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The effect of interlingual and intralingual semantic priming on translating ambiguous words

Abstract*: The two experiments described in this article are focused on semantic priming in the context of lexical ambiguity and hierarchic model of mental lexicon. For both experiments, the verification method was a decision taken in the process of translating a sentence from Polish (L1) to English (L2). The decision was a result of solving dilemma of interpretation of the particular sentence that included homonym. The sentences used in the experiments were prepared in a manner that allowed them to be interpreted in at least two ways – each way being a direct result of interpretation of a ambiguous word meaning included in a sentence. In this study the secondary meanings of the homonyms were primed. In the first experiment the primes were presented in L2 – therefore this part of the study was concentrated on interlingual aspect of semantic priming. The second experiment was focused on intralingual aspect of semantic priming and the primes were presented in L1. The results of both experiments have shown the effect of semantic priming of ambiguous words' meanings when translating from one language to another. Participants used significantly more often (when translating sentences from Polish to English) those English words the meaning of which was primed in the experimental groups during the first phase of the conducted experiments. We discuss the results in the context of the hierarchic model of mental lexicon in the case of bilingualism and we suggest possible paths for future research.*

Keywords*: ambiguity, semantic priming, translating homonyms, bilingualism*

Introduction

When translating a text from one language to another there often are two or even more possibilities to translate a particular word or phrase. For example, when translating from Polish to English, we have to decide whether the Polish word "strona" should be translated as "a side" or "a page", and the word "pokój" as "a room" or "peace". Of course we have to deal with a similar phenomena when the translation happens in the opposite direction – from English to Polish. For example the word "bark" can mean either a part of a tree, or the voice of a dog, and a sentence "He hit the man with the stick" can mean that he had a stick and hit a man with it or that he hit a man who had a stick (see Lyons, 1989). In the case of such common words as "take" or "for" their ambiguity leads to multiple forms of translation. As shown by analyses carried out in the English and Spanish languages (Prior, MacWhinney, & Kroll, 2007) in a freely selected set of

words, 60% of them were characterized by translation ambiguity.[1]

The provided examples illustrate the phenomenon of language ambiguity, which is a common feature of all natural languages. In any given language, the same words or sentences can have different meanings. In the case of words we talk about lexical ambiguity. While when a sentence or a phrase can be interpreted in two or more ways due to their grammatical structure and the syntactic function of words (for example the sentence "Jack or Tom and Marcus will go" does not indicate clearly who will certainly go somewhere) we talk about syntactic ambiguity.

The subject of the present studies was the effect of intralingual and interlingual semantic priming on lexical

[1] The description of the phenomenon of interlingual ambiguity in the context of a translator's work is described in works of Tokowicz and Kroll (2007); Prior, MacWhinney and Kroll (2007); Prior, Winter, MacWhinney and Lavie (2011). A comprehensive review of solving interlingual lexical ambiguities can be found in Altarriba and Gianico (2003).

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decisions while translating ambiguous words from mother tongue to a second language. The purpose of the studies was to verify whether the phenomenon of semantic priming, which – as research shows – may also be interlingual, occurs in the case of translating words which are ambiguous in the first language (eg., *strona*) and at the same time correspond to separate words in the second language (eg., *page* and *side*).

The research topic and the research methodology that were chosen are firstly, of great importance to research on ambiguity for the enrichment of the field psycholinguistics, especially concerning the link between the word and meaning; and secondly, to the tradition of using semantic priming as the fundamental paradigm in research on lexical ambiguity.

The importance of research on ambiguity and the semantic priming paradigm

It should be noted that studies on lexical ambiguity within a given natural language are closely related to the resolution of the fundamental problems of psycholinguistics, concerning the understanding and producing of language expressions (see Reeves, Hirsh-Pasek, & Golinkoff, 2005, p. 232). Lexical ambiguity is, on one hand, a particular problem of the theory of mental lexicon and the question of how to store meanings. On the other hand, research results on this subject influence the creation of various models of lexical access, which explain the process of words activation while using a language (recognizing and recalling words, when we listen or read or when we speak or write).

