

# Vocabulary Acquisition Revisited: The Case of Human Movement Science

**Darija Omrčen**

*Faculty of Kinesiology University of Zagreb, Zagreb, Croatia  
darija.omrcen@kif.hr*

## 1. Introduction

That women excel men in language ability and skills (Gu, 2002; Kimura, 1999; Moir & Jessel, 1992; Wilson, 1975) is a continuously challenged stereotype whose refutation seems to be corroborated time and again. Some studies found no gender differences in this respect (Agustín Llach & Gallego, 2012; Brantmeier, 2003; Morris, 1998; Voyer & Voyer, 2014). The results of some other studies showed that men bettered women (Boyle, 1987; Scarcella & Zimmerman, 1998), whereas in some women did better in one and men in the other segment of a study (Newman, Groom, Handelman, & Pennebaker, 2008; Lin, 2011; Lin & Wu, 2004; Xia, 2013). In some cases, results regarding the absence/presence of differences between men and women depended on the methodology and experimental design of research (Ali, 2016; Pahom, Farley, & Ramonda, 2015). This inconsistency in findings holds true both for language ability/skills in general and for L2 language acquisition in many of its possible aspects.

Research into English for Specific Purposes (ESP) vocabulary acquisition in kinesiology students has adduced the absence of differences between men and women in a written multi-task ESP test, dictation and English into Croatian open-ended translation (Omrčen & Bosnar, 2008). No differences between men and women were found in the knowledge of selected English grammatical constructions either (Omrčen, 2011a). Another study showed that men achieved better results in translating higher technicity-level terms into Croatian, whereas women were better in translating terms of a lower technicity level (Omrčen & Bosnar, 2010). Research into the knowledge of German kinesiological vocabulary, carried out using German into Croatian open-ended translation tests, has also confirmed the lack of differences between male and female students of kinesiology (Omrčen, 2010, 2011b)

### 1.1. Vocabulary assessment

Language ability is an intricate concept that is commonly measured by various tests of two spoken and two written language skills – listening and speaking on the one hand, and reading and writing on the other. Vocabulary knowledge, accompanied by the choice of words and style (Powers, 2010, p. 3), is said to be a subskill that lies in the background of all four language skills.

The choice of language assessment tools varies in compliance with its purpose. The plethora of omnifarious tests makes this choice easier, however, the selection of tests should be done by both clearly pinpointing the aim of testing and by structuring the assessment tool with caution. To test vocabulary knowledge various tests have been applied varying with regard to the research aims, participants, etc.

Research addressing contextual and decontextual vocabulary knowledge yielded disparate results. Van Zeeland (2013) found that learners' contextual and decontextual vocabulary knowledge agree in 65% of the cases. Kelly (1990) regarded contextual clues to vary as for their relevance in learning a word, and Gu (2015, p. 4) considered some contextual clues as helpful, and others as useless or even confusing.

Multiple-choice tests (termed *multiple-choice tasks* in this text) (MCT), frequently used to test L2 acquisition, have been subject to analyses commencing from different points of view. In general, validity and reliability, as well as design (Considine, Botti, & Tomas, 2005) of MCTs and guidelines for their construction (Haladyna, Downing, & Rodriguez, 2002; Moreno, Martínez, & Muñoz, 2006) have long been in the focus of research. As for L2 acquisition, MCTs have been used to test incidental vocabulary learning (Laufer & Hulstijn, 2001; Waring & Nation, 2004; Yoshii, 2006), comprehension-focused extensive reading (Horst, Cobb, & Meara, 1998), second language vocabulary acquisition through reading (Pulido, 2003), vocabulary size (Wood, 1999; Laufer & Nation, 1999), etc. Although MCTs are believed to strongly encourage guessing (Walstad & Becker, 1994, p. 193) and to imply only the simple recognition of facts (Bennett, Rock, & Wang, 1991), MCTs offer an opportunity for each item in it to reflect specific content (Haladyna et al., 2002, p. 312). Since in a MCT choices may be kept independent (Haladyna et al., 2002, p. 312), inclusion both of a single correct choice (a key) and of students' typical errors as distractors into choices (Haladyna et al., 2002, p. 312; McNamara, 2005, p. 6) increases the accuracy-related requirements crucial in language for specific purposes. To be able to include the best possible distractors in the choice set, a test maker should be familiar with errors that test takers most frequently make with regard to selected terms. Ultimately, MCTs are considered to possess a high degree of reliability, which is the result of the scoring procedure that is objective and unbiased (Haladyna, 1999; Douglas, 2000, p. 225).

