What is the Evidence that Idioms Are Stored as Separate Lexical Units in the Mental Lexicon?

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Abstract

This thesis aims at researching the concepts of idioms and the mental lexicon, with the question of the storage of idioms in the mental lexicon in its focus. Discussed in this work are the most important notions which are related to the topic of the research. Idioms are explained and described regarding their structure and properties. The concept of the mental lexicon is presented, together with the most relevant theories regarding its structure. The aim of the research was to test the hypothesis that idioms are stored as separate lexical units in the mental lexicon. Before presenting the study, previous works of research which explored the question of idiom storage in the mental lexicon are displayed. The research question is assessed by a simple experiment using an online survey. The results are presented in tabular fashion and examined in detail. The findings of the experiment point towards conclusions which are evaluated according to the previously described theories.

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1. Introduction

Picture a large crossroads, but the traffic lights are not working. The drivers are confused, unsure about which car has the right of way. Drivers slow down as they approach; lines are forming from every direction. A less experienced driver causes a car crash, and things are getting out of hand. The image alone causes stress. The key to driving safely and stress – free through crossroads are traffic lights. They "communicate" with the drivers, helping them to pass through safely. Without traffic light regulation and its rules equally clear and understood by all drivers, people would be left on their own to riddle the intentions of everyone around them.

A stressful car jam at a busy crossroads seems more dramatic than a misunderstanding in language, but their correlation is simple – an agreement in understanding the basic concepts and rules that all participants need. As interlocutors, we rely on a semantic and pragmatic agreement as a basis of successful communication. We suppose that the recipient will understand the meaning of our words, and the underlying context that, in a specific situation, contributes to a successful receival of the message, i.e. to understanding what is being said.

A misunderstanding in communication can occur for numerous reasons, which stem from various semantic and pragmatic factors. Interlocutors need to detect those misunderstandings and try to interpret them. However, there are certain expressions for which the meaning is in great measure or almost completely unrelated to the individual meanings of words that form the expression. If someone is told: "*break a leg!*" and they do not possess the knowledge of the meaning of this expression, they might be offended by this 'malevolent' wish. (Or they might proceed to interpret what the speaker said, or ask for clarification, in order to negotiate the

meaning[1]). These specific expressions are called idioms. They are examples of figurative speech – they have a meaning that may not be deduced from the meaning of the individual words. As such, their storage in the mental lexicon has been the focus of linguistic research.

Figurative speech was, in a way, already a focus of research in my bachelor's thesis, which aimed at exploring the difficulties of natural language processing of polysemous words, more specifically machine translations of polysemous words. Having become acquainted with psycholinguistics during the course of my studies, I decided to continue exploring figurative speech, only with a focus on idioms. By evaluating the question of idiom storage in the metal lexicon, we shall also explore the nature of the mental lexicon, one of the great questions in psycholinguistics.

In Chapter 2, we will bring a brief overview of idioms as a lexical category, provide examples, and display the multiple divisions and categories of idioms. Chapter 3 provides a look at the important ideas related to the mental lexicon. Here we will look at what has been researched in the field of the lexicon, with the most prominent theories about its organization and structure. This will be followed by a review of previous research of idiom storage in the lexicon in Chapter 4. As a part of the study, a simple experiment will be presented. This experiment aims to test the hypothesis that idioms, being fixed expressions, are as such stored in the mental lexicon as separate lexical units. The results of the study will be displayed in Chapter 5. Chapter 6 will give a further elaboration on the study results and provide a review of the materials used in the study. Finally, in Chapter 6 we shall encompass this study by

[1] Rapaport, 2003: 402

comparing its results with the research hypothesis and evaluate them considering the limitations of the study. Possible directions for future research will be displayed.

2. Idioms

Idiomatic expressions are present in everyday communication. They enrich our language. There are around twenty-five thousand idioms together with other fixed expressions in the English language[2]. However, idioms are hardly specific for English alone. Rather, idioms can be found in many languages of the world. We do not have to search far to find an example in languages most familiar to us, albeit some influenced others through history and culture. *Head in the clouds*, *testa nelle nubi*, *glava u oblacima* – these English, Italian, and Croatian idioms share the same lexical structure and their core figurative meaning is completely the same – to live unrealistically, out of touch with the world around them.

2.1. Defining idioms

Because of the idiosyncratic nature of these structures, there are many definitions of idioms. The Oxford companion to the English language provides the following explanation:

> [16c: from Latin *idioma,* Greek *idiôma* specific property, special phrasing, from *idios* one's own, personal, private] - An expression unique to a language, especially one whose sense is not predictable from the meanings and arrangement of its elements, such as *kick the bucket* a slang term meaning 'to die', which has nothing obviously to do with kicking or buckets.[3]

We can say that idioms are expressions or phrases which as a unit represent a meaning different from the meanings of words that are its constituent parts, i.e. the semantic representation of an idiom is not a compositional function of the formatives of which it is composed.[4] Another important notion when we consider idioms is that, apart from having a

[2] Weinreich (1969), cited by Jackendoff (1997: 157)
[3] McArthur (1992: 497)
[4] Fraser (1970: 22)

different meaning than the words that it consists of, the meaning of an idiom often cannot be inferred from its separate parts.[5] To understand the meaning of an idiom, we have to *know* it, learn it. Let us look at the following example:

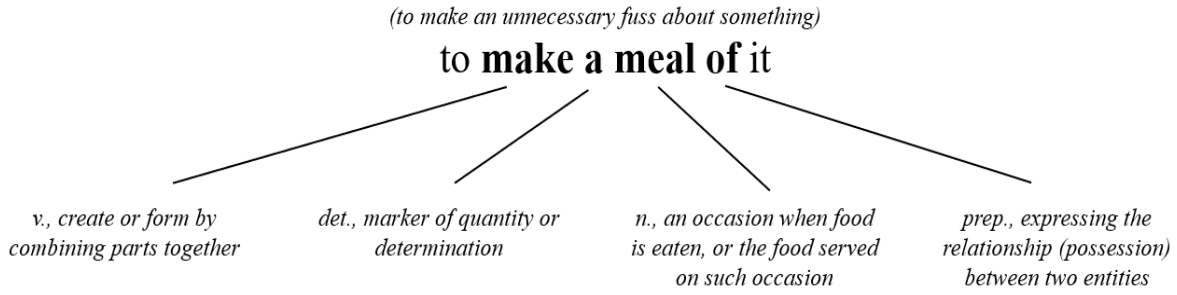


Figure 1 Idiom meaning example: to make a meal of it

Figure 1 shows that idiom *to make a meal of it* that the semantic essence, '*unnecessary fuss'*, cannot be associated with any of the meanings of its component words which are very simple (make, meal). In a way, the beauty of idioms lies in the fact that rich formulaic language is created by using common, simple words.

2.2.Versatility of idiom structure

Idioms can be classified based on their structure, complexity, and flexibility. According to Fraser (1970) there are compound lexical entries, such as *overturn* or *knucklehead*, which are called *lexical idioms*. Idioms that have a more complicated constituent structure such as *the cat's got your tongue,* we refer to as phrasal idioms.[6] In this work, various kinds of idioms were used as examples as well as stimuli in my experiment.

[5] Gulland, Hinds – Howell (2001: 7)
[6] Katz and Postal (1964) cited by Fraser (1970: 23)

Some idioms are more holophrastic (a property where a single word or fixed phrase functions as a complex idea[7]) and unanalysable than others:[8]

(1.a) *When I greeted Anne and her mother, Anne hid behind her skirts.*

(1.b) *He's been hiding behind his mother's shirts, although we've been telling him that he needs to move out and become independent*.

(2.a) *I kicked the bucket out of my way as I approached them.*

(2.b) *He only became famous after he kicked the bucket.*

We can understand a connection between (1.a) and (1.b) where we can note a constant in the meaning of *hiding*, a literal one – behind a physical obstacle, and a figurative one – hiding behind something as a shield. Contrary to the example (1), in (2.a) and (2.b) there is no semantic continuity between *kicking the bucket* and *dying*.

Another property of idioms is that they vary in syntactic flexibility. We can look at the following examples:

(1) *He kicked the bucket early this morning.*

The bucket was kicked by John at age of 83.

His kicking the bucket attracted a lot of media attention.

(2) *I am taking steps to keep this plan going.*

First steps were taken to ensure the collaboration between our companies.

The police force took necessary steps to ensure the safety of civilians.

Example (1) indicates that the verb in *kick the bucket* cannot be used in passive form, which makes that idiom somewhat fixed, in contrast to (2) where all verb forms are correct. Fraser calls this property *frozenness* and suggests a hierarchy of six levels to categorize idioms, which

[7] McArthur (1992: 481)
[8] Ibid., 497

range from *unrestricted* F_0 (e.g. *spill the beans*) to *completely frozen* F_5 (e.g. *face the music*).[9] This division indicates that in the example of *spill the beans,* we can make a following transformation: *We spilled the beans on our plan.* → *The beans were spilled on our plan*. On the other hand, we cannot do the same for *face the music*: *John finally needed to face the music.* → *The music needed to finally be faced by John.* Considering the syntactic flexibility of an idiom will be important later in my experiment. Various types of idioms were included in the study, fixed and semi – fixed expressions. With semi – fixed expressions, it was important to determine a "threshold", the part of the idiom contained in the provided word strings which can be evaluated as satisfactory, and thus suggest that a participant in fact recognized the idiom.

