Relationship between Vocabulary Knowledge, Comprehension Monitoring and Reading Comprehension

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Metarazumijevanje u čitanju na materinjem i stranom jeziku: istraživanje odnosa između bogatstva rječnika, nadgledanja razumijevanja i razumijevanja pročitanog teksta

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Abstract

The present paper analyzes the relationships between vocabulary knowledge, metacognitive monitoring and reading comprehension in L1 and L2 reading in upper elementary school. The relationship between vocabulary knowledge and reading comprehension is presented through the Construction-Integration model of reading developed by Walter Kintsch. The analysis emphasizes vocabulary knowledge as the most important element of L2 reading for this age group. The relationship between vocabulary knowledge and metacognitive monitoring is explored through the measures of resolution and calibration, and the results are fitted into the wider context of research on metacognitive knowledge and control. The results support metacognitive word awareness as an important element of vocabulary learning. Statistically significant differences in bias are found between top and bottom quartile of students according to their vocabulary tests scores. The top quartile shows underconfidence and bottom quartile overconfidence in both the 5th and 8th grades. In the discussion of the relationship between metacognitive monitoring and reading comprehension, error detection is emphasized. The importance of simplifying text language in order for error detection skills to emerge in L2 reading of fifth-grade students is found. A developmental line in comprehension monitoring, according to which these skills first emerge in L1 and then transfer to L2, is also found. In both languages, the first to emerge are local metacomprehension skills, followed by global ones. Finally, a question whether L2 reading is a language problem or a reading problem is discussed, with the results firmly supporting the language threshold hypothesis. Educational implications are discussed throughout the paper.

Key words: vocabulary knowledge, metacomprehension, reading comprehension, L1, L2

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1. Introduction

If a second language learner is going to become second language literate, learning how to read well is an essential component of that process. Considering this argument leads to the following questions: What are the most important components of learning how to read well in a foreign or second language? What can teachers do to help their students through that process? What is needed for students to become independent readers, the ones who can keep improving on their foreign language reading comprehension on their own? To answer these questions, language-specific and more general (meta)cognitive factors have been identified as key factors that have emerged out of second language reading research. In addition, the key age for second language reading comprehension development has been identified as upper elementary school years. The present study, therefore, researches the interactions of vocabulary knowledge as a language-specific factor and comprehension monitoring as a metacognitive factor with reading comprehension in students attending the 5th and 8th grades of elementary school, in order to explore the nature of their relationships and make conclusions relevant for educational settings and learning practice.

2. Key Constructs in Defining Reading Comprehension

Reading is a complex process best explained through the use of models or metaphors. The most general model of reading in cognitive psychology and linguistics is the information processing metaphor, described by Barbara M. Birch (2007) as consisting of two basic parts: the knowledge base component, which is a "storage for general and specific knowledge in long-term memory," and the processing strategies component, which "consists of a variety of strategies that the reader has acquired or learned" (p. 3). The reader reads the words on a page or screen while using strategies to process these words and connect them to prior knowledge already stored in long-term memory. In the process, two basic mechanisms are involved: language or decoding processing and cognitive or comprehension processing. Both types of processing consist of their own knowledge base and processing strategies.

The goal of language processing is "to translate letter symbols into meaningful language," and the goal of cognitive processing is "to learn to construct meaning from a text" (Helder et al., 2016, p. 17). As Susan E. Haviland and Herbert H. Clark (1974) point out, cognitive processing of comprehension or understanding does not occur in isolation – clause by clause or sentence by sentence, it always occurs through the integration of clause or sentence meaning that has just been read with the information previously read in the text or information contained in the reader's background knowledge (p. 512). Through the process of text and background knowledge information interaction, the reader constructs a mental model of a text, which is "a higher-level representation of a situation described in a text," and should be differentiated from "a meaning representation of the text itself," which is based only on the information contained in the text (Carpenter et al., 1995, p. 110). By creating the mental model, the reader is said to have comprehended the text.

RAND Reading Study Group and its chair, Catherine Snow (2002), define reading comprehension as "the process of simultaneously extracting and constructing meaning through interaction and involvement with written language" (p. 11). Inherent in the definition are two basic processes in reading, which have gained considerable attention in the history of reading research. These are bottom-up processes (the extracting meaning component of the definition) and top-down processes (the constructing meaning component). They describe two basic flows of information during the reading process, from the text on paper or screen to the knowledge stored in long-term memory (bottom-up processes) and *vice versa*, from the knowledge stored in long-term memory to the text (top-down processes).

In the information processing metaphor of reading, the reader is seen as using

> cultural and world knowledge and generalized cognitive processing strategies at the "top" to construct a meaning for big pieces of text, like sentences, paragraphs, or stories. … The bottom of the model contains precise bits of knowledge about language and writing and processing strategies that permit our minds to turn squiggles on the page into meaningful symbols. (Birch, 2007, pp. 3-4)

However, the reader does not do one or the other separately, rather they engage in both types of processing simultaneously. This generally accepted view of reading is called the interactive model of reading. The Construction-Integration Model of Reading Comprehension is an interactive model of reading developed by Walter Kintsch.

3. Construction-Integration (CI) Model of Reading Comprehension

According to the Construction-Integration (CI) Model of Reading Comprehension, Kintsch argues that the text is represented by the reader at three separate yet interacting levels of reading comprehension: 1) the surface or linguistic level, 2) the semantic or propositional level, and 3) the level of the situation or mental model. Text comprehension "proceeds by a succession of two kinds of processing phases: construction and integration" (Schmalhofer et al., 2002, p. 108). The construction phase involves the processing of text input, which may or may not involve the activation of the reader's background knowledge. Information is coded at all three levels of reading comprehension. During the integration phase, information is pruned as well as related within and between the reading comprehension levels.

Both bottom-up and top-down processes are present at every level of reading comprehension. However, the surface and the propositional levels are primarily driven by bottom-up processes or the information input from the text; whereas, the situation model level is primarily driven by top-down processes or the information coming from the reader's background knowledge.

3.1. Surface or Linguistic Level of Reading Comprehension

The surface or linguistic level of reading comprehension is the decoding level, which includes the "processing of the particular words and phrases contained in the text itself" (Kintsch & Rawson, 2005, p. 210). The linguistic bottom-up processes involved at this level concern perception, word recognition and proposition formation. In L2 (second language) reading, they are primarily composed of orthographic, phonological, lexical, syntactic and semantic strategies. The main characteristic of all bottom-up processes is "the potential to be strongly automatized, which is a requirement for fluent reading" (Löwenadler, 2019, p. 370).

Orthographic strategies enable the recognition of written signs. Phonological processing strategies enable the discrimination and production of sounds. Phonemic awareness consists of "knowledge that words are made up of discrete sounds, along with the strategies that allow discrimination and segmentation of sounds." (Birch, 2007, p. 63). After the graphs (letters on a page) have been identified (matched to the graphemes – the abstract representations of graphs in the human mind) through the orthographic processing, they are then processed phonologically, which means that they are matched to phonemes – the abstract mental images

of the sounds of English, which are stored in the knowledge base for language in long-term memory. Thus, the graphemic-phonemic image (the visual-aural image) of the word is created, which then "undergoes lexical processing to identify and retrieve the word and its correct meaning (Birch, 2007, p. 49). Through lexical processing strategies, the graphemic-phonemic image of a word is matched with the representation of the word in the mental lexicon. This is the process of word recognition. William Grabe (2009) asserts that there is a consensus among researchers that "semantic and syntactic information becomes available after word recognition and is used for word-integration and comprehension processes" (p. 25). Syntactic parsing and semantic strategies are the strategies used for proposition formation. Syntactic parsing is "the assignment of words to their roles in sentences and phrases" (Kintsch & Rawson, 2005, p. 210). The reader relies on grammatical cues (word order, prepositions, tenses, etc.) in order to integrate words into larger units. These cues provide "ongoing instructions for the construction of text comprehension" (Grabe, p. 30). The semantic strategy involves predicting the text "on the basis of meaning and on the selection restrictions provided by the preceding words" (Murtagh, 1989, p. 97). The syntactic parsing and semantic strategy work together to form propositions or units of meaning. A proposition is "the smallest unit of knowledge that can stand as a separate assertion – that is, the smallest unit one can meaningfully judge as true or false" (Anderson, 2015, p. 104). The proposition has been conceptualized by Kintsch as consisting of a relation, e.g., a verb or an adjective, followed by an ordered list of arguments, e.g., nouns. Thus, the sentence "John drank coffee" is represented in our brain as the following proposition: "drink (John, coffee, past)".

3.2. Semantic or Propositional or Textbase Level of Reading Comprehension

3.2.1. Text Microstructure

Propositions are linked by coherence or cohesive relationships into the microstructure of the text. The coherence relationships between propositions are "the primary determinant of whether a set of sentences do or do not constitute a text" (Brown & Yule, 1983, p. 191). M. A. K. Halliday and R. Hasan (1976) emphasize that the text is not a grammatical unity (the highest structural unit of grammar being the sentence), it is a semantic unit. The text is not a collection of sentences, rather it is defined by its texture and "the texture is provided by the cohesive RELATION" (p. 2, emphasis in the original). The cohesive relationship is a function of co-

referentiality *within* the text (it is, therefore, an *endophoric* relationship): to understand what one element of the text means we need to know what another one means – the one to which the first element refers or with which it forms a cohesive tie. The cohesive relationship can be anaphoric ("those which look back in the text for their interpretation") and cataphoric ("those which look forward in the text for their interpretation") (Brown & Yule, 1983, p. 192). Walter Kintsch and Eileen Kintsch (2005) emphasize that "inferences are necessary to bridge gaps in cohesion between propositions and to identify pronouns to arrive at a coherent microstructure (pp. 72-73). Therefore, inferences are needed to process co-reference. An inference is a process of drawing a conclusion from a set of premises, which is active in forming a microstructure whenever there is a "piece of information that is not explicitly stated in a text" and which, therefore, needs to be arrived at or concluded or inferred (McKoon and Ratcliff, 1992, p. 440).

3.2.2. Text Macrostructure

The microstructure of the text gives the local understanding of the text – phrase by phrase, clause by clause or sentence by sentence understanding. However, the number of thus coded propositions is very high and in order to understand longer and more complex texts, the reader needs to find and/or infer the most important propositions, which are called macropropositions. A macroproposition is constructed from a number of microstructure-based propositions using macrorules, which are reductive inferences that reduce and organize the text into its most important propositions. In this manner, the reader arrives at a globally coherent semantic description of text content, which forms the topic, theme, gist, upshot or point of the text being read. The macrorules behave recursively, leaving the reader with an ability to create a still higher-level macroproposition set from the macroproposition set already created, thus creating a hierarchical structure consisting of several levels of semantic representation of the text, which is called the macrostructure. The global understanding of the text or the macrostructure is a "hierarchical structure of (macro) propositions – either propositions directly represented by the text or generalizations and constructions based on the text" (Kintsch & Kintsch, 2005, p. 73). Except through macrorules, the macrostructure is also created using macrostrategies. Whereas macrorules are performed on full propositional sequences, macrostrategies use bits of information of various lengths and the reader can start to infer what the theme of a text is even after having just read a single phrase, clause or sentence of that text.

3.3. From Textbase to Mental or Situation Model or Interpretation Level of Reading Comprehension

Put together, the microstructure and the macrostructure form the textbase, which is a semantic or propositional representation that the reader constructs of a text. The meaning acquired by a proposition in a textbase is defined as true if it does not contradict any other proposition in the textbase. This is the intensional meaning of a proposition, based on the coherence theory of truth. According to this theory, "the truth of any (true) proposition consists in its coherence with some specified set of propositions" (Young, 2018). However, there is another way of looking at propositional meaning. The extensional meaning of a proposition asserts that to understand what a propositions means is "to know what the world would have to be like for it to be true" (Johnson-Laird, 1980, p. 96). This meaning of a proposition is based on the correspondence theory of truth. According to this theory, "truth is correspondence to, or with, a fact . . . truth consists in a relation to reality" (David, 2022). However, as Johnson-Laird (1980) points out, "human beings do *not* apprehend the world directly; they possess only internal representations of it. Hence, a propositional representation is true or false with respect to a mental model of the world" (p. 98). The mental model is an internal model an individual creates of a world or reality. Van Dijk and Kintsch (1983) call the mental model the situation model and define it as "the representation of that fragment of the world the text is speaking about" (p. 338). That fragment of the world depicts a certain state of affairs, which consists of objects, properties, relations, facts, etc. Facts are defined as referents of propositions in a possible world (Van Dijk & Kintsch, 1983, p. 116). Therefore, the essence of referential meaning and mental or situation models is the idea that "to understand the text we have to represent what it is about. If we are unable to imagine a situation in which certain individuals have the properties or relations indicated by the text, we fail to understand the text itself" (Van Dijk & Kintsch, 1983, p. 337).

The reader as they read constructs the situation model in parallel with the textbase. However, the construction of the situation model does not come automatically and many readers do not construct strong and elaborate situation models. One of the most important roles of the textbase is to provide the basis for the construction of the situation model. In addition, the textbase would make no sense "if we did not have this ability to coordinate the text representation with the situation model" (Van Dijk & Kintsch, 1983, p. 339). For example, the expressions *my son* and *the pupil* may have different semantic meanings in the textbase, but can both refer to the same individual in the situation model, say Mark. Therefore, the cohesive

or coreferential relation of the textbase would not be possible without the situation model, which ties different concepts in the textbase together by providing the representation of the same individual. As the construction of the situation model follows the construction of the textbase, micropropositions are paralleled with local facts, while macropropositions are paralleled with global facts; that is, both the textbase and the situation model have the microstructure and the macrostructure (Kintsch, 1998, p. 166). In addition, our knowledge about the represented individual Mark can contain much more information than the concepts *my son* and *the pupil* do. In other words, by creating a situation model the reader adds to the text meaning a lot of elements that are not directly presented in the text, which form a basis for inferencing and other cognitive processes. Van Dijk and Kintsch (1983) include in the textbase only those inferences "that are necessary to establish coherence at the local or global level" (p. 336). Any other inferential processes belong to the situation model. "The situation model . . . is the basis for the interpretation of the text. It features all the knowledge that is left implicit in the text or otherwise presupposed" (Van Dijk & Kintsch, 1983, p. 338). It is the interpretation level of text comprehension.

The elements added to text interpretation which are not directly present in the text come from the reader's background knowledge. The background knowledge is stored in long-term memory in the form of generalized knowledge, which is "decontextualized, generalized information . . . distilled from many experiences," or episodic knowledge, which is a memory of "context-embedded, unique personal experience" (Van Dijk & Kintsch, 1983, p. 312). When the reader reads a word, phrase or a clause, an input is created which serves to instantiate particular generalized knowledge structures, which, in turn, activate specific episodic memories that form the basis for the activation or construction of a situation model. In this manner, situation models are not only constructed, but also reactivated, reused and re-updated many times (whereas the textbase is rarely reactivated once it has served its purpose of creating a situation model). Thus, the situation model is much more easily retrieved than the textbase and is what is remembered once the text is read. (On the other hand, when the situation model is not constructed or at least not in a manner sufficient for understanding, elements of propositional text-based representations can be remembered; however, such memory is rather superficial and it often includes verbatim recall of phrases and clauses.) Therefore, it is the situation model that "provides the basis for further cognitive operations," such as, problem solving, logical reasoning, inferencing, translation and learning, the last-mentioned even being defined as "the modification of situation models" (Van Dijk & Kintsch, 1983, pp. 341-342).

As part of the background knowledge, the situation model does not just contain conceptual information, it can also contain emotional information and imagery (Kintsch & Rawson, 2005, p. 211) as well as spatial, temporal, causal, intentional or motivational and protagonist dimensions (Zwaan & Radvansky, 1998).

4. L2 Reading

According to William Grabe and Junko Yamashita (2022), the process of reading comprehension is similar in both L1 (first language) and L2 reading. That is why both languages exhibit analogous developmental processes and predictor variables are usually the same. In addition, both languages use the same conceptual store of background knowledge as well as the underlying cognitive capacities. However, the main difference is that the native language speaker is introduced to reading while already having acquired a large vocabulary set and an implicit knowledge of grammar. On the other hand, the second language learner is introduced to second language reading while having a limited knowledge of L2 vocabulary and grammar, but at the same time with the knowledge of and reading experiences in their mother tongue. Due to being explicitly taught vocabulary and grammar in school, the L2 reader has a greater awareness of language, that is, a stronger metalinguistic component as a resource in tackling L2 reading assignments. Therefore, the main issues that have arisen in researching L2 reading are the connections or crosslinguistic transfer between L1 and L2 reading, as well as the role of L2 linguistic resources in L2 reading.

J. Charles Alderson (1984) formulated the problem in his famous question: "is foreign language reading a language problem or a reading problem?" (p. 24) If it is a reading problem, then there is an underlying reading ability that manifests in both languages and once it has been learned in the first language, it is just a matter of transferring that ability to the second language. In that case, good L1 readers will also be good L2 readers and poor L1 readers will be poor L2 readers. Jim Cummins (1979) formulated the view as the Interdependence Hypothesis, in which he posited a mutual factor for both L1 and L2 reading, called the Cognitive/Academic Language Proficiency or CALP, and stated that "the cognitive/academic aspect of L1 and L2 are interdependent . . . both L1 and L2 CALP are manifestations of the one underlying dimension" (p. 199). This view had its predecessor in Kenneth S. Goodman and the Reading Universals Hypothesis. Goodman stated that "the reading process will be much the same for all languages" (Goodman, 1971, as cited in Alderson, 1984, p. 3). A specific type of interdependence hypothesis is the Central Processing Hypothesis or the Common Underlying Cognitive Processes Framework, which argues that

> common (or underlying) cognitive processes such as verbal working memory (WM), rapid serial naming, reading strategies, metacognitive awareness skills, executive control skills (WM, inferencing, comprehension monitoring . . .), background knowledge, motivation, and phonological awareness are all viewed as potentially universal supports for reading abilities in any (alphabetical) language (and potentially also the concept of metalinguistic awareness). (Grabe & Yamashita, 2022, p. 184)

If foreign language reading is a language problem, then "a student's knowledge of the foreign language is more important to the comprehension of foreign language texts than is reading ability in the first language" (Alderson, 1984, p. 13). Good L2 readers are good because they are more proficient in the second language and have more adequate knowledge of L2 vocabulary and grammar than poor L2 readers. The Language Threshold Hypothesis formulated by J. Charles Alderson (1984) emphasizes L2 reading as a language problem until a certain ceiling level of language competence or the L2 knowledge threshold has been reached, after which L2 reading becomes primarily a reading problem. The transfer of reading ability is only possible after the student has good enough knowledge of L2 vocabulary and grammar. Prior to Alderson, Jim Cummings (1981) stated the Linguistic Threshold Hypothesis in the context of bilingualism: "those aspects of bilingualism that might positively influence cognitive growth are unlikely to come into effect until children have attained a certain minimum or threshold level of proficiency in the second language" (p. 38). Cummins was discussing contradictory findings of different studies, some of which provided evidence that bilingualism was detrimental to cognitive growth, while others provided evidence that bilingualism enhanced cognitive growth. The Linguistic Threshold Hypothesis was a way to reconcile these studies. Mark A. Clarke (1980) also provided an earlier expression of the Language Threshold Hypothesis. He called it the Short Circuit Hypothesis and stated that "limited control over the language 'short circuits' the good reader's system, causing him/her to revert to poor reader strategies when confronted with a difficult or confusing task in the second language" (p. 206).