## **1.2. Agents playing a crucial role in vocabulary acquisition**

Vocabulary acquisition in an L2 is not, and cannot be, devoid of both external and internal influences on a learner. Those influences are numerous, and difficult to control. An array of agents playing an important role in L2 (vocabulary) acquisition is comprised of age (DeKeyser, 2000; Birdsong, 2006; Mihaljević Djigunović, 2014), motivation (Dörnyei, 1998), motivational strategies (Cheng & Dörnyei, 2007), attitudes and motivation (Mihaljević Djigunović & Bagarić, 2007), affect (Mihaljević Djigunović, 2007; Qin, 2007), learning strategies and styles (Ehrman & Oxford, 1995), gender (Khamkhien, 2010), attention (Schmidt, 2010), use of web technologies (Wang & Vásquez, 2012), etc. Other aspects affecting foreign language for specific purposes acquisition range from developing teaching materials for language for specific purposes learners (Candlin, Bhatia, & Jensen, 2002), to content (disciplinary, specialist, professional) knowledge (Smit & Dafouz, 2012), approach to teaching a foreign language for specific purposes (Zhang, 2007), to research-based language education (Hyland, 2002), etc.

## **2. Study**

To realize the aims of research presented in this paper an action research model was adopted to provide additional perceptions regarding English kinesiological terminology acquisition-related issues, which would consequently contribute to

more efficient teaching-oriented guidelines. In compliance with the action research model paradigm, a four stage approach to the matter, as specified by Sagor (2005) was applied. In other words, first, the research targets were set. Secondly, the best- suited approaches to obtain the desired data were prepared. Thirdly, data were collected, and finally, the yielded results were analysed to be able to draw on the possible practical implications.

## 2.1. Aim

The aim of the research was to identify any statistically significant differences in terms of English kinesiological vocabulary knowledge between male and female students of kinesiology, as well as to identify which of the five selected agents – four subjects from the university study of kinesiology (*Systematic Kinesiology*, *Biomechanics*, *Basic Kinesiological Transformations* and *Advanced English Usage in Kinesiology*) and the number of years of learning English – played a decisive role in the acquisition of kinesiology-specific vocabulary. Participants' exam grades in the four aforementioned subjects were regarded as indicators of their academic achievement.

The selection of the four subjects was guided by the contents they cover. *Systematic Kinesiology* provides students with the knowledge of general principles of human movement, general principles of managing the process of physical exercise, and with the knowledge of consequences that these processes have on human organism. In *Biomechanics* the students are taught the basic laws of biomechanics of human movement, and the key aspect in *Basic Kinesiological Transformations* is the knowledge of morphological characteristics, cardiorespiratory endurance, motor abilities and skills and their possible transformations. In all, these three subjects rely on the basic concepts of kinesiology. All three subjects have Croatian as the language of instruction. The aim of the subject *Advanced English Usage in Kinesiology* is to teach, among other topics, the key terms in English that are connected with selected anthropological characteristics, e.g. morphological characteristics, energy production in human body, motor abilities, but also the training process connected with their development (transformations). In other words, one part of the syllabus is based on the selection of terminology from the contents of the aforementioned kinesiology-specific subjects.

To achieve the research aims, an assessment tool was created which would make it possible to collect the necessary data and to conduct a research among kinesiology students. The sample was comprised of 58 male and 24 female participants, students from the Faculty of Kinesiology at the University of Zagreb (Croatia) who all attended the classes in the subject *Advanced English Usage in Kinesiology* within the university study of kinesiology. The ratio of men and women corresponded to the ratio of male and female students at the Faculty of Kinesiology. Although the sample was a convenience one, it best suited the aims of the research in that the results were expected to yield some practical implications for implementation in the syllabus of the previously mentioned subject in which English kinesiological terminology is taught. Correspondingly, the following research questions were formulated:

RQ1: Are there any differences between male and female kinesiology students in their knowledge of a selected set of English kinesiology-related terms?

RQ2: Which of the agents (exam marks in the subjects *Systematic Kinesiology*, *Biomechanics*, *Basic Kinesiological Transformations* and *Advanced English Usage in Kinesiology*, as well as the number of years of learning English) have greater relative effect on the knowledge of a selected set of English kinesiology-related terms in male and female kinesiology students?

## 2.2. Instruments and procedure

An assessment tool consisting of five tasks was used: i. a five-item English into Croatian term translation multiple choice task; ii. a five-item Croatian into English term translation multiple choice task; iii. a five-item English by English term denotation multiple choice task; iv. a ten-item open-ended Croatian into English term translation task; and v. a ten-item true or false task. The focus of the constructional knowledge in an L2 for specific purposes is primarily at a lexical level, i.e. on multi-word terms (although multi-word expressions in a broader sense, e.g. *in contrast to*, *with regard to*, are not negligible), and less a syntactical one. Further, the selection of context-free tasks – multiple-choice and open-ended term translation task – was made in compliance with the fact that the context at sentence and text level, again in contrast to general language, is not necessarily helpful in understanding a term; on the contrary, it might even be confusing, as previously pointed out (Gu, 2015, p. 4). Since the scope of vocabulary testing was not on the contextual knowledge, the decontextualized type of MCTs was selected as a dominant format for this research. Due to the fact that there were cases in which past research showed that context was redundant for vocabulary testing on the one hand, and since language for specific purposes demands terminological accuracy which is not context-dependent on the other, textual context was omitted in three MCTs and one open-ended task in this research. An additional reason for omitting context for each of the terms in the MCTs was the fact that the broader frame of kinesiology-related contextual knowledge was known, which provided a wide clue for vocabulary knowledge.