[9] Fraser (1970 :41)

3. The mental lexicon

We know today that the words in the mind are organized in a structured, complex system. This mental dictionary is called the mental lexicon. We know it includes knowledge of the word's meaning, orthographic knowledge – how it is spelled, phonetic knowledge – how it is pronounced, syntactic properties – what kind of word it is and how do we use it with other words, which words does it go together with, pragmatic knowledge – when to say it, and so forth. These building blocks of the mental lexicon are called *lexical units*, or *lexical entries*.

During the previous century, extraordinary notions about human language have intrigued researchers: the question of how can word retrieval during our speech production be so fast, or the fact that people possess knowledge of so many words. Researchers have been preoccupied with these notions since the 1930s, when first experiments (Seashore and Eckerson, 1937) suggested that an average person has knowledge of up to 150,000 words. Later studies have shown that number to increase up to 250,000 words for native English speakers (Diller, 1978). Experiments on word production showed that native speakers recognize a word of their native language in 200 milliseconds and can detect a non – word in under half a second. These discoveries suggested that the mental lexicon must be systematically organized.[10]

Several decades ago, researchers suggested that the mental lexicon was organized as a list of words, which focused on irregularities and idiosyncratic properties[11]. We now know – or have firm evidence that suggests – that the arrangement of lexical units is more complex and multidimensional in nature. Fodor formulated in 1983 in his work *The Modularity of Mind* that

[10] These findings are summarized in Aitchison's *Words in the Mind* (1990: 6)
[11] Ibid., 26.

cognitive systems (or *modes*) are modular, hypothesizing that input systems – sensory (sight, hearing, touch, taste, and smell) and one linguistic system are separate, and thus domain – specific specialized, comparing the multiple cognitive mechanisms to the complex computational mechanisms of a computer. Fodor describes 'shadowing' speed (repeating another person's speech as you hear it), and the astonishing fact that subjects can 'shadow' as fast as 250 milliseconds (which suggests that during this time frame both comprehension and repeating occur), as evidence that points towards a distinct linguistic module within the cognitive system.[12]

By using Fodor's account of the modularity of cognition, Caplan implemented the same division to the language system and described *models* as separate components of the language system for different processes – speaking, reading, listening (comprehension) etc. Caplan reinforces this theory of the modularity of the language system by analysing findings of various speech disorders that have been studied. Among others, studies on different forms of dyslexia have shown that damage and disorders which affect one of the processes, e.g. reading, can leave other processes such as speech recognition and production intact and highly functional.[13]

3.1. Architecture of the mental lexicon

Former research on the nature of the structure of the mental lexicon has yielded with complex and dissimilar results. It has been implied that the mental lexicon might be a singular system for all processes, or alternatively four lexicons could exist, *each for the tasks* of writing, reading,

[12] Adler (2008: 889), contains Fodor's *The Modularity of Mind*: *An Essay on Faculty Psychology*

[13] Caplan (2008: 176) describes research on patients with phonological dyslexia who are unable to read nonsense, but can nonetheless read and recognize written words, which suggests that the part of the brain in charge of translating orthographic units smaller than words is damaged, while units that are permanently stored as comprehensible words are not affected by this damage.

speaking, and listening. Some works of research suggested that lexicons could be dual, based on either visual versus spoken, or input versus output for both written and spoken language.[14] Research in neuropsychology has shown that it can help clarify the nature of the structure of the lexicon. In the *Psychology of Language*, Harley states that there are *many neuropsychological dissociations found between reading, writing, and visual and spoken word recognition*.[15] Several theorists brought the findings of relevant research to form an idea of the structure of the language system, as shown in the following figure.

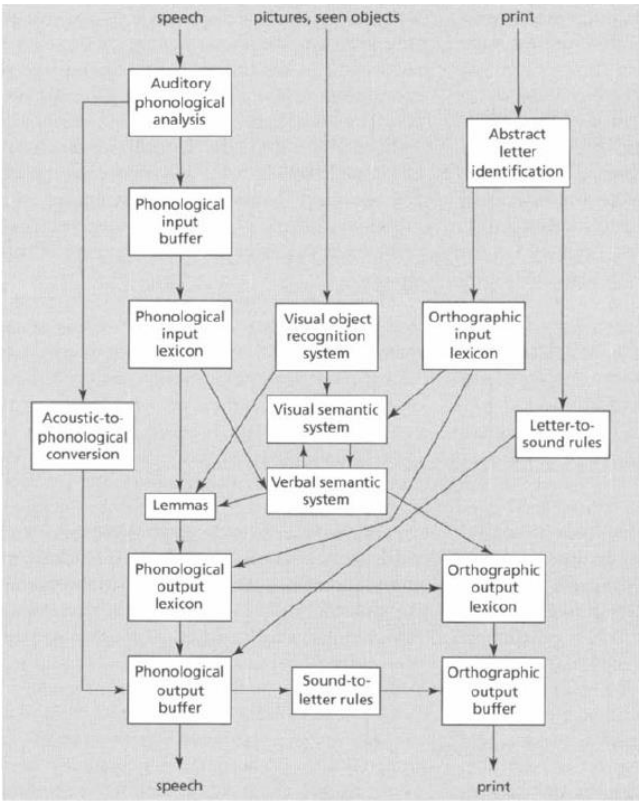


Figure 2 The structure of the language system (Harley, 2007).

Figure 2 illustrates the existence of a central semantic lexicon where word meanings are stored, and four lexicons – one for speaking, writing, and spoken and visual word recognition.

[14] Harley (2007: 421)
[15] Ibid., 422.

The figure describes the interrelation of the lexicons and shows simplified processes of reading, listening, speaking, and writing.

3.2. Idiom storage in the mental lexicon

Idioms are fixed expressions, which suggests they are *not constructed during language production*. This suggests that they must be retrieved from long – term memory, and that their mental representation should at least consist of a set of words, their syntactic peculiarity, and their figurative meaning.[16]

Following the trends in psycholinguistic research throughout its history, several relevant theories on idiom storage in the lexicon have been considered, some of them having been rejected as other, more plausible theories emerged.

Within their research framework, Swinney and Cutler (1979) summarize two most relevant theories of idiom storage in the mental lexicon during the 1970s: the *Idiom List Hypothesis*, formulated by Bobrow & Bell in 1973, and the *Lexical Representation Hypothesis*, by multiple researchers (e.g. Lackner & Garrett, 1972). [17] The first theory held that idioms are stored in a special list separated from the normal lexicon. This theory correlated with the initial theories on the structure of the mental lexicon as a list of words with special semantic, idiosyncratic properties. The second model, the Lexical Representation Hypothesis, claimed that idioms are stored and accessed from the lexicon like any other word, countering the Idiom List Hypothesis, and that they undergo structural analysis during lexical access of the entire string which is

[16] Sprenger et al. (2006: 162)
[17] Swinney, Cutler (1979: 524)

treated as a long word. At that time, the majority of research supported the Lexical Representation Hypothesis.[18]

Recent research on this matter resulted with another model firstly proposed by Gibbs, Nayak, & Cutting in 1989, *the Idiom Decomposition Hypothesis*. This theory claimed that idioms were stored and processed differently, based on whether they are decomposable or not.[19] Decomposability represents a property of *relation* between the meaning of separate constituents of a phrase (idiom) and the meaning of the phrase as a whole. *Kick the bucket* would be a non – decomposable idiom, while *butter up* would be a composable idiom. This theory suggests that the semantically non – decomposable idioms are stored in the mental lexicon as separate units, while in case of decomposable idioms, each constituent is stored and accessed separately from the mental lexicon. This type of organization implicates a separate process of comprehension of non – decomposable and composable idioms: decomposable idioms undergo similar processes of comprehension as literal expressions, while non – decomposable idioms are recognized as individual words.[20]

3.3. Idiom comprehension and processing models

The two major issues in the theory of idiom comprehension are the compositionality and syntactic flexibility of idioms. The question and degree of compositionality, i.e. to what degree can the literal meaning of an idiomatic expression be associated to the figurative meaning, was interpreted variously among researchers. The syntactic flexibility of idioms additionally complicates the understanding of idiom comprehension; if idiom's constituents do not have

[18] Ibid.
[19] Tabosi, et al. (2009: 529)
[20] Ibid., 530

meaning on their own, the idiom should be incapable of syntactic flexibility, but that is not the case. Idioms can vary from being fixed to fully syntactically flexible. [21]

In order to understand how we look at an image and produce an expression which that image represents, we need to investigate the underlying cognitive processes behind it. There have been a number of models that seek to explain the process of lexical access of idioms and the principles their comprehension. There are three major categories of models of idiom comprehension.[22] The first category of models comprises the *non – compositional models*, which emerged early during the history of research of figurative language. The authors of these models advocated the theory that idioms, because of their non – composable nature, undergo the same retrieval processes as other words. Other research resulted with the creation of oppositional models, the *compositional models*, which claimed that idiom processing is different from literal word processing and that individual components are processed as literal words during idiom comprehension. Both non – compositional and compositional models have been criticised for their singular inclination towards *literal* or *figurative* processing of words during idiomatic expressions. Finally, there are *hybrid models* that try to reconcile the differences between the previous two categories by combining compositional and non – compositional aspects of idiom processing.

[21] Glucksberg (2001: 69)
[22] This assessment of idiom comprehension models has been composed by Panou (2017).

4. Previous research on idiom storage in the mental lexicon

The matter of idiom storage in the mental lexicon has been the focus of a number of researchers, who investigated lexical access, storage, and comprehension of idiomatic expressions. In 1979, Swinney and Cutler aimed at researching comprehension of idioms, linguistic peculiarities that defied traditional concepts of syntactic and semantic analysis with their ambiguity of meaning. They conducted two experiments to test the two most distinguished theories of idiom storage in the mental lexicon, the Idiom List Hypothesis and the Lexical Representation Hypothesis.

