

# Manifestations of lexical retrieval struggle and the role of iconic gestures in lexical retrieval

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## **Abstract**

Previous research on fluency has found that language dysfluency manifests itself through non-juncture pauses and the use of non-lexical fillers. Taking into account that lexical retrieval struggle is one of the main causes of disfluency, the goal of this study is to provide further indicators of disfluency that are related particularly to word retrieval. The research argues that manifestations of lexical retrieval difficulties can be found within modalities of speech, gesture, and gaze. A corpus was created through a task in which multilingual speakers were asked to watch a story and retell it in two languages. Lexical retrieval pauses were extracted from the collected corpus and analyzed in the reported case study. Patterns which repeatedly occur within lexical retrieval pauses have been targeted across modalities and include use of iconic gesture and beat gesture during pauses, increase of beat gesture with disfluency, hand-to-face gestures, comments on word retrieval difficulties, finger snapping, dental clicks, and redirection of gaze. It is argued that these patterns can be used as indicators of lexical retrieval difficulties when they co-occur with non-juncture pauses or non-lexical fillers. Second language and multilingual features as code-switching and requests for assistance have been found in these cases as well and are argued to function as manifestations of word retrieval difficulties. A second major focus of the research is directed to the question on which of these manifestations can play a facilitating role in resolving lexical difficulties. The analysis describes aforementioned manifestations of lexical difficulties and addresses theories on the facilitating role of gestures in decreasing speaker's tension and recapturing elusive words from lexical memory.

## 1. Introduction

Lexical retrieval is a process of language production that requires the ability to access, select, and produce lexical items from the language according to the context and communicative intentions of the speaker (Hartsuiker & Notebaert, 2010). It is possible to distinguish two stages of lexical retrieval: 1) meaning-based lexical retrieval process (choice of a lexical presentation); 2) form-based lexical retrieval process (retrieval of a word form, selection of phonological segments, and syllabification) (Garrett, 1975).

The implicit process behind lexical retrieval has received much attention in previous research. However, there is limited insight into the explicit indicators of lexical retrieval struggle. In a study on non-juncture pauses, Goldman-Eisler (1957) has shown that non-lexical fillers can function as signs of disfluency. However, what indicates a disfluency does not necessarily indicate a lexical disfluency. It is highlighted that difficulties may occur at one particular level of speech, not necessarily affecting another (Hartsuiker et al., 2009). For instance, non-lexical fillers can signify disfluency associated with issues with discourse planning or informedness of the speaker. Examples of non-lexical fillers in English include *<um>*, *<er>*, *<ah>*.

Another theory found in previous research is that pauses that exceed a certain time interval are known to indicate disfluency (Rossiter, 2009). The first limitation of this claim is that relying on silent pauses as an indicator of disfluency is not reliable because it is debatable whether a certain pause time interval can be estimated as a rule of thumb. Secondly, as highlighted by Duez (1982), a pause can also manifest states as hesitation and breathing. “it is not possible to assign one function only to a pause: a pause can have different functions (hesitation, grammatical marking, breathing). Furthermore, despite the importance of distinguishing such manifestations, a separate indicator of lexical retrieval difficulty cannot be used as a criterium in defining lexical retrieval difficulties. This is because every modality is a context-dependent semiotic resource. Moreover, meaning (and therefore interpretation) is known to be integrated in a multimodal ensemble and tied to the interaction of modes between each other (Geenen, Norris, & Makboon, 2015). This means not only that all modalities have flexible meaning and interpretation potentials, but also that they deeply interact with each other and produce a sum of meanings and interpretations that exceeds the sum of the meanings produced through modalities separately. A complete analysis of actions within a modality cannot be done without taking into account co-occurring actions in the remaining modalities.

There are previous studies that addressed a common assumption that gesture can increase as speech fluency decreases. This could be used as a manifestation of disfluency. However, there is considerable uncertainty with regard to this claim because of inconsistent results (Nicoladis, 2005). Furthermore, other evidence shows the parallel correlation of the speech and gesture in which gesture decrease as speech fluency decreases and then increases as it revives (McNeill, 2005).

Another manifestation of lexical retrieval process found by previous research is redirection of gaze. Gaze aversion is described as the phenomenon of looking at or away from an interlocutor during mental activity. As summarized by Micic et al. (2010), there has been evidence that shows that while answering difficult questions speakers tend to shift their gaze

away from visual distractions and the questioner(s) both in face-to-face and in video link situations. The study aims to bring more insight into the role of gaze redirection in lexical retrieval pauses, especially for cases with iconic gesture.