Semantic priming, based on semantic links between particular words, is the most common paradigm used in research on the processing of lexical ambiguity (see Field, 2004). Semantic priming means that if words of related meaning occur sequentially, the processing of the first word will facilitate the recognition of the second one. Lexical Decision Task is a research method used in studies on ambiguities in the semantic priming paradigm; participants decide whether a string of letters which appears on the screen is a word or a nonword (a group of letters that is not a word in the given language). The purpose of the present studies was to verify whether and in what conditions, both meanings of ambiguous words prime the lexical decisions, influencing the speed of recognition of the target words. The priming paradigm was often used to study the influence of the sentence context on the processing of ambiguity. The design of such experiments usually is that the ambiguous word is presented either in a neutral context, or in a context linked to a chosen meaning of the homonym (eg., respectively: *A man looked at a bat* vs. *A baseball player looked at a new model of a bat*). After which the target word linked to one of the meanings is presented. The task of the participants is to make a lexical decision, read the word, or specify the color of the target word (Swinney, 1979; Onifer & Swinney, 1981). Based on that, the conclusions were drawn whether all of the meanings of the homonym were automatically activated or whether the activation of a given meaning

depends more on the frequency or on the sentence context.

Interlingual priming

Bilingualism (or multilingualism) is the ability to use two (or more than two) languages. To denote the order of acquiring the languages the symbols L1 (for the first acquired language), L2, or possibly L3, etc (for the second language and the subsequent ones) are used. One of the important issues in psycholinguistics is the relationship between the two languages in the context of conceptual systems, that is the system of meanings of words in both languages. The classic distinction (purely theoretical) of types of bilingualism was suggested by Weinreich (1953) who distinguished: 1) coordinate bilingualism, when the words from L1 and L2 have a separate system of meanings, 2) compound bilingualism, when the words from L1 and L2 have one common system of meanings, and 3) subordinative bilingualism, where the system of accessibility of meaning has a sequential character – a word from L2 can access the meaning representation only through its counterpart from the first language (L1).

Nowadays it is believed that in the case of bilingualism, the organization of the mental lexicon is hierarchical, or more precisely – it consists of two steps (see Cieslicka, 2004). In this model it is assumed that there are separate verbal representations of different languages on the lexical level (two lexicons: L1 and L2) and common representations of meaning on the semantic level, which are accessible for both lexicons. This position is supported by numerous empirical studies carried out with the use of semantic priming, where the exposition of a given word in L1 changes the access to its counterpart in L2 (see Chen & Ng, 1989; Kroll & Sholl, 1992; Kroll & Tokowicz, 2001).

The occurrence of this effect depends on the type of task carried out by the participant (Cieslicka, 2004). If the task engages the bottom up processes (*bottom-up processing*, *data-driven processing*), which involves phonemes identification in order to understand the meaning, then the priming effect does not occur. This type of tasks refer to the lexical level (for example making lexical decisions), which suggests that lexical representations (lexicons of a certain language) are separate (Cieslicka, 2004). On the other hand, when the task involves top-down processes (*top-down processing*, *conceptually-driven processing*), which involves using semantic and syntactic information, then a distinct priming effect occurs. Since a certain type of task (for example categorizing words as abstract or concrete) refers to the semantic level (the level of meanings), then the occurrence of the priming effect indicates the existence of common structures of meaning representations in the case of bilingualism (Cieslicka, 2004).

Numerous researchers (see Hamann & Squire, 1996; Weldom, 1993; Challis & Brodbeck, 1992) claim that the word fragment completion task can refer to both bottom-up and top-down processes, and thus to the lexical (word-form representation) and semantic (meanning representation)

levels. This task consist of showing incomplete word strings (eg., d_i_k) which are (or are not) an element of previously presented items list, and the task is to complete the letters sequence with the first word that comes to mind (eg., *drink*). The probability that a certain word will be generated increases if it was presented in the previous phase of the experiment.