First, they designed a task which measured the response time of the subjects while they decided whether a string of words was a meaningful phrase in English. The hypothesis was that if idioms are accessed from a separate, special list of words in the mental lexicon, the subjects would take less time to identify idiomatic phrases. They created a list of grammatical idiomatic word strings which were matched with 23 grammatical control word strings, that were each constructed by replacing one word in each idiomatic string, with a word of the same length and of equal or higher frequency. Additionally, they included 30 non – idiomatic acceptable English word strings to minimize the ratio of idiom to non - idiom strings, and 76 word strings which did not form an acceptable English phrase. These 152 word strings were presented to the subjects in random order, each string for 2 seconds with random intervals between presentations. The subjects were twenty undergraduate students. They had to indicate if the word string represented a meaningful phrase by pressing one of two buttons. Response latencies were measured.

The results showed that grammatical idioms were judged as acceptable phrases far more quickly than their matched controls, which was not in favour of the Idiom List Hypothesis. They tested the subjects after the experiment to measure if the subjects were aware of the presence of idioms and included these variables in additional analysis. Mean reaction time for those subjects who had awareness of the presence of idioms was shorter than for those subjects who had no awareness. This showed that there was no basis for a conclusion that the subjects were in a special idiom processing mode, which is according to the Idiom List Hypothesis.

However, since the first experiment consisted of a set of idioms with various level of frozenness, another experiment was performed, which examined the frozenness categorization[23] with respect to lexical status. Forty – two undergraduate students participated as subjects. The materials included twelve grammatical idiomatic phrases, which were *a priori* tested. There were three idioms for each of the Fraser's idiom frozenness hierarchy: F_0 – completely frozen, mild level of frozenness, intermediate level of frozenness, and the F_5 with maximum level of grammatical transformational applicability. Each idiom was matched with a control word string in which one of the words from the idiom was exchanged with another word of equal length and frequency. 35 word strings were formed which did not form acceptable English phrases. The procedure was identical to the one in the first experiment. Mean reaction times were calculated across subjects with respect to the frozenness level.

The results again showed no significant effect for the variable of frozenness. This implied that the susceptibility these idioms showed to transformational change is a factor applicable to these items as lexical items, meaning that the acceptance of the Lexical Representation

[23] (p. 7)

Hypothesis (LRH) in no way contradicted the notion that certain idioms can be more grammatically restricted. These two experiments showed that idioms appeared to be stored and accessed as lexical items, and not from a special list distinct from the lexicon.[24]

More recent studies expand the LRH regarding the compositional aspect of idioms. A study from 2006 by Sprenger et al. tested the assumption that idioms have their own lexical entry in three experiments. They based their hypothesis on the work of Cutting and Bock from 1973, which, as previously described, suggests a more complex representation of idioms in the mental lexicon, as displayed in Figure 3, where although they are stored as a whole on a certain level of processing, they cannot be word – like units without internal structure.[25]

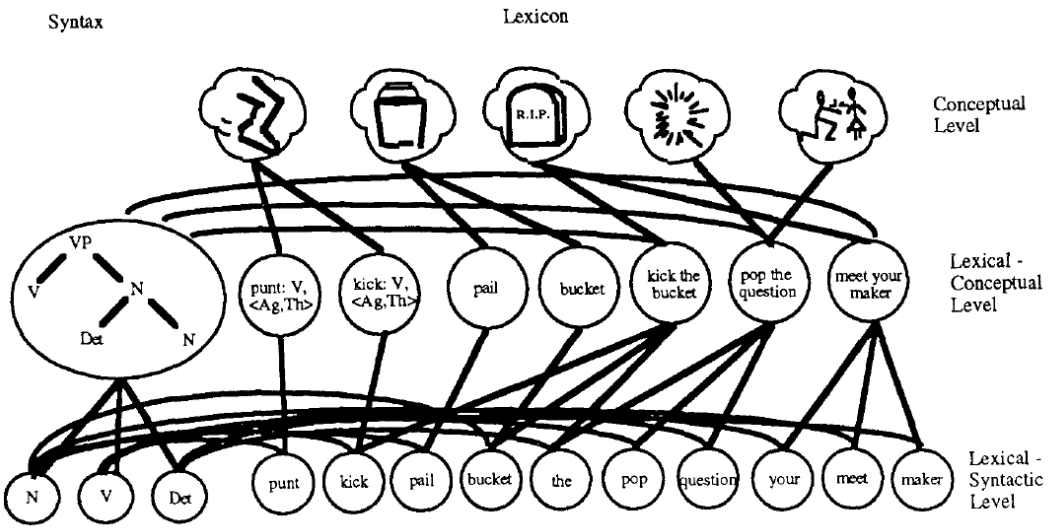


Figure 3 A model of the lexicon, Cutting and Bock (1997)

In this experiment they tested the hypothesis that idioms have their own lexical entries, which are linked to their constituent lemmas, according to previous research by Cutting and

[24] Swinney, Cutler (1979: 532)
[25] Sprenger et al. (2006: 164)

Bock from 1997. The main task was a cued – recall experiment. Participants produced literal and idiomatic phrases in response to a visually presented prompt word. Two kinds of primes were presented to the participants auditorily, either identical with the target, or unrelated semantically and phonologically. Response time was again measured. Sixteen participants, undergraduate students, all native speakers of Dutch, first participated in a learning phase, after which two cued – recall blocks of the main task followed. During the learning phase, where they were asked to memorize a list of eight names and associated phrases, out of which half were idiomatic. When the participants successfully and fluently produced all phrases, the first experimental block was started. In this task, the participants had to react to the visually presented prompt word by producing the appropriate phrase as quickly as possible.

Four experimental lists were created by combining 16 item pairs, where one half being idiomatic items, the other half literal. These items were distributed equally in two experimental blocks, where a combination of each item would be repeated eight time within a block, resulting with 128 items in each block, and 256 trials for a subject. Each list was tested on four participants, who received a different randomized version.

The researched measured reaction time. The results showed non - significant effect of Idiomaticity in a 32 milliseconds difference in mean speech onset latencies in the unrelated condition., and a difference between the mean speech onset latencies in the related condition of 26 milliseconds, with idiomatic phrases being faster than literal phrases. Sprenger et al. conclude that the results support the hypothesis that during the planning of an idiomatic phrase the single words that make up the utterance are accessed separately. The fact that both idiomatic and literal phrases can be primed successfully by means of priming one of their content words supports the compositional nature of idiomatic expressions. The effect of priming was stronger

in the case of idioms, which was in favour of the hypothesis that the different components of an idiom are united by one common entry in the lexicon.

5. The study

Considering limited available resources, the aim of this experiment was to use a simple test to find evidence which would support the hypothesis that idioms are stored in the mental lexicon as separate lexical units. Apart from this issue, this work also aimed to give insight into how familiar non – native speakers are with common English idioms, compared to native speakers. It intended to explore how non – native speakers would recognize certain idioms, more specifically those idioms which share the same lexical features on the word level for both languages.

The most straight – forward test which might provide considerable insight was a word production task elicited by visual stimuli. In my experiment, participants were asked to describe the images, with as little explanation or clarification about the content of the images as possible.

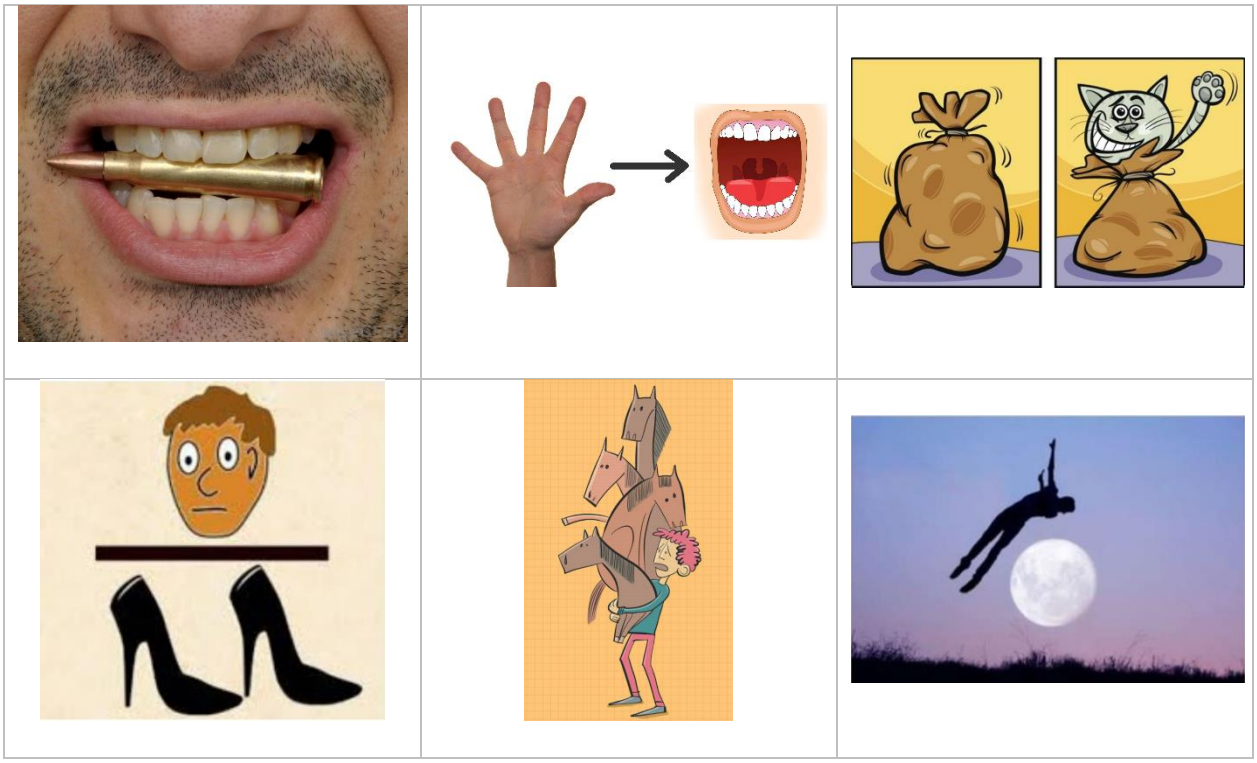
5.1. The participants

There were two groups of participants: native speakers of the English language, and speakers of English as a foreign language, which were all native Croatian speakers. There were two reasons for choosing these two groups. One was to facilitate collecting and interpreting the data. The second and most important reason was including those speakers of English that are most relevant to me as a non – native speaker of English and a student of a teaching course. The aim was also to find relevant information that might give insight into how we as speakers of a foreign language perceive and understand English idioms, and how it differs from native speakers' perception.