In order to find further patterns of behaviour are likely to manifest lexical retrieval difficulties, this study targets co-occurring patterns that accompany lexical difficulties within speech and non-speech modalities. The first research question is therefore which manifestations of lexical retrieval difficulties can be found across language modalities and in which combinations they are more likely to indicate struggle with word retrieval. The observed modalities include speech, gesture, and gaze. A second question addressed in the study is which of them may play a facilitating role in solving lexical struggle and why.

Observing behaviour during lexical difficulties, especially gestural behaviour during disfluency, was chosen as an approach to answer to these questions. A narrative task demand was employed to elicit natural disfluencies in spontaneous speech. The task has been assigned to each participant in two proficiency conditions in order to confirm the absence of a casual relationship between proficiency and lexical struggle.

The collected corpus has shown many cases of word retrieval difficulties to be accompanied by similar and overlapping patterns in actions and speech. Within speech, this includes requests for assistance, code-switching, comments on word retrieval difficulties, dental clicks, and (expectably) fillers. As to gesture, the targeted manifestations include non-synchronized speech and gesture (for instance, the use of representational or beat gestures during pauses). Less expected gestural manifestations as hand-over-face gestures, finger-tapping were found and are observed in the reported study. The role of redirection of gaze is addressed as well in order to offer more insight into the role of gaze direction in focusing on a word retrieval task. It is argued that these patterns can indicate lexical retrieval difficulties when they co-occur with non-lexical fillers or a pause that disrupts the flow of speech.

Story retellings of 17 participants were used to elicit cases of successful lexical retrieval in natural spoken discourse and gesture. The analysis addresses the suggested signs of lexical retrieval difficulties, the temporal relationship between speech and gesture during lexical retrieval, and the link between the functional and visual aspects of iconic gestures and their associated concepts in the speaker's mental lexicon. The collected data was also analyzed in order to add more insight into the facilitating role of particular manifestations in lexical retrieval problems. The major focus within this question is on gestures.

An idea of cross-modal activation has been addressed by Krauss (1998) within the topic of whether lexical (iconic) gestures play a facilitating role in word retrieval. It explains that human memory employs several different formats (e.g., visuo-spatial, motoric) to represent knowledge, and much of the content of memory is multiply encoded in more than one of these representational formats (Krauss, 1998). When a concept is activated in one format, it is assumed to activate related concepts in other formats. This study follows that idea by claiming that activating the visual format of a lexical item through lexical gestures helps the speaker to activate (and therefore produce) its linguistic format. Furthermore, it provides cases that may be used as examples of how iconic gestures might aid in naming objects by recruiting functional knowledge about them (Bub, Masson & Bukach, 2003).

This research also considers the suggestion that gestures reduce tension of the speaker through movement (Krauss, Chen & Gottesman 2001). It implies that lexical retrieval struggle can create tension, and since movement is associated with decreasing tension, increasing gesture

may facilitate lexical retrieval by decreasing tension of the speaker. Unfortunately, I am unaware of any evidence that supports this theory and it cannot be proved directly because it describes and implicit cognitive and emotional process. However, previous research on the effect of restriction of movement in speech (Rauscher, Krauss & Chen) and evidence that memory load (when related to spatial content) causes an increase of gesture (Melinger & Kita, 2007) provides ground to support this notion. This study has shown examples of increase of movement during lexical pauses, related to both spatial and non-spatial content. Furthermore, it was shown that an increase of movement tends to disrupt or stop when the searched word is produced.

The Analysis chapter provides a case study with a range of manifestations of lexical struggle based on which patterns have shown to repeatedly accompany lexical difficulties. It has shown both expected and unexpected manifestations. Each case was transcribed and the role of each manifestation was analyzed. Examples to each pattern were added to the analysis and observed in detail. The corpus of collected cases of word retrieval difficulties is available in the Appendix.

The Discussion section explains the question on which manifestations and manifestation combinations are more likely to function as indicators of lexical retrieval. Furthermore, it addresses suggestions on what aspect of lexical retrieval these manifestations are related to. The major focus of the chapter is insight that multimodal manifestations provide into the implicit process of word choice and how they can manifest the memory, cognitive, and emotional loads associated with lexical struggle. The section also explores what our data can add to the question on the facilitating role of gesture in lexical retrieval. It discusses the existing notions on how iconic gestures facilitate lexical retrieval and analyzes the role of other movements in remediating fluency.