Therefore, it seems that L2 reading is both a language problem and a reading problem, with the two levels continually interacting with each other, which prompted Elizabeth B. Bernhardt and Michael L. Kamil (1995) to restate Alderson's question in the following manner: "How L1 literate does a second language reader have to be to make the second language knowledge work? How much second language knowledge does a second language reader have to have in order to make L1 literacy knowledge work?" (p. 15). This might be the earliest expression of the Dual-Language Involvement in L2 reading, a position that emphasizes that "the L2 reader engages the L2 reading task with a dual-language system" (Grabe & Yamashita, 2022, p. 191). We cannot not read both with our L1 and L2 reading resources whenever we

engage in L2 reading. The dual-language view expands the notion of transfer. According to Grabe and Yamashita (2022), transfer is a permanent process while reading, and not an occasional occurrence because L1 linguistic resources are always activated at least implicitly while we read in an L2.

After introducing reading comprehension, the focus is next turned to two important reading components: vocabulary as a representation of the language dimension and metacognition as a representation of the reading dimension.

5. Vocabulary Knowledge

Caroline T. Linse (2005) defines vocabulary or lexis as “the collection of words that an individual knows” (p. 121). Michael L. Kamil and Elfrieda H. Hiebert (2005) define it as “the knowledge of meaning of words” (p. 3). However, the meaning and form do not need to have a one-to-one correspondence. Because “both single and multi-word units can realize meaning,” Joe Barcroft et al. (2011) define a lexeme, lexical unit or lexical item as “an item that functions as a single meaning unit, regardless of the number of words it contains” (p. 573). Receptive or passive vocabulary is based on “perceiving the form of a word while listening or reading and retrieving its meaning,” while the productive or active vocabulary is connected to producing a word through speaking or writing. (Nation, 2013, p. 47). Vocabulary tests usually measure either vocabulary breadth or depth. Vocabulary breadth measures “how many words are known” and vocabulary depth “how well a particular word is known” (Nation, 2013, p. 573).

6. Defining Metacognition

Metacognition is a multifaceted phenomenon and the research on metacognition still is theoretically fragmented. An overview will be given of key theoretical concepts and frameworks that have emerged out of around half a century of research.

6.1. Metacognitive Knowledge

John H. Flavell (1979) defines metacognition as "knowledge and cognition about cognitive phenomena" (p. 906) and divides it into metacognitive knowledge and metacognitive experiences. Metacognitive knowledge is "stored world knowledge that has to do with people as cognitive creatures and with their diverse cognitive tasks, goals, actions, and experiences" (Flavell, 1979, p. 906). Metacognitive knowledge is further divided by Flavell into person, task and strategy categories. The person category comprises "everything that you could come to believe about the nature of yourself and other people as cognitive processors," the task category "concerns the information available to you during a cognitive enterprise," and the strategy category concerns "what strategies are likely to be effective in achieving what subgoals and goals in what sorts of cognitive undertakings" (Flavell, 1979, p. 907).

Other researchers have conceptualized metacognitive knowledge in a similar vein. For example, Paul R. Pintrich (2002) sees metacognitive knowledge as consisting of self-knowledge, knowledge about cognitive tasks and strategic knowledge (pp. 220-222). Gregory Schraw and David Moshman (1995) call metacognitive knowledge "the knowledge of cognition" (p. 352). They divide it similarly to Flavell (1979) and Pintrich; however, there are differences. Flavell's person and task categories as well as Pintrich's self-knowledge and knowledge about cognitive tasks are grouped together and termed "declarative knowledge or knowing *that*," Flavell's strategy category and Pintrich's strategic knowledge are termed "procedural knowledge or knowing *how*," and there is an additional, third category added, termed "conditional knowledge or knowing *when*," which represents "knowing when and why to apply various cognitive actions" (Schraw & Moshman, 1995, pp. 352-353). The conditional category has been introduced because the research has shown that knowing about a particular strategy and knowing how to employ it still do not guarantee the learner or reader will actually employ it in a particular situation. The knowledge that guarantees that the learner is flexible in their strategy use, knowing when to and when not to apply a strategy is captured by this aspect

of the definition. As Ruth Garner (1990) points out, "effective learners are strategic when they need to be" (p. 518). Furthermore, Scott G. Paris and Peter Winograd (1990) term metacognitive knowledge "self-appraisal," and state that it "includes personal reflections about one's knowledge, states and abilities" (p. 8).

6.2. Metacognitive Experiences

Flavell (1979) defines metacognitive experiences as "any conscious cognitive or affective experiences that accompany and pertain to any intellectual enterprise" (p. 906). Anastasia Efklides (2008) sees metacognitive experiences as "what the person is aware of and what she or he feels when coming across a task and processing the information related to it" (p. 279). Metacognitive knowledge is based on the information (knowledge and beliefs) about persons, tasks and strategies, which are stored in long-term memory, whereas, metacognitive experiences are products of online awareness or online monitoring of cognition and information available in short-term memory. Furthermore, metacognitive knowledge is general in scope, it refers to "classes of similar tasks or responses to them, to models of cognitive processes, to ideas or beliefs about the person . . . to experiences with tasks on various occasions and/or situations, to strategies used, etc." (Efklides, 2001, p. 300). On the contrary, metacognitive experiences are specific in scope, that is, they are task specific and "refer to features of particular tasks or of their processing" (Efklides, 2001, p. 300). Additionally, metacognitive knowledge is cognitive in character, while metacognitive experiences can be either cognitive or affective in nature, or both cognitive and affective at the same time.

Efklides (2001) distinguishes between three basic types of metacognitive experiences: metacognitive feelings, metacognitive judgments or estimates and online metacognitive knowledge, which she also calls online task-specific knowledge. Metacognitive feelings are "feelings experienced in relation to the task at hand" and their affective character is "manifested in the quality of pleasantness or unpleasantness they have" (Efklides, 2001, pp. 300-301). An example from the research on memory cognitions or metamemory is the feeling of knowing (FOK) judgment. FOKs are "judgments about whether a given currently nonrecallable item is known and/or will be remembered on a subsequent retention test" (Nelson & Narens, 1990, p. 130). They are composed of both the feeling component and cognitive component. Metacognitive judgments or estimates are cognitive in nature, they are focused on the person or task knowledge, and have no affective component. For example, judgments of learning

(JOLs) “occur during or after acquisition and are predictions about future test performance on currently recallable items” (Nelson & Narens, 1990, p. 130). Finally, online metacognitive knowledge or online task-specific knowledge “monitors the task features heeded and kept in short-term memory as well as cognitive operations performed on task input for the attainment of the goal set” (Efklides, 2001, p. 301). It distinguishes itself from metacognitive knowledge because it is not general in scope, rather, it pertains to the task at hand; however, it can contain metacognitive knowledge retrieved from long-term memory that is required to process a specific task. Its nature is purely cognitive, with no affective component. This type of knowledge is, for example, reported in verbal reports or think alouds, where learners express their thought processes as they solve a task. Metacognitive experiences are “metacognition that originates from one’s own self,” while metacognitive knowledge “may originate not only from oneself but from other people as well” (Efklides, 2001, p. 302). Metacognitive experiences feed their products (various types of judgments) into the metacognitive knowledge long-term memory store; however, beliefs about cognition can also be acquired from talking, observing and interacting with other people. Both metacognitive knowledge and metacognitive experiences are products of cognition monitoring. Monitoring and control are important processes that connect metacognition and cognition, and are emphasized in Thomas O. Nelson and Louis Narens’ (1990) model of metacognition.

6.3. Process Model of Metacognition

In his semantic conception of truth, Alfred Tarski resolves the paradox of self-reference by distinguishing between the object-level and the meta-level that refers to that object-level (Nelson, 1996). The paradox of self-reference is exemplified, for example, in the following sentence: “This sentence is false.” The question is what the truth value of that self-referential sentence is. If the sentence is true, then according to its meaning, it is false. If the sentence is false, then it is true that it is false, and therefore it is true. Hence the paradoxical contradiction that needed to be resolved. Tarski posited that at the object-level there are “only sentences about things other than sentences,” and at the meta-level, there are “only sentences about object-level sentences.” (Nelson, 1996, p. 105). Thomas O. Nelson (1996) applied Tarski’s way of thinking to the problem of consciousness that plagued the 19th century psychology, as expressed in Comte’s paradox: “The thinker cannot divide himself into two, of whom one reasons whilst the other observes him reason,” and developed a metacognitive model of

consciousness and cognition. (p. 103). The thinker can indeed divide themselves into two: at the first- or the object-level are "cognitions concerning external objects," and at the second- or the meta-level are "cognitions concerning cognitions of external objects" (Nelson, 1996, p. 105).

Therefore, Thomas O. Nelson and Louis Narens' (1990) model of metacognition consists of two connected levels: the meta-level and the object-level (see Figure 1). The flow of information from the meta-level to the object-level is called "control" and the flow of information from the object-level to the meta-level is called "monitoring." The meta-level contains "a model of the object level" and can modify it (i.e., change its state and processes) through creating an object-level behavior (the initiation, continuation or termination of an activity) (Nelson & Narens, 1994, p. 11). This is the process of regulation or cognition control. The opposite is not possible; that is, the object-level has no model of the meta-level and does not modify it. The flow of information from the object-level to the meta-level rather informs the meta-level. This is the process of cognition monitoring. "The key role of metacognitive monitoring" is "as the input device for the individual's control system" (Nelson, 1996, p. 114).

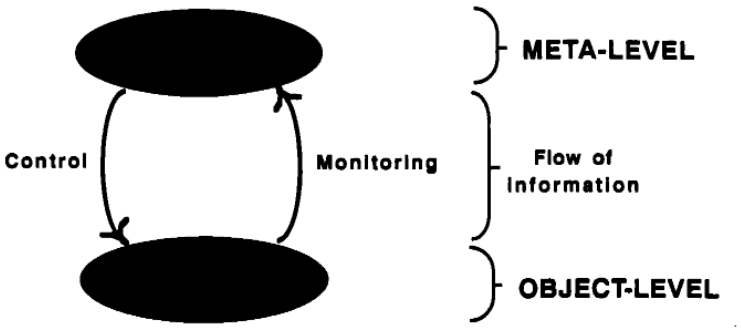

Figure 1: Model of metacognition by Nelson and Narens (1990, p. 137)

6.4. Metacognitive Skills

Anastasia Efklides (2008) sees metacognition as a multifaceted phenomenon that consists of three basic elements: metacognitive knowledge, metacognitive experiences and metacognitive skills. She defines metacognitive skills as "the deliberate use of strategies (i.e., procedural knowledge) in order to control cognition" (p. 280). Metacognitive knowledge is declarative in nature. It can be expressed verbally. Metacognitive judgments, as products of

metacognitive experiences, are also at least partially declarative. Online metacognitive knowledge is declarative as well. However, as online awareness of cognition, metacognitive experiences serve the monitoring function, which is procedural in nature: its essence is not about being stated in declarative sentences, rather, it is about activities and behaviors an individual engages in during learning or reading, and these activities or behaviors are called metacognitive skills or strategies. As Wilbert J. McKeachie et al. (1985) point out, "knowledge about cognition, however, does not necessarily lead to improved cognition. Students need to learn how to regulate their cognition through executive control of their resources" (p. 154). Executive control of cognition involves both monitoring and control (Efklides, 2008, p. 280). According to Efklides (2008), metacognitive skills consist of orientation, planning, regulation (both through monitoring and control) and evaluation strategies. Metacognitive skills can also "call in cognitive strategies – such as rehearsal, elaboration, and so forth – to regulate cognition" (p. 280).

Paris and Winograd (1990) term the monitoring and regulation of cognition "self-management," and state that it refers to "metacognitions in action, or how metacognition can orchestrate cognitive aspects of problem solving" (p. 8). Shraw and Moshman (1995) define regulation of cognition as "metacognitive activities that help control one's thinking or learning" (p. 354). They divide it into three main parts: planning, monitoring and evaluation. During the planning phase, goals for learning or reading are set, the relevant background and metacognitive knowledge is activated, and according to the goals and prior knowledge, appropriate strategies are chosen. During the monitoring phase, the individual is aware of their online comprehension as the activity proceeds and can choose between various metacognitive monitoring strategies to keep track of their understanding. Finally, during the evaluation phase, the learner or reader appraise the outcome of their learning or reading activities in terms of the goals set for the task.

In his model of self-regulated learning, Pintrich (2005) identifies four key areas of regulation of one's learning. These are cognition, motivation or affect, behavior and context. In the area of regulation of cognition, there are four main phases: 1) forethought, planning and activation, 2) monitoring, 3) control and regulation and 4) reaction and reflection. The first, second and fourth phase are identical to Shraw and Moshman's (1995) parts of cognition regulation. However, Pintrich adds the cognitive control and regulation phase, which includes "the types of cognitive and metacognitive activities that individuals engage in to adapt and change their cognition" (Pintrich, 2005, p. 459).

In cognitive science, the learner and the reader are seen as active participants or agents in the process of learning and reading, with "the capacity to be reflective, and to assume control of his or her activity" (Palinscar, 2002, p. 496). Active participants interact with their environments by setting goals, which they aim to reach. By being reflective, learners observe or monitor their progress towards the goal set and make introspective judgments which help identify the discrepancies between that goal and current achievement. They can then exercise metacognitive control by changing and adapting their goals, plans and behaviors.

6.5. Metacomprehension and Knowledge Monitoring Assessment (KMA) Framework

The introspective metacognitive judgments that learners make during their metacognitive monitoring are not always correct. They can "contain errors or distortions . . . called *cognitive illusions*" (Nelson, 1996, p. 106, emphasis in the original). This is why it is important to match one's metacognitive judgments on object-level cognitions with an independent means of assessing their validity. This enables one to assess "the correspondence between what the individual believes is cognitively occurring and the empirical reality of what is actually occurring" (Nelson, 1996, p. 106). Philip H. Winne and John C. Nesbit (2009) define the learner's ability "to accurately judge what they know" as metacomprehension (p. 262). Metacomprehension is comprehension of comprehension. Within the KMA framework, it is a judgment of comprehension or understanding of what one knows. Ayanna K. Thomas and Mark A. McDaniel (2007) define it as "the process of monitoring the online learning of text material" (p. 212). Gregory Schraw (2009) conceptualizes metacomprehension as the "understanding at the broadest possible level that is necessary for an individual to be fully self-regulated," and divides it into metamemory, which is "knowledge and understanding of memory in general, as well as one's own memory in particular," and metacognition (p. 415). He divides metacognitive or metacomprehension judgments into three groups: prospective judgments or predictions, concurrent judgments and retrospective judgments or post-dictions. Prospective judgments or predictions "require the examinee to make a judgment about learning or performance prior to performing the criterion task" (Schraw, 2009, p. 416). Examples are JOLs and FOKs. Concurrent judgments "refer to ongoing assessments of learning performance" (Schraw, 2009, p. 417). Examples are online confidence judgments, which are "judgments of confidence in one's performance" (Schraw, 2009, p. 416). Finally, retrospective

judgments or post-dictions "refer to judgments of learning or performance after the criterion task has been completed" (Schraw, 2009, p. 417). These include, for example, retrospective ease of learning judgments or EOLs, which are "judgments after study or testing about the relative ease of learning information" (Schraw, 2009, p. 416).

The Knowledge Monitoring Assessment (KMA) framework has been developed by Sigmund Tobias and Howard T. Everson (2009). Participants are asked to differentiate between what they know and what they do not know in a certain academic area. Thus, it tests their ability to monitor and accurately assess their knowledge state. The KMA consist of a meta-level test and an object-level test. The meta-level test is a list of items, and next to each item the students have to circle either "yes" or "no," depending on whether they think they know or do not know that item, respectively. The object-level or criterion test is operationalized as a knowledge test that consists of the same items that were used in the meta-level test. It is given after the meta-level test and empirically determines the student's real knowledge of the items in question. Metacomprehension accuracy is the degree of relationship between the verbal report as stated at the meta-level test and the criterion response as made at the object-level test (Thomas & Mcdaniel, 2007, p. 212). In the KMA, it is a relationship between prospective or predictive metacomprehension judgments and criterion responses, and is the measure of resolution or relative accuracy, in which "learners judge their comprehension bit by bit (e.g., learning objective by learning objective)" (Winne & Nesbit, 2009, p. 262). The KMA generates four scores. Two scores indicate accurate metacomprehension monitoring judgments: 1) the student indicates that they know the meaning of a word on the meta-level test and they provide a correct response on the object-level test (abbreviated as (hit, hit)), 2) the student indicates that they do not know the meaning of a word and provide an incorrect response (abbreviated as (miss, miss)). Two scores indicate inaccurate metacomprehension monitoring judgments: 3) the student indicates that they do not know the meaning of a word and they provide a correct response (abbreviated as (miss, hit)), and 4) the student indicates that they do know the meaning, however, they provide an incorrect response (abbreviated as (hit, miss)). These scores can be arranged in a 2x2 matrix with binary self-report estimates from the items list (yes or no) as the columns and binary criterion test item scores (correct, incorrect) as the rows. The cumulative KMA score is calculated using the Hamman coefficient. The formula for the Hamman coefficient is as follows (Schraw, 2009):

$$\text{Hamman coefficient} = \frac{(a+d)-(b+c)}{a+d+b+c}$$

a = the number of (hit, hit) scores
b = the number of (miss, miss) scores
c = the number of (miss, hit) scores
d = the number of (miss, miss) scores

Calibration or absolute accuracy is "the correspondence between mean metacognitive judgments and mean actual performance and it reflects the extent to which metacognitive judgments are realistic" (Koriat et al., 2008, p. 38). A measure of calibration or absolute accuracy is called bias, which is formulated as "the signed difference between confidence judgments and actual performance" (Maki et al., 2005, p. 723). The term "signed difference" refers to taking into account the direction or sign (+/-) of the difference between the metacognitive judgment and actual performance. It captures "the direction and magnitude of the lack of fit between confidence and performance" (Schraw, 2009, p. 419). Overconfidence is indicated by a positive value, showing that "judgments are higher than performance," whereas underconfidence is indicated by a negative value, showing that "judgments are lower than performance" (Maki et al., 2005, p. 723).

The KMA framework is based on the prospective metacognitive judgments of an individual determining whether they do or do not know a particular item. This kind of judgment is multidimensional in nature and has an element of confidence in it (Tobias & Everson, 2009, p. 122). The learner can be understood as judging how sure they are that they know an item, with the forced choice between knowing and not knowing. The KMA bias score is then calculated in the following manner. The accurate metacomprehension monitoring judgments are given the value 0, while the inaccurate (hit, miss) judgments are given the value 1 and the inaccurate (miss, hit) judgments the value -1. Then all the values for each student are added and the bias score is calculated. The higher the positive value of the bias score, the more overconfident a student is. The lower the negative value of the bias score, the more underconfident they are. If a student's bias index is 0, then the student is as underconfident as overconfident, and is not leaning in any one direction.

7. Method

7.1. Participants

Prior to the main study, a pilot study was done on 16 students attending the 5th grade and 18 students attending the 8th grade of an elementary school in Zagreb, Croatia. The results of the pilot study were included in the study results. The main study was done on 49 5th grade students and 42 8th grade students attending several elementary schools in Zagreb, Croatia. Overall, there were 35 female and 30 male 5th grade participants and 33 female and 27 male 8th grade participants.

7.2. Measures

All the measures used were created for the purposes of the present study. Different, age appropriate, tests were created for the fifth-graders and eighth-graders.