A total of 79 respondents participated in the survey. 34 were non – native speakers of English, all Croatian L1 speakers. 45 were native English speakers from English – speaking countries.

5.2. The survey

A list of ten common English idioms was created. The list is as follows: *bite the bullet*, *hand to mouth*, *the cat is out of the bag*, *head over heels*, *hold your horses*, *over the moon*, *take (something) with a pinch of salt*, *bread and butter*, *kick the bucket*, and *hit the sack*. The images that most closely represented the idioms were found *online*. There were a few expressions for which an appropriate image could not be found – *hand to mouth* and *hit the sack*, so individual images were put together to get a satisfactory visual input. The images that were used as visual stimuli are shown in the following figure:



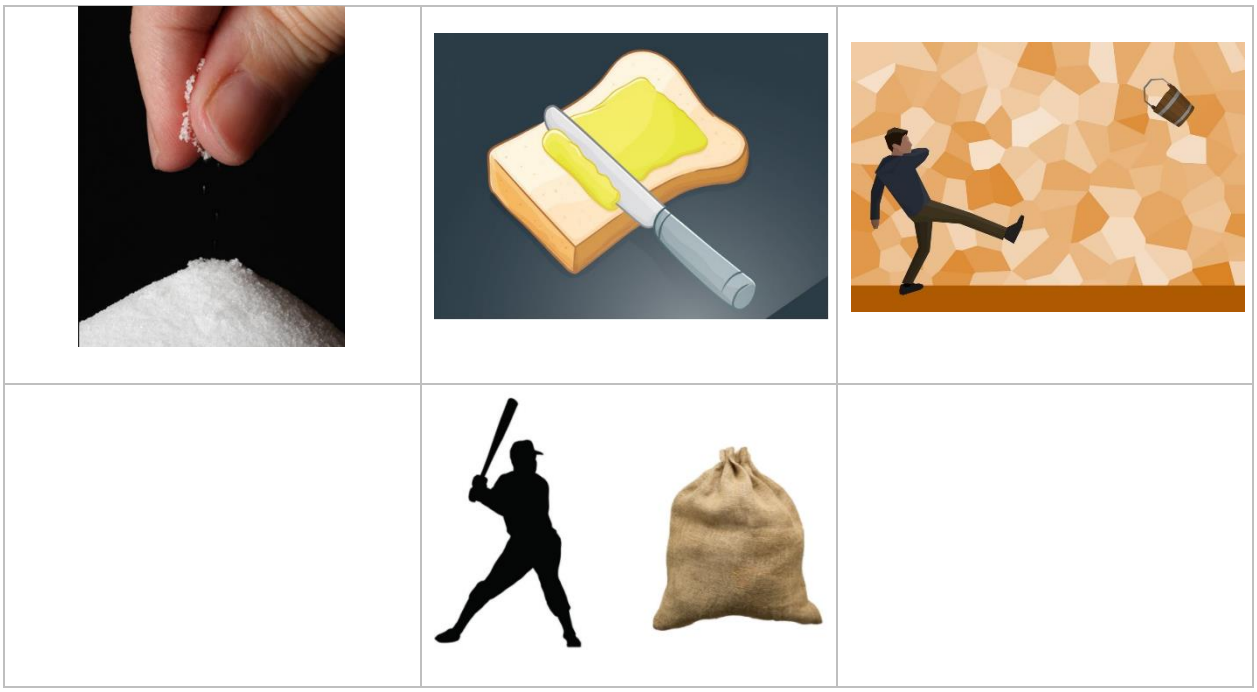


Figure 4 The main task - visual stimuli

Two random images, which were considered semantically neutral as opposed to the ten images that represented idioms, were selected as control images: one of the city skyscrapers, and one of nature, as shown in Figure 5.

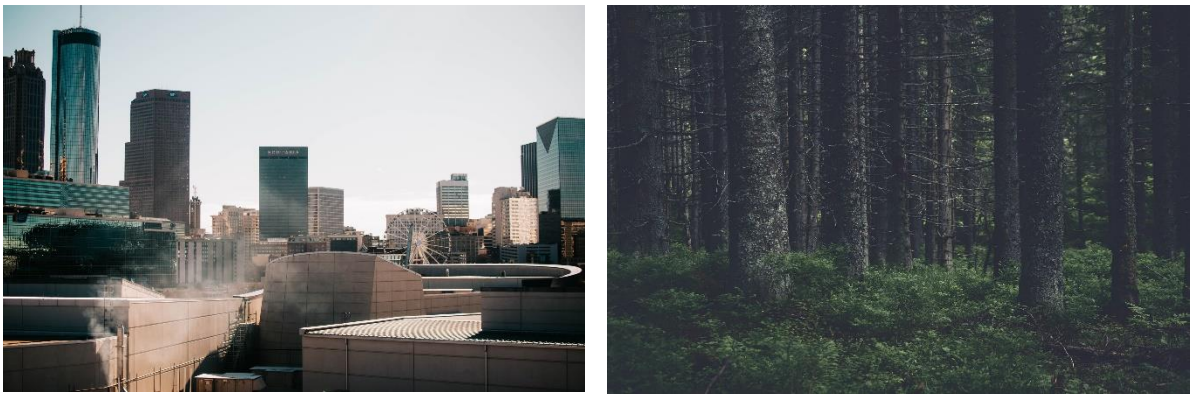


Figure 5 The main task - control images

These images were inserted among the ones that represented idioms in the main task, in order to break the series of idiom – expressing images into smaller sequences.

Before the main task, the participants were given the following example as an explanation for the main task:

EXAMPLE: the answer to the image below – "head in the clouds"

Figure 6 Example image from the description of the main task

Two separate Google Forms surveys were created, one for each group of participants. Both surveys contained the same main task with 12 images, and an example which explained what the main task was.

The survey was distributed *online* via several reliable locations on the Web. These sources are mostly visited by other researchers who also seek participants for their own studies, students and other people that are interested in taking part in surveys.

5.3. Research method and hypothesis

A quantitative method might be appropriate for this research, considering that the question this experiment aims to answer is most precisely answered by using numbers and statistics, which are characteristic for quantitative research.[26] However, using a mixed method of research

[26] Dörnyei (2007: 33)

including quantitative and qualitative data analysis seems more suitable for a language analysis, especially of such peculiar figurative expressions as idioms. By relying on quantitative data analysis, but also analysing possible anomalies in the results, and adding one last question of a qualitative nature to the survey which is more directed towards a qualitative approach, this study aims to obtain more valuable results.

The hypothesis was that both groups of participants would provide the same word strings as responses based on the provided images which represent idioms. This might suggest that the visual stimulus, i.e. the visual representation of an idiom, would trigger the access of the same lexical unit in their mental lexicons. In the case of the neutral images, my prediction was that the participants would simply describe what they saw in the image or write something along the lines of 'I don't know'. Demographic variables, age and level of education, were included to test if there would be any correlation between these variables and the participants' results, assuming that with experience and education, an average person's vocabulary expands which would result with more correct responses by older participants and those with higher level of education.

The prediction was that:

- Both groups of participants will describe images by using the same expressions,
- Native speakers will provide to a great extent more correct responses than non – native speakers,
- Foreign participants will be influenced by their first language.

Following the simplified structure of the language system suggested in the Figure 2, the process of lexical access based on a visual stimulus might be similar to the following:

visual input → visual object recognition system → visual semantic system ↔ verbal semantic system → orthographic output lexicon → orthographic output buffer → written word string. In case the production of the same expressions occurred, it would imply that the same unit in the visual and verbal semantic system was triggered, which might support the hypothesis.

5.4. Results

Out of the total 79 responses, seven responses from native English speakers and two from non – native English speakers were excluded from the collected data; seven because of an error in the survey which prevented them from submitting a response for one of the images, and two who did not answer the questions genuinely.

The written phrases were marked as correct if the phrase contained the constituent words of a specific idiom, regardless of other words that were written with it. For example, for the idiom *let the cat out of the bag*, there were 12 distinct responses which were all marked as correct since they contained the relevant word string.