Lets refer to the studies by Cieslicka (2004) which concerned the issues related to intralingual and interlingual (Polish/ English) priming, tested with the use of the word fragment completion task (research approach and the materials were based on the original studies concerning French-English bilingualism; Smith, 1991). Participants read sentences, and for each sentence their task was to conclude which item was implied by that sentence (eg., for the sentence *Boat traveled under water*, it was the word SUBMARINE). In the next phase, the participants performed the task of completing the missing letters in a word in either English or Polish. The basic set of materials included four variants of incomplete words for each of the previously presented sentences. For example, if the previously read sentence was: *Building kept books*, then the following incomplete words were presented with the task to complete them: 1. B_O_ (book), 2. L_B_A_Y (library), 3. K_I_ _KA (*książka* – book in Polish), 4. B_ _L_O_ _K_ (*biblioteka* – library in Polish). Analogous sets were matched to the Polish experimental sentences. The four variants were "*same language repetition*", "*same language inferred*", "*different language repetition*" and "*different language inferred*". In the experimental group, the words that were to be completed were semantically linked to the preceding sentences. While in the control group there was no content relationship between the sentences read and the subsequently displayed incomplete words. The experimental and the control groups were both presented with the same set of incomplete words. It turned out that the experimental group completed more words than the control group, regardless of the language of the sentence (Polish or English language) and the variant of the word (the same or different language and repeated word or a different word but related semantically). As such, the intralingual and interlingual semantic priming effects were obtained; moreover, the priming effect occurred also when the language was changed between different phases of the experiment – which supports the existence of interlingual priming (Cieslicka, 2004). This result provides a strong foundation for the hierarchical model of words and meanings, in which the words have their representations in separate lexicons, which have access to a system of meanings that is common to both of them. The results of the experiment by Cieslicka (2004) are consitent with the results of a classical experiment by Smith (1991) which used the relation between the French and the English languages.

Own research

Interlingual semantic priming was shown in numerous studies in various linguistic areas. The main goal of our project was to verify whether the phenomenon of interlingual priming will occur in the case of lexical ambiguity during a task of translating homonyms from L1 to L2. As already mentioned, studies on the processing of lexical ambiguity in a given language are carried out with the use of semantic priming paradigm. In one version of this paradigm the primes used are ambiguous words and the effect of priming is verified through, among others, lexical decision task (Swinney, 1979). An important goal of the studies was to verify whether the two meanings of homonyms prime the lexical decisions concerning the words linked to the first and the second meaning of the homonym (here the primes are the meanings of the homonyms and the lexical decisions are primed). In another version of this paradigm (see Duffy, Morris, & Rayner, 1988) the sentence context is used as the prime of the meanings of the ambiguous word; the sentences provide a context thanks to which it is possible to determine which meaning of the homonym is the right one (for example, for the homonym "bat" the sentence *A baseball player looked at a new model of a bat* could provide such a context). The main goal of this study was to investigate whether both meanings of the ambiguous word are activated and what is the role of the sentence context in the case of the dominant (more common, more often used) and secondary (less common) meanings of the homonym.

Our research approach uses the second variant of the described paradigm, in which the context precedes the ambiguous word. In everyday communication, and of course in the work of an interpreter, the context usually provides one interpretation of an ambiguous word. If a translator had to translate the word "pokój" – which can mean "a room" or "peace" – in a Polish sentence "Sprzątaczka weszła do pokoju, by go posprzątać" [The cleaner went into a room to clean it.], he or she would obviously use the word "room" and not the word "peace". In the case when the context does not imply which meaning is the right one, the interpretation of the ambiguous word can be based on the frequency of use (for example, the Polish word "zamek", which can mean "a castle", "a lock" or "the lock of a firearm", appears more often in the context of a building or a door, than in the context of a weapon).

We asked whether the way a sentence with a homonym will be translated from Polish (L1) to English (L2) will be influenced by an earlier reading of a text implying a chosen (non-dominant) meaning of ambiguous words, that were later present in the translation task. We planned interlingual and intralingual semantic priming; thus the primes will be presented in L2 (Experiment 1) and in L1 (Experiment 2). As such, participants' task was to translate words that have more than one meaning in Polish (L1), for example "pokój" (room/ peace) to English (L2); while in L2 the two meanings of the L1 homonym are designated by two different words (eg., room and peace). The goal of the first experiment was to verify whether the unambiguous sentence context in L2 (English) will prime the secondary meaning of an ambiguous word in L1 (Polish) when translating Polish sentences to English. In the second experiment, the priming text was written in Polish.