Further, since the testing was done for a specific population and for a specific subsystem of language, i.e. for language for specific purposes, the accuracy regarding two aspects was critical. The first aspect involved domain knowledge and the accuracy of knowledge of terminology in a mother tongue (Croatian in this case). The second aspect focused on the accuracy of the knowledge of translation equivalence of terms that possess the same communicative value in a foreign language (English in this case). Hence, the selection of translation-type tasks was built on the fact that acquisition of an L2 as a language for specific purposes relies primarily on the knowledge of terminology and translational equivalence of terms between two (or more) languages.

As for the English by English term denotation task, the reasoning behind including it into the assessment tool used lies in synonymy – a crucial semantic relation in the mental lexicon, both in L1 and in L2. Although synonymy is not a desirable feature in language for specific purposes, which strives for terminological accuracy and clarity, it still exists and is frequently inversely proportional to a term's degree of technicality. Since language for specific purposes operates with terms of various technicality degrees, an attempt was made to include precisely such terms whose degree of technicality is not the same. Further and according to Turney, Littman, Bigham and Shnayder (2003), "multiple choice synonym questions can be used to determine the semantic orientation of a word".

According to Nation (2001, p. 359), translations both from L2 into L1 and vice versa involve recall. The open-ended translation format from L1 into L2, as a measure of the learners' productive vocabulary knowledge, was therefore selected as a further vocabulary testing technique.

Not to omit contextual testing at text level completely, a context-based true or false task was included in the research. This task has been devised by taking into account one of its critical features, i.e. its advantageous nature which provides information on whether something has been understood or not (Brown & Hudson, 2002, p. 66).

Finally, the students who participated in this study were familiar with all types of tasks included in the assessment tool, since these types of tasks were previously used in the classes.

### **2.3. Length of the assessment tool and the number of choices**

The length of the assessment tool applied in this research (the total number of multiple-choice questions = 15) was within the recommended length of five to 30 multiple-choice questions (Considine et al., 2005, p. 23). In contrast to general language in which various vocabulary teaching and learning strategies may be employed, e.g. paraphrasing, using synonymous words or expressions, etc., language for specific purposes is more demanding in this respect and requires both conceptual and terminological precision.

Although research commonly speaks in favour of a three-option MCT format (Dehnad, Nasser, & Hosseini, 2014, p. 399), researchers opt for the four-option format due to the fact that the decrease of choices increases guessing (Dehnad et al., p. 399). Vyas and Supe (2008) conducted a survey of studies done on the number of choices per item on a multiple-choice test and found that three-option tests were of a similar quality as four- and five-option ones. Still, there are authors who recommend that as many plausible distractors as possible be provided in the choice set (Haladyna et al., 2002). In compliance with this recommendation, eight choices were given for each item in all three MCTs with the intent to increase the difficulty of the three tasks.

### **2.4. Selection of terms and text**

The terms selected for all three MCTs and for the open-ended L1 into L2 term translation task were all extracted from the syllabus of the subject *Advanced English Usage in Kinesiology*. Both the English terms and their Croatian translation equivalents have been discussed with the students in these classes. The terms tested in the MCTs were extracted from three specialized areas: a domain that is a common denominator of all scientific disciplines, i.e. from research methodology (e.g., *incidence, perpendicular*); domains of general kinesiology (e.g., *physique, division, superposition, motor ability, body fat*); and a sport-specific domain (e.g., *violation, dolphin kick*).

Similarly, the topic of the true or false task was also a topic analysed and discussed with the students both in the classes of the specialized subject of kinesiology and in the subject in which English kinesiological vocabulary is taught, so that the students were familiar both with the domain context and topical knowledge as well as with vocabulary used in it, be it in L1 or in L2. A 200-word long text dealt with components of sports training programmes and the denotation of the terms *volume of training, intensity of training* and *density of training*. Although translation of two of them into the Croatian language might seem easy (English *volume of training* → Croatian *volumen treninga*; English *intensity of training* → Croatian *intenzitet treninga*), what perplexes their understanding in the two languages are their divergent semantic fields, i.e. the terms *volume of training* and *intensity of training* are false cognates.

### **2.5. Statistical methods**

The sums of scores per task were used as indices of the English kinesiological vocabulary knowledge and served as dependent variables in *t*-tests for independent

samples, gender being a categorical factor. Further, a series of regression analyses was performed for men and women separately having each time one of the five vocabulary knowledge variables as a dependent one. Exam grades in the four selected subjects from the university study of kinesiology – *Systematic Kinesiology, Biomechanics, Basic Kinesiological Transformations* and *Advanced English Usage in Kinesiology* – and the number of years of learning English as a foreign language comprised a set of independent variables that served to identify agents that best predicted the success in each of the five tasks, i.e. that played a decisive role in the acquisition of English kinesiological vocabulary. Statistical package Dell Statistica (data analysis software system), version 12 (Dell Inc., 2015) was used to process the collected data.