The percentage of correct answers was calculated per respondent. The mean percentage of correct answers was 68,4% for native speakers, and 43,4% for non – native speakers. In case of native English speakers, some images resulted with an expected, very high accuracy of correct answers: 37 out of 38 for *kick the bucket*, 36 out of 38 for *over the moon*, and 34 out of 38 for *head over heels* and *the cat is out of the bag*. Certain images resulted with a low percentage of recognition: seven correct recognitions for *hand to mouth*, and 11 for *take with a pinch of salt.* Table 1 shows a mean percentage of recognition for each idiom for both groups.

Idiom	% per image, native English speakers	% per image, non – native English speakers
bite the bullet	87%	50%
hand to mouth	18%	41%
the cat is out of the bag	89%	13%
head over heels	89%	69%
hold your horses	55%	47%
over the moon	95%	50%
take with a pinch of salt	29%	31%
bread and butter	71%	59%
kick the bucket	97%	63%
hit the sack	53%	13%

Table 1 Accuracy per idiom

The following tables (Table 2 through Table 7) indicate that the majority of participants produced the correct word string, with a higher accuracy in the group of native English speakers, as predicted.

Bite the bullet			
Responses given by native English speakers	**Count**	**Responses given by non – native English speakers**	**Count**
bite the bullet	29	bite the bullet	16
bit the bullet	2	bullet in mouth	3
biting the bullet	2	bite a bullet	1
bullet between the teeth	1	biting a bullet	1
by the skin of your teeth	1	biting the bullet	1
catch a bullet in your teeth	1	bullet between theets	1
dodged a bullet	1	bullet in the mouth	1
shot yourself in the mouth	1	bullet in the teeth	1
		bullet in your mouth	1
		bulletproof	1
		catch a bullet with teeth	1
		catch the bullet	1
		catching the bullet	1
		grinding teeth	1
		to catch a bullet	1

Table 2 Responses: bite the bullet

Head over heels			
Responses given by native English speakers	**Count**	**Responses given by non – native English speakers**	**Count**
head over heels	33	head over heels	21
two left feet	2	I don't know	1
head over heals	1	face heel turn	1
if the shoe fits?	1	goody two shoes	1
mind over matter	1	head above the heels	1
		head in shoes? :)	1
		head on heels	1
		head over hills	1
		high heels	1
		high on heels	1
		man divided by woman	1
		on high heels	1

Table 3 Responses: head over heels

Over the moon			
Responses given by native English speakers	**Count**	**Responses given by non – native English speakers**	**Count**
over the moon	36	over the moon	15
jump over the moon	1	shoot for the moon	2
jumping over the moon	1	jump over the moon	2
		jump on the moon	1
		jump to the moon	1
		fly to the moon	1
		fly over the moon	1
		men on the moon	1
		man on the moon	1
		man above the moon	1
		hop on the moon	1
		fly me to the moon	1
		head over moon	1
		to the moon	1
		feeling over the moon	1

Table 4 Responses: over the moon

Kick the bucket			
Responses given by native English speakers	**Count**	**Responses given by non – native English speakers**	**Count**
kick the bucket	30	kick the bucket	17
kicked the bucket	4	kicked the bucket	3
kicking the bucket	2	kick a bucket	2
kick the can	1	kicking the can	2
		?	1
		angry	1
		be full up of something	1
		hitting the bowl	1
		kicking a bucket	1
		throw a bucket of cold water	1
		throw the bin	1
		yeet	1

Table 5 Responses: kick the bucket

Let the cat out of the bag / the cat is out of the bag			
Responses given by native English speakers	**Count**	**Responses given by non – native English speakers**	**Count**
let the cat out of the bag	12	cat in the bag	18
cat's out of the bag	4	cat in a bag	5
cats out of the bag	3	cat in a box	2
the cat is out of the bag	3	cat in bag	2
the cat's out of the bag	5	cat in a trash	1
cat out of the bag	2	cat's out of the bag	1
cat is out of the bag	1	let the cat out of the bag	1
cat's got the bag	1	the cat is out of the bag	1
cat's in the bag	1	the cat's out of the bag	1
cats outta the bag	1		
let the cat out the bag	1		
let the cat outta the bag	1		
letting the cat out of the bag	1		
the cats in the bag	1		
the cat's in the bag	1		

Table 6 Responses: let the cat out of the bag

Hold your horses			
Responses given by native English speakers	**Count**	**Responses given by non – native English speakers**	**Count**
hold your horses	21	hold your horses	15
I don't know	10	1v9 carry	1
too many horses	2	carring a pony	1
... something about horses? no clue	1	carry a horse	1
beat a dead horse	1	carrying a horse	1
four horsemen of the apocalypse	1	carrying horses	1
high horses?	1	cary horses	1
horsing around	1	donkey	1
		I don't know	1
		five horses	1
		guy carrying horses	1
		holding horses	1
		horse	1
		horse load	1
		horses	1
		horsin around	1
		strong as a horse	1
		to take a horse	1

Table 7 Responses: hold your horses

The following idiom, *hand to mouth*, was one of two idioms for which a custom image was prepared for the survey. The accuracy of word strings produced by native speakers was less than the accuracy of the answers provided by non – native speakers, 18% versus 41% respectively. The fact that the visual input was prepared for this idiom based on personal interpretation of the idiom as a non – native speaker, might be a cause for these results.

Hand to mouth			
Responses given by native English speakers	**Count**	**Responses given by non – native English speakers**	**Count**
hand in mouth	8	hand to mouth	13
hand to mouth	8	hand in mouth	4
I don't know	5	bite the hand that feeds you	2
put your hand in your mouth	3	hand in the mouth	2
bite the hand that feeds you	1	yawn	2
bite your nails	1	I don’t know	2
bite your thumb	1	chewing nails	1
biting the hand that feeds you	1	cover your mouth	1
don't bite the hand that feeds	1	fist in your mouth	1
facepalm	1	open	1
fist in my mouth	1	put your hand in your mouth	1
hand in the mouth	1	speak to the hand	1
hand in your mouth	1	stop yelling	1
hand over the mouth	1		
high speak	1		
idk but it made me think of 'foot in his mouth'	1		
putting my hand in my mouth	1		
smack talk	1		

Table 8 Responses: hand to mouth

Table 9 displays the responses for the idiom *with a pinch of salt*. The low percentage of accuracy from both groups suggests that the visual input might not have completely corresponded to the idiom. The participants mostly answered with some form which included “pinch of salt” or “grain of salt”. These answers were evaluated as not sufficient to conclude that the participants recognized the idiom that the image represented.

With a pinch of salt / with a grain of salt			
Responses given by native English speakers	**Count**	**Responses given by non – native English speakers**	**Count**
(a) pinch of salt	17	pinch of salt	5
take it/this/that with a grain of salt	7	salty	5
a grain of salt	3	a pinch of salt	4
grain of salt	3	grain of salt	4
take it with a pinch of salt	2	take it with a grain of salt	2
with a grain of salt	2	take with a pinch of salt	2
salt pincher	1	take this with a grain of salt	2
salty	1	picking up salt	1
pitch of salt	1	pinch of salt	1
sprinkle of salt	1	salt to the wound	1
		sipping salt on a wound	1
		take something with a grain of salt	1
		take something with a pinch of salt	1
		with a grain of salt	1
		with a pinch of salt	1

Table 9 Responses: with a pinch of salt

The various recurring word strings for the following idioms in Table 10 and Table 11 indicate the existence of variations of the idiom *hit the sack*, and multiple idioms which share the same constituent words as *bread and butter*.

Hit the sack			
Responses given by native English speakers	**Count**	**Responses given by non – native English speakers**	**Count**
hit the sack	15	punching bag	5
don't know	9	hit the sack	4
hit the hay	3	hit the bag	3
sack of potatoes	2	beat the sack	2
batting bag	1	hitting the bag	2
go pound sand	1	kick the bag	2
got this in the bag?	1	baseball	1
hit the sack?	1	baseball bat bag	1
hitting the bag	1	baseballer and a bag	1
hitting the sack	1	bat a thousand	1
sacked a home run	1	batter bag	1

slap the bag	1	beat like a sack of potatoes	2
up to bat	1	don't know	1
		homerun	1
		I don’t know	1
		kicking a bag	1
		punching the bag	2
		throw a curve	1

Table 10 Responses: hit the sack

Bread and butter			
Responses given by native English speakers	**Count**	**Responses given by non – native English speakers**	**Count**
bread and butter	4	bread and butter	4
like a hot knife through butter	4	buttering up	2
smooth as butter	3	like a knife through butter	2
which side your bread is buttered on	3	like butter on toast	2
butter the toast	3	smooth as butter	2
spreading thin	3	a knife through butter	1
buttering bread	2	butter	1
like spreading butter	2	butter and bread	1
like butter on toast	2	butter on bread	1
I don’t know	2	butter on the bread	1
smooth as butter	2	butter something up	1
butters my toast	2	butter up	1
spread the butter	2	butterknife	1
butter your bread	1	heaven	1
spreads like butter	1	I don’t know	1
soft as butter	1	knife in the butter	1
butter up	1	knife through butter	1
		like knife though butter	1
		like knife through hot butter	1
		smooth like the butter	1
		soft like butter	1
		spread margarine on bread	1
		spread the bread	1
		spreads like butter	1
		that's your usual bread n butter	1

Table 11 Responses: bread and butter

The last question asked the participants to describe strategies they used to "figure out" the meaning of expressions behind images. This question was not mandatory, so the number of responses did not correspond to the number of participants. Both groups stated that they focused on the parts of the image that "carried the most meaning", usually nouns (horse, moon, sack, bucket), and then searched for the expression that would fit with the rest of the image. It is interesting to note that native speakers mentioned that they either knew the phrase or not, and that if the answer were not clear right away that they would "give up". Non – native speakers applied various strategies more often, trying to search through their memory, describing the image and identifying key concepts that would lead to an answer, even thinking in their native language first. These responses are shown in Table 12.