Experiment 1

Method
Participants

Participants in the experiment included 89 undergraduate or graduate students of English Philology at the Jagiellonian University in Cracow. The control group included 47 participants, and the experimental group included 42 participants (random assignment). Participation in the experiment was voluntary and the participants did not receive remuneration.

Materials and procedure

We prepared two sets for the experimental and the control group: 1) a text in English, in a form of short excerpt from a story (2/3 of a page); in the experimental group the text worked as the prime for one of the meanings of the subsequently presented homonyms; 2) seven sentences in Polish which included ambiguous words (eg., "strona" – page/ side), to be translated to English. The text differed in some aspects for the experimental and the control group. For the control group, the words used in the English text were not linked to any of the meanings of the homonyms used in the sentences provided for translation (the text gave no interpretative guidance nor any primes of the meanings of the Polish homonyms). The text of the story for the experimental group was supposed to prime one of the meanings for all of the homonyms used in the Polish sentences to be translated to English. The meanings with less frequency were supposed to be primed; which means that the English words that represent them are less frequently used when translating these homonyms (eg., it turned out that the Polish word "strona" in a neutral context is much more often translated as "page" rather than "side"). The results of the translation of the sentences to English in the control group allowed us to identify English words that are less frequently used when translating Polish homonyms.

The sentences prepared for translation included only such polish homonyms the meanings of which were designated by different English words; for example, the two meanings of the Polish word "pokój" are "room" or "peace"; or of the homonym "zamek" – "lock", "castle", "zip". Of course the content of the sentences did not imply the meaning of the ambiguous words; the context allowed both meanings simultaneously. For example, in the Polish sentence "Sędzia uważnie przeczytał dokument i dalej nie wiedział, która *strona* ukrywa kluczowe informacje" ("The judge carefully read the document and still did not know which *page/ side* hides the key information") – the word "strona" is ambiguous. It is unclear whether the judge is referring to a page of a document or a side of the court proceedings. When translating to English, the choice has to be made between the word "page" (document page) or "side" (party to court proceedings) – the choice is the indicator of which meaning of the word "strona" was activated.

The procedure was identical for the experimental and the control groups. The participants were asked, during their classes at the Institute of English Philology at the Jagiellonian University to take part in a psychological study concerning "selected cognitive traits of English philology students". After a short introduction the participants read the text in English, and then were asked to translate seven sentences from Polish to English.

Predictions

We assumed that the effect of interlingual semantic priming will occur, that is, that the Polish ambiguous words will be more often translated to English with the use of English words the meaning of which was previously presented in the English text. Meaning that after coming in contact with a statement such as "She still hasn't realized it's a cage preventing her from performing some violent and irresponsible actions" will cause the participants who translate the Polish sentence "Odtwarzał film w zwolnionym tempie, aż odnalazł *klatkę* z uwięzioną kobietą" ["He played the movie in slow motion until he found *a cage/ film frame* with a trapped woman."] to translate the ambiguous word "klatka" with the word "cage" rather than "film frame". On the other hand, we predicted that after coming in contact with the following part of the story "He looked through documents quickly, snorting with disapproval at some clerk's handwriting. Those were hard times – disturbing thoughts of endangered world peace had been familiar to many people since past few months" they will be more likely to translate: "Mężczyzna przestał pisać zastanawiając się, czy jego charakter naprawdę jest tak trudny do zrozumienia" ["The man stopped writing, wondering if his *character/ handwriting* really is so difficult to understand"] and "Sprzątaczka prezydenta nigdy nie przypuszczała, że utrzymanie pokoju może być aż tak trudne" ["The president's cleaner have never thought that *keeping peace/ keeping room clean* can be this hard."] using the words "peace" and "handwriting" rather than "room" and character" when translating the ambiguous words "charakter" and "pokój".