L2 vocabulary KMA was assessed through two tests. In the first test, the student was presented with a list of forty English words, and next to each word they needed to circle "yes" or "no," depending on whether they thought that they knew what a particular word meant or not. Then they were given an L2 vocabulary knowledge test, consisting of the same forty words. The test had forty multiple-choice questions in which students needed to circle the correct meaning for each word (one answer was correct and three answers served as distractors per each question). This measure was also used as a stand-alone measure of *L2 vocabulary knowledge*. The L2 vocabulary knowledge test assessed vocabulary breadth of students' receptive or passive vocabulary. In order to choose age-appropriate words for the L2 vocabulary KMA and L2 vocabulary knowledge measures, English language text- and workbooks used in classrooms around Croatia in grades four through eight of elementary school and the first two grades of high school were consulted.

Error detection was assessed through a ten-item test. Each item consisted of a short paragraph in English that contained an error. Student needed to choose a sentence with the error among four options. Fifth-graders did poorly on the error detection test in the pilot study and the revised version of the test was given to the students in the main study.

L2 reading comprehension was assessed in each grade by using two short English texts (fifth-grade texts consisted of 225 and 242 words and eighth-grade text consisted of 309 and 267 words). The first text was followed by 13 questions and the second text was followed by 15 questions in both grades. All questions were in the multiple-choice format with four options to choose from and one correct answer. The students had texts available while solving the questions, and could look back into the texts. Some of the questions asked about specific terms from the texts, and these terms were then bolded in the texts in order to make it easier for students to find them. The texts used both for the error detection and L2 reading comprehension measures were obtained from the website *dreamreader.net*, which published texts for different age and proficiency levels, designed to help with learning how to read in English as a foreign language. All texts were published under the *Creative Commons* license, which allows for their use for non-commercial purposes.

The Cronbach coefficient alpha for each test can be seen in Table 1.

Table 1

Cronbach's Alpha

Grade	Test	Number of items	Cronbach's α
5th	L2 Vocabulary KMA	40	0.88
	L2 Vocabulary Knowledge	40	0.86
	Error Detection (Pilot)	10	-0.82
	Error Detection (Revised)	10	0.56
	L2 Reading Comprehension	28	0.84
8th	L2 Vocabulary KMA	40	0.91
	L2 Vocabulary Knowledge	40	0.91
	Error Detection	10	0.74
	L2 Reading Comprehension	28	0.90

7.3. Procedure

An e-mail was dispatched randomly to a number of elementary schools and those who responded positively were included in the study. Sometimes just several students from a school participated, and sometimes an entire class. Prior to participating, the students' parents or guardians signed a consent form in which they agreed to their child participating in the study.

First, a pilot study was done. The data obtained showed problems with the fifth-grade error detection test, while other tests yielded acceptable data. Therefore, the error detection test for the fifth-grade was revised and the revised version was given to the participants in the main study.

All the tasks in both the pilot and main studies were administered in English, with the researcher giving oral instructions prior to each task in Croatian. The written instructions were also in Croatian, as well as a "yes or no" option in the L2 vocabulary KMA measure. In both the pilot and main studies, data collection was obtained in two steps. In the first step, the students were given the L2 vocabulary KMA test (which also contained the L2 vocabulary knowledge test) and an error detection test. In the second step, performed a week later, the students were given the L2 reading comprehension test. The time allocated to both steps was 45 minutes per step, which was plenty of time to finish the tests for all involved students.

7.4. Study Aim and Research Questions

The aim of the study is to explore the nature of the relationships between vocabulary knowledge, procedural metacognition and reading comprehension. The correlations obtained between these variables in English as an L2 have served as points of departure; however, the discussion has been extended to the connections between L1 and L2 reading. The main research questions are:

1. What is the nature of the relationship between vocabulary knowledge and reading comprehension in L2?
2. What is the nature of the relationship between procedural metacognition and vocabulary knowledge in L2?
3. What is the nature of the relationship between procedural metacognition and reading comprehension in L2?
4. Is L2 reading a language problem or a reading problem?

8. Prior Research

When investigating metacognition, of specific interest to researchers have been children due to metacognition developing throughout childhood and into adulthood. There is evidence of some elements of metacognitive awareness already developing in children as young as 4 to 6 years old, before they enter school (Alexander et al., 1995, p. 4). "Metacognitive knowledge gradually grows in the years thereafter, but the development of metacognitive skills is not expected to set in before the age of 11-12 years" (Veenman & Spaans, 2005, p. 162). Although metacognition is found in young children, it is less solidly established than in older children and adults. The key period of a more stable emergence of metacognition seems to roughly coincide with what Piaget termed as a formal-operational stage of cognitive development, which approximately spans the ages between 11 and 15. John H. Flavell et al. (2002) argue that "Piagetian formal-operational thinking is metacognitive in nature because it involves thinking about propositions, hypotheses, and imagined possibilities – cognitive objects all" (p. 164). Therefore, the focus of the present study were elementary school children, fifth graders between 11 and 12 years old, in order to obtain additional empirical evidence on how metacognition functions at this key period of life.

Research has identified two broad categories of factors contributing to L2 reading development: language-specific knowledge (which includes L2 vocabulary) and general reading skills (usually tapped through metacognition) (Ardasheva et al., 2019; Ardasheva & Tretter, 2013; Schoonen et al., 1998). There is a long research history confirming that vocabulary knowledge is one of the strongest predictors of L1 or native language reading comprehension (Bast & Reitsma, 1998; Cain et al., 2004; Didović & Kolić-Vehovec, 2009 demonstrate the connection for elementary school children). The same holds true for L2 vocabulary knowledge and L2 reading comprehension (as shown for elementary school children by Ardasheva et al., 2019; August et al., 2005; Rydland et al., 2012). Moreover, the research evidence reveals that the effect of L2 vocabulary knowledge on L2 reading comprehension is stronger than the effect of L1 vocabulary knowledge on L1 reading comprehension (Lervåg and Grøver Aukrust, 2010; Taboada, 2012 show this on research samples of children attending elementary school). This makes L2 vocabulary knowledge even more important as a variable in L2 reading comprehension.

Metacognition has also been shown to be positively associated with L1 reading comprehension (Kolić-Vehovec & Bajšanski, 2001; Kolić-Vehovec & Bajšanski, 2006; Tobias

& Everson, 2009 demonstrate the connection between the comprehension monitoring component of metacognition and reading for elementary school children). Metacognition is also positively associated with L2 reading comprehension, and specifically with L2 reading comprehension of students attending elementary school (Kolić-Vehovec & Bajšanski, 2007; Fajar et al., 1996, as cited in Tobias & Everson, 2002).

Although there is a lot of research demonstrating the importance of vocabulary and metacognition as predictive variables in reading comprehension, as Ardasheva et al. (2019) point out, "to date, findings regarding relative contributions of a broader spectrum of language-specific and metacognitive knowledge skills to L2 reading are inconsistent" (p. 154). For example, Van Gelderen et al. (2004) studied the relative contribution of vocabulary and metacognitive knowledge as components of L2 reading comprehension in Grade 8 elementary school students and found that metacognitive knowledge had a significant contribution with the standardized regression weight $\beta = .70$, $p < .05$, and vocabulary knowledge had a significant contribution with $\beta = .26$, $p < .05$ (p. 26). Therefore, metacognitive knowledge contributed almost three times as much to the explanation of L2 reading comprehension as vocabulary knowledge did. Tobias et al., 1991 as cited. in Tobias and Everson (2000) also found that in a group of freshmen university students, in an L1 reading study, "metacognitive assessments of students' word knowledge were more substantially related to reading comprehension than the number of correct answers" in the vocabulary test (p. 157). By contrast, on a sample of 856 English language learners attending elementary school as well as high school, Ardasheva and Tretter (2013) found that English proficiency, defined as language-specific knowledge, which includes vocabulary, was the strongest predictor of L2 reading comprehension and that metacognitive knowledge (measured through a questionnaire on metacognitive strategies), although also significantly contributing to student reading scores, was less substantially related to L2 reading comprehension than language-specific knowledge. Schoonen at al. (1998) also found that the best predictor of L2 reading comprehension was L2 vocabulary in grades 8 and 10, although the importance of vocabulary decreased and the importance of metacognition increased in grade 10, with students having a higher level of L2 reading proficiency in grade 10. Metacognitive knowledge was also "not entirely implicated in vocabulary knowledge," since it was "capable of explaining additional variance" in L2 reading comprehension, beyond L2 vocabulary knowledge (Schoonen at al., 1998, p. 98). In L1 reading comprehension, L1 vocabulary was also the most important predictor. In grade 6, metacognitive knowledge did not contribute to L1 reading comprehension beyond L1 vocabulary knowledge. However, in

grades 8 and 10, metacognitive knowledge became more important and contributed to L1 reading beyond L1 vocabulary, thus explaining additional variance in L1 reading comprehension (Schoonen at al., 1998). Therefore, considering these contradictory findings, further research is needed.

9. Results and Discussion

9.1. Correlation between L2 Vocabulary Knowledge and L2 Reading Comprehension

The correlation between L2 vocabulary knowledge and L2 reading comprehension for fifth-graders is 0.681 and is statistically significant at the 0.01 level ($p<0.01$). For the eighth-graders, the correlation between L2 vocabulary knowledge and L2 reading comprehension is 0.784 ($p<0.01$). The strengths of these correlation coefficients are considered moderate to high; that is, the variables are considered moderately to highly associated. The direction of the correlations is positive, meaning that as the knowledge of L2 vocabulary increases, L2 reading comprehension ability increases as well, and *vice versa*, as L2 vocabulary knowledge decreases, the L2 reading comprehension ability also decreases. With the p-value being less than 0.01, the probability of obtaining these results or higher degrees of correlation by chance alone is less than one in a hundred cases, which means that, statistically, there are very small chances that the observed relationships have occurred by chance alone, and are rather real connections, not obtained by accident. The correlation coefficient results are presented in Table 2.

Table 2

L2 Vocabulary Knowledge and L2 Reading Comprehension Correlation

		L2 Reading Comprehension
L2 Vocabulary Knowledge	5th grade	0,68**
	8th grade	0,78**

** p < .01.

The obtained results support a well-established body of research, which has consistently found high correlations between vocabulary knowledge and reading comprehension. For example, in their study of the relationship between L1 vocabulary knowledge and L1 text comprehension in elementary school students attending grades four and eight, Martina Didović and Svjetlana Kolić-Vehovec (2009) found that the Pearson correlation coefficient between vocabulary knowledge as measured by a word recognition test and reading comprehension test was 0.62 for female fourth graders, 0.60 for male fourth graders, 0.57 for female eighth graders

and 0.45 for male eighth graders ($p<0.001$ in all cases) (pp. 107-108). In L2 reading research, C. Patrick Proctor et al. (2005) studied a sample of 135 Spanish-speaking fourth-grade English language learners, and found the correlation between their English vocabulary knowledge, as measured by the Woodcock Picture Vocabulary test, which required children to name picture objects, and their English comprehension test, as measured by the Woodcock Passage Comprehension test, which is a cloze-type reading comprehension test, to be 0.73 ($p<0.001$) (p. 252).

The correlation between vocabulary and reading comprehension being strong and positive in both the native and second languages indicates that the poorer the vocabulary, the less the learner is able to understand what they have read, no matter if they read in their L1 or L2. The *vice versa* is also true, the richer the vocabulary, the better their understanding of the written material. Experimental studies have shown that increasing vocabulary knowledge can have a positive effect on reading comprehension, as well as that reading more and better text understanding can have a positive effect on increasing vocabulary knowledge. In other words, the hypothesis made by Keith E. Stanovich (1986) that the relationship between vocabulary knowledge and reading is bi-directional or that there is reciprocal causation between the two variables has been proven true (p. 378). For example, Isabel L. Beck et al. (1982) studied fourth-graders and found that, in the experimental group, intense vocabulary instruction over a period of several months resulted in considerable gains in the recall of a story which contained instructed words, as well as in the transfer of gains to a standardized reading comprehension test as compared to the control group, with which they had similar results on the relevant tests that had been done prior to the instruction. Similarly, in L2 reading research, Keiko Koda (1989) found that both L2 specific vocabulary knowledge and vocabulary knowledge transferred from L1 increased L2 reading comprehension in college students learning Japanese as a foreign language. On the other hand, Diana Pulido (2004) examined the effects of L2 reading comprehension on L2 incidental vocabulary acquisition while reading and found that the comprehension of narrative passages containing the target vocabulary (in the form of nonsense words that needed to be inferred from the propositional meaning of the passages and thus were incidentally acquired) was a very robust predictor of the incidental learning of L2 target vocabulary. In L1 reading research, Irene-Anna N. Diakidoy (1998) pretested 73 sixth graders on their vocabulary knowledge. The pretest contained various lexical items, as well as target vocabulary. The students had to respond "yes, no or don't know" to vocabulary questions containing a lexical item. Then they were given two expository passages, which contained the

target vocabulary. After reading the texts, students answered reading comprehension questions in the form of a sentence verification task, after which they answered a vocabulary posttest, which consisted only of the target words, and was of the same format as the vocabulary pretest. The knowledge of target words between the pretest and posttest was compared, and if a student didn't know a word on the pretest, and did on the posttest, it was because of having acquired the meaning of the word through reading the assigned passages. Diakidoy (1998) found a significant relationship between reading comprehension and vocabulary acquisition from context. The students scoring higher on their reading comprehension tests learned more words from reading expository passages.

In view of these empirical connections between vocabulary knowledge and reading comprehension, it is not surprising that Charles Perfetti and Joseph Stafura (2014) place word knowledge at the center of text understanding. As a summary of reading comprehension research and theory up to mid-2010s, they developed the Reading Systems Framework, a view of reading comprehension that incorporates the Construction-Integration (CI) model of reading developed by Kintsch. There are two basic subsystems to this framework: the word identification system and the comprehension system. The centrality of vocabulary knowledge is shown by the lexicon being a central connection point between these two subsystems. This is because word knowledge is the output of the lower level or word recognition reading processes, which include orthographic, phonological and lexical processing at the surface or linguistic level of reading comprehension. The word recognition processes are word identification processes and they are present in the construction phase of reading, which has the aim of activating word meanings in the reader's memory, where they are stored in the form of the mental lexicon. The word meaning is the output of the word identification system and, at the same time, the input of the comprehension system. The comprehension system consists of sentence comprehension (the linguistic level of reading), text comprehension (the propositional or textbase level) and situation comprehension (the situation or mental model level). It enables the integration of a word into the surrounding text, which allows for complete word comprehension. Word-to-text integration occurs in the integration phase of reading comprehension and is the process of fine-tuning and selecting a word's meaning based on the larger context (propositional and situation models).

Considering the direction from vocabulary knowledge to reading comprehension, Perfetti and Stafura (2014) argue that the central reading comprehension process is "the integration of the currently read word into a mental structure that represents the current

understanding of the text (the situation model)" (p. 34). A paradigm case for the process is understanding a word within a text in relation to a previous phrase, clause or sentence. A following example is given: "*While Cathy was riding her bike in the park, dark clouds began to gather, and it started to storm. The rain ruined her beautiful sweater*" (Perfetti & Stafura, 2014, p. 28, emphasis in the original). As the reader reads the first sentence, a situation model is created that consists of four referents: Cathy, the park, the bike and dark clouds, as well as one event: the storm. "The noun phrase that begins the new sentence – *the rain* – is understood immediately in relation to the situation model. It refers to the storm event, to which it can be integrated as part of the situation model" (Perfetti & Stafura, 2014, p. 28, emphasis in the original). Experimental studies (e.g., Perfetti et al., 2008) have shown that the reader integrates this sequence of sentences in an easier manner as opposed to, e.g., "*When Cathy saw there were no dark clouds in the sky, she took her bike for a ride in the park. The rain that was predicted never occurred*" (Perfetti & Stafura, 2014, p. 28, emphasis in the original). This is because in the latter example, there is no referent for the noun phrase "the rain" (the storm event that conceptually contains the rain is not mentioned). Only "dark clouds" are mentioned and since "dark clouds" do not contain the rain within their concept, the rain has to be added as a new conceptual attachment, which makes a noticeable and measurable difference in word-to-text integration. The cohesive relation of co-reference between "the storm" and "the rain" reflects the comprehension process of understanding the latter phrase by integrating it into the situation or mental model created by the sentence containing the previous phrase plus the related background knowledge. This kind of "word-to-text integration processes are central to comprehension because they recur with each phrase" (Perfetti & Stafura, 2014, p. 30). They exhibit significant individual differences, with good comprehenders being better at them than bad comprehenders (Perfetti et al., 2008).

Considering the direction from reading comprehension to vocabulary knowledge, the level of comprehension represents the context within which the meaning of an unknown word is inferred. Pulido (2004) sees the context as consisting of the textbase and its propositional content, which is more easily available in working memory in good comprehenders, and, therefore, enhances "the potential for relevant background knowledge to be activated during the process of constructing a mental representation of the passage" (p. 502). The situation model thus created makes lexical inferencing easier. This is supported by Diakidoy (1998), who also sees the context as a situation model created during text comprehension, which is

regularly updated as the reader continues to read. The meaning of new words is then acquired while building this conceptual storage or the knowledge base or the situation model of the text:

> It is in the process of adding to and modifying the knowledge base that the meanings of difficult or unknown words are also acquired. . . . [T]he quality and richness of the mental representation – in terms of the amount and strength of the links established among pieces of text information – that the reader has been able to construct will also facilitate word meaning acquisition form context. (Diakidoy, 1998, p. 133)

Better readers are more proficient at such processes (Pulido, 2004, p. 502). However, in order to infer the meaning of a word from context, the reader has to notice that they do not know the meaning of certain words in the text that they are reading. This is the role of the metacognitive monitoring processes, which will be discussed next.

9.2. Relationship between Metacomprehension and L2 Vocabulary Knowledge

9.2.1. Correlation between the L2 Vocabulary KMA and L2 Vocabulary Knowledge

The Pearson coefficient of correlation between the L2 vocabulary KMA and L2 vocabulary knowledge variables is 0.54 for the fifth-graders and 0.831 for the eighth-graders, both are statistically significant at the 0.01 level ($p<0.01$). The correlations are moderately to highly strong and their direction is positive. The higher the metacognitive word awareness, as measured by the L2 vocabulary KMA, the broader that individual's vocabulary knowledge, as measured by the L2 vocabulary knowledge test. The lower the metacognitive word awareness, the narrower the individual's knowledge of vocabulary. The reverse is also true, since a correlation does not measure the influence of one variable on another, just their interconnectedness. Therefore, the broader the individual's vocabulary knowledge, the higher their metacognitive word awareness and the narrower the individual's vocabulary knowledge, the lower their metacognitive word awareness. With the p-values being less than 0.01, the probability of these results being a coincidence is less than 1 in 100 cases, which gives a strong statistical confirmation that the results are an indication of true connections between the variables. The correlation coefficient results are presented in Table 3.

Table 3

L2 Vocabulary Knowledge and L2 Vocabulary KMA Correlation

		L2 Vocabulary KMA
L2 Vocabulary Knowledge	5th grade	0,54**
	8th grade	0,83**

** p < .01.

The obtained result fits into a well-established body of research that has found connections between various aspects of metacognition and L2 vocabulary knowledge. Since the field of metacognition is too vast for a thorough exposition of all its connections to vocabulary knowledge, the focus will be on a broad overview of the nature of the relationship between metacognition and vocabulary knowledge, while providing illustrative examples of the studies done.