### 3. Results and discussion

#### 3.1. Gender differences

##### 3.1.1. Open-ended L1 into L2 translation

The yielded results continued to follow the trends outlined by previous analyses of the differences between male and female kinesiologists as regards the knowledge of kinesiological vocabulary in L2. The differences were small but significant, and when significant, this has proven to be in favour of men. Still, even the analysis of items from tasks in which men and women did not differ significantly pointed to some instructive pieces of information that might help to design a syllabus for teaching English as an L2 for specific kinesiological purposes. Overall, there was a significant difference between men (M=18.8; SD=5.7) and women (M=16.1; SD=5.4) in the Croatian into English open-ended term translation test –  $t(80)=1.98, p \leq 0.05$ .

The three most frequently correctly translated terms, by both men and women, were *aerobna izdržljivost* (English *aerobic endurance*), *repetitivna snaga* (English *muscular endurance*) and *anaerobna izdržljivost* (English *anaerobic endurance*) (Table 1). This could be justified by a well-known perception that antonymy, implied in the terms *aerobic* and *anaerobic endurance*, belongs to the set of crucial lexical semantic relations in the mental lexicon, and its uniqueness lies in that it “requires one-to-one relations” (Jones, Murphy, Paradis, & Willners, 2012, p. 1), which draws on its simplicity. Moreover, *aerobic* and *anaerobic* are adjectives, and adjectives possess marked affinity for expressing oppositeness (Jones et al., 2012, p. 4). The reason for the term *repetitivna snaga* (English *muscular endurance*) to be among the three most frequently correctly translated terms together with the terms *aerobic* and *anaerobic endurance* is the notion of *endurance* that conjoins them both conceptually in L1 and L2, and intra-linguistically in terms of its similarity in form in L2 with the terms *aerobic* and *anaerobic endurance*.

Table 1. Percent of incorrect, partially correct and correct translations in the open-ended translation MCT by gender

CROATIAN TERM	CORRECT ENGLISH TRANSLATION	INCORRECT (%)		PARTIALLY CORRECT (%)		CORRECT (%)	
		MEN	WOMEN	MEN	WOMEN	MEN	WOMEN
<i>jakost</i>	<i>strength</i>	36.2	50.0	63.8	41.7	-	8.3

<i>snaga</i>	<i>power</i>	43.1	66.7	55.2	33.3	1.7	-
<i>repetitivna snaga</i>	<i>muscular endurance</i>	77.6	87.5	3.4	-	19.0	12.5
<i>mišićna izdržljivost</i>	<i>muscular endurance</i>	41.4	50.0	53.4	45.8	5.2	4.2
<i>aerobna izdržljivost</i>	<i>aerobic endurance*</i>	44.8	54.2	34.5	29.2	20.7	16.6
<i>opća izdržljivost</i>	<i>stamina</i>	63.8	54.2	29.3	37.5	6.9	8.3
<i>jakosna izdržljivost</i>	<i>strength endurance</i>	55.2	79.2	39.6	16.7	5.2	4.1
<i>izdržljivost u brzini</i>	<i>speed endurance</i>	55.2	75.0	44.8	25.0	-	-
<i>silina</i>	<i>force</i>	58.6	75.0	39.7	20.8	1.7	4.2
<i>anaerobna izdržljivost</i>	<i>anaerobic endurance</i>	43.1	66.7	41.4	20.8	15.5	12.5

\*Aerobic endurance is also termed aerobic fitness, cardiovascular endurance/fitness, cardiopulmonary endurance/fitness. Hence, these were also possible correct translations.

The three terms most frequently partially correctly translated from L1 into L2 by both men and women were *jakost* (English *strength*), *snaga* (English *power*) and *mišićna izdržljivost* (English *muscular endurance*). However, the survey of data in Table 1 also shows that men translated all the terms but one partially correctly more frequently than women. This partial correctness might point to the fact that, although not being completely sure as regards the correct translation of terms, men dared take a risk and tried to guess them, consequently achieving an overall better result than their female peers. Such a result is to some extent in compliance with past research which pointed to males being more prone to guessing than females (Bolger & Kellaghan, 1990). Although Bolger and Kellaghan (1990) dealt with guessing on MCTs, their result might be extended to open-ended term translations. Additionally, this task requires an analytical approach to learning because on the one hand it requires the knowledge in L1 of the distinction between the terms, included in this task, and concepts that they designate, and their translation equivalency in L2 on the other. This consequently means that in contrast to the perception that women learn more analytically than men, male kinesiologists, at least as far as this task is concerned, appeared to be an exception to this rule. Still, impulsiveness, a feature of men's learning style, might be expressed through guessing. What the result regarding the existence of a significant difference between men and women in this type of task also implies is that men exceeded women in one of the two most difficult tasks (the second most difficult task being the true or false task) in this analysis, i.e. in one segment of the productive aspect of L2 vocabulary knowledge.