Understanding the process behind word retrieval and lexical disfluencies is helpful in the fields of cognition, language acquisition, and interlingual communication (especially intelligibility). Observations of how lexical difficulties manifest themselves can be useful in research on second language speech, the cognitive processes behind word retrieval, and the link between different modes of communication and spoken language.

### *Literature overview*

The concept of fluency has received much attention in linguistic research. One of the first researchers to define fluency was Fillmore (1979). He distinguished four criteria for fluency: 1) the ability to talk at length with few pauses, 2) the ability to talk in coherent, reasonable and meaningful sentences, 3) the ability to speak what is relevant and appropriate in the context, 4) the ability to be creative and imaginative in language use (Fillmore, 1979). This is a broad meaning of fluency that includes pragmatic competence and concerns production proficiency in general. This meaning of fluency is often implied in the field of second language acquisition, where the topic is discussed because achieving fluent production skills is especially challenging in a second language. In a narrow sense, fluency applies to an aspect of oral proficiency: the smoothness in which sounds, syllables, words, and phrases are connected when speaking. This study focuses on disfluencies caused by difficulties in word retrieval, an issue that affects fluency both in a narrow and broad sense.

Most research on speech disfluencies assumes that at least some disfluencies occur when speech planning is difficult. The work by Goldman-Eisler (1957) was one of the first observations of speech disfluencies in linguistic research. It has shown that speakers more often

pause before difficult and long utterances. Furthermore, it was concluded that difficulties related to the formulation of the message significantly increase disfluency. (Hartsuiker, Robert & Notebaert, 2009; Smith & Clark, 1993). However, a speech disfluency can be caused not only by word retrieval difficulties, but also by problems in discourse organization, syntactic planning, or by uncertain knowledge about the speech content. Nevertheless, previous research has provided sufficient evidence that difficulties in lexical access can lead to speech disfluencies (Hartsuiker & Notebaert, 2010; Beattie & Butterworth, 1979).

Pauses are known to play an important role in oral discourse and fluency. They have three main functions in fluent speech: 1) They allow the speaker to take a breath 2) Similarly to punctuation, they divide language into meaningful units 3) They direct attention of the listener to important units in the discourse (Lege, 2012). The nature of pausing has been examined in a study by Riggenbach (1991). They distinguish two types of pauses: silent gap and non-lexical fillers. When pauses exceed an expected time interval, they are often viewed as a factor of disfluent speech (Rossiter, 2009).

The original work on non-juncture pauses in spontaneous speech was carried out by Goldman-Eisler (1957). She sees speech as a sequence of acts of choice and silent pauses and non-lexical fillers as an indicator of hesitation in a lexical decision. By pauses she means periods of silence or non-lexical fillers exceeding 250 milliseconds. In recent research on second language acquisition, a pause indicating disfluency is considered to be a moment of silence which exceeds 1-3 seconds (Lege, 2012). There is a growing amount of literature that examines speech disfluencies in general. They mostly address the aspect of lexical struggle as one of the implicit causes of disfluencies or an aspect of cognitive load associated with non-native speech. Less knowledge is available on explicit indicators of lexical retrieval difficulties. Patterns that can be included from previous research on dysfluency would be non-lexical fillers (Goldman-Eisler, 1957) and non-juncture pauses (Lege, 2012). Other patterns as code-switching and requests for assistance are described in previous research as manifestations of multilingualism or non-native speech. This study suggests that they can indicate lexical dysfluency depending on the context and whether they co-occur with more disfluency. To my knowledge, there was no research devoted to exploring patterns in language and behaviour that indicate lexical retrieval difficulties. This research attempts to find and distinguish these indicators while taking into account observations from research on disfluency and second language research that are applicable to this subject.