What kind of strategy did you use to identify the expression behind the image, in those cases when it was not clear or straightforward from the image itself? Please provide an example.	
Responses given by native English speakers	**Responses given by non – native English speakers**
Identified the most concrete picture (for example, the sack in the last question) and used that to go through a list of possibilities in my head.	In cases not apparent to me, I tried to identify the object in as close detail as possible and determine its relation to other objects in the picture, by re-iterating on their relation to each other.
I took a guess, such as on the final one "hit the hay" - I'm not sure it's correct, but I could only think of the batter as "hitting" something and "hit the bag" isn't a phrase I've ever heard.	I used the image itself to construct the expression picture of a hand -> hand, picture of an arrow -> to, picture of the mouth -> mouth, all together hand to mouth (a way of life previously familiar with, nowadays not thank God).
usually from word association, e.g. #12 was not clear to me at first, but thinking of expressions with "sack" led me to the answer.	connecting things pictured with their names directly, like solving rebus.
none, I only answered when I knew the expression.	Remembering if I heard something like this in movies/series etc.

tried different ways of phrasing a picture until I recognized something. i.e. hand in mouth? fingers to your lips? oh right! from hand to mouth	tried to think of an equivalent in my native language.
I usually picked one of the main subjects of the photo and tried to think or phrases I knew that contained that subject. Like for the moon photo, I was trying to think of phrases that dealt with the moon-- man in the moon, fly me to the moon, cow jumped over the moon, etc. until I figured out "to be over the moon", which made more sense in context with the image.	Thinking in my native language
View the image as separate images rather than one collective image - cat's out of the bag, head over heels.	I've used the "The first thing that comes to my mind" strategy or giving answers by writing exactly what was shown on the attached pictures.
Some came intuitively (I just knew the answer e.g. pinch of salt - "exactly what is says on the tin" as they say). While others i broke down the image into single words or actions to determine the phrase, e.g. hit the sack.	memory
Either the answer came to me or I said I don’t know. I skipped and returned for a second or third try but that didn't help.	image description
I tried to find the most obvious interpretation of the image, because that was consistently the answer for the ones I did know.	rebus style
none. just said didn't know.	just gave up
just wrote what i saw	familiar expressions
i didn't.	connecting images
looked at certain elements of the photo. for example, with the horse one, at first i was stuck thinking it was about weight or heavy. but as soon as i got the word horse in my head, i was able to think of a saying.	
thought about synonyms for what was shown	

Table 12 Responses: Strategies

6. Analysis

In the survey, the participants were not specifically instructed whether they should write grammatically and syntactically correct phrases, so a large amount of everyday writing and slang was present in the responses. Since the purpose of this survey was to test recognition of idioms, the only relevant factor in the data evaluation was the existence of constituent words of a specific idiom. Thus, word strings like "*let the cat out of the bag"*, "*cat's out of the bag"*, "*cats outta the bag"* were all evaluated as a correct recognition of that idiom, since they all contained the relevant words that constitute that idiom (*cat*, *out*, *bag*).

It was decided not to focus on students of the English language. Instead, a more general group of participants from different professions was gathered, consisting of average speakers in both groups, whose profession was not specifically associated with mastering the English language.

Two demographic variables, *age* and *education*, were collected in the survey to improve data interpretation. Initial analysis of the data resulted with an unexpectedly low percentage of correct answers for the group of native English speakers, while the same was expected for the group of non – native English speakers. After including age and education into further examination of these results, a small correlation between education and age, and the percentage of correct responses can be noted, especially in groups with the highest respondent count. Respondents with the highest level of education being bachelor's degree had a mean of 75% of correct responses, while those participants with a high school degree responded correctly with a mean accuracy of 60%. Other groups regarding the level of education did not have a sufficient count in order to be taken into account. However, a pattern might be noticed, with the exception

of the participants with a master's degree. In the group of non – native speakers, the distribution of number of participants with different levels of education was not substantial to draw relevant conclusions, however, we can notice a higher accuracy of answers by participants with a master's degree, as opposed to the accuracy of participants with a bachelor's degree.

Highest level of education	native English speakers		non – native English speakers	
	Correct answers	Respondent count	Correct answers	Respondent count
doctoral degree	80.0%	1	25.0%	1
bachelor's degree	75.0%	16	38.6%	7
associate degree	70.0%	1	60.0%	1
master's degree	68.3%	6	44.7%	18
high school diploma or equivalent	60.0%	14	46.0%	5

Table 13 Accuracy per education level

Similar results were obtained when including age into account. If we disregard one participant from the 41 – 50 age group, we can observe a correlation between age and mean accuracy of responses. The lowest accuracy of responses provided by the 51 – 60 group might be ascribed to vocabulary deterioration with age, but that would only be an assumption.

Age	native English speakers		non – native English speakers	
	Correct answers	Respondent count	Correct answers	Respondent count
31-40	77.5%	8	44.0%	10
41-50	70.0%	1	-	-
25-30	67.5%	12	43.8%	16
18-24	67.1%	14	41.7%	6
51-60	53.3%	3	-	-

Table 14 Accuracy per age group

The correlation between accuracy and demographic variables shown in Table 13 and Table 14 might be attributed to the fact that our vocabulary expands with age, as well as with education, which might provide insight for certain unexpected results of the survey.

6.1. Challenges

The process of selecting the images which would be used in the survey gave insight into how difficult it is for a foreign speaker of English to *think* like a native speaker. We can illustrate this on the example of idioms (*from*) *hand to mouth* and *hit the sack*. Before the actual survey, a pilot survey was conducted with the selected group images, in order to test them as visual input. The participants mostly answered with the following word strings:

	
Giving kisses *Kiss on the hand* *Kissing* *My lips are sealed* *Lust* *Handful of kisses*	*Punching bag*

Figure 7 Images from the pilot survey

These answers showed that *lips* on the left image were not a good representation for *mouth* and that a more accurate image showing *mouth* as a cavity, instead of only the *lips* would be more suitable. In addition, it seemed that it was necessary to include the *direction* or *connection*

between *hand* and *mouth*, so a new image was composed from individual images retrieved online (Figure 8).

In the case of *hit the sack*, all of the participants answered with *punching bag*, instead of *hit the sack*. In fact, the image was faulty since it was not a correct representation of the idiom. It pictures a *fist* instead of an open palm or hand. When it comes to the verb *hit*, the verb most associated with the *fist* is *punch*, which might explain unfavourable results, while a *hit* would be an act made with another tool. Thus, the following image was constructed by removing the image of a *fist* and adding a silhouette of a baseball player with a baseball bat (Figure 8).

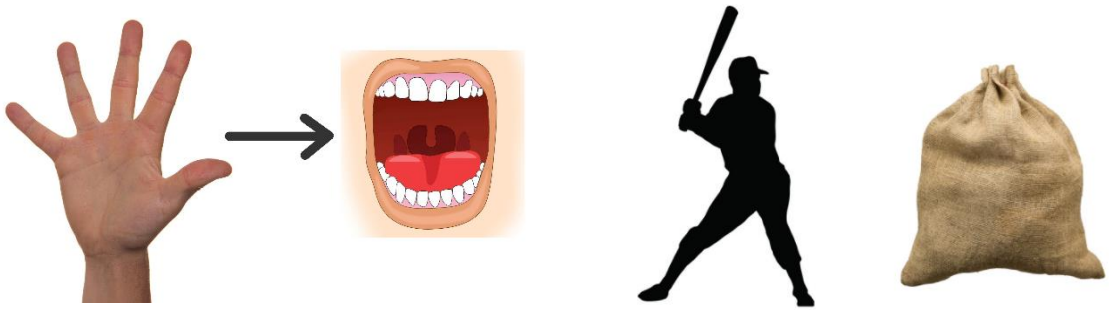


Figure 8 Images subsequently constructed for the main task

6.2. False friends

The image which represented the idiom *the cat is out of the bag (*or *let the cat out of the bag*) was considered exemplary for this idiom. It had a form of a comic in the way that it showed a closed bag with "something" in it on the left, and on the right, it pictured a cat peeping out of the bag and waving. Native speakers wrote some of the two previously mentioned forms of the correct phrase 89% of the time (34 out of 38). However, only four participants out of 32 from the non – native speakers group wrote the expected phrase. In fact, 28 of the participants responded with some form of *cat in the bag*, which is a literal translation of the very well –

known Croatian idiom *mačak u vreći*, usually associated with *buying*, which means *buying something without knowing or checking what it is*. From its definition we can see that it actually corresponds to a completely different English idiom – *to buy a pig in a poke*[27], whereas *the cat is out of the bag* means revealing facts that were previously a mystery or hidden.

The prevalent number of matching answers in two groups respectively yet again indicates an agreement in the lexical unit which was triggered by the image. Another interesting observation arises from the opposite answers: the distinctly different responses by speakers of the two languages, which were caused by the same image, imply that the participants' perceptions were influenced by their native languages. This might be related to the principles of the Sapir – Whorf hypothesis, which suggests that linguistic factors can affect cognitive processes.[28]

6.3. Idiom variations

During the analysis process, some unexpected answers were found. Additional research showed that certain idioms which were selected for the survey had several variations for different varieties of the English language. Since there were plural matching occurrences of these variations, they were evaluated as correct recognitions of the idiom.