### 3.1.2. Multiple-choice tasks

When constructed cautiously, MCTs may provide a rather informative insight into knowledge structure in general, thus also into vocabulary knowledge in a foreign language. The absence of differences between men and women on language-related MCTs in this study is in compliance with results of other researchers' work into the same subject matter, although past research reveals inconsistent data. Cole (1997) and

Grace (2000) found only very small differences between men and women, whereas Bolger and Kellaghan (1990) as well as Hellekant (1994) found no differences between the two genders in this type of task. Further, scarce data from past research into the connectedness between MCTs and guessing – MCTs being believed to encourage it (Walstad & Becker, 1994, p. 193) – reveal that only small differences between men and women were found hereof (Ben-Shakhar & Sinai, 1991).

Further, although no statistically significant differences were obtained between men and women on any of the MCTs, some valuable information displayed in Table 2 might be useful for further application in the process of acquiring kinesiological English terms.

One of those findings confirms a reliance on the knowledge of general English which was evident in the English into Croatian translation MCT. More men than women translated the term *violation* correctly into L1. However, when translated incorrectly, either by men or by women, it was understood as *nasilje*, i.e. *violence*.

Table 2. Frequency and percent of correct translations in three multiple choice tasks

MULTIPLE CHOICE TASK	ITEM	CORRECT TRANSLATION	MEN		WOMEN	
			COUNT	PERCENT	COUNT	PERCENT
English into Croatian translation	<i>incidence</i>	<i>učestalost</i> (English <i>occurrence, frequency</i> )	12	20.7	3	12.5
	<i>physique</i>	<i>oblik tijela</i> (English <i>shape of the body</i> )	28	48.3	10	41.7
	<i>division</i> (in muscle structure)	<i>dio mišića</i> (English <i>a part of a muscle</i> )	19	32.8	8	33.3
	superposition	položaj jedan iznad drugoga*	36	62.1	19	79.2
	violation (in team sports)	povreda pravila igre isključujući prekršaje na protivničkome igraču i pravila ponašanja u igri**	10	17.2	2	8.3
Croatian into English translation	<i>rad nogu</i> (in a stroke termed <i>dolphin technique</i> in Croatian)***	<i>dolphin kick</i>	25	43.1	9	37.5
	građa tijela	body type	14	24.1	12	50.0
	motorička sposobnost	motor ability	33	56.9	13	54.2
	motoričko znanje	motor skill	25	43.1	10	41.7
	veličina	magnitude	19	32.8	11	45.8
English by English denotation	<i>rupture</i>	<i>breaking</i>	38	65.5	15	62.5
	body fat	all body fat	43	74.1	21	87.5
	intact	not damaged	32	55.2	15	62.5
	duct	passage	26	44.8	13	54.2
	perpendicular	orthogonal	23	39.7	9	37.5

\*Position of one above the other.

\*\*Infringement of the rules of the game excluding fouls committed on an opposing player and the fouls regarding unsportspersonlike conduct.

\*\*\*Kicking action in butterfly stroke which is in Croatian termed leptir/dupin tehnika.

With reference to the result that more men than women knew the meaning of the term *violation* and in spite of its low correct translation rate, it might be supposed that, globally, more men than women participate in team sports, and are hence more familiar with the terminology used in sporting games. Additionally, according to the research by Koivula (2001), many team sports such as soccer, football, handball, ice-hockey, baseball and rugby are regarded as masculine sports, which might also be regarded as a reason why more men are interested in these team sports.

Further, men correctly translated the term *incidence* more frequently than women. The reasons, however, for such a finding are to be sought elsewhere, not in the masculine, feminine or gender-neutral nature of various sports, since this term belongs to an area common to all scientific disciplines, i.e. to the terminology of research methodology. *Incidence* (Croatian *učestalost*) and *incident* (Croatian *slučaj*) are two terms that are strikingly similar in form, so that consequently most participants (both men and women) mistook the former for the latter – the latter again being known to them from general English. However, an additional point emerges here, namely, no such item as *slučaj* was to be found among the possible solution choices. What was offered among the eight items (Figure 1) was the word *slučajnost*. The similarity in the form of the terms *incidence* and *incident* in L2, and partial similarity of the Croatian into English translation equivalent of the L1 term *incident*, might be presumed to have been prioritized by the participants as indicators considered to supposedly link the form of the word/term to its meaning.

CROATIAN CHOICES	ENGLISH TRANSLATIONS OF CHOICES
slučajnost	<i>chance, mere chance</i>
vjerojatnost	<i>probability, likelihood</i>
valjanost	<i>validity</i>
pouzdanost	<i>reliability</i>
učestalost	<i>frequency</i>
raspršenost	<i>dispersion</i>
raspodjela	<i>distribution</i>
vrijednost	<i>value</i>

Figure 1. The Croatian choices provided in the task for the term *incidence* in the English into Croatian term translation task.