The conventional distinction between a semantic level and a phonological level of lexical retrieval was first shown in data on substitution speech errors (Garret, 1975). It shows speech errors that either displayed semantic (meaning-based) similarity with the intended word or a phonological (form-based) similarity. As reviewed by Hartsuiker & Notebaert (2010), the two-level model is further supported by experimental studies on naming latencies, studies eliciting tip-of-the-tongue stage, by studies using event-related brain potentials, and by research on the naming performance of patients with brain damages. It is also possible to distinguish the speech production process into three stages. Levelt (1989) refers to them as conceptualizing, formulating, and articulating. As noted by Krauss (2001), there is no evidence on to which stage the production of gesture is attributed to and it may even be flexible. However, previous research has addressed the conceptualizing role of representational gestures. According to the gesture-for-conceptualization hypothesis, iconic gestures assist the speaker by activating,

manipulating, packaging, and exploring spatio-motoric information related to the speech content (Kita et. al, 2017). Unfortunately, there is not yet any evidence that supports this theory.

Speech and (co-speech) gestures are increasingly seen as an integrated whole that is planned and processed together in comprehension, production, and development (McNeill 1992). Gesture is considered synchronous and co-expressive with speech (McNeill 2005). In other words, gesture and speech express the same underlying idea unit in their own ways. It has been proven that information from gesture plays a role in comprehension and remanifests in reproduction (Cassell, J., McNeill, D. & McCullough, K. E. 1999). As summarized by Gullberg (2010), although the precise details of the speech–gesture relationship is under theoretical debate (e.g., the exact role of imagery, linguistic influences, and communicative intentions; the latest point of interaction in the encoding process), it is generally agreed that speech and gestures are connected at the conceptual level. The co-expressiveness of speech and gesture can be confirmed by the tendency of gesture to freeze during stuttering, the joint slowdown of speech and gesture in delayed auditory feedback, and the fact that lack of vision (blindness) evidently does not impede thinking and expressing content of speech in gestural terms (McNeill 2007). It is still under debate whether speech and gesture form a psycholinguistic unit or two co-expressive interrelated systems.

An important approach in investigating the theory that gestures aid in word retrieval supposes that if gestures aid in lexical retrieval, lexical retrieval will be more difficult if gestures are restricted. Graham and Heywood (1975) have analyzed the speech of five speakers who were prevented from gesturing as they described abstract line drawings. They concluded that restriction of gesture has no marked effects on speech performance. On the other hand, Rimé (1982) and Rauscher, Krauss and Chen (1996) have found that restricting gesturing adversely affects speech. During their experiment, speakers were videotaped as they described animated action cartoons to a listener. As predicted, it has been shown that speakers were less fluent in the constrained condition. Thus, the inability to gesture has caused disfluency.

The aforementioned study provides knowledge on the effect of restriction of movement of the speech. However, it may not be providing enough insight on which aspect of speech fluency is violated by restriction of gesture. When focusing on word retrieval, the interpretations of these studies are not straightforward because lexical struggle is not the only cause of disfluency. Firstly, gestures may positively affect fluency by decreasing tension. Secondly, difficulties in accessing lexical items are not the only cause of speech disfluency. Therefore, word retrieval is not the only aspect in which restriction of gestures may adversely affect speech. For instance, this unnatural condition may adverse speech by increasing the speaker's tension and therefore emotional load.

On the other hand, the results of the study on the impact of gesture restriction on speech have shown that the disfluencies manifested themselves mostly during spatial content. It is known that iconic gestures are more common in speech with spatial content (e.g., accompanying spatial prepositional phrases) comparing to non-spatial content (Rauscher, Krauss & Chen, 1996). In other words, spatial content often implies use of iconic gesture, and it has been found speech with spatial content was affected by restriction of gesture the most. This gives a reason to argue that iconic gestures have properties that facilitate fluency in some way. Rauscher, Krauss & Chen (1996) explain this with the notion that representational (e.g. lexical) gestures facilitate access to visuo-spatial knowledge because they derive from spatially coded knowledge and reflect spatio-dynamic features of concepts. Furthermore, there is a theory that lexical gestures

activate pre-existing spatio-motoric knowledge. However, the only suggested evidence was increase of gesture by speakers when maintaining spatio-motoric knowledge on the speech content (Chu & Kita, 2008).

Another aspect of knowledge on a lexical item that may be activated by iconic gestures is the functional knowledge about the word. Functional knowledge resides in functional iconic gestures (e.g., gestures that resemble the function of an object instead of its form). A theory considered in this study is that iconic gestures facilitate word retrieval for manipulable objects by recruiting functional knowledge. The study by Bub, Masson & Bukach (2003) has shown that gestural knowledge about form and function is automatically evoked if participants attend to the meaning of the object (e.g., when asked to name it).