For the idiom *from hand to mouth*, a few answers referred to another idiom that is also related to *hand* and *mouth – do not bite the hand that feeds (you)*.

[27] Vrgoč, Fink – Arsovski (2008: 433)
[28] Harley (2007: 93)

For the idiom *hit the sack*, there is a corresponding counterpart in the American English, *hit the hay*, which seems to derive from the turn of the 20th century, when mattresses were sacks filled with hay (hence the phrase *hit the sack*).[29]

The idiom *bread and butter* was represented by an image picturing a slice of *bread* with *butter* spread on with a *knife*. This image triggered multiple associations, all of which were valid idiomatic Phrases in English:

Idiom	Meaning
Bread and butter	A primary source of income, a living
Like a (hot) knife through butter	Smooth, without difficulties
Spread (something) thin *Spread yourself thin*	To spend more resources on something than one can afford To have too many responsibilities or tasks
(it) butters my bread	To benefit from two separate and often contradictory or incompatible sources
(it) butters my toast	A variant of *butter my bread*
Know which side your bread is buttered (on)	Related to *have your bread buttered on both sides,* knowing where best interests lie[30]
To butter up	To praise or flatter someone in order to make them more receptive[31]

Table 15 Idioms related to bread and butter

6.4. Control images

Control images were used to test if the participants would produce idiomatic expressions based on images which did not contain elements that might be linked to an idiomatic expression. The prediction was that the participants will describe the image.

[29] https://www.phrases.org.uk/meanings/182700.html
[30] Gulland, Hinds – Howell (2001: 158)
[31] Ibid., 158.

The results for the first control image are displayed in Table 16. They showed that some native speakers described what they saw in the image, while almost half of them were not sure what to write, possibly as a result of being expected to write an expression. Non – native speakers literally described this image in a smaller number, while they were more imaginative with their responses, providing other interesting idiomatic expressions, e.g. *sky is the limit, tall as a building, concrete jungle*.

Control image 1 - city			
Responses given by native English speakers	**Count**	**Responses given by non – native English speakers**	**Count**
I don't know	15	I don't know	4
skyline	4	metropolis	3
the big city	3	city	3
skyscrapers	3	skyline	3
it's just a city	2	sky is the limit	2
through the roof	1	tall as a building	2
til the fog rolls in	1	city dust	1
castle of glass	1	concrete jungle	1
the sky is the limit	1	ghost town	1
concrete jungle	1	cityscape	1
ghost town	1	morning rush	1
foggy city	1	smoke in the city	1
london fog	1	blowing smoke	1
the city is waking up	1	downtown cloud	1
over the roof top	1	big in the city	1
windy city	1	building blocks	1
		city at daytime	1
		smoke and mirrors	1
		urban life	1

Table 16 Responses: Control image 1

The results of the second control image (Table 17) showed that it is not simple to find an image "without a meaning", or perhaps that we will tend to find meaning everywhere. The

image of nature, which was considered *neutral*, resulted with the majority of participants from both groups writing the same idiom – *cannot see the forest for the trees*. Although it did not serve as a control image, it added more support to the hypothesis that was being tested.

Control image 2 - nature			
Responses given by native English speakers	**Count**	**Responses given by non – native English speakers**	**Count**
can’t see the forest for the trees	5	forest	7
(not) out of the woods	4	can't see the forest for the trees	5
(don’t) miss the forest for the trees	4	I don't know	2
I don’t know	4	alone in the woods	1
can’t see the forest from/through the trees	3	can't see a tree from the forest	1
can’t see the wood for the trees	3	cant see a tree from the forrest	1
lost in the woods	3	can't see the forest through the trees	1
forest	2	cant see the tree from forrest	1
cant see the forest for the trees	2	cant see the trees through the forest	1
forest for the trees	2	can't see the wood for the trees	1
see the forest for the trees	1	can't see the wood from the trees	1
scary forest	1	can't see tree from the forest	1
neck of the woods	1	dark forest	1
through the woods	1	forest something	1
can’t see the trees through the forest	1	wood	3
seeing the forest for the trees	1	keep it in the woods	1
		thick like a forrest	1
		trees	1
		woods and no trees	1

Table 17 Responses: Control image 2

7. Conclusion and limitations

This study aimed at answering the question of the nature of idiom storage in the mental lexicon. A simple experiment in the form of a survey was conducted. The main task was written word production based on visual input. The results showed that a considerable number of participants produced the same word string per image, with an expected greater accuracy by the group of native English speakers, compared to the group of non – native English speakers. The results point towards supporting the non – compositional model of idiom comprehension, the lexical representation hypothesis, which suggests that idioms are stored in the mental lexicon as separate units, despite certain limitations of the survey which affected the scope of the study. The results of the research imply that the lexical retrieval based on the same visual input resulted with the same word strings provided by most participants.

The scope of this study was in large part limited by the methodology of the experiment. The visual input (i.e. image) was a major factor for the choice of idioms used in the survey. There is a limited number of common English idioms which can be presented by an image or a drawing. There is also a limited scope of what can be accomplished in word production based on visual input (e.g. results for the idiom *take with a pinch of salt* from the survey). Furthermore, certain images were constructed manually and were not tested prior to the experiment, in order to confirm their validity, with regard to the association between the image and the expression.

This research might be further expanded by conducting a cross – linguistic study of Croatian and English idioms, with a focus on a mutual influence of one language as L1 to the other as a foreign language. There are certain indications in the study results which suggest that further analysis on this matter might be more revealing.

The new hybrids models of idiom comprehension might be tested by using a different type of experiment which would allow more flexibility in selecting idioms of various degree of compositionality and syntactic flexibility, which was limited in this study because of the limitations of the visual input.

The figurativeness and fixedness of idioms make these expressions an enriching part of language. They also cause difficulty with learning new vocabulary, especially for foreign learners of the English language. Learning new words, particularly for older learners, is often done by heart, simply by memorization. The analysis of the results showed that many idioms have an interesting historical and cultural background. When it comes to learning new vocabulary, it is easier to learn words and expressions for which the literal meaning can be associated with its figurative meaning. This property is called compositionality and should be considered when teaching new vocabulary, especially idioms. Idioms, which are often non – decomposable, might be easier to store in the long – term memory if the learners are given historical and cultural background of how the expression was formed. This might facilitate linking the literal and figurative meaning of such expressions.

APPENDIX – The survey

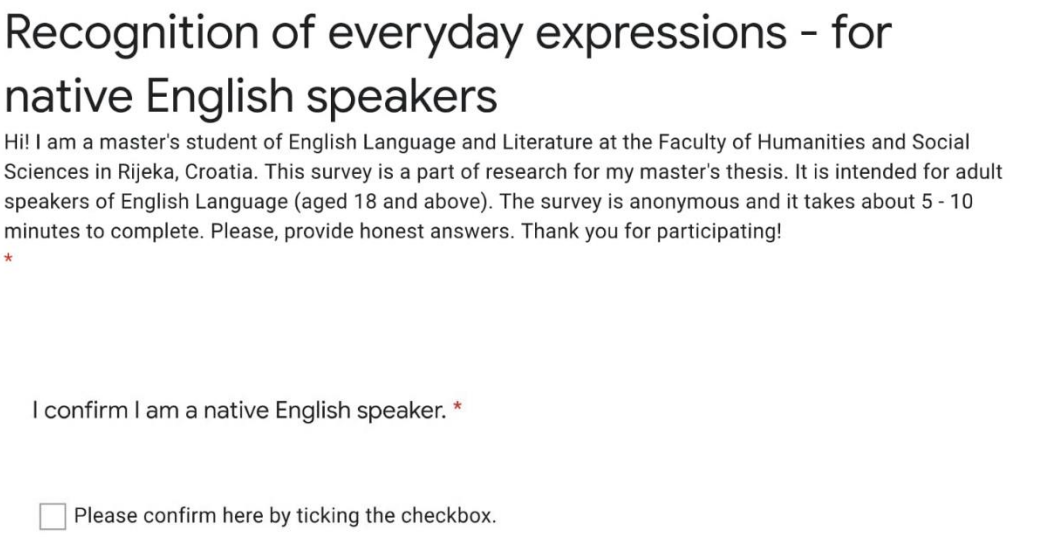
Recognition of everyday expressions - for speakers of English as a foreign language

Hi! I am a master's student of English Language and Literature and Informatics at the Faculty of Humanities and Social Sciences in Rijeka, Croatia. This survey is a part of research for my master's thesis. It is intended for adult speakers of English Language (aged 18 and above). The survey is anonymous and it takes about 5 - 10 minutes to complete. Please, provide honest answers. Thank you for participating!
*

I confirm I am a speaker of English as a foreign language (I do not live in an English - speaking country). *

Please confirm here by ticking the checkbox.

Native English speakers were given a modified version with the statement above a shown in the following image.



Recognition of everyday expressions - for native English speakers

Hi! I am a master's student of English Language and Literature at the Faculty of Humanities and Social Sciences in Rijeka, Croatia. This survey is a part of research for my master's thesis. It is intended for adult speakers of English Language (aged 18 and above). The survey is anonymous and it takes about 5 - 10 minutes to complete. Please, provide honest answers. Thank you for participating!
*

I confirm I am a native English speaker. *

Please confirm here by ticking the checkbox.

The rest of the survey was identical for all participants.

What is the highest level of education you have completed? *

Označite samo jedan oval.