Results and discussion

The subject of the analysis was a between-group comparison of the frequency of use by the participants – while translating Polish homonyms – those English words the meaning of which was present in the text preceding the translation. We must keep in mind that those words are less frequently used to express the meaning of the used Polish homonyms. In the following table (Table 1) we present the mean frequency of use (while translating seven sentences) of those English words, the meaning of which occurred in the experimental group during the first part of the experiment.

Table 1. Means and standard deviations for the frequency of use of words with primed meaning (primed by English words) when translating sentences. Experiment 1.

Group	Mean	Standard deviation
Control	1.45	0.92
Experimental	2.46	1.20

The results of the analysis of variance showed the main effect of group $F(1, 73) = 16.97$; $p < 0.05$. While translating the sentences, the participants in the experimental group significantly more often than the participants in the control group used the English words denoting the secondary meaning of the Polish ambiguous word. This result suggests the effect of interlingual priming. However, this is the result averaged for all seven sentences. After making the comparison between the groups separately for each sentence, it appears that the significant priming effect occurred for four out of seven sentences. This includes the homonyms: "strona" (page and **side**), "kurs" (course and **rate**), "zamek" (lock and **castle**) and "charakter" (character and **handwriting**). In the case of the homonym "zawód" (job and **disappointment**) the meaning that was not primed was selected significantly more often (the bold words refer to the secondary meanings of the homonyms).

The obtained results support the hypothesis concerning interlingual priming. An English word corresponding to a secondary meaning of a Polish homonym primed this meaning – this effect is evidenced by the significant difference between the experimental and the control groups on the mean frequency of English words linked to this meaning of the Polish homonym that appeared in the English material preceding the translation task. The obtained result suggests that the process of activation of meaning can be of interlingual character also in the case of homonyms; the meaning of L2 words can influence the way of understanding and interpreting ambiguous words written in the mother tongue. In other words, previous contact with the word "side" and its meaning caused that the choice of the meaning "party to proceedings" was more likely than the choice of the meaning "page of a document" – in comparison to the control group – in the case of interpretive dilemma with the translation of the sentence "The judge carefully read the document and still did not know which *page/ side* hides the key information".

In the conducted study, the following language sequence occurred: English – Polish – English. The material that was used in the process of priming of one of the meanings of the Polish homonym was presented in English, next Polish sentences with ambiguous words appeared, and they had to be translated to English. The occurrence of the priming effect in such a sequence means that certain meanings were activated in deep semantic structures, and not just a simple lexical access (easier access to particular words). This result suggests a strong relationship of meaning structures or even a common semantic organization of ideas despite separate lexicons. Thus it seems that the results of this experiment support the hypothesis that a collection of words and meanings are organized in a two-step hierarchical manner; mental lexicons are separate, and the system of meanings (organization of concepts) is common (Cieslicka, 2004).

In Experiment 1 the effect of interlingual semantic priming concerning selected meaning of ambiguous words occurred; as such interlingual semantic priming occurs also when the priming material consists of meanings of homonyms presented in a different language than the primes. The aim of the second experiment was to verify whether the effect of priming of homonym meanings will replicate when the priming material will be presented in the same language (L1) as the primed material containing ambiguous words, that have to be translated to English (intralingual priming). Thus, in the next study we applied the following language sequence: Polish – Polish – English.

Experiment 2

The second study concerned the issue of intralingual priming of the meaning of homonyms. The question was whether a precise indication of a Polish homonym will prime the activation of that meaning in a neutral propositional context, influencing the way of solving an interpretative dilemma when translating sentences from Polish to English.

Method
Participants

Participants in this experiment included 60 people from 19 to 21 years old. All of the participants were undergraduate students of English Philology at the Pedagogical University in Cracow. The number of people in the control and the experimental groups was the same – 30 people in each. Participants were randomly assigned to one of the groups. The participants were informed that participation in the study is voluntary and anonymous, and that the study results, including statistical analysis, will be available to them upon request.