Another way to explore the link between gesture and fluency has been analyzing a possible correlation between gestural behaviour and proficiency. Even though the relationship between gesture and proficiency is still under debate, gestural behaviour of second language users can provide insight into the role of iconic gestures in lexical retrieval. To our knowledge, the first comprehensive study of gesture as an L2 communication strategy was conducted by Gullberg (1998), who investigated different types of gestures produced by learners of French and Swedish during a task of retelling a story that had been presented as a cartoon. The results have shown that participants produced more gestures when they were producing narratives in the L2 than when they were performing the same task in the L1. Furthermore, it was concluded that the gestures produced in L2 narratives included iconic gestures that solved lexical problems through visual representation. Intuitively, it may lead to the conclusion that iconic gestures can play a compensatory role for lack of proficiency. However, the results of studies that compare iconic gestures in L1 and L2 are incongruent (Mori and Hayashi, 2006; Gullberg, 1998; Nicoladis, 2004).

A research by Nicoladis, Pika, & Marentette (2007) addresses the link between gesture rate and task complexity. It supposes that gesture rate increases as the task complexity increases and that the link is particularly strong with iconic gestures because they visually resemble elements of the speech content. It is indeed more likely that gesture use is not linked directly to bilinguals' proficiency in a language but rather to the tasks that the speaker undertakes in each language. If so, lexical retrieval pauses will occur in both conditions. The results of previous studies that attempt to target the link between proficiency and gestures might have been incongruent for the same reason, the interaction between two variables: bilinguals' proficiency and the task they are to perform (Nicoladis, Pika, Yin, & Marentette, 2007). The effect of this interaction is also why it is important the speakers are assigned to the exact same task in both proficiency conditions.

An experimental study by Frick-Horbury and Guttentag (1998) examines the effect of restricting hand gestures on speech, but precisely on lexical retrieval and free recall using a tip-of-the-tongue (TOT) state. The authors examined the effects of restricting hand gestures on retrieving lexical items. Using cases of TOT-state is one of the most productive ways to exclude cases where lexical retrieval is caused by not knowing a lexical item opposed to cases of difficulties in reproducing lexical items from memory. As predicted, it has been found that those participants who were allowed to gesture retrieved more words than those participants whose hand gestures were restricted. This fact is in line with the hypothesis that gestures are implicated in lexical access. However, it has been reported that the participants retrieved only 2% of TOT words (Frick-Horbury and Guttentag, 1998). Thus, on among 50 words, the average participant



retrieved just one lexical item. Beattie and Shovelton (2000) suppose that it may have been the case that some participants appeared to be in a TOT-state when they were in fact not in order to not appear in a bad light. (They refer to Beattie and Coughlan, 1999, p. 43, for an experimental test, using gestural evidence, of whether or not participants are in fact in a TOT state when they claim to be.) The study reported herein includes only self-resolved cases of successful lexical retrieval in which the speaker did not receive assistance from the listener in order to avoid cases of imitating a tip-of-the-tongue state.

Because of described limitations and incongruent results of the aforementioned studies related to the role of gestures (especially iconic gestures) in lexical retrieval, the question of whether there might be types of gestures that play a facilitating role in production difficulties remains to be resolved and is revisited in this study.

It is often argued that the link between iconic gestures and lexical access might be particularly strong with iconic gestures due to the fact that they resemble the referent in form or manner. This is congruent with the theory suggested by Krauss (1998) which claims that lexical gestures aid speakers' access to mental lexicon through the aforementioned process of cross-modal activation. On the other hand, due to evidence that other kinds of manual movement (pointing, tapping) have been linked to aiding language production, it is still considered a possibility that gestures aid language access not so much through shape resemblance but through movement (Nicoladis, 2007). The study by Gullberg (1999) has shown that adult L2 learners tend to use more deictic gestures (i.e., pointing or other gestures indicating a stable location) in their second or weaker language than their first or stronger language. Moreover, there is research which has shown that movement in general tends to increase when speech becomes dysfluent (Butterworth & Beattie, 1978). This study notes that gestures can positively affect fluency both through movement and their inner properties (particularly iconic gestures through visual representation). In other words, the role of cross-modal activation in gesture and the role of movement in gesture are not mutually exclusive. Furthermore, it is likely that gesture use depends less on how well a speaker can speak the language and more on what the speaker is doing with language at the particular time (Nicoladis, 2007). This is why to analyze the relationship between fluency and iconic gesture we target both speech and gestural components of lexical retrieval pauses.