This has confirmed the well-known principle that in terms of cognitive processes, similarity, e.g. in form, appears to be one of the ways in which people categorize things most frequently, either in language or in general (Escribano, 2004). Subsequently, a conclusion may be drawn that in some instances in this study women seemed to have relied more than men on the form of a term both in L1 and in L2 when trying to infer its meaning.

The correct translation from L2 into L1 of the term *physique* was *oblik tijela*, i.e. *shape of the body* (also termed *građa tijela* and *somatotip* in Croatian, and *body type* and *somatotype* in English. More men than women translated the term *physique* from L2 into L1 correctly, which is contradictory to the result obtained for a different term designating the same concept (Croatian *građa tijela*; English *body type*) later on in the L1 into L2 translation task. Hence, further research focusing on this particular subject matter seems to be necessary to make more accurate conclusions in this respect possible.

In the Croatian into English term translation MCT, women were more efficient than men in translating the term *građa tijela* (English *body type, somatotype, body build, physique*). Even more, the poorest results, with respect to other results achieved by men in this task as well as with respect to other results achieved by both men and women, were found in translating this particular term *građa tijela* into L2. A more detailed scrutiny allows for the identification of a probable cause of such a result. First of all, three concepts – *body type* (Croatian: *građa tijela*), *body structure* (Croatian: *struktura tijela*) and *body composition* (Croatian: *sastav tijela*) – are sometimes incorrectly and interchangeably used in Croatian, i.e. in L1, wherefore their acquisition in L2 requires an analytical approach. Further, although synonymous terms, as previously stated, are not desirable in the language for specific purposes because it strives towards the usage of uniform terms to avoid or, at least, reduce misunderstanding and to facilitate accurate communication in scientific and occupational expert communities, terms with the same or very similar meaning do exist. Hence, two terms exist in the Croatian language – *somatotip* and *građa tijela* to designate *body type*. In English any of as many as four synonymous translation equivalents may be used – *body type, somatotype, body build* and *physique*. A perplexing situation caused by failing to grasp a concept designated by one or even more than one term in one language might incur the lack of its comprehension in another language, and the situation may be exacerbated even further if the same communicative value in another language is also conveyed by more than one term. Such concatenation of possible interferences in concept representation and storage in memory significantly reduces conceptual knowledge in the mother tongue which then affects the knowledge of the term in a foreign language. Subsequently, the knowledge of a term and its meaning in the mother tongue need meticulous scrutiny prior to the presentation of its translation counterpart in a foreign language. In contrast to the result in the open-ended term translation task in which men appeared to have expressed a more analytical approach to learning than women, women achieved a better result when translating the term *građa tijela* into L2 because the acquisition of this term, as is evident from previous discussion on it, requires a more analytical approach to learning, which is the style of learning more frequently applied by women.

Another term that women proved to have better knowledge of was the term *veličina* (English *magnitude*), i.e. its translation equivalents in L2. The Croatian term *veličina* has several possible translation equivalents in English (e.g., *size, dimension, extent, measure, magnitude, quantity, volume*) out of which only one (*magnitude*) was to be found among the choices. All terms included in the choices referred to a kind of measure, be it a measure of length (*longitude*), width (*latitude*), height (*altitude*), number (*multitude*), extent (*amplitude*), quality or state (*platitude*), greatness of size or amount (*magnitude*) and finiteness (*infinitude*), and accuracy in the knowledge of the meaning of all the given terms was necessary to select the correct one. Again, a more analytical approach, typically employed by women, in order to acquire the meaning of the term in L2 was necessary.

In the English by English denotation MCT correct translation rate, both for men and women, exceeded 40% in all but one item – the term *perpendicular*. As for this term, the selection of translation choices that the participants had at their disposal did not contain the term *vertical* (*slanting, tilted, orthogonal, parallel, transverse, oblique, skewed, diagonal*) which is usually the first choice by many when it comes to possible synonyms of the term *perpendicular*. Instead, the term *orthogonal* was used, which the students have learned in statistics, which has Croatian as the language of instruction, e.g. in factor analysis and the rotation of factors. Consequently, the participants were

(or should have been) familiar with the term. Further, the topic of statistics-related terminology used in the English language had been discussed with them in the subject *Advanced English Usage in Kinesiology*. Moreover, both the term *vertical* and the term *orthogonal* are also used in Croatian (*vertikalnan* and *ortogonalan*) so that the correct solution rate was expected to be higher. Obviously, what hindered a higher correct solution rate was the lack of knowledge of the term *perpendicular* used in English. Whereas two stimuli might have conditioned the knowledge of the term *orthogonal*, only one stimulus – within the context of the university study of kinesiology – could have existed for storing the term *perpendicular* into the memory: the subject in which English kinesiological terminology is taught, i.e. the source which was not preceded by a concept representation stimulus in the mother tongue and within the creation of content knowledge. In addition, a term similar in form to the term *perpendicular* does not exist in Croatian, so that reference to the same concept based on form similarity of its name in the mother tongue was not possible.