Metacognition has traditionally been divided into its declarative component or metacognitive knowledge and procedural component (metacognitive monitoring or experiences and regulation) (Flavell, 1979; Pintrich, 2002; Pintrich, 2005). Metalinguistic knowledge is a form of metacognitive knowledge that is defined by Karen Roehr (2008) as "a learner's explicit or declarative knowledge about the syntactic, morphological, lexical, pragmatic, and phonological features of the L2" (p. 72). It is an explicit mental representation that the learner holds in their mind of grammar, where grammar is taken as "any aspect of language that can be described systematically" (Roehr, 2008, p. 70). William Nagy (2007) says: "To the extent that one is aware of the process at all, learning a new word is a metalinguistic activity" (p. 56). He emphasizes three metalinguistic sources of word knowledge: definitions, context (other words as well as the syntactic sentence structure) and word parts. Morphological awareness is the ability to recognize words, it is the metalinguistic knowledge of word parts or morphemes, and has been shown to correlate with vocabulary knowledge. For example, William Nagy et al. studied the relationship between morphological awareness as measured by the Suffix Choice Test and Morphological Relatedness Test, and L1 vocabulary knowledge as measured by the Vocabulary subtest of the Stanford Diagnostic Reading Test, on 607 students attending grades 4 through 9 of an elementary school in the United States (Nagy, 2006). They found high correlations between metalinguistic knowledge and L1 vocabulary knowledge for all grade levels: 0.83 for the fourth/fifth-grade group, 0.72 for the sixth/seventh grade group and 0.67 for the eighth/ninth-grade group, $p<0.001$ for all groups (Nagy, 2006, p. 140).

Masamichi Mochizuki and Kazumi Aizawa (2000) studied the relationship between morphological awareness as measured by the affix knowledge and L2 receptive vocabulary size in 403 Japanese high school and university students. The affix knowledge test measured how many affixes the learner knew while the vocabulary size test was a modified Vocabulary Levels Test, and the correlation between the two was 0.65, $p<0.05$ (Mochizuki & Aizawa, 2000, p. 296).

Having shown the correlations between metacognitive knowledge in its specific form of metalinguistic knowledge (with an illustrative example of the studies done on morphological awareness) and L1 and L2 vocabulary knowledge, of further interest becomes the influence of metacognitive knowledge on vocabulary knowledge. Flavell (1979) divides metacognitive knowledge into the person, task and strategy categories. This means that, for example, metalinguistic knowledge and morphological awareness as forms of metacognitive knowledge related to vocabulary acquisition and manipulation, can also be divided into the person, task and strategy categories. However, the area of metacognitive knowledge connected to vocabulary knowledge is broader than just metalinguistic knowledge, and contains other forms of metacognitive knowledge, such as the knowledge of a broader span of cognitive strategies for vocabulary learning and manipulation, as well as the knowledge of metacognitive strategies that serve to oversee and organize cognition, including cognitive strategies.

Experimental studies have shown that metacognitive strategy knowledge influences vocabulary knowledge acquisition through the use of metacognitive control strategies. The general design of this study type consists of two groups of learners, the control and intervention, with the latter group receiving metacognitive strategy instruction. First, metacognitive knowledge is influenced by raising the awareness of metacognitive strategies and/or cognitive vocabulary learning strategies, then metacognitive skills are practiced by applying metacognitive knowledge of strategies in vocabulary assignments. As D. Nunan (1991) writes: “Informed selection of strategies presupposes knowledge of strategies and knowledge of strategies presupposes instruction” (Nunan, 1991, as cited in Rasekh & Ranjbary, 2003, p. 4). Both groups are given a vocabulary knowledge pre-test (prior to strategies instruction) and post-test (after instruction). The results usually indicate that there is no difference among groups at pre-test, while at post-test, the difference in vocabulary knowledge is statistically significant, with the experimental group having significantly better results. For example, Regina Boulware-Gooden et al. (2007) investigated the impact of instruction in multiple metacognitive strategies on the English as L1 vocabulary achievement of 119 third-grade

elementary school students. The metacognitive strategies aimed at regulating cognition (vocabulary learning) were based on metacognitive knowledge (metalinguistic language awareness – generating synonyms, antonyms, etc.) and were taught to students in the experimental group for five weeks. The control group did not receive instruction in metacognitive vocabulary strategies, rather they just had to write out vocabulary words and use them in a sentence. The experimental group showed significant improvements over the control group in their vocabulary knowledge, $F(1, 117) = 22.5$, $p<.001$ (pg. 76). In L2 reading research, Zohreh Eslami Rasekh and Reza Ranjbary (2003) investigated the effect of the explicit metacognitive strategy instruction using the CALLA method on the development of lexical knowledge as measured by a multiple-choice vocabulary test of students at the pre-intermediate level of EFL language proficiency. 53 students were randomly assigned to the control and experimental groups, where both groups received instruction in vocabulary learning strategies. The experimental group received additional instruction in metacognitive strategies. The students were pre-tested at the beginning of the study and showed no differences in their vocabulary knowledge levels. After ten weeks of instruction, both groups were again tested on a multiple choice vocabulary test and the results compared using the statistical t-test analysis. The mean score of the intervention group ($M = 29.29$, $SD = 3.84$) was significantly ($t(51) = 3.55$ a$< .05$) different from the control group ($M = 25.30$, $SD = 4.32$). Thus, "the experimental group surpassed the control group in terms of lexical knowledge at the end of the experiment" (Rasekh & Ranjbary, 2003, p. 11). The above two studies show that metacognitive knowledge influences metacognitive skills which serve the purpose of metacognitive control. According to the Nelson and Narens' (1990) model of metacognition, this is the process through which the meta-level changes or regulates or controls the object-level. However, the interplay between metacognitive knowledge and metacognitive control skills is more nuanced than that because it involves metacognitive experiences, as well.

When metacognitive knowledge is activated as "the result of deliberate, conscious memory search," it gives rise to a conscious metacognitive experience. (Flavell, 1979, p. 907). In her conceptualization of metacognition, Anastasia Efklides (2001) terms this activated metacognitive knowledge "online metacognitive knowledge" and also sees it as part of the metacognitive experience of monitoring (p. 301). Metacognitive experiences in the form of metacognitive feelings and judgments can be informed and guided by the activated metacognitive knowledge. For example, as the person is aware of themselves while dealing with a task, the level of difficulty they experience may be guided by their previous experience

of dealing with the same or similar tasks, the knowledge of which is stored as metacognitive knowledge in long-term memory. The opposite is also true, "metacognitive experiences can affect your metacognitive knowledge base by adding to it, deleting from it, or revising it" (Flavell, 1979, p. 908). As an example, you can observe the relationship between a metacognitive feeling of difficulty that arises while you are doing a task with the metacognitive judgment of confidence that your task solution is correct and assimilate these observations and conclusions into your existing metacognitive knowledge. Thus, various metacognitive experiences interact with each other and with metacognitive knowledge. The interaction between metacognitive knowledge and metacognitive experiences is bidirectional. According to A. Efklides (2001), both metacognitive experiences and metacognitive knowledge are products of monitoring the object-level or cognition: metacognitive knowledge is "product of monitoring memory knowledge and/or beliefs about persons, tasks and strategies," and metacognitive experiences are "products of online monitoring of cognition" present in short-term memory (p. 300).

According to Thomas O. Nelson and R. Jacob Leonesio's (1988) "monitoring affects control" hypothesis, the object level influences metacognitive experiences, which in turn influence control processes (p. 678). For example, if a student is studying, then the objective difficulty of their studies influences the feeling of difficulty they experience while studying, which, in turn, influences the amount of study time that the student devotes to their learning. In other words, metacognitive experiences influence metacognitive skills. Asher Koriat et al. (2008) expand on this hypothesis and provide experimental evidence that not only does monitoring affect control, but control affects monitoring as well; that is, the relationship between monitoring and control is bidirectional – metacognitive skills and cognitive skills used with metacognitive purpose also influence metacognitive experiences because "metacognitive judgments are based on the feedback from the outcome of control operations" (p. 39). On the example of the feelings of knowing or FOKs, a person cannot recall an exact item in question, but they have a feeling that they know the name of the item, and would recognize it and choose the correct answer on a multiple-choice question. According to the "monitoring affects control" hypothesis, first they have the FOK and then they search their memory store; however, according to the "control affects monitoring" hypothesis, first they search the memory store and on the basis of the feedback of retrieval failure, they develop their FOK. Moreover, Koriat et al. (2008) state that the two processes are not mutually exclusive and "evidence consistent with both of them can be found in one and the same situation" (p. 39). Furthermore, Anastasia

Efklides (2001) states that metacognitive experiences "by themselves do not suffice for deliberate strategy use, because selection of strategy depends on awareness of the available strategies. It also depends on knowledge of which strategies are appropriate for each kind of failure or mismatch detected" (p. 312). In other words, it is the combined influence of both metacognitive experiences and metacognitive knowledge that is needed for the effective control of behavior, for example, for deliberate metacognitive strategy use while reading.

9.2.2. L2 Vocabulary KMA Bias

Having established the significance of metacognitive experiences as the expression of metacognitive monitoring capacity, and its dynamic interplay with metacognitive knowledge and metacognitive skills or control capacity, it is clear that "the effective control of learning behavior requires accurate assessments of current states of knowledge" (Finley et al., 2010, p. 110). The KMA metacomprehension accuracy score, as calculated through the Hamman coefficient, indicates whether a student knows which specific L2 words need further study and which have been mastered. The Hamman coefficient ranges from 0 to 1. The closer the student's result is to 0, the more metacomprehensively inaccurate a student is. The closer it is to 1, the more metacomprehensively accurate they are. On the other hand, the KMA bias score indicates how overconfident or underconfident a student is. An overconfident student might terminate their L2 vocabulary study prior to sufficiently mastering it because they think they know most of the items when indeed they do not. Therefore, they may be underprepared for their vocabulary tests and lag behind their more accurate peers in vocabulary knowledge over time. An underconfident student might continue with their L2 vocabulary study although they have already mastered the words, which takes the time out of studying other, not yet mastered, knowledge items or doing different activities. These students might be overprepared for their tests and receive relatively good grades; however, their rate of internal progress in vocabulary knowledge might be slower than what it potentially could be. In addition, even metacognitively accurate students who do not use their judgments timely and effectively will show poorer performance than what they are capable of.

Hadley Koltun and Andrew Biemiller (1999) examined the agreement between students' word consciousness or metacognitive word knowledge and the open-ended definitions of these same L1 words on 22 children attending grade 4 in Toronto, Canada. Metacognitive word knowledge or the students' ability "to tell what words they know" was

also termed self-knowledge of words or word awareness and was assessed by the students indicating how well they knew words (Koltun & Biemiller, 1999, p. 1). The categories available were the following: they did not know the word, they had seen the word but did not know what it meant, they did know what the word meant but did not use it often and, finally, they did know what the word meant and used it often. Students provided written definitions of these words, which were rated for their correctness by two independent examiners. Their results showed that "students can accurately assess word knowledge when words are of easy to moderate levels of difficulty. In those instances where words are generally difficult for the population studied, students tend to over-estimate their own ability to define words" (Koltun & Biemiller, 1999, pp. 6-7). In other words, overconfidence is mostly due to test difficulty. Indeed, Koltun and Biemiller (1999) chose the words so that they are at a several grades more advanced level than the children's grade 4 level. Ruth H. Maki et al. (2005) cite a large number of studies which show that these results generalize across time and tasks in different domains. "Students who were overconfident or underconfident at one time tended to be overconfident or underconfident at the second time; a similar pattern was seen across tasks" (Maki et al., 2005, p. 724).

Task difficulty is much larger for incompetent individuals per definition, as opposed to their more competent peers. Across task domains such as humor, logical reasoning and grammar, Justin Kruger and David Dunning (1999) found that incompetent individuals lack metacomprehension due to consistently overestimating their own knowledge and abilities. They identified incompetent individuals relatively to their more competent peers by selecting those study participants that scored in the bottom quartile on tests of humor, logical reasoning and grammar. "Although their test scores put them in the 12th percentile, they estimated themselves to be in the 62nd" (Kruger & Dunning, 1999, p. 1121). Contrary to these *unskilled and unaware* poor performers, the most competent individuals, those participants that scored in the top quartile, tended to underestimate their abilities across the domains.

In the present study, we found that the fifth-grade students generally tended to underestimate themselves. The mean L2 Vocabulary KMA Bias score for the entire group was -2.72 with the standard deviation (SD) of 5.970, as shown in Table 4. Since the overconfidence is generally due to the test difficulty, it was reasoned that the underconfidence found is due to the L2 vocabulary knowledge test ease. On average, students solved 30.02 out of 40 items on the test, with the standard deviation (SD) of 6.163, as can be seen in Table 5. Since that is 75.05% of the test, the test could be considered relatively easy. Therefore, it is not only that

difficult tests lead to the overestimation of one's abilities, but easy tests lead to their underestimation as well.

Table 4

5th Grade: L2 Vocabulary KMA Bias

	n	M	SD
All students	65	-2,72	5,970
Bottom quartile	16	2,19	6,036
Top quartile	17	-4,65	2,849

Table 5

5th Grade: L2 Vocabulary Knowledge Score

	n	M	SD
All students	65	30,02	6,163
Bottom quartile	16	21,81	3,851
Top quartile	17	36,94	1,638

The connection between the test difficulty and student overestimation or overconfidence as well as the test ease and student underestimation or underconfidence was confirmed when the students were divided according to their L2 vocabulary knowledge tests scores, following Kruger and Dunning (1999), into the bottom and top quartile. The bottom quartile or the bottom 25% of students had the mean L2 Vocabulary KMA Bias score of 2.19 (SD=6.036), as shown in Table 4. That is, the most unskilled performers showed overconfidence. On the other hand, the most skilled performers – the top 25% of students – showed significant underconfidence, with their L2 Vocabulary KMA Bias score -4.65 (SD=2.849). The L2 vocabulary test for the top performers was really easy, on average they solved 36.94 out of 40 answers or 92.35% of the test correctly (see Table 5). The L2 vocabulary knowledge test for the bottom performers was difficult, but still they managed to, on average, solve 21.81 items out of 40 or 54.53% of the test (Table 5). Since that is more than half of the test, it cannot be considered an extremely poor result, and their overconfidence matched this: they were overconfident but not over-the-top overconfident. In comparison, the students in the top quartile were more than doubly underconfident than the students in the bottom quartile

were overconfident, when taking into consideration the absolute distance of their L2 Vocabulary KMA Bias score from 0 (which would show accurate metacomprehension monitoring ability). Moreover, when comparing the results between the top and bottom quartile students using the T-test, these group differences in their L2 Vocabulary KMA Bias means are shown to be statistically significant and, therefore, not accidental: t (21.082) = 4.118, p=0.000.

In the eighth grade, students were on average metacognitively accurate, with a slight bent towards overconfidence. The mean L2 Vocabulary KMA Bias score for the whole group was 0.37 (SD=6.181), as can be seen in Table 6. The eighth-graders solved on average 29.35 assignments out of 40 on their vocabulary knowledge test (SD=7.897), which is 73.38% of the test (see Table 7). This is a similar result to the fifth-graders, who on average solved 75.05% of their vocabulary knowledge test. Therefore, the test could be considered easy for the eight-graders as well. Despite this, their metacognitive monitoring score shows that, as a group, the students attending the eighth grade exhibited a more accurate metacomprehension monitoring skills than those attending the fifth grade. If the above analysis for the fifth-graders is correct, and their average underconfidence as a group was due to test ease, then it follows that because the eighth graders showed an improved metacognitive accuracy under the same conditions, that their metacomprehension monitoring skills on average improved. However, when divided into the top and bottom quartile, the most skilled performers again showed underconfidence (their mean L2 Vocbulary KMA Bias score was -2.20 (SD=3.167)) and the most unskilled performers showed overconfidence (with the mean L2 Vocabulary KMA Bias score of 3.44 (SD=9.003)). The results can be seen in Table 6. The T-test found that the group differences between the top and bottom quartile were statistically significant: t (18.868) = 2.354, p<0.05.

Table 6

8th Grade: L2 Vocabulary KMA Bias

	n	M	SD
All students	60	0,37	6,181
Bottom quartile	15	3,44	9,003
Top quartile	15	-2,20	3,167

Table 7

8th Grade: L2 Vocabulary Knowledge Score

	n	M	SD
All students	60	29,35	7,897
Bottom quartile	15	18,94	5,555
Top quartile	15	37,87	1,356

In L2 vocabulary learning research, Jon-Chao Hong and Ming-Yueh Hwang (2017) examined the effects of calibration on vocabulary learning in 110 ninth-grade students divided into poor and good vocabulary learners. The students were assigned vocabulary to be learned and then prior to testing, they needed to make prospective metacognitive judgments on how well they think they will perform on the upcoming test. The procedure was repeated 12 times throughout 12 weeks for 12 different sets of words. They found that, as students had more opportunities to practice, the more accurate their prospective judgments became, which was true for both poor and good vocabulary learners; however, poor vocabulary learners showed a greater improvement. Therefore, practicing is essential for improving metacognitive monitoring and more benefit is experienced by poorer learners, helping to close the gap with good learners.

9.2.3. L2 Vocabulary KMA as a Tool in Educational Practice

Since vocabulary acquisition is the foundational component of acquiring and learning a foreign language, both Nagy (2007) and Koltun and Biemiller (1999) call for word consciousness in vocabulary instruction in elementary schools. Learning vocabulary is not a purely cognitive activity, it is a metacognitive activity as well. Moreover, the better a student is at learning L2 vocabulary, the more metacognitively aware they are. Specifically, it is essential that students are able to distinguish between words they know and do not know since, otherwise, “they are not expected to engage more advanced metacognitive strategies, such as evaluating their learning in an instructional setting, or employing more efficient learning and studying strategies” (Tobias & Everson, 2009, p. 108). Students cannot be expected to employ efficient control strategies if they are inaccurate metacognitive monitors. As metacognition as

well as vocabulary knowledge continuously develop throughout elementary school education, children need more metacognitive support in their word learning (Nagy, 2007). Wolfgang Schneider and Elisabeth Löffler (2016) point out that "most of memory and metamemory development is not so much a product of age but of education and practice," yet teachers who employ metacognitive tools "represent a minority group in elementary school classrooms" (pp. 510-511).

The L2 vocabulary KMA can be helpful to both teachers and students in monitoring students' vocabulary knowledge. It is easy to design and implement, without demanding much classroom time. "One of the most difficult problems facing researchers and practitioners is identifying metacognitively aware learners quickly and reliably. . . . These procedures are prohibitive in most applied settings due to the amount of time and effort necessary to administer them" (Schraw & Dennison, p. 461). Other metacognitive tools, such as think alouds or questionnaires, cannot be integrated into the regular classroom practice easily. The L2 vocabulary KMA can fill this gap. It is also a technique that is easily transferable to other language learning tasks.