- Elementary school diploma
- High school diploma or equivalent
- Associate degree
- Bachelor's degree
- Master's degree
- Doctoral degree

[If applicable] What is your field of study?

Age *

- 18-24
- 25-30
- 31-40
- 41-50
- 51-60
- 60+

Main task - Example

This example shows how to complete the following part of the survey.

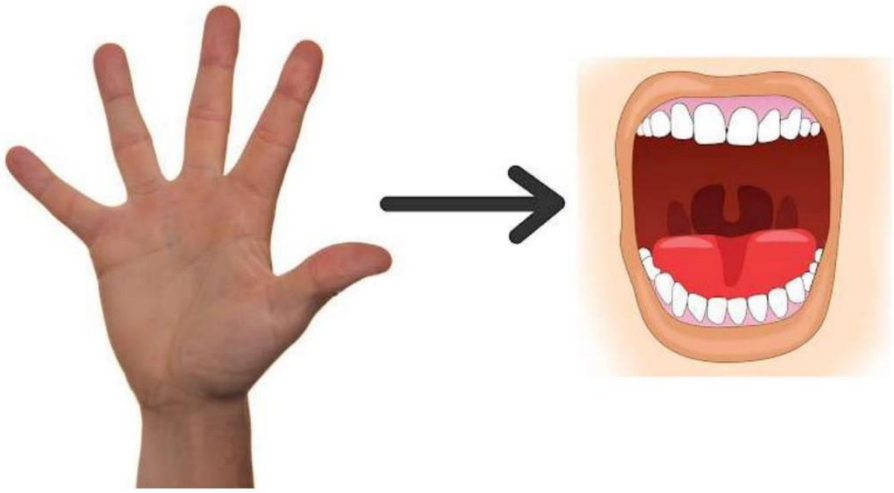
EXAMPLE - This is the answer to the image below: "head in the clouds"

Main Task

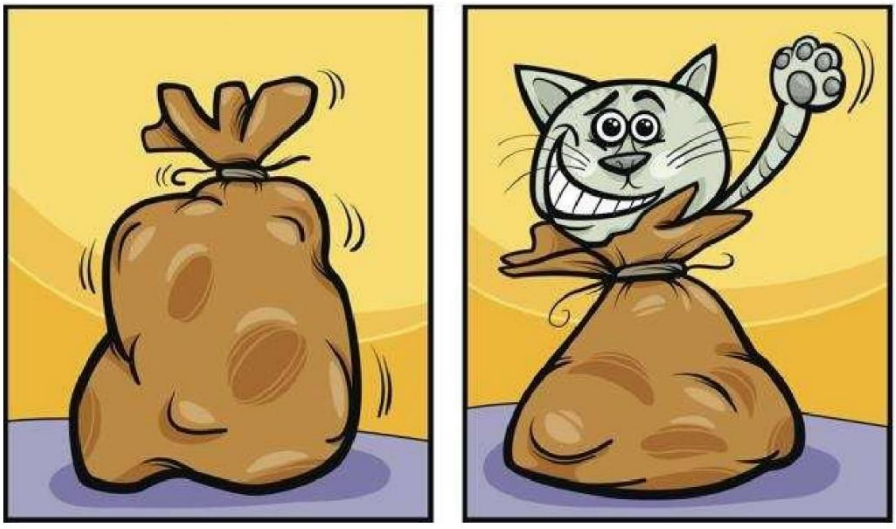
Look at the following 12 images. For each image, write an expression that you most associate the image with. All questions are mandatory, so take time to think about the answer.

1. *

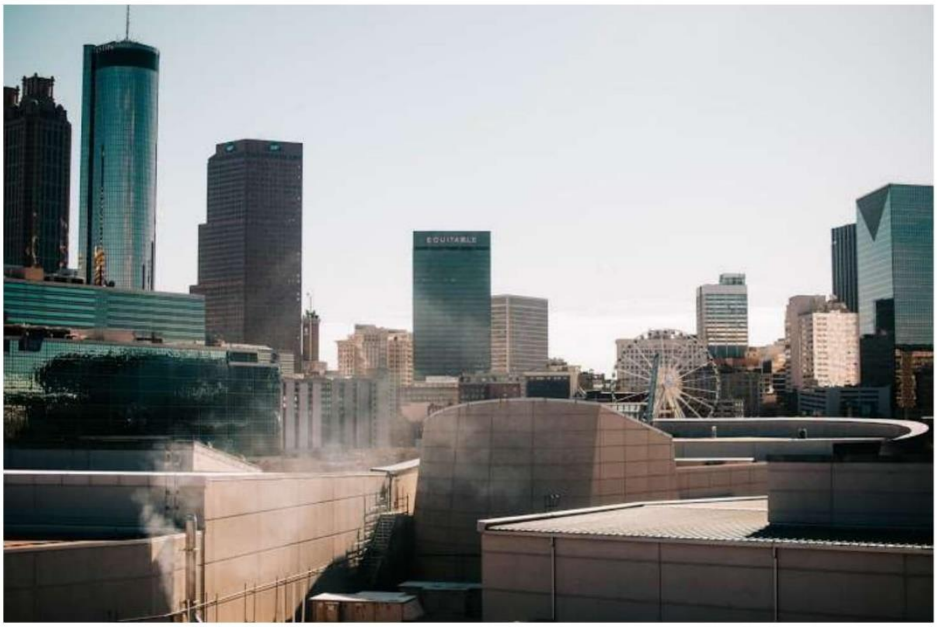
2. *



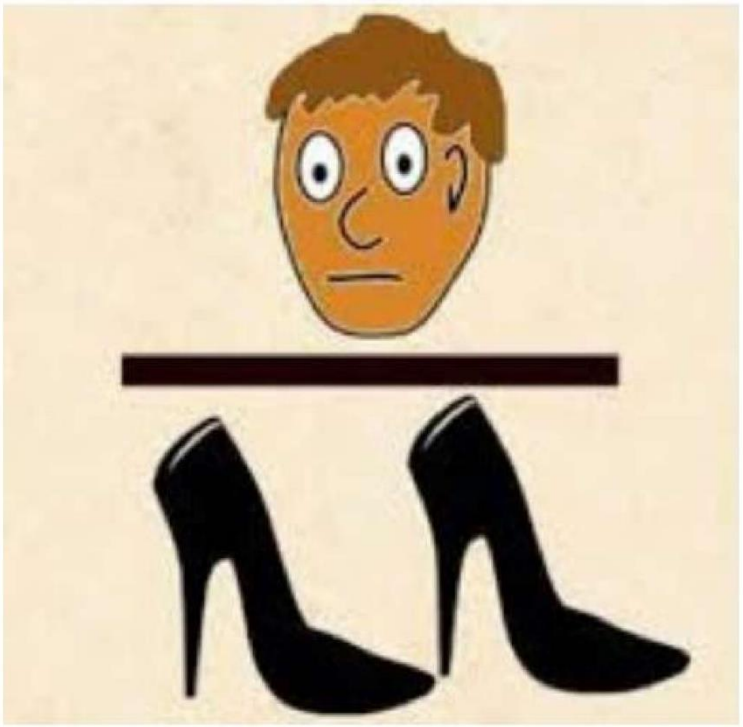
3. *



4. *



5. *



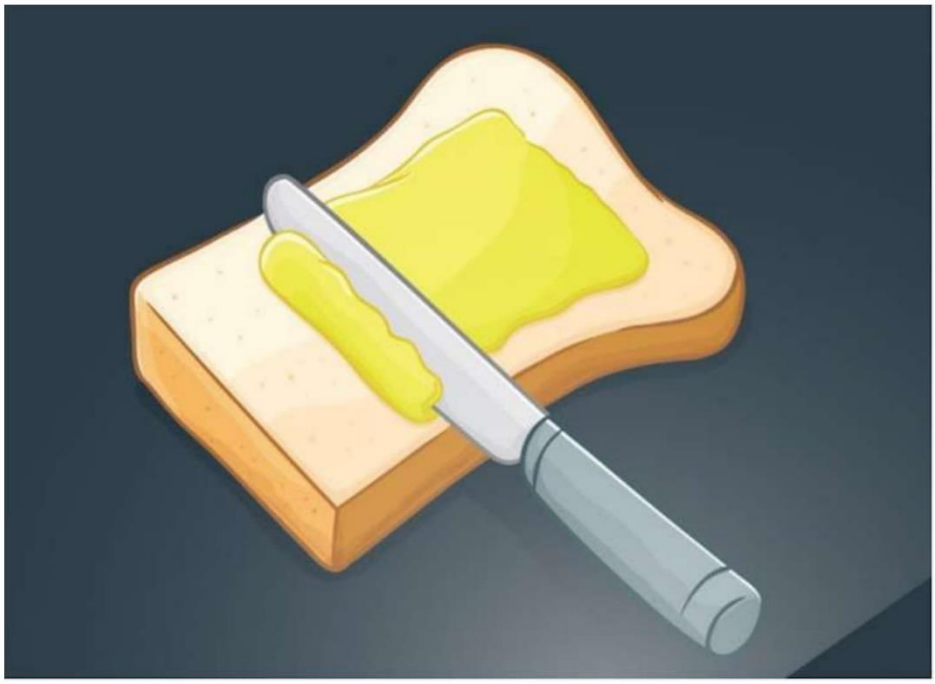
6. *

7. *

8. *

9. *

10. *



11. *

12. *

Feedback

What kind of strategy did you use to identify the expression behind the image, in those cases when it was not clear or straightforward from the image itself? Please provide an example. *

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