Materials and procedure

Similarly to the first experiment we prepared two research sets – one for the experimental group, and one for the control group. The first one (this time written in Polish) was a short excerpt from a story (2/3 of the page). The second one included five sentences with ambiguous words (e.g., "strona" – page/ side) in Polish to be translated to English (we used the same sentences as in the first experiment). In the story for the experimental group we included ambiguous words the meaning of which was clear because of the context (an example for the Polish homonyms "strona" [page/ side] and "klatka" [cage/ film] frame was as follows: "You came here which means you represent the right side. The one which does not want the centralization of power and locking people in the golden cage"). The context pointed to the secondary meaning, identified thanks to a pilot study conducted in relation to the first experiment. The text for the control group differed, as it did not include the homonyms that were present in the sentences that were to be translated, or the context which would suggest the meaning linked to those homonyms.

The procedure was the same as in Experiment 1. The participants were asked, during classes at the Faculty of Philology of the Pedagogical University, to take part in a psychological study concerning "the cognitive abilities of

English philology students". After presenting the task and the deceptive instruction, the participants read the text in Polish, and were then asked to translate five sentences from Polish to English. We predicted an effect of intralingual priming of ambiguous words to occur, which would influence the translation to English. The priming indicator was a significantly more frequent translation of ambiguous words to English with the words the meaning of which is coherent with the previously suggested meanings of the Polish homonyms.

Results and discussion

The purpose of the statistical analysis was to compare among the two groups, the frequency of use – when translating Polish homonyms to English – those English words, the meaning of which occurred in the Polish text preceding the translation task. Table 2 presents the mean frequency of use (while translating the five sentences) of these English words, the meaning of which was primed in Polish during the first phase of the experiment in the experimental group.

Table 2. Means and standard deviations for the frequency of use of words with primed meaning (primed by Polish words) when translating sentences. Experiment 2.

Group	Mean	Standard deviation
Control	0.74	0.90
Experimental	1.58	1.17

The results of the analysis of variance showed the main effect of group $F(1, 49) = 8.33$; $p < 0.05$. It turned out that when translating sentences to English, the participants in the experimental group were significantly more likely to choose English words denoting the meaning that occurred in the preceding text in Polish. This results suggests the occurrence of the intralingual priming effect. There was no interaction effect of the type of group and sentences $F(4, 196) = 0.40$; $p = 0.80$, which means that the obtained effect concerned all five sentences that were translated.

The obtained results confirm the predicted occurrence of the semantic priming effect. The sentence context which indicated the secondary (less common) meaning of the Polish homonym primed the activation of that meaning when translating sentences to English, as shown by the significant difference between the experimental and the control groups in using the English words linked to that meaning. Which means that an earlier contact with the word "strona" (page/ side) – with a contextual indication pointing to the secondary meaning of this word: a group of people wanting to achieve a common goal, caused that in the case of an interpretation dilemma when translating the sentence: "Sędzia uważnie przeczytał dokument i dalej nie wiedział, która strona ukrywa kluczowe informacje" ["The judge carefully read the document and still did not know which *page/ side* hides the key information"] the choice of the

meaning "party to proceedings" was more likely than the choice of the meaning "a page of a document" compared to the control group (in the experimental group significantly more participants chose to translate the above sentence with the word "side" rather than "page"). This result confirms the effectiveness of the semantic priming in the context of activation of particular meanings.

This might point to the conclusion that if the priming and primed language were the same (activation of meanings within L1) then the semantic priming could in fact concern only quite superficial, lexical level, instead of deep semantic structures. However, it seems that the mere necessity to refer to a different language during a translation forced a deeper processing on the semantic level.

General summary and discussion

The main area of our research lies the place of contact of the word and the meaning, in other words, concerns the link between the lexicon and the semantic representations in the system of organization of concepts. What is especially important, is the relationship between the collection of words and collection of meanings in the context of a change of the language used in the process of undertaking such mental activities as, for example, translating or having a conversation while fluently switching language codes. One of the important issues in semantics (the science of words and their meanings) is the relationship between the word and its meaning. Although they are related phenomena, they can be studied separately; research about words concerns, among others, how they are understood and recognized in speech and in writing, and what factors influence access to particular words (lexical access), and research about meaning concentrates on the issues related to their storage in the mind (see Reeves, Hirsh-Pasek, & Golinkoff, 2005).