In addition to fulfilling the teacher's diagnostic and evaluation needs, the essence of the approach can be taught to students as a learning strategy, who can then practice using it on their own. In this way, students can take charge of their own learning and become more autonomous. As O'Malley et al. state: "Students without metacognitive approaches are essentially learners without direction or opportunity to review their progress" (O'Malley et al., 1985, p. 561). Learners cannot be effective if they are not metacognitive (Tullis & Benjamin, 2012). A strategy based on the L2 vocabulary KMA can be taught to students as a self-assessment tool to monitor the progress of their learning. There is no independent learning without the ability to self-assess. With practice in self-evaluation, the individual becomes more self-reflective and self-guided in their learning, and therefore more self-regulated. In addition, "self-estimation of core knowledge is associated with an increase in reasoning performance . . . it is suggested that student awareness about delimitation of mastered core knowledge is considered as part of learning" (Collard et al., 2015, p. 74). Yet, "self-assessment of cognitive achievement has been very rare in education" (Tamir, 1999, p. 402). Therefore, the L2 vocabulary KMA can prove to be an effective tool for use both for learners and teachers.

Future research should examine how to implement the KMA framework into the classroom setting effectively; whether children who are taught the procedure show improvements in vocabulary learning, metacognition, and other areas of language learning over

time as compared to the children who are not taught the procedure; do children transfer the strategy effectively and with measurable benefits into different areas of second language learning and learning in general; do poor vocabulary learners benefit more from learning the strategy than good vocabulary learners, etc.

9.3. Correlation between L2 Comprehension Monitoring and L2 Reading Comprehension

L2 reading metacomprehension was tested through an error detection test that consisted of 10 assignments. In each assignment, there was a short paragraph, which contained either a lexical error (a lexeme was used incorrectly), logical inconsistency (a contradiction between two key propositions) or structural cohesiveness error (a proposition did not belong meaningfully with the rest of a paragraph). Students had to solve a multiple-choice question by choosing one sentence within a paragraph that contained an explicit error, while the three additional sentences from the same paragraph served as distractors. They were informed that there was an error in each short text and that their assignment was to identify or notice it.

During the pilot testing on fifth-graders, sixteen students solved between 2 and 6 items out of 10 per student, and the mean number of solved items was 4 (SD=1.155) (see Table 8). The test yielded a statistically insignificant lack of correlation with the L2 reading comprehension test of -0.10 ($p>0.05$) (see Table 9). Due to fact that the best student solved only 6 assignments out of 10, it was reasoned that the test was too difficult. Therefore, the second version of the test was created, in which the processing requirements of some of the assignments were made easier through shortening the paragraphs and simplifying the sentences, while the total number of error types remained the same, with 3 texts containing lexical errors, 6 texts logical inconsistencies and 1 text a structural cohesiveness error. In all, one assignment was changed completely, four assignments were simplified and five assignments remained the same. The new version of the test was given to the 49 students in the main study. In addition to being informed that each paragraph contained an error that needed to be identified, the students also received an example demonstration of how to solve an error detection problem involving a logical inconsistency prior to taking the test. They solved between 2 and 10 assignments out of 10 per student, while the mean number of solved items was 6.8 (SD=1.979) (see Table 8). With the L2 reading comprehension test, the new error detection test yielded a statistically significant correlation of 0.31 ($p<0.05$) (see Table 9). The

eighth-graders solved their error detection test without issues and its correlation with the L2 reading comprehension test was 0.66 ($p<0.01$) (see Table 9).

Table 8

Error Detection Score

	n	M	SD	Range[a]
5th grade (Pilot)	16	4,00	1,155	2-6
5th grade (Revised)	49	6,80	1,979	2-10
8th grade	60	6,63	2,558	1-10

[a] Maximum score is 10

Table 9

Error Detection and L2 Reading Comprehension Correlation

		L2 Reading Comprehension
Error Detection	5th grade (Pilot)	-0,10
	5th grade (Revised)	0,31*
	8th grade	0,66**

* p < .05. ** p < .01.

In her 1979 study, Ellen M. Markman presented elementary school-aged subjects with L1 texts that contained inconsistencies. The children were divided into two conditions, the explicit condition, in which the inconsistencies were explicitly stated in the texts, and the implicit condition, in which they were not explicitly stated and needed to be inferred. The texts were read aloud twice by the experimenter and the children were asked to say if there was anything that they did not understand. They were probed with several questions to help them notice the problem. The implicit condition proved to be significantly more difficult than the explicit condition. "Overall, 96% of the children missed all or all but one of the implicit problems by probe 7. . . . Between 40% and 50% of the children missed all or all but one of the problems in the explicit condition" (Markman, 1979, p. 647). In a follow-up experiment within that study, Markman distinguished between two groups of third and sixth graders: those that were not warned that there was a problem (and therefore repeating the first experiment) and those that were warned. The results of the group that was not warned were comparable to the

results of the first experiment. Within that group, the results of the sixth graders were comparable to that of the third graders. In contrast, the children who received the warning performed significantly better than children who did not receive the warning. Within that group, the results of the sixth graders were significantly better than that of the third graders. Moreover, "when the sixth graders are informed of the existence of a problem, the difference between explicit and implicit material disappears" (Markman, 1979, p. 652). However, "the majority of the informed third graders (10 of 16) still fail to spontaneously discover the inconsistencies on at least two out of three essays" (Markman, 1979, p. 652). Therefore, receiving the explicit instruction that there were inconsistencies in the text which needed to be located helped sixth-graders to perform better.

Markman's (1979) study is illustrative of the problems researchers faced with error detection studies, where the results seemed to indicate that the children were excruciatingly poor at noticing inconsistencies. Ruth Garner (1987) outlines five conditions which helped improve children's error detection abilities in subsequent research: 1) explicit instructions to locate errors, 2) inclusion of blatant errors, 3) the implementation of naturalistic research designs ("familiar and simple stimuli, naturalistic interactions, a familiar setting"), 4) use of non-verbal measures of detection (body signals such as frowning, head scratching, etc.) and 5) introducing children to the type of error that they should be searching for (p. 93). Therefore, error detection studies proved to be especially sensitive to task characteristics, including the task materials as well as task context. The same problem was faced in the present study, where informing the fifth-grade students of the nature of the task and explicitly stated errors still were not enough to help them process information adequately. However, with the decreasing of the task difficulty through shortening of the texts and sentences as well as demonstrating a solution to an example, the students were able to process the material sufficiently enough for the correlation with reading comprehension to emerge. Since students were fifth-graders, this is in line with Markman's research results on the forewarned sixth-graders. The question of what makes error detection tasks so difficult for elementary school students naturally arises.

According to Markman (1979), "the greater the disparity between the amount of information processing required and the amount actually executed, the more subjects will be misled into thinking they have comprehended material they have in fact failed to comprehend" (p. 644). In order for children to notice inconsistencies in the explicit condition, they need to encode and store the relevant information and then retrieve it from long-term memory and compare it in their short-term memory. For the implicit condition, in addition to these

processes, the appropriate inferences need to be drawn before comparing the propositions in short-term memory. Therefore, children might have had memory problems (problems with encoding, storage and retrieval), difficulties comparing the items or inferencing. Through her experiments, Markman ruled out memory problems and difficulties inferencing since children exhibited good memory when asked to recall the essays and they made the necessary inferences when probed by the researcher to do so. What was left were the problems with proposition comparison. The third graders did not realize there was an issue even when they stated the contradictory propositions right next to each other, while the sixth graders generally had no problem in detecting adjacent contradictions. Markman concluded that the third graders did not realize that they did not comprehend due to employing a different standard of comprehension evaluation. They evaluated the texts for empirical truth instead of logical consistency. Empirical truth or completeness examines a proposition for its extensional meaning, that is, if a proposition on its own corresponds to reality (or one's mental model of reality). If each individual proposition in a sequence matches what one knows in one's background knowledge, then the sequence of propositions is deemed as true and the student declares that they have comprehended, no matter if the propositions contradict each other. On the other hand, logical consistency or contradiction detection examines propositions for their intensional meaning, that is, if propositions fit each other. If one proposition does not say one thing and the other the opposite of that, these propositions align with each other and the student declares that they have comprehended. The sixth-graders were able to evaluate their comprehension according to the criterion of logical consistency once they were warned that there was a mistake in the text; however, the third-graders were still unable to do so.

Integrating Kintsch's Construction-Integration (CI) model of reading into the discussion, it seems that Markman's (1979) data suggest that the third graders were able to construct a mental or situational model in which individual facts were not sufficiently connected, which allowed for the completeness criterion of comprehension, but not the contradiction detection. This is supported by the second experiment in Markman's study, in which she asked the children to recall the text information presented, and "the majority of third graders repeated contradictory material verbatim with no resultant improvement in performance" (p. 651). Verbatim repetition is characteristic of the textbase level of text comprehension, which is not sufficient for performing "further cognitive operations" (Van Dijk & Kintsch, 1983, p. 341). This analysis would suggest that the children did indeed have problems with information encoding – at the situational level of comprehension. Markman

provides extra support for this conclusion when she says, “almost all of the sixth graders spotted the problem even without repetition” (p. 651). Therefore, the sixth-graders were able to construct the situation model sufficiently enough to allow for the cognitive operation of comparison to take place, and no textbase repetition was needed. This suggests that the sixth-graders were able to construct more elaborate situation models than the third-graders and, only when the situation models were elaborate enough, were the students able to perform more complex cognitive operations such as comparison. In other words, although it seems that to do a comparison while reading is to compare propositions, what is really being compared are the facts in the situation model that match the propositions of the textbase. Therefore, it can be concluded that children’s metacomprehension failures are first and foremost connected to problems with memory representations, and that most comparison problems are a consequence of this.

The above reinterpretation of Markman’s (1979) article is supported by Stella Vosniadou et al. (1988) study, which concluded that children’s failures to detect contradictions “were related more to difficulty in representing the inconsistent information in memory than to difficulty in comparing the representations of the inconsistent propositions with each other” (p. 36). The results of their study are also going to be interpreted through the lens of Kintsch’s CI reading model. The study consisted of two experiments. In the first experiment, elementary school children attending grades one, three and five were asked to detect inconsistencies in a narrative text. There were two kinds of inconsistencies, falsehoods and contradictions. A contradiction consisted of two contradictory statements, both explicitly present in the text. A falsehood consisted of a single statement present explicitly in the text that contradicted the student’s background knowledge or reality. Therefore, a falsehood was more familiar to the student than a contradiction and was easier to represent in memory for two reasons: there was only one proposition to represent as a fact in the situation model and the other proposition came out of the already constructed and reused situation model from long-term memory. On the other hand, a contradiction required two unfamiliar propositions to be represented, which implied the novel creation of a more complex situation model. Vosniadou et al. found that it was more difficult for children to detect contradictions than falsehoods, which suggests that this was due to the ease with which falsehoods could be represented in the situation model. Indeed, the transcripts of the children’s recall protocols “suggested that the difficulties in detecting the contradictions were related more to remembering the inconsistent information (recall errors) than to comparing the inconsistent propositions once they were recalled (comparison errors)”

(Vosniadou et al., 1988, p. 34). The frequency of recall errors was much higher than the frequency of comparison errors. The second experiment showed that "when the familiarity variable is controlled, contradictions are not harder to detect than falsehoods, even by first-grade children" (Vosniadou et al., 1988, p. 35). That is, when it is roughly equally hard to represent the information in the situation model because there is no added benefit of background knowledge, it does not matter what type of inconsistency it is, children have equally hard time recalling them and, therefore, detecting them. Vosniadou et al. concluded that "the ability to detect inconsistencies in text begins early" because children showed "a relatively high rate of inconsistency detection" (pp. 35-36). With a more appropriate task difficulty, children do show an ability to detect inconsistencies. Vosniadou et al. "suggest that greater attention be paid to the conditions that facilitate text representation because those conditions are likely to affect comprehension monitoring as well" (p. 27). This proved relevant for the present study because when the pilot error detection test was deemed too difficult, the text representation was facilitated by simplifying the text base through the shortening of paragraphs and sentences. The amount and type of errors did not change, therefore, the success in detecting errors in the revised version of the test was not a result of change in error type. Rather, a simplified text base eased the processing load and, with fewer language distractors, the students were presumably able to create more adequate situation models.

Our situation model interpretations of both Vosniadou et al. (1988) and Markman's (1979) articles are supported by Menno van der Schoot et al.'s (2012) inconsistencies detection study, where the results were interpreted through the situation model framework of Zwaan & Radvansky (1998). In their study, van der Schoot et al. explored the differences between good and poor 10 to12-year-old comprehenders on a narrative inconsistency detection task, which included a description of a main character and an action performed by him or her which was inconsistent with their character. In the local condition, the sentence in which the action was performed immediately followed the character's description. In the global condition, it was separated by a lengthy paragraph. Therefore, in the local condition, the information about the main character was still present in the reader's working memory when they encountered the inconsistent sentence. Contrary to that, in the global condition, the lengthy passage served the purpose of deleting the main character's description from short-term memory by the time the inconsistent sentence was encountered. It was only if the student had built the character information into the situation model in long-term memory that they were able to have that information available when encountering the problem sentence and use it to detect the

inconsistency in the global condition. With this in mind, the reading times of the inconsistent sentence were analyzed in two experiments: through the self-paced moving window method, in which readers read a text sentence by sentence, pressing a key on the computer screen in order to be shown the next sentence, and through the eye-tracking method, in which the reader's eye-movements and eye-fixations were analyzed. Both methods yielded the same results. The poor readers showed a slower reading time of the problem sentence in the local condition, but not in the global condition. The slower reading time reflected noticing the inconsistency. That is, the poor readers were able to notice the inconsistency when the character's information was still present in their working memory, but not when it was not. This would imply that, in the latter case, they did not build an adequate situation model, which they could then retrieve from long-term memory and use to detect that inconsistency. On the contrary, the good readers showed a slower reading time of the problem sentence in both local and global conditions. This would indicate that they did build a good-enough situation model of the text, which was then available when needed. Moreover, the fact that the poor readers were able to notice inconsistences in the local condition showed that the problem was not with comparing the propositions, but rather in representing the propositions in memory.

In addition to the comprehension monitoring differences between good and poor readers in upper elementary school, as exemplified by the above study, there are also developmental differences in metacomprehension between younger and older upper elementary school students. For example, Svjetlana Kolić-Vehovec and Igor Bajšanski (2006) investigated L1 reading comprehension and metacomprehension of 11- to 14-year-old children attending grades five to eight of elementary school. They used three comprehension monitoring tasks: an error detection task, a text sensitivity task (which "required children to rate the relative importance of parts of the text and to identify important elements versus trivia") and the cloze task (in which "subjects are asked to fill in missing words in a text") (Kolić-Vehovec & Bajšanski, 2006, p. 441). They found moderate correlations between all three measures of metacomprehension and L1 reading comprehension for all four grades of elementary school, from the fifth grade to the eighth grade. The correlations ranged from 0.26 to 0.50 and all but one were statistically significant at the $p<0.01$ level (the one left was statistically significant at the $p<0.05$ level). Although the differences in error detection scores between successive individual grades were not significant, "eight-graders had better results than fifth-graders," in the text sensitivity task, "the seventh- and eighth-grade students had better results than the fifth-grade students," and "significant grade effect was found for the cloze task . . . sixth graders had

better results than fifth graders, and seventh graders had better results than sixth graders" (Kolić-Vehovec & Bajšanski, 2006, p. 443). Therefore, Kolić-Vehovec and Bajšanski concluded that developmental improvements could be systematically seen in metacomprehension during upper elementary school years. Citing other studies that obtained similar results, they claim that "higher elementary school is a critical period for the development of comprehension monitoring" (Kolić-Vehovec & Bajšanski, 2006, p. 440).

The developmental trend in metacomprehension during upper elementary school years could also be observed in bilingual students. Svjetlana Kolić-Vehovec and Igor Bajšanski (2007) made a comparable study to the above described on Croatian – Italian bilingual students attending grades five through eight in Rijeka, Croatia. The students were divided into a high and low proficiency bilingual groups (Kolić-Vehovec & Bajšanski, 2007). Two-way ANOVAs showed significant effects of grade as well as proficiency level for all three metacomprehension tasks – the error detection, text sensitivity and cloze tasks. The higher the grade level, the better the metacomprehension test score. More proficient students were better than less proficient students. Nevertheless, there are not many studies that can be found on comprehension monitoring of reading in English as an L2. So little in fact that in 1988 Christine P. Casanave (1988) called it "a neglected essential" (p. 283). In the last thirty plus years not much has changed, however, prompting Grabe and Yamashita (2022) to write in 2022, "there is relatively little research on comprehension monitoring and its impact on reading comprehension with L2 readers" (p. 305).

The discussion so far has emphasized that children do not find it easy to monitor text comprehension, especially when the comprehension criterion is to compare and monitor several sentences as opposed to just one sentence or a pair of adjacent sentences. Kolić-Vehovec and Bajšanski (2006) showed that "achievement on inconsistency detection and text sensitivity tasks showed a slower pace of improvement during higher elementary school years compared to cloze task" (p. 446). Cloze task differs from the other two comprehension monitoring tasks in that it primarily monitors word comprehension or "the local processing level of reading" (Kolić-Vehovec & Bajšanski, 2003, p. 3). Moreover, in their study on third-, fifth- and eighth-graders, Kolić-Vehovec and Bajšanski (2003) found that, in a multiple regression analysis, the only significant metacomprehension predictor of L1 reading comprehension for the third graders was the cloze task, while, for the fifth- and eighth-graders, both the cloze task and error detection task contributed significantly to reading comprehension (p. 3). In addition, William Nagy (2007) states that "much comprehension monitoring takes

place at the level of individual words. Readers often become aware of a breakdown in comprehension when they encounter a word they do not know" (Nagy, 2007, p. 62). Knowing how important vocabulary knowledge is for L2 reading, we hypothesize that vocabulary knowledge monitoring as measured through the L2 Vocabulary KMA captures some of the reading comprehension monitoring dimension as well. Especially because the vocabulary test part of the measure was designed completely in English and could therefore be understood as mimicking a very short L2 text in which the focus is on the comprehension of individual words. Sigmund Tobias and Howard Everson (2000) elaborate on the topic in the following manner:

> If students are unable to differentiate accurately between the words they know and do not know, they must find it difficult to determine whether to slow down while reading and try to figure out the meaning of a word from the context, or go to a dictionary to have it defined, or go on in the possibly mistaken or uncertain belief that they understand the word's meaning. Such uncertainty must be reflected in reduced reading comprehension for students with inaccurate knowledge monitoring. On the other hand, being able to distinguish accurately between words students can define correctly and those they cannot should enhance their reading comprehension and their effectiveness in learning new material. (*Tobias & Everson*, 2000, p. 152)

The Pearson coefficient of correlation between the L2 Vocabulary KMA and L2 reading comprehension is 0.54 ($p<0.01$) for fifth-graders and 0.83 ($p<0.01$) for eighth-graders, as can be seen in Table 10. The obtained correlations suggest that the hypothesis is worth exploring in future research. The result is further supported by the correlation of 0.45 between the vocabulary KMA and L1 reading comprehension found by Sigmund Tobias and Thomas Everson (2000) on a sample of 167 freshmen university students (p was not reported) (p. 157). In addition, Lourdes Fajar et al. found a correlation of 0.26 (p not reported) between the vocabulary KMA and reading comprehension for bilingual children attending the fifth and sixth grades of elementary school (Fajar et al., 1996, as cited in Tobias & Everson, 2002, p. 3).

Table 10

L2 Reading Comprehension and L2 Vocabulary KMA Correlation

		L2 Vocabulary KMA
L2 Reading Comprehension	5th grade	0,54**
	8th grade	0,83**

** p < .01.

9.4. Is L2 Reading a Language Problem or a Reading Problem?

The above results have indicated that both metacognitive variables as well as vocabulary knowledge correlate moderately to strongly with reading comprehension for elementary school students attending grades five and eight. To see whether metacognitive variables explain additional variance after controlling for vocabulary knowledge, hierarchical regression analyses were done, with reading comprehension as the dependent variable and vocabulary knowledge and comprehension monitoring as the independent variables.