### 3.1.3. True or false task

The number of correct solutions, by both men and women, in the true or false task varied (Table 3); however, item 1 stood out as for its highest rate of correct solutions to the true/false choice. The correct marking of the statement as being true when compared to the text depended on the participants' knowledge of the word *gradually*, which belongs to general language and has a low degree of technicality, and its synonymous expression *step by step* in the statement in item 1.

Table 3. Frequency and percent of correct solutions on the T/F task separately for men and women

No.	T/F ITEM	MEN		WOMEN	
		COUNT	PERCENT	COUNT	PERCENT
1	The desired fitness level of an athlete must be achieved step by step.	58	100.0	23	95.8
2	The selection of objectives is non-sport-dependent.	49	84.5	20	83.3
3	Combat sports require team capability.	51	87.9	18	75.0
4	The selection of goals to be met is strict and obligatory.	31	53.4	13	54.2
5	Density and intensity of training are synonymous terms.	54	93.1	21	87.5
6	The time aspect of training belongs to the concept of the intensity of training.	41	70.7	19	79.2
7	The time aspect of training belongs exclusively to the concept of the density of training.	29	50.0	10	41.7
8	The density of training refers to time periods between the phases of exertion and the phases of rest.	49	84.5	20	83.3
9	The duration of training is an aspect of the density of training.	26	44.8	16	66.7
10	The frequency of repeating an effort is an aspect of the density of training.	38	65.5	16	66.7

Another high rate of correct solutions by both men and women was obtained for item 5 and the statement that two focal terms – *density* and *intensity of training* – are not synonymous. Such a high correct solution rate was the result of the fact that both in English and in Croatian literature the distinction between the two concepts and the terms designating them is clear. However, further specification, by introducing the aspect of time, of the density and intensity of training as expressed in the underlying text was the reason for the decrease in the rate of correct solutions for items 6 and 7 in both genders. The time aspect continued to perplex men more than women in item 9. Still, the differences between the two genders were not such as to be identified as statistically significant.

### 3.1.4. Effects of exams grades in four subjects from university study of kinesiology and the number of years of learning English on vocabulary acquisition

Although no statistically significant differences were found between the two genders as for the exam grades obtained in the four subjects of university study of kinesiology, women received more excellent grades in three subjects, except for the subject in which English kinesiological terminology is taught. This is a finding that speaks in favour of men excelling women in at least some language aspects. Overall, the results from Table 4 point to rather evenly spread achievements of men and women in three crucial kinesiological subjects and in one technical language-related one. The absence of differences between the genders is informative as for the academic achievement in domain-specific subjects and a subject which combines linguistic and domain knowledge.

Table 4. Examination grades in the selected subjects from the university study of kinesiology (University of Zagreb, Faculty of Kinesiology)

SUBJECT	VALUE	EXAMINATION GRADE							
		SUFFICIENT		GOOD		VERY GOOD		EXCELLENT	
		MEN	WOMEN	MEN	WOMEN	MEN	WOMEN	MEN	WOMEN
Systematic Kinesiology	Count	19	3	16	5	16	9	7	7
	Percentage	32.8	12.5	27.6	20.8	27.6	37.5	12.1	29.2
Biomechanics	Count	11	3	14	4	23	9	10	8
	Percentage	19.0	12.5	24.1	16.7	39.7	37.5	17.2	33.3
Basic Kinesiological Transformations	Count	3	2	5	5	28	7	22	10
	Percentage	5.2	8.3	8.6	20.8	48.3	29.2	37.9	41.7
Advanced English Usage in Kinesiology	Count	-	-	5	5	14	4	39	15
	Percentage	-	-	8.6	20.8	24.1	16.7	67.2	62.5

As for the duration of systematic learning of the L2, men have been learning English for 10.31 years on average and women for 10.96 years. However, this minor difference in the length of learning English was not significant ( $p \leq 0.05$ ).

The series of regression analyses has shown that, as for men, the subject *Advanced English Usage in Kinesiology* was the significant agent that best predicted participants' accomplishment in two out of five vocabulary knowledge tasks. The exam grades in this subject were found to explain a significant proportion of variance in the true or false task ( $R^2=0.199$ ,  $F(5, 52)=2.595$ ,  $p=0.036$ ) and to significantly predict the results in it ( $\beta=0.412$ ,  $t(52)=3.148$ ,  $p=0.003$ ). A significant proportion of variance in the English by English denotation MCT was explained ( $R^2=0.307$ ,  $F(5, 52)=4.609$ ,  $p=0.001$ ) and success in this task was significantly predicted ( $\beta=0.453$ ,  $t(52)=3.721$ ,  $p=0.000$ ) by the academic achievement in the subject *Advanced English Usage in Kinesiology*.