An interesting area in which the relationship between the word and its meaning is present, is the issue of words translation and the phenomenon of bilingualism. Psycholinguistic research on bilingualism concerns, among others, the issues of mental lexicon organization and the relationship between the lexical and semantic levels of language. Research on that topic uses the paradigm of semantic priming, which confirmed the existence of the phenomenon of interlingual semantic priming (see Smith, 1991; Cieślicka, 2004), which supports the hierarchic model of organization of words and meanings (see Cieślicka, 2005).

Our project is related to the idea of interlingual semantic priming research. The character of our research approach and its novelty consist of taking into consideration the phenomenon of language ambiguity. The research topic concerned the issue of whether the way of translating sentences with Polish homonyms to English will be influenced by prior reading of a text (in English or Polish) which indicated a chosen (not dominant) meaning of the ambiguous words, that were later involved in the translation task. As an indicator of priming we used the way

the Polish ambiguous words presented in a neutral sentence context (in L2 two meanings of a certain homonym from L1 are linked to different words) were translated to English. Priming can be considered effective when the participants translated Polish homonyms using English words related to that meaning of the homonym which was previously primed. We examined two aspects of priming of chosen meanings of ambiguous words; firstly, the primes were English words that related to one of the meanings of the Polish homonyms; secondly, the primes were texts in Polish, in which the sentence context suggested a chosen meaning of the homonyms. In both cases the studied variable was the translation of Polish sentences to English.

The effect of semantic priming occurred in both cases; both when the prime was in English, as well as when the prime was in Polish, the participants more often used for their translations those English words the meaning of which was primed in the experimental groups during the first phase of the experiments. It should be emphasized that the interlingual semantic priming concerns also the homonyms in L1.

The results of our research can be interpreted in the context of previously described model of hierarchical organization of words and meanings in bilingualism – recognizing that they confirm this model. The superficial lexical level is separate, while the semantic level is common for L1 and L2.

It is also possible to look at our research project in the context of traditional research on the processing of lexical ambiguity and the process of priming of meanings of homonyms. Research on the processing of lexical ambiguity mostly concerned everything that happens at the early stage of processing, and especially the question about the activation of meanings on an unconscious level. While our research concerns the conscious interpretation of ambiguous words in order to translate a sentence with this word to a different language. The indicator of access to the meanings of homonyms was the choice of words in L2 that pointed out to one of the meanings of the homonym in L1. Based on that, obviously, it can not be concluded whether both meanings were automatically activated, or whether the participants consciously experienced the interpretive dilemma. If that was the case, then they had to suppress it quickly, because the instruction included the direction to translate the sentences based on the first impression.

Due to the fact that we started research on a new problem, there is a lot of ambiguity as well as a lot of ideas for continuing the research. The question remains whether our research concerns more the process of priming of words (lexical access) or meanings? It seems that we are dealing with the issue of accessibility to the resources of the surface of the mental lexicon as well as to the system of meanings. Superficial priming of words could have happened because there are specific words that can be used when translating the sentences (Experiment 1) in the materials first presented. However, in order to translate a homonym with a use of a word presented in a different language, the

meaning that can be used in a given sentence has to be activated. We chose a word to convey a specific meaning; it can be said that in the translation phase there is the issue of access to a meaning; for example, if while translating the word "pokój" the participants chose the word "peace" and not "room" then it means that they had access to the meaning of "pokój" as a "state without war".

Empirical studies on the processing of ambiguity due to bilingualism and activation of meanings of homonyms when translating them to a different language can concern different issues. As such numerous research problems arise. Under what conditions the effect of the semantic context manifests itself? What is the role of the temporal distance between the prime and the task of translating a homonym and whether this factor modifies the influence of the sentence context on the activation of meanings? It seems interesting to use traditional methods of processing of lexical ambiguity to study this ambiguity in the context of bilingualism. For example, cross-modality semantic priming paradigm and the lexical decision task can be used to study the processing of ambiguity in the context of bilingualism.

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