First, a hierarchical regression analysis was done for the fifth graders, as can be seen in Table 11. The L2 vocabulary knowledge variable was added in the first step and the L2 vocabulary KMA variable in the second. L2 vocabulary knowledge was a significant predictor of L2 reading comprehension and it explained 46% of variance. L2 vocabulary KMA was also a significant predictor and it explained an additional 4% of the variance. Therefore, L2 vocabulary KMA as a comprehension monitoring variable made a weak, but significant contribution over and above that explained by L2 vocabulary knowledge. In the second hierarchical regression analysis for the fifth graders (see Table 12), the L2 vocabulary knowledge variable was again added in the first step, but in the second step the revised error detection variable was added. Due to the problems with the pilot error detection test, all the students from the pilot study were excluded from the calculation. Therefore, on a sample of 49 students from the main study, the L2 vocabulary knowledge variable explained 36% of L2 reading comprehension variance. The contribution of the revised error detection test was not statistically significant. In other words, the revised error detection variable did not explain any additional variance above and beyond the L2 vocabulary knowledge variable.

A different picture emerged when the hierarchical regression analyses were done for the eighth graders. In the first analysis, L2 vocabulary knowledge was entered in the first step and L2 vocabulary KMA in the second, as can be seen in Table 13. L2 vocabulary knowledge explained 61% of variance in L2 reading comprehension; however, the contribution of the L2 vocabulary KMA variable was not statistically significant. In the second analysis, which is presented in Table 14, L2 vocabulary knowledge was again entered in the first step and error detection was entered in the second. L2 vocabulary knowledge explained 61% of variance in L2 reading comprehension and the percentage of variability accounted for in the second step, when the error detection variable was added to the model, went up to 66%. In other words, error detection explained additional 5% of variance over and above L2 vocabulary knowledge and its contribution was statistically significant.

These results unequivocally suggest that L2 vocabulary knowledge is the strongest predictor of L2 reading comprehension for upper elementary school students. Comprehension monitoring also explains additional variance over and above L2 vocabulary knowledge in both grades. However, it is the L2 vocabulary KMA that adds additional predictive power to the hierarchical regression analysis model in the 5th grade, while in the 8th grade, it is the error detection test. This would suggest that metacomprehension in L2 reading first develops on a local, intrasentential level, captured with the L2 vocabulary KMA measure. The above mentioned difficulties that the fifth-grade students had with the pilot error detection test, which needed to be simplified in order for the students to solve it, supports this conclusion. The error detection test measures intersentential comprehension monitoring and these metacognitive abilities seem to be still in an early phase of development at the fifth grade level of L2 reading. By the time students reach the eighth grade, the L2 vocabulary KMA variable does not explain additional variance in L2 reading comprehension. What emerges now as its metacognitive monitoring predictor is the ability to detect errors. That is, global comprehension monitoring exerts more significant influence than local comprehension monitoring as the students' L2 proficiency increases.

In their study on children's metacognition as a predictor of L1 reading comprehension in Croatian at different developmental levels of elementary school, Svjetlana Kolić-Vehovec and Igor Bajšanski (2003) did a series of multiple regression analyses with the cloze detection task and an error detection task as two of the several predictor variables and L1 reading comprehension as a dependent variable. They found that the cloze task made a significant unique contribution (11.56%) in the 3rd grade, but the error detection task (which they called the "sentence detection task") did not. However, both the cloze task and the sentence detection tasks made significant unique contributions in the fifth grade as well as the eighth grade. "Significant contribution of close task was 6.8% in the fifth and 12.25% in the eighth grade, and contributions of sentence detection task was 10.2% in the fifth and 4.8% in the eighth grade" (Kolić-Vehovec & Bajšanski, 2003, p. 7). Combining these results with the results of the present study, a pattern of comprehension monitoring development during the elementary school years emerges. First, students develop local or intrasentential comprehension monitoring in their L1, which can be seen by the significant contributions of the cloze task to L1 reading comprehension in the third grade. However, they have not yet developed their global or intersentential comprehension monitoring skills, which they do develop sufficiently enough by the time the fifth grade is reached, which can be seen by the sentence detection

variable becoming a significant predictor of L1 reading. However, these global metacognitive abilities are still not transferred to L2 reading comprehension sufficiently enough for the error detection task to become a significant predictor of L2 reading. On the other hand, local metacomprehension has developed in a good enough manner for L2 vocabulary KMA to become a significant predictor of L2 reading comprehension. Finally, by the time students reach the eighth grade, global metacomprehension in L2 reading has transferred as well, and the error detection task becomes a significant predictor not only of L1 reading, but also of L2 reading. The fact that L2 vocabulary KMA is not a significant predictor of L2 reading comprehension in the eighth grade, while the cloze task is a significant predictor of L1 reading comprehension in the same grade can be explained by the L2 vocabulary KMA measuring a more local level of intrasentential metacomprehension, where the focus is on the individual word, while in the cloze task the focus is most often on the whole sentence or adjacent sentences, and sometimes even on a more global level than that. It is possible that L2 vocabulary KMA did not influence L2 reading comprehension beyond L2 vocabulary knowledge because individual differences in L2 vocabulary knowledge and L2 vocabulary KMA were interdependent and that L2 vocabulary knowledge had a more powerful explanatory effect. Rob Shoonen et al. (1998), in their study of elementary school students found that L1 vocabulary knowledge influenced L2 reading comprehension and that L2 vocabulary knowledge influenced L1 reading comprehension. They concluded that "vocabulary tests are not language-specific measures exclusively" and that vocabulary knowledge "itself contains both language-specific knowledge and more general reading skills" (Shoonen et al., 1998, pp. 100-101). They called for further research that "should perhaps question the very notion of language-specific knowledge versus general reading skills" (Shoonen et al., 1998, p. 100). With the focus of the L2 vocabulary KMA being so strongly on individual words, it could be that by the time students reach the eighth grade, these variables become strongly interdependent, especially for easy vocabulary tests, as the L2 vocabulary test was for the eighth graders, who on average solved 29.35 questions out of 40 (SD=7.897), which is 73.38% of the test.

Rob Schoonen et al. (1998) measured the influence of vocabulary and metacognitive knowledge on L1 (Dutch) and L2 (English) reading comprehension in the sixth, eighth and tenth grades. Metacognitive knowledge was measured by a series of questionnaires assessing four metacognitive dimensions: assessment of oneself as a reader, knowledge of reading goals and comprehension criteria, knowledge of text characteristics and knowledge of reading

strategies. The sixth grade was assessed only on L1 because the students were in the first year of L2 learning. Vocabulary was found to be a significant predictor of L1 reading comprehension while metacognitive knowledge was not. In both L1 and L2 reading comprehension, both vocabulary and metacognition were significant unique predictors of reading comprehension in the eighth and tenth grades. In both grades and in both languages, vocabulary knowledge was a much stronger predictor of reading comprehension than metacognition was. Therefore, a developmental line has also emerged from Schoonen et al.'s results, leading from vocabulary being the most important predictor and metacognition not achieving unique significance in the sixth grade to both vocabulary and metacognitive knowledge contributing unique significance in the eighth and tenth grades; however, vocabulary still plays a much bigger role, although the role of metacognitive knowledge increases with age. Schoonen et al.'s study was done with declarative metacognition, while in the present study procedural metacognition was investigated. With that in mind, it is interesting that in the above mentioned Kolić-Vehovec and Bajšanski (2003) L1 study, not only procedural but also declarative metacognition was investigated. Declarative metacognitive knowledge of reading was measured by a questionnaire. It was found that metacognitive knowledge was not a significant unique predictor of reading comprehension in grades three, five or eight, although it did improve with grade. It was concluded that the effect of metacognitive knowledge was "mediated by on-line metacognition" (Kolić-Vehovec & Bajšanski, 2003, p. 9).

The results of these three studies, especially when combined, offer a firm support for the Language Threshold Hypothesis as well as the Common Underlying Cognitive Processes Framework. The metacognitive process, viewed as a process common to both L1 and L2, can be seen as emerging first in L1 and then, after enough linguistic knowledge of L2 has been acquired, transferring onto L2. Different metacognitive processes require different language thresholds, with local metacognitive processing being less demanding of linguistic resources than global metacognitive processing. It is not the case that as soon as certain cognitive or metacognitive processing is acquired in L1, that it is immediately available in L2 as well. Therefore, the Common Underlying Cognitive Processes Framework needs to be viewed within the Linguistic Threshold Hypothesis.

Additionally, the strong and foundational effect of the language variable can be seen in the results of the pilot and revised error detection tests for fifth graders. As Alderson (1984) pointed out, "if language is the cause of difficulty in reading the foreign language, then perhaps reading texts need to be simplified linguistically, to encourage the use of appropriate reading

strategies" (p. 4). This is exactly what was done when creating the revised test out of the pilot test. L2 language was simplified, in effect lowering the linguistic threshold, which allowed for the metacognitive processing of error detection to emerge. The fifth grade students were already shown to be capable of this processing in their L1 by the Kolić-Vehovec and Bajšanski study (Kolić-Vehovec & Bajšanski, 2003). Alderson continues, "knowledge of English is less important to the understanding of easy texts. In the reading of easy texts, one might expect first-language reading ability to be more important. As the linguistic or conceptual difficulty of the text increases, the importance of foreign language proficiency increases and that of first-language reading ability reduces" (Alderson, 1984, p. 14). Therefore, reading in a foreign language is a complex interaction of both language variables and reading variables, and the dual-language involvement in L2 reading as well as the importance of the linguistic threshold can continually be seen.

Although the error detection test was not a unique predictor of L2 reading comprehension in the 5^{th} grade, the correlation between the two variables was 0.33 ($p<0.05$), indicating that error detection is still important for L2 reading comprehension. Therefore, in an educational context of the fifth grade, both error detection and L2 vocabulary KMA skills should be taught, although the emphasis should be on L2 vocabulary KMA as a more significant factor in L2 reading comprehension. In contrast, the focus of metacognitive monitoring instruction in the eighth grade should be on error detection skills, while L2 vocabulary KMA should be more emphasized with poorer readers. In addition, the KMA framework should be employed on the aspects of L2 reading comprehension where more emphasis is put on intersentential or global level of metacomprehension monitoring, such as in calibration of comprehension, where students are asked to make a metacognitive judgment about a paragraph before answering a question about it.

Table 11

5th Grade: Hierarchical Regression Results for L2 Reading Comprehension – L2 Vocabulary KMA Added in Step 2

Variable	B	95% CI for B		SE B	β	R^2	ΔR^2
		LL	UL				
Step 1						0,46	0,46***
Constant	-1,46	-6,52	3,59	2,53			
L2 Vocabulary Knowledge	0,60	0,44	0,77	0,08	0,67***		
Step 2						0,50	0,04*
Constant	-1,32	-6,23	3,59	2,45			
L2 Vocabulary Knowledge	0,49	0,30	0,68	0,09	0,55***		
L2 Vocabulary KMA	6,44	0,58	12,30	2,93	0,23*		

Note. CI = confidence interval; LL = lower limit; UL = upper limit;
* p < .05. *** p < .001.

Table 12

5th Grade: Hierarchical Regression Results for L2 Reading Comprehension – Error Detection Added in Step 2

Variable	B	95% CI for B		SE B	β	R^2	ΔR^2
		LL	UL				
Step 1						0,36	0,36***
Constant	1,87	-4,74	8,48	3,28			
L2 Vocabulary Knowledge	0,53	0,32	0,73	0,10	0,60***		
Step 2						0,39	0,03
Constant	0,24	-6,60	7,08	3,40			
L2 Vocabulary Knowledge	0,49	0,28	0,70	0,10	0,56***		
Error Detection	0,42	-0,11	0,96	0,26	0,18		

Note. CI = confidence interval; LL = lower limit; UL = upper limit;
*** p < .001.

Table 13

8th Grade: Hierarchical Regression Results for L2 Reading Comprehension – L2 Vocabulary KMA Added in Step 2

Variable	B	95% CI for B		SE B	β	R^2	ΔR^2
		LL	UL				
Step 1						0,61	0,61***
Constant	0,36	-3,79	4,52	2,07			
L2 Vocabulary Knowledge	0,65	0,52	0,79	0,06	0,78***		
Step 2						0,62	0.01
Constant	1,57	-3,41	6,55	2,49			
L2 Vocabulary Knowledge	0,56	0,32	0,81	0,12	0,67***		
L2 Vocabulary KMA	2,90	-3,69	9,50	3,29	0,12		

Note. CI = confidence interval; LL = lower limit; UL = upper limit;
*** p < .001.

Table 14

8th Grade: Hierarchical Regression Results for L2 Reading Comprehension – Error Detection Added in Step 2

Variable	B	95% CI for B		SE B	β	R^2	ΔR^2
		LL	UL				
Step 1						0,61	0,61***
Constant	0,36	-3,79	4,52	2,07			
L2 Vocabulary Knowledge	0,65	0,52	0,79	0,06	0,78***		
Step 2						0,66	0,05**
Constant	-0,17	-4,09	3,74	1,95			
L2 Vocabulary Knowledge	0,50	0,34	0,66	0,08	0,60***		
Error Detection	0,75	0,25	1,26	0,25	0,29**		

Note. CI = confidence interval; LL = lower limit; UL = upper limit;
** p < .01. *** p < .001

10. Conclusion

There are three key insights with important educational implications that result from the exploration of the connections between vocabulary knowledge, metacognition and reading comprehension in L2 reading. The first is an overwhelming importance of L2 vocabulary knowledge for L2 reading development in upper elementary school. It is essential that teachers spend a lot of time on activities designed to acquire vocabulary, both in its breadth and depth, both passively and actively. These activities should be as diversified as possible, and should engage the student inside the classroom as well as outside. In addition, an emphasis should be put on the explicit teaching of vocabulary learning strategies, which also include metacognitive strategies (one such strategy being L2 vocabulary KMA). The second insight is related to the emergence of task difficulty as an important factor in connection to metacomprehension monitoring, as seen both through L2 vocabulary KMA bias and error detection calculations. Not only should teachers be encouraged to carefully consider task difficulty while designing metacognitive monitoring tasks, they should also be encouraged to implement a regular classroom practice that consists of task difficulty discussions with students. In that manner, the student will be encouraged to reflect on their own learning experiences, which should increase their metacognitive experiences awareness as well as their metacognitive knowledge, both of which can help with expanding one's own metacognitive control and thus lead to the student becoming more self-regulated. The third insight is connected to reading comprehension and emphasizes the importance of the situation model creation for comprehension. To regurgitate the textbase verbatim is not comprehension, and therefore it is necessary for L2 teachers to introduce students to the idea of the situation model as well as to model its creation while reading aloud in front of students and to allow them enough practice with constructing their own situations models, so that it becomes a natural way of reading a text.

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12. Appendices

12.1. Appendix A: L2 Vocabulary KMA Test for 5th Grade (includes L2 Vocabulary Knowledge Test)

Ime i prezime: _____
Razred: _____

Uputa: U lijevom stupcu navedene su riječi na engleskom jeziku. Znaš li što znače? Ako smatraš da znaš, zaokruži DA pored navedene riječi. Ako smatraš da ne znaš, zaokruži NE.

Riječ ili izraz na engleskom:	**Znam značenje (DA):**	**Ne znam značenje (NE):**
1. plump	DA	NE
2. school	DA	NE
3. dragon	DA	NE
4. win	DA	NE
5. audience	DA	NE
6. naughty	DA	NE
7. shout	DA	NE
8. twice	DA	NE
9. suggest	DA	NE
10. convincing	DA	NE
11. go swimming	DA	NE
12. puppy	DA	NE
13. argue	DA	NE
14. carry out a task	DA	NE
15. greedy	DA	NE

16. shy	DA	NE
17. novels	DA	NE
18. feed	DA	NE
19. clever	DA	NE
20. library	DA	NE
21. green	DA	NE
22. belt	DA	NE
23. earring	DA	NE
24. breakfast	DA	NE
25. mountain	DA	NE
26. fin	DA	NE
27. repair	DA	NE
28. nuisance	DA	NE
29. carol	DA	NE
30. spacious	DA	NE
31. dining room	DA	NE
32. pineapple	DA	NE
33. foggy	DA	NE
34. hammer	DA	NE
35. champion	DA	NE
36. immortal	DA	NE
37. bossy	DA	NE
38. bitter	DA	NE
39. apologise	DA	NE
40. sugar	DA	NE

Uputa: Zaokruži točan odgovor.

1. Your friend Tom is **plump**. He is:
a) thin
b) ugly
c) fat
d) handsome

2. In **school** you:
a) watch TV
b) play with your pet
c) visit your grandmother
d) learn

3. A **dragon** opens its mouth and out can come:
a) fish
b) fin
c) fur
d) fire

4. Mary always **wins**, she is:
a) better than Tina, but worse than Glenda
b) the best
c) the worst
d) good, but not the best

5. An **audience** is:
a) a group of people watching a concert
b) a singer singing on stage
c) an audition for a movie role
d) actors acting in a movie

6. Little Jenny is very **naughty**. She:
a) doesn't listen to her mother
b) likes to eat vegetables
c) goes to bed early
d) plays with her pet often

7. When you **shout**, you are:
a) quiet
b) slow
c) loud
d) quick

8. You kicked a ball **twice**. You kicked it:
a) one time
b) four times
c) two times
d) three times

9. You **suggest** your friend to watch Youtube together. You:
a) like your friend
b) ask your friend for help
c) tell your friend to go home
d) say it to your friend

10. Anna is very **convincing**. You:
a) believe her
b) don't trust her
c) love her
d) don't like her

11. When you **go swimming**, you go:
a) into the mountains
b) to the theatre
c) to school
d) to the pool or to the beach

12. A **puppy** is a young:
a) cat
b) dog
c) mouse
d) bird

13. Tom often **argues** with his friends. He:
a) sings happy songs
b) yells at them and doesn't agree with them
c) asks them questions nicely
d) is angry at them and hits them

14. When you **carry out a task**, you:
a) do your task
b) carry the task up to the roof
c) carry the task out into the yard
d) ignore your task

15. Sandy is **greedy**. She:
a) doesn't want a candy
b) greets everybody kindly
c) greets everybody grumpily
d) ate all of the candies

16. My little sister is **shy**. She:
a) talks too much around people
b) cries around people
c) doesn't talk much around people
d) laughs a lot around people

17. What do you do with **novels**?
a) you watch them
b) you listen to them
c) you talk to them
d) you read them

18. When you **feed** your pet, you:
a) give it a hug
b) take it out
c) give it food
d) talk to it

19. Mary is very **clever**. She is:
a) not stupid
b) slow
c) shiny
d) a great friend

20. The **library** is a place where you go to:
a) talk to your friends
b) read and borrow books
c) drink a glass of juice
d) wait for the buss

21. **Green** is a:
a) city
b) color
c) meal
d) T-shirt

22. You put your **belt** around your:
a) waist
b) arm
c) leg
d) ear

23. You can put an **earring** on your:
a) leg
b) ring
c) arm
d) ear

24. You eat **breakfast**:
a) in the morning
b) in the evening
c) in the afternoon
d) at night

25. An example of a **mountain** is:
a) New York City
b) Germany
c) Mt Everest
d) Lake Superior

26. Which animal has a **fin**?
a) monkey
b) tiger
c) whale
d) cat

27. When Mr. Pink **repairs** a car, he:
a) sells it
b) cleans it
c) parks it
d) fixes it

28. Your little brother is a **nuisance**. He:
a) makes you smile
b) irritates you
c) shocks you
d) leaves you alone

29. A **carol** is:
a) a Christmas song
b) a book
c) a famous movie
d) a Christmas cartoon

30. Your bedroom is **spacious**. It:
a) doesn't have enough space
b) has large windows
c) has a lot of room
d) has big mirrors

31. **Dining room** is a place where you:
a) eat
b) sleep
c) rest on a couch
d) wash your clothes

32. **Pineapple** is a:
a) vegetable
b) sandwich
c) pudding
d) fruit

33. It's **foggy** outside. You:
a) cannot hear very well
b) cannot see very well
c) cannot taste very well
d) cannot smell very well

34. A **hammer** is a:
a) song
b) nail
c) tool
d) plate

35. A **champion** is:
a) a winner
b) a loser
c) a winner and a loser
d) not a winner and not a loser

36. When you are **immortal**, you:
a) die young
b) die old
c) live forever
d) are immoral

37. When you are **bossy**, you:
a) you don't like to work
b) you are very fast
c) tell other people what to do
d) you are good and kind

38. A **bitter** drink is:
a) not sweet
b) sweet
c) not fresh
d) fresh

39. When you **apologise**, you:
a) forgive and forget
b) are very angry
c) yell and scream
d) say you are sorry

40. **Sugar** is:
a) sour
b) sweet
c) spicy
d) fresh

12.2. Appendix B: L2 Vocabulary KMA Test for 8th Grade (includes L2 Vocabulary Knowledge Test)

Ime i prezime: _____

Razred: _____

Uputa: U lijevom stupcu navedene su riječi na engleskom jeziku. Znaš li što znače? Ako smatraš da znaš, zaokruži DA pored navedene riječi. Ako smatraš da ne znaš, zaokruži NE.