As for women, the results of regression analyses have shown that academic achievement in the subject *Advanced English Usage in Kinesiology* explained a significant proportion of variance in the open-ended Croatian into English term translation task ( $R^2=0.595$ ,  $F(5, 18)=5.285$ ,  $p=0.004$ ), and it significantly predicted the female students' success in this task ( $\beta=0.401$ ,  $t(18)=2.638$ ,  $p=0.017$ ). Interestingly, academic achievement in *Biomechanics* was influential in the English into Croatian multiple-choice translation task where it explained a significant proportion of variance ( $R^2=0.439$ ,  $F(5, 18)=2.828$ ,  $p=0.047$ ) and significantly predicted the female participants' success ( $\beta=0.576$ ,  $t(18)=2.416$ ,  $p=0.026$ ) in this task. As for the success in the English by English multiple choice denotation task, for which the multiple regression equation was statistically significant and explained 53.6% of the variance ( $R^2=0.536$ ,  $F(5, 18)=4.154$ ,  $p=0.011$ ), it was significantly predicted by two independent variables – exam grades in *Biomechanics* ( $\beta=0.630$ ,  $t(18)=2.902$ ,  $p=0.009$ ) and exam grades in *Advanced English Usage in Kinesiology* ( $\beta=0.409$ ,  $t(18)=2.516$ ,  $p=0.021$ ). In other words, the knowledge obtained in biomechanics as well as the knowledge of English kinesiological terminology learned in the subject *Advanced English Usage in Kinesiology*, the former to a somewhat greater extent than the latter, proved to be critical for the scores in this task.

Overall, these results have shown that, in men, although believed to learn impulsively, the knowledge of vocabulary in L2 is affected by the actual instruction in the subject whose focus lies on teaching English kinesiological terminology. As regards future female kinesiologists, they combined their knowledge acquired both in the L2 instruction and in a kinesiology-specific domain subject in which instruction attention is aimed at physical laws of mechanics on which the science of human movement relies.

These results point to the fact that many kinesiology students ignore the importance of learning English kinesiological terminology and rely on their knowledge of general English, as well as on within-language and inter-language similarity. Still, one of the most compelling results was that the length of learning English as an L2 was not a decisive agent, either for men or for women, for the achievement in the tasks included in this research. Additionally, the Croatian kinesiological terminology has not been standardized yet, so that there are cases when some terms are not uniformly used and interpreted by all kinesiologists. This is then consequently reflected in the mistakes made by students when acquiring English translation equivalents of those terms. Consequently, although instruction in the subject *Advanced English Usage in Kinesiology* strongly focuses on correct terminology both in English and in Croatian, further steps seem to be necessary to standardize Croatian kinesiological terminology.

#### **4. Conclusion**

Firstly, although men scored better than women in one task, a conclusion might be drawn that actually there is little difference in language ability and skills between male

and female kinesiologists. The results in this research have once again confirmed that the dominance of women in language-related skills has not only decreased but seems to increasingly speak in favour of men, which is in contrast with the long-existing attitude according to which women better men in language skills. In spite of the fact that women are believed to learn more analytically than men, whereas men learn more impulsively than women, male kinesiologists bettered their female peers in the second most difficult subtest out of the total of five. Secondly, the analysis has shown that the subject in which students are taught language for specific purposes as a foreign language fulfils its purpose. Although it might be argued that such a conclusion is only natural and that the obtained result should go without saying, this need not always be the case, since many students rely on their previous knowledge of general English and fail to put time and effort into learning English kinesiological terminology necessary to understand the concepts that are in the basis of theories constituting the scientific discipline in question.

As for the practical implications of this action research and regarding the future structuring of the teaching process in which technical kinesiological English is taught at tertiary level in the domain of the science of human movement, several possible guidelines may be identified.

- When learning English kinesiology-specific terminology, kinesiology students should be advised not to rely on form similarity of terms between L1 and L2, since this might result in an incorrect understanding of those terms.
- Female kinesiology students should be instructed to pay more attention to the productive aspect of the knowledge of English kinesiological terminology, i.e. they should try to connect a Croatian term with its English translation equivalent. Accordingly, more exercises seem to be necessary during the class in which Croatian terms should be the basis on which English terminology would then be practised.
- Both male and female kinesiology students should be encouraged to apply a more analytical approach to learning terminology. However, to be able to do so, even more emphasis than usual during the English classes should be put on using accurate Croatian terms and on clearly describing the concepts designated by those terms.
- More exercises based on semantic relations such as synonymy and antonymy should be introduced, which would then in turn contribute to the overall analytical teaching and learning style.
- More teaching- and terminology-oriented cooperation between subject specialists, i.e. kinesiologists, and language teachers might contribute to a better structuring of syllabi of both kinesiology-specific and L2-specific subjects.

Ultimately, this action research provides some valuable pieces of information regarding some possible future improvements that could help plan beneficial changes to be incorporated into the teaching process. Due to some limitations of the study, continuous future research seems to be necessary to be able to continue fostering the development of syllabi.

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