Riječ ili izraz na engleskom:	Znam značenje (DA):	Ne znam značenje (NE):
1. **restaurant**	DA	NE
2. **cyclist**	DA	NE
3. **immediately**	DA	NE
4. **reply**	DA	NE
5. **population**	DA	NE
6. **get on with**	DA	NE
7. **don't fuss**	DA	NE
8. **receipt**	DA	NE
9. **anxious**	DA	NE
10. **mute**	DA	NE
11. **hammock**	DA	NE
12. **hectic**	DA	NE
13. **boisterous**	DA	NE
14. **improbable**	DA	NE
15. **swap**	DA	NE
16. **breeze**	DA	NE

17. persuade	DA	NE
18. pale	DA	NE
19. frugal	DA	NE
20. urgent	DA	NE
21. hospital	DA	NE
22. president	DA	NE
23. disaster	DA	NE
24. cinema	DA	NE
25. give up	DA	NE
26. furious	DA	NE
27. apparition	DA	NE
28. deal with	DA	NE
29. drought	DA	NE
30. head over heels in love	DA	NE
31. convenient	DA	NE
32. lavish	DA	NE
33. stiff	DA	NE
34. immense	DA	NE
35. accustomed to	DA	NE
36. for good	DA	NE
37. be fond of	DA	NE
38. demanding	DA	NE
39. loathe	DA	NE
40. enormous	DA	NE

Uputa: Zaokruži točan odgovor.

1. A **restaurant** is:
a) a night club
b) a website
c) a place where you go to eat
d) a city in Northern Ireland

2. A **cyclist** is somebody who:
a) repeats the same cycle over and over again
b) rides or races a bike
c) sees into the future
d) is on a some kind of a list

3. When you do something **immediately**, you do it:
a) sometime later
b) in the morning
c) as soon as you can
d) right away

4. When you **reply** to somebody, you:
a) give them an answer
b) invite them to a party
c) listen to them silently
d) greet them kindly

5. A **population** is:
a) the total number of people in an area
b) the number of people who are popular
c) the number of people who have a disease
d) the minimum number of people needed for a job

6. When you **get on with** somebody, the two of you:
a) continue doing what you have been doing
b) start something new
c) have a good relationship
d) climb on top of something

7. When you **don't fuss**, you:
a) try to change something about it
b) don't worry about it
c) make a fuss about it
d) don't like it so much

8. A **receipt** is:
a) a piece of paper that confirms that money has been received
b) a formal letter
c) a thank-you note
d) an envelope

9. When you are **anxious**, you are:
a) tired
b) hungry
c) sleepy
d) nervous

10. Somebody who is **mute**:
a) can't hear
b) can't see
c) can't talk
d) can't smell

11. What can you do in a **hammock**?
a) rest, relax, swing
b) buy, exchange, replace
c) travel, dive, ride
d) cook, clean, vacuum

12. The tempo is **hectic**. It is:
a) slow and dull
b) calm and easy
c) quick and busy
d) upset and worried

13. A young man is **boisterous**. He is:
a) quiet and peaceful
b) loud and noisy
c) happy and proud
d) sad and angry

14. It is **improbable**. It is:
a) very probable
b) very important
c) not very important
d) not very likely to happen

15. When you **swap** with a friend:
a) your friend returns what was yours
b) the two of you do something very quickly
c) your friend gives you something and you give something to your friend
d) you don't speak to your friend and your friend doesn't want to speak to you

16. A **breeze** is a:
a) beautiful tree
b) heavy rain
c) gentle wind
d) spring flower

17. Your mom **persuaded** you to go with her. She:
a) didn't let you to go with her
b) talked you into going
c) invited you to join her
d) didn't say anything

18. Your face is **pale**. It is:
a) red
b) pimply
c) colorful
d) without color

19. A **frugal** person:
a) doesn't spend a lot of money
b) doesn't talk to anybody
c) spends a lot of money
d) talks to everybody

20. You need **urgent** information. The information you need is:
a) top-priority, it is very important it comes to you as quickly as possible
b) medium-priority, it is important for you to receive it, but it doesn't have to be right away
c) low-priority, it is not important to receive it now
d) no-priority, you don't need to receive it ever

21. A **hospital** is a place where you go when you are:
a) sick
b) hungry
c) poor
d) old

22. A **president** is:
a) a person who likes presents
b) a pet cat
c) a TV reporter
d) the leader of a country

23. A **disaster** is:
a) a disease
b) a problem
c) a catastrophe
d) a hobby

24. A **cinema** is a place where you go to:
a) dance
b) see a movie
c) eat
d) read a book

25. When you **give up**, you:
a) carry something up
b) break apart
c) make something so much better
d) stop what you have been doing

26. When you are **furious**, you are:
a) extremely angry
b) very shy
c) completely disappointed
d) totally happy

27. An **apparition** is:
a) an apparatus
b) an appearance of a ghost
c) an appropriate amount of nutrition
d) a job application

28. When you **deal with** a problem, you:
a) don't think about it
b) leave it for another time
c) try to solve it
d) understand it very well

29. A **drought** is:
a) a wind that blows through a house
b) a long time without rain
c) a doughnut
d) a very special type of machine

30. When you are **head over heals in love**, you:
a) are completely in love
b) a little bit in love
c) not at all in love
d) hate

31. It would be more **convenient** to sit and eat in the kitchen. It would be:
a) more difficult for us if we sat and ate in the kitchen
b) inconvenient
c) easier for us if we sat and ate in the kitchen
d) inappropriate

32. Freddie Mercury was known for throwing **lavish** parties. These parties were:
a) lush, boring, frugal
b) open, relaxed, easy
c) quiet, peaceful, soft
d) rich, extravagant, wild

33. Your friend John is very **stiff**. He cannot:
a) relax
b) love
c) think
d) see

34. This is an **immense** success. The success is:
a) very small, tiny
b) very big, huge
c) very easy, simple
d) very difficult, tough

35. Now that she is no longer in school, Stella has become **accustomed to** staying up late and sleeping until noon. She:
a) accuses herself of staying up late and sleeping until noon
b) gets up early in the morning
c) got used to it
d) likes it very much

36. When something is over **for good**, it is:
a) finished forever
b) for the greatest good of everyone
c) not yet finished
d) good that it is over

37. Lucy **is fond of** Tom. She:
a) hates him
b) loves him
c) likes him
d) doesn't care about him

38. Leah's son Jason is very **demanding**. He is very:
a) easy
b) warm
c) cold
d) difficult

39. The two women **loathe** each other. They:
a) love each other
b) hate each other
c) care about each other
d) worry about each other

40. That is an **enormous** tree. The tree is:
a) huge
b) little
c) beautiful
d) ugly

12.3. Appendix C: Error Detection Test (Pilot) for 5th Grade

Ime i prezime: _____
Razred: _____

Uputa: Pročitaj kratke tekstove i zaokruži slovo ispred rečenice koja sadrži pogrešku.

1. Exercise can help your body. It can help you feel better. It makes your body strong. He can help you lose weight.
a) Exercise can help your body.
b) It can help you feel better.
c) It makes your body strong.
d) He can help you lose weight.

2. Bigfoot is an unusual animal. It is very tall and quite big. It brown hair and walks on two legs. There are even pictures of it! They show a large hairy creature walking in the woods.
a) Bigfoot is an unusual animal.
b) It is very tall and quite big.
c) It brown hair and walks on two legs.
d) They show a large hairy creature walking in the woods.

3. Bondi Beach is a beach in Sydney, Australia. It is about one kilometer long and 50 to 100 meters wide. It was much faster and less expensive. It is one of the world's greatest beaches. Large numbers of tourists visit it throughout the year.
a) It is about one kilometer long and 50 to 100 meters wide.
b) It was much faster and less expensive.
c) It is one of the world's greatest beaches.
d) Large numbers of tourists visit it throughout the year.

4. The original iPhone was made in 2007. It had a camera, an MP3 and video player, e-mail and text messaging. The iPhone also had a touch screen and a virtual keyboard. In 2008 Apple made the iPhone 3G. The next year, in 2007, Apple made the iPhone 3GS. The next iPhone was the iPhone 4S. 1.7 million people bought it in the first 3 days since it came out.
a) It had a camera, an MP3 and video player, e-mail and text messaging.
b) In 2008 Apple made the iPhone 3G.
c) The next year, in 2007, Apple made the iPhone 3GS.
d) 1.7 million people bought it in the first 3 days since it came out.

5. The West Edmonton Mall is the largest shopping mall in North America and the fifth largest in the world. It is located in Edmonton, Alberta, Canada. It was opened in 1981. In total, there are now just 10 shops in the mall. It has over 110 different places to eat. It has a swimming pool and an amusement park. There is always something to do at the West Edmonton Mall!
a) It is located in Edmonton, Alberta, Canada.
b) It was opened in 1981.
c) In total, there are now just 10 shops in the mall.
d) It has over 110 different places to eat.

6. On March 17, people in Ireland celebrate Saint Patrick's Day. People in many other places also celebrate it. They wear green hats, green T-shirts and green book socks. They hold big parades.

a) On March 17, people in Ireland celebrate Saint Patrick's Day.
b) People in many other places also celebrate it.
c) They wear green hats, green T-shirts and green book socks.
d) They hold big parades.

7. Pelé is one of the best football players of all time. He comes from Brazil and he grew up in a poor neighborhood of Sao Paulo. Pelé won the world cup with Brazil when he was 17 years old. He never scored a goal and became the best scorer of Brazil.

a) Pelé is one of the best football players of all time.
b) He comes from Brazil and he grew up in a poor neighborhood of Sao Paulo.
c) Pelé won the world cup with Brazil when he was 17 years old.
d) He never scored a goal and became the best scorer of Brazil.

8. John doesn't eat meat. He is a vegetarian. He thinks meat is not healthy. John and his friends went into a restaurant yesterday. John ordered chicken and some french fries. His friends ordered hamburgers.

a) He thinks meat is not healthy.
b) John and his friends went into a restaurant yesterday.
c) John ordered chicken and some french fries.
d) His friends ordered hamburgers.

9. Polar bears are the world's biggest bears. They are also called white bears because of their white fur. They have black skin under their white fur. They are strong and fast. Polar bears are also very good at swimming. They have very thick black fur that keeps them warm and dry in cold water. They have sharp claws and big, sharp teeth.

a) They have black skin under their white fur.
b) They are strong and fast.
c) They have very thick black fur that keeps them warm and dry in cold water.
d) They have sharp claws and big, sharp teeth.

10. Henry and Mark are playing a very scary game. Who can stay longer locked in a dark attic? Mark is in the attic now. After a few seconds, Henry is scared. He wants to get out of the dark attic. 'Let me out', he yells. 'Please! Please! Please! Let me out!' So, Mark decided to open the door and let his friend go.

a) Mark is in the attic now.
b) After a few seconds, Henry is scared.
c) He wants to get out of the dark attic.
d) So, Mark decided to open the door and let his friend go.

12.4. Appendix D: Error Detection Test (Revised) for 5th Grade

Ime i prezime: _____
Razred: _____

Uputa: Pročitaj kratke tekstove i zaokruži slovo ispred rečenice koja sadrži pogrešku.

1. **Edward loves Bella. Edward hates Bella. Bella loves Edward. Edward and Bella are in love.**

a) Edward loves Bella.
b) Edward hates Bella.
c) Bella loves Edward.
d) Edward and Bella are in love.

2. **Bigfoot is an animal. It is very tall and big. It two legs. It has brown hair.**

a) Bigfoot is an animal.
b) It is very tall and big.
c) It two legs.
d) It has brown hair.

3. **Bondi Beach is a beach in Sydney, Australia. It is about one kilometer long and 50 to 100 meters wide. It was much faster and less expensive. It is one of the world's greatest beaches. Large numbers of tourists visit it every the year.**

a) It is about one kilometer long and 50 to 100 meters wide.
b) It was much faster and less expensive.
c) It is one of the world's greatest beaches.
d) Large numbers of tourists visit it every the year.

4. **The original iPhone was made in 2007. It had a camera, an MP3 and video player, e-mail and text messaging. The iPhone also had a touch screen and a virtual keyboard. In 2008 Apple made the iPhone 3G. The next year, in 2007, Apple made the iPhone 3GS. The next iPhone was the iPhone 4S. 1.7 million people bought it in the first 3 days since it came out.**

a) In 2008 Apple made the iPhone 3G.
b) The next year, in 2007, Apple made the iPhone 3GS.
c) The next iPhone was the iPhone 4S.
d) 1.7 million people bought it in the first 3 days since it came out.

5. **The West Edmonton Mall is the largest shopping mall in North America and the fifth largest in the world. It has thousands of shops and over 110 different places to eat. It has a swimming pool and an amusement park. There are few shops there. There is always something to do at the West Edmonton Mall!**

a) It has thousands of shops and over 110 different places to eat.
b) It has a swimming pool and an amusement park.
c) There are few shops there.
d) There is always something to do at the West Edmonton Mall!

6. **On March 17, people in Ireland celebrate Saint Patrick's Day. People in many other places also celebrate it. They wear green hats, green T-shirts and green book socks. They hold big parades.**

a) On March 17, people in Ireland celebrate Saint Patrick's Day.
b) People in many other places also celebrate it.
c) They wear green hats, green T-shirts and green book socks.
d) They hold big parades.

7. **Pelé is one of the best football players of all time. He comes from Brazil and he grew up in a poor neighborhood of Sao Paulo. Pelé won the world cup with Brazil when he was 17 years old. He never scored a goal and became the best scorer of Brazil.**

a) Pelé is one of the best football players of all time.
b) He comes from Brazil and he grew up in a poor neighborhood of Sao Paulo.
c) Pelé won the world cup with Brazil when he was 17 years old.
d) He never scored a goal and became the best scorer of Brazil.

8. **John doesn't eat meat. He is a vegetarian. He thinks meat is not healthy. John and his friends went into a restaurant yesterday. John ordered chicken and some french fries. His friends ordered hamburgers.**

a) He thinks meat is not healthy.
b) John and his friends went into a restaurant yesterday.
c) John ordered chicken and some french fries.
d) His friends ordered hamburgers.

9. **Polar bears are the world's biggest bears. Their color is white. You have black skin under their white fur. They are strong and fast. Polar bears are also very good at swimming.**

a) Their color is white.
b) You have black skin under their white fur.
c) They are strong and fast.
d) Polar bears are also very good at swimming.

10. **Henry and Mark are playing a very scary game. Who can stay locked in a dark attic longer? Mark is in the attic now. After a few seconds, Henry is scared. He wants to get out of the dark attic. 'Let me out', he yells. So, Mark opens the door. Henry gets out of the dark attic.**

a) Mark is in the attic now.
b) After a few seconds, Henry is scared.
c) He wants to get out of the dark attic.
d) So, Mark opens the door.

12.5. Appendix E: Error Detection Test for 8th Grade

Uputa: Pročitaj kratke tekstove i zaokruži slovo ispred rečenice koja sadrži pogrešku.

1. Scientists are beginning to understand that sitting down for long hours can be very bad for your health. Sitting with poor posture can lead to serious chronic back pain that chair doesn't go away. Many people develop constant neck pain while sitting. They bend their necks forward to look at a screen or read a book.

a) Scientists are beginning to understand that sitting down for long hours can be very bad for your health.

b) Sitting with poor posture can lead to serious chronic back pain that chair doesn't go away.

c) Many people develop constant neck pain while sitting.

d) They bend their necks forward to look at a screen or read a book.

2. Mother Teresa was born on August 26, 1910. She was given the name Agnes Gonxha Bojaxhiu. She changed her name to Sister Mary Teresa when she was 18 years old. Her family was Catholic. His mother was involved in the local church when she was a child.

a) She was given the name Agnes Gonxha Bojaxhiu.

b) She changed her name to Sister Mary Teresa when she was 18 years old.

c) Her family was Catholic.

d) His mother was involved in the local church when she was a child.

3. Romulus was the first king of Rome. The story of Romulus is that he born the son of a god named Mars. He and his brother, Remus, were abandoned by the Tiber River as babies. However, a wolf found them and kept them both alive.

a) Romulus was the first king of Rome.

b) The story of Romulus is that he born the son of a god named Mars.

c) He and his brother, Remus, were abandoned by the Tiber River as babies.

d) However, a wolf found them and kept them both alive.

4. *Arun* is one of the most visited temples in Bangkok, Thailand. It has a tall central tower covered in porcelain. When the sun rises in the morning, it reflects off the tower. This creates a beautiful dazzling effect and it is an unforgettable experience for most visitors. The interior of the building is just as ugly. Lovely painted murals line the walls and wonderful ceramics are on display.

a) When the sun rises in the morning, it reflects off the tower.

b) This creates a beautiful dazzling effect and it is an unforgettable experience for most visitors.

c) The interior of the building is just as ugly.

d) Lovely painted murals line the walls and wonderful ceramics are on display.

5. Bad leaders have problems with communication. They can't or won't listen to their workers. They want to take responsibility when things go wrong. They take all of the acclaim when things go well. They don't thank their employees for doing a good job. This can hurt people's feelings.

a) They can't or won't listen to their workers.

b) They want to take responsibility when things go wrong.

c) They take all of the acclaim when things go well.

d) They don't thank their employees for doing a good job.

6. In 1942, America and England were at war with Germany. Soldiers and supplies needed to be sent from America to England. The only way to send it all was by ship. The journey from America to England was long and arduous. It was much faster and less expensive. It often took weeks for a ship to leave the United States and arrive in England. German submarines traveled the seas and destroyed American ships. Many of the ships that left America never arrived.

a) The only way to send it all was by ship.

b) The journey from America to England was long and arduous.

c) It was much faster and less expensive.

d) It often took weeks for a ship to leave the United States and arrive in England.

7. A sea shanty is a song sung by sailors at work aboard a ship or boat. Sea shanties were not sung merely as a form of entertainment. They were important for helping sailors to coordinate all their actions together at the same time. For example, the 'short drag' shanty was used to give the sailors a rhythm for when they unfurled the sails. This helped to keep the crew safe and in danger, especially in rough seas.

a) Sea shanties were not sung merely as a form of entertainment.

b) They were important for helping sailors to coordinate all their actions together at the same time.

c) For example, the 'short drag' shanty was used to give the sailors a rhythm for when they unfurled the sails.

d) This helped to keep the crew safe and in danger, especially in rough seas.

8. In 1997, Phil Shaw had an interesting idea. He wanted to go rock climbing but he needed to iron his clothes. He decided to do both activities at the same time. He didn't do the ironing, he just climbed the mountain. He trekked up the mountain and when he reached the summit, he pressed his shirts. Phil told his climbing friends what he had done and they soon began doing it. What started out as a joke became an international sport known as 'extreme ironing'. Some of the athletes (who call themselves 'ironists') in extreme ironing prefer to do their ironing while bungee jumping (called 'bungee ironing'). Other athletes like to go to strange places such as the top of tall mountains, in the middle of busy highways, underwater, or in a rainforest. They always bring their ironing boards and clothes with them.

a) He decided to do both activities at the same time.

b) He didn't do the ironing, he just climbed the mountain.

c) He trekked up the mountain and when he reached the summit, he pressed his shirts.

d) They always bring their ironing boards and clothes with them.

9. In ancient Rome, gladiators were people who fought in an arena. They fought animals, criminals, and other gladiators. Although most gladiators had a low status in Roman society, a few of them became famous. Gladiators came from various places. Many of them were prisoners who were captured in wars. Some of them were criminals. Others were volunteers who wanted to become gladiators. All of them served a master, who controlled when and where they would fight. A gladiator could win a match by injuring his opponent. The spectators then decided if the losing gladiator should be killed. Quite often, the crowd spared the life of the losing gladiator and both men lived to fight again. This was because the crowd wasn't asked if gladiators should live. Winners received money and awards. If a gladiator fought particularly well, the head of the games

would reward him with his freedom. The gladiator would no longer need to serve his master and could fight for himself or quit altogether and live a normal life.

a) Although most gladiators had a low status in Roman society, a few of them became famous.

b) Many of them were prisoners who were captured in wars.

c) The spectators then decided if the losing gladiator should be killed.

d) This was because the crowd wasn't asked if gladiators should live.

10. In the 18th and 19th centuries, many African-Americans lived as slaves. Slaves were people who were bought and sold, much like commercial goods. Many white people who owned land in the southern American states used slaves. They made the slaves live and work on their farms. The slaves had a choice where to live and work. Many slave owners treated slaves very badly. Usually, if a slave had children, they too would become slaves. Many believed this system (called 'slavery') was wrong and they fought against it.

a) They made the slaves live and work on their farms.

b) The slaves had a choice where to live and work.

c) Many slave owners treated slaves very badly.

d) Usually, if a slave had children, they too would become slaves.

12.6. Appendix F: Reading Comprehension Test for 5th Grade

Ime i prezime: _____
Razred: _____

Uputa: Pročitaj sljedeći tekst i odgovori na pitanja koja slijede. Svako pitanje ima samo jedan točan odgovor, zaokruži ga.

World Refugee Day

The World Refugee Day is held on June 20 each year. This day was arranged by the United Nations General Assembly. **It** is a day to **raise awareness** about the difficult situations that refugees are in around the world. **It** was first held on June 20 in 2001. The UN chose to do this because 50 years earlier an **agreement** about what rights refugees have was made.

To mark this day, many countries hold events. In fact, there are different events in more than 100 countries. Famous people, members of governments, aid workers and refugees participate in these events. At some events, films are played to show how refugees have to live and the terrible conditions they are in. Some people write letters to their government. They ask for more help for the refugees. Other people who want to see changes to how refugees are treated hold protests. These people are usually called activists.

The UN Refugee Agency is involved in this day. Their logo is associated with the World Refugee Day. The logo has two olive branches which **symbolize** peace. Inside the two branches are two hands. They are surrounding the figure of a person. The two hands are protecting the person. The pictures on the logo are usually in blue on a white background, but sometimes they are white on a blue background.

1. When is the World Refugee Day?
a) on July 20
b) on May 20
c) on June 20
d) on January 20

2. When was the first World Refugee Day held?
a) 50 years ago
b) 100 years ago
c) the text doesn't say
d) in 2001

3. 'It' in paragraph 1 appears twice and refers to:
a) United Nations General Assembly
b) refugees
c) World Refugee Day
d) UN

4. To 'raise awareness' in paragraph 1 means:
a) to help understand
b) to meet, talk and agree
c) to be in a situation that is not easy
d) to assemble and arrange

5. The word 'agreement' at the end of paragraph 1 means:
a) people agree on it
b) people argue about it
c) people don't talk about it
d) people don't like it

6. What do many countries hold on the World Refugee Day?
a) famous people, members of governments, aid workers and refugees
b) events
c) films
d) activists

7. What are people who hold protests usually called?
a) actors
b) attractors
c) activists
d) actresses

8. Who are refugees?
a) people who hold events and show how they live
b) people who hold protests and play films at events
c) people who symbolize peace
d) people who are in difficult situations and live in terrible conditions

9. Who is involved in the World Refugee Day?
a) UN Security Council
b) UN Refugee Agency
c) UN Food and Agriculture Organization
d) International Monetary Fund

10. What does the logo have?
a) olive branches, hands, the figure of a person
b) four different colors
c) the word 'peace'
d) two figures of a person

11. The word 'symbolize' in paragraph 3 means:
a) describe, talk about
b) entertain, make funny
c) represent, stand for
d) simplify, make easy

12. The text is about:
a) World Refugee Day
b) United Nations General Assembly
c) UN Refugee Agency
d) it doesn't say

13. On the World Refugee Day people:
a) write letters to the government, protest, hold events and design a logo
b) design a logo and raise awareness about the difficult situations the refugees are in
c) write letters to the government, give a lot of money and symbolize peace
d) write letters to the government, protest, hold events and raise awareness about the difficult situations the refugees are in

Uputa: Pročitaj sljedeći tekst i odgovori na pitanja koja slijede. Svako pitanje ima samo jedan točan odgovor, zaokruži ga.

Dog camps

Dog camps are an alternative dog boarding accommodation to traditional kennels. Regular kennels keep dogs in an individual cage for most of the day. Being kept in a cage while the dog owner is on vacation can be rather **stressful** for dogs. However, dog camps are very different. Dog camps are a new idea and are becoming quite popular with dog owners in the United States, Britain and Canada. At these camps, dogs can play and **socialize** with other dogs throughout the day. The dogs can play both indoors and outdoors. As **they** play, **they** are supervised by people. The dogs can join in many activities. Activities at dog camps include running, **fetching** balls, digging holes, chasing other dogs, and paw ball. Paw ball is a dog sport a little like soccer.

There are several **benefits** to dog camps over traditional kennels. First, the dogs can get good exercise. Dog camps are usually located in the countryside and there are often lots of spaces for them to run around. In addition, the dogs can socialize. Dogs are social animals, so this can be a good experience for them. Reports have also shown that these camps can reduce the stress of a dog. This is especially true for dogs that live in an **urban** area. Some camps even have places for people to stay. This means the dog and its owner can get to spend some time in a relaxed and friendly atmosphere.

1. Where are dog camps becoming popular?
a) in the United States, New Zealand and Australia
b) in Japan, Korea and China
c) in the United States, Britain and Canada
d) in Germany, France and Belgium

2. The word 'they' near the end of paragraph 1 appears twice and refers to:
a) people
b) dogs
c) owners
d) managers

3. The word 'fetching' at the end of paragraph 1 means:
a) bringing
b) dropping
c) running
d) holding

4. In traditional kennels dogs:
a) are free to play with other dogs
b) can run and dig holes
c) can get good exercise
d) are in cages

5. Dog camps:
a) dogs are there while their owners are on vacation
b) are the same as traditional kennels
c) are not popular anymore
d) keep dogs in cages

6. There is more stress in traditional kennels than in dog camps:
a) false
b) the stress is the same
c) true
d) the text doesn't say

7. The word 'stressful' in paragraph 1 means:
a) it's bad for dogs
b) it's easy for dogs
c) it's popular for dogs
d) it's new for dogs

8. The word 'socialize' in paragraph 1 means:
a) dogs love to run
b) dogs can be with other dogs
c) dogs like to be alone
d) dogs are popular

9. Paw ball is a sport. In it dogs:
a) bring a stick to their owners
b) dig holes
c) run after people
d) kick a ball with their paws

10. The word 'benefits' in paragraph 2 means:
a) why dog camps are better than traditional kennels
b) why dog camps are worse than traditional kennels
c) why dog camps benefit traditional kennels
d) why traditional kennels benefit dog camps

11. Which of the following is a benefit of dog camps over traditional kennels?
a) the dogs can find a new owner
b) the dogs can lose weight
c) the dogs can have a healthy diet
d) the dogs can get good exercise

12. The word 'urban' in paragraph 2 means:
a) rural
b) under
c) city
d) social

13. In dog camps, there is a:
a) cage
b) lot of stress for a dog
c) relaxed and friendly atmosphere
d) traditional kennel

14. What are dog camps like?
a) they are small and there aren't many things for dogs to do
b) dogs are not happy there
c) they are big and there are a lot of things for dogs to do
d) dog owners don't like them very much

15. What are traditional kennels like?
a) there are many things for dogs to do there
b) they are not very loud
c) they are nice and relaxed
d) there aren't many things for dogs to do there

12.7. Appendix G: Reading Comprehension Test for 8th Grade

Uputa: Pročitaj sljedeći tekst i odgovori na pitanja koja slijede. Svako pitanje ima samo jedan točan odgovor, zaokruži ga.

The Broken Windows Theory

In the 1980s and 1990s, many people considered New York City to be one of the most dangerous cities in the world. New York City had **one of the highest violent crime rates**. Gangs **roamed** the city streets at night looking to rob people of their wallets. Many New Yorkers did not feel that riding the subway at night was safe.

New York City has changed a lot over the decades. Now, it has one of the lowest violent crime rates compared to other large cities. People feel much safer walking the streets after sunset. The murder rate in New York City these days is only 18 percent of what it was in the 1980s. This **significant** drop in crime shocked even the experts. But why did this happen?

The reasons for New York City's lower crime rates are not so clear. Some experts believe that the "Broken Windows Theory" explains this change. The "Broken Windows Theory" was created in 1982 by two social scientists named James Wilson and George Kelling. They believed that people look for even the smallest signals about how they should behave in **their** environment. For example, if someone sees a broken window somewhere, it may hint that breaking other windows or other things are permitted and even encouraged. On the other hand, when an environment is clean, this signals to other people that they should behave respectfully and not commit offenses.

During the 1980s and 1990s, New York City authorities hired George Kelling and **they** put his theory to use. Under Kelling's advice, the mayor of New York City ordered the police to crack down on **petty** crimes such as jaywalking and public drinking. The crime rate in New York began to fall drastically. Not everyone agrees that this decrease was due to the Broken Windows Theory but it may have been one cause.

1. When was New York City considered a very dangerous place?
a) in the 1980s and 1990s
b) in the 1980s
c) in the 1990s
d) in the 2000s

2. To have "one of the highest violent crime rates" means:
a) you are out of danger there
b) high violence is overrated
c) bad things happen there
d) the crime rates are dropping

3. The word "roamed" in paragraph 1 means:
a) destroyed
b) walked
c) cleaned
d) helped

4. What has happened to the violent crime rate in New York City over time?
a) it has stayed about the same
b) it has doubled
c) it has increased
d) it has decreased

5. The word "significant" in paragraph 2 means:
a) signal
b) large
c) small
d) expected

6. Who created the "Broken Windows Theory"?
a) Wilson and Kelling
b) New York City mayor
c) the police
d) gangs

7. The word “their” in paragraph 3 refers to:
a) broken windows
b) social scientists
c) people
d) James Wilson and George Kelling

8. The “Broken Windows Theory” is an idea that:
a) we should always repair a broken window
b) James Wilson and George Kelling disagree with
c) people are influenced by surroundings
d) we should be very careful in New York City

9. The word “they” in paragraph 4 refers to:
a) New York City authorities
b) George Kelling
c) 1980s and 1990s
d) theory

10. The word “petty” in paragraph 4 is means:
a) famous
b) small
c) terrible
d) large

11. What advice did George Kelling give to New York City authorities?
a) he told them to make public drinking illegal
b) he told them to stop arresting people for small crimes
c) he told them to break the windows in subway stations
d) he told them to change how the police worked

12. What is the text about?
a) about how people used a social theory to cut down on crime
b) about how the Broken Windows Theory helped solve a case of wallet theft
c) about how New York City went from low to high crime rates
d) about the dangers of jaywalking and public drinking

13. You are walking around your neighborhood and you see policemen catching people who throw eggs at cars or slash tires on a bike. The Broken Windows Theory tells you that:
a) you feel unsafe because the police isn't catching the real criminals
b) you too can throw eggs at cars and not get caught
c) you have less chance of getting robbed in that same neighborhood
d) you must break some windows in the same neighborhood

Uputa: Pročitaj sljedeći tekst i odgovori na pitanja koja slijede. Svako pitanje ima samo jedan točan odgovor, zaokruži ga.

What is Cyber-bullying?

Cyber-bullying is a form of online harassment of a person. This problem was almost unheard of only 15 years ago. However, more and more people are now using the Internet. This is creating new problems for society. On the Internet, it is easier for people to hide their identity. This can encourage bullies to use the Internet to engage in this kind of harmful behavior. There are many ways that cyber-bullies use the Internet to **hurt** their victims.

Cyber-bullies might use social media sites like Facebook or Twitter to make hurtful comments about another person. **They** may spread rumors or lies about someone, which can damage the victim's **reputation**. Cyber-bullies often pose as another person in order to try and make their victim say something embarrassing. They might also try to trick their victim into believing they are in a romantic relationship or friendship that is not real. Another form of cyber-bullying is to post embarrassing photographs or videos of the victim without asking permission. **These** can remain on the Internet for years so they are very distressing for victims.

This type of bullying is becoming more **common**, especially among young people. A 2010 CBS News report showed that 42% of young Americans have been the victims of cyber-bullying. Some victims of cyber-bullying have even committed suicide. Many governments are trying to make online harassment illegal. Forty-five states in the USA have passed laws to prevent online bullying. Canada is currently considering passing a strict law against cyber-bullying. It will take some time before society learns how to **cope with** the potential drawbacks of this new technology.

1. What is cyber-bullying?
a) when someone hides their identity online
b) when someone encourages a person to post content online
c) when someone uses the Internet to harm or frighten another person
d) when someone hurts or frightens someone who is smaller or less powerful

2. Why was cyber-bullying almost unheard of 15 years ago?
a) because most societies are now worse than ever
b) because more people are now using the Internet
c) because more people are turning into bullies
d) because bullying someone online is easier than bullying someone physically

3. The word 'they' in paragraph 2 refers to:
a) victims
b) friends
c) relationships
d) cyber-bullies

4. The word 'hurt' in the last sentence of paragraph 1 means:
a) harm
b) burn
c) assist
d) smash

5. The word 'reputation' in paragraph 2 means:
a) the damage you have suffered
b) what you hate the most
c) hurtful comments about another person
d) how other people see you

6. The word 'these' in paragraph 2 refers to:
a) victims
b) cyber-bullies
c) romantic relationships
d) photographs or videos

7. The word 'common' in paragraph 3 means:
a) usual
b) unusual
c) public
d) private

8. Why are many governments trying to make online harassment illegal?
a) because of the tragedies which have been caused by online bullying
b) because 42% of young Americans want stricter laws
c) because Canada is currently considering passing a strict law against cyber-bullying
d) because new technology cannot cope with cyber-bullying

9. How many American states have passed legislation on cyber-bullying?
a) 42
b) 43
c) 44
d) 45

10. The phrase 'cope with' in paragraph 3 means:
a) put up with
b) run with
c) deal with
d) go with

11. What do cyber-bullies do?
a) harass, hurt, believe, prevent
b) spread lies, pose as another person, ask for permission
c) harass, hurt, spread rumors, trick
d) hide their identity, believe they are in a romantic relationship or friendship

12. How do the victims feel?
a) hidden, lied to, romantic and strict
b) hurt, embarrassed, distressed and some even commit suicide
c) hurt, tricked, friend zoned and new
d) easy, loved, photographed and fresh

13. When a person creates a fake profile online and uses it to stalk people and threaten them, he or she:
a) is a victim
b) is in the news
c) is a cyber-bully
d) prevents online bullying

14. The society we live in:
a) has learned how to deal with the cyber-bullies and the victims
b) helps governments and news reporters pass strict laws
c) has less and less people using the Internet
d) is different than it was not so long ago because of technology

15. The Internet:
a) is a new technology responsible for bad human character
b) can be a dangerous place because you can easily connect with people you don't know
c) is safe to use because of strict laws
d) is more dangerous in the USA than in Canada

Sažetak

U radu se analiziraju odnosi između bogatstva rječnika, nadgledanja razumijevanja i razumijevanja pročitanog teksta na materinjem i stranom jeziku u višim razredima osnovne škole. Odnos između bogatstva rječnika i razumijevanja pročitanoga teksta prezentiran je kroz konstrukcijsko-integracijski model čitanja Waltera Kintscha. Bogatstvo rječnika naglašeno je kao najvažniji element čitanja na stranom jeziku za ovu dobnu skupinu. Odnos između bogatstva rječnika i nadgledanja razumijevanja istražen je kroz mjere rezolucije i kalibracije, a rezultati su uklopljeni u širi kontekst istraživanja koji uključuje metakognitivno znanje i kontrolu. Metakognitivna svijest o riječi ističe se kao važan element usvajanja i učenja rječnika. Nađene su statistički značajne razlike u pristranosti između gornje i donje četvrtine učenika podijeljenih prema rezultatima na testu znanja rječnika. Gornja četvrtina pokazuje prenisku samouvjerenost, dok donja četvrtina pokazuje pretjeranu samouvjerenost i u petom i u osmom razredu. U raspravi o odnosu između nadgledanja razumijevanja i razumijevanja pročitanog teksta posebni naglasak stavljen je na otkrivanje pogrešaka. Rezultati upućuju na važnost pojednostavljivanja jezika teksta kako bi učenici petog razreda mogli upotrijebiti svoje vještine pronalaženja pogreške prilikom čitanja na stranom jeziku. Uočena je razvojna linija nadgledanja razumijevanja, koje se javlja prvo na materinjem jeziku, a potom transferira na strani jezik. U oba jezika, prvo se javljaju lokalne vještine nadgledanja razumijevanja pa potom globalne. Na pitanje je li čitanje na stranom jeziku problem jezika ili problem čitanja, rezultati daju čvrstu potporu hipotezi jezičnog praga. Raspravljaju se obrazovne implikacije ključnih rezultata.

Ključne riječi: bogatstvo rječnika, nadgledanje razumijevanja, razumijevanje pročitanog teksta, materinji jezik, strani jezik