Research on cognition and gesture has provided evidence that memory load increases use of gestures (Melinger & Kita, 2007). This is another fact that provides ground to claim that gesture aids the speaker in memory-related cognitive load, which is the key aspect of lexical struggle. On the other hand, gesture rate may increase due to increased tension caused by emotional load. This study suggests that these notions are not mutually exclusive. Gestures can facilitate different aspects of lexical retrieval depending on their properties and the stage of lexical retrieval. Furthermore, different aspects of gesture may aid in more than one aspect of lexical struggle simultaneously, especially for lexical gestures.

## 2. Methodology

A naturalistic communicative situation was created in order to extract spontaneous speech and associated language disfluencies. In order to facilitate the naturalistic communicative situation, a task was designed wherein participants watch a video and retell the story to a listener. The data for the corpus was collected from 17 subjects and consists of 29 cases of lexical retrieval struggle in English, Russian, Spanish, and French. The corpus was used for the described case study. Cases of disfluency were identified based on non-juncture pauses and fillers. The targeted cases were analyzed in order to find further manifestations of disfluency caused particularly by lexical difficulties. It was concluded that any pause which interrupts the flow of speech may indicate lexical struggle when accompanied with further manifestations of word retrieval difficulties.

### *Subjects*

17 university students between 21 and 30 years old participated in the study. In order to create a corpus of naturalistic narrations of multilingual speakers, multilinguals with contrasting language proficiencies were recruited. The reason varying proficiencies were selected was to assure generation of speech disfluencies.

All participants are multilinguals with high proficiency in English (1 among 17 participants is a native speaker of English) and low or medium proficiency in a second language. 10 other university students were recruited as listeners in order to facilitate to make the communicative situation more naturalistic. Depending on the availability of suitable listeners, a few participants have chosen to use their native language (instead of English) for the high proficiency condition. These languages include Italian and Spanish. All participants have read and signed a consent form prior to the task. The minimum IELTS score for post-graduate programs at Radboud University is 6,5. The lower proficiency condition involved French, Spanish, Russian, Italian. Self-rating in a 1-10 scale was used to identify how the speakers evaluate their proficiency in both languages. All participant-speakers rated their proficiency level in English as from 7,5 to 10 and their level in the second language as from 4 to 6. As for listeners, the only proficiency requirement for listeners was to understand speech in the target language. All subjects gave written consent to participate in the study.

The task was assigned in a high proficiency and low-medium proficiency condition. First, this has been done in order to guarantee a number of cases of lexical retrieval because lexical disfluencies are still more likely to occur in non-advanced proficiency levels. Secondly, this increases the chance to target iconic gestures used during lexical retrieval because it was supposed that iconic gestures play a larger role in speech of language users who lack proficiency due to their compensatory role for word production challenges. The third (and most important) reason of this choice is attempting to highlight the role of active and passive knowledge in word retrieval difficulties. Previous researchers have distinguished three components of word knowledge: 1) passive knowledge (knowledge of the core meaning of the word), 2) controlled productive knowledge (ability to produce the word when prompted by the task) and 3) free productive knowledge (use of words at one's free will, without any specific prompts for particular words) (Laufer, 1998). Productive knowledge of a word implies the presence of passive knowledge. As to passive knowledge, it is in many cases present without the productive component (or co-exists with difficulties in activating the productive component). Even though it is not unusual to have difficulties with retrieving a word from L1 that is rarely used (and

therefore transferred to passive knowledge), lexical retrieval pauses and passive lexical knowledge are usually discussed within the topic of L2 speech. Lexical retrieval difficulties were expected to occur in the reported data across different proficiency levels in support of the notion that this discussion is applicable to L1. It is argued that words cause retrieval difficulties because of their location within passive knowledge that exists both for first and second languages. This argument implies that a more direct cause of lexical retrieval struggle is difficulties in accessing the word in the speaker's active mental lexicon rather than the speaker's low proficiency level or absent word knowledge. Even though the lower proficiency implies a decreased active knowledge and increased inactive knowledge, the study does not consider proficiency as an independent variable that directly influences how lexical retrieval manifests itself. For this reason, it was concluded that there is no necessity in using additional proficiency measures.

### *Procedure*

All participant-speakers watched the same 7min episode of the Home Tweet Home cartoon and retold it to a participant-listener. In this episode, Sylvester the cat tries a variety of ways to catch the bird Tweety but ends up being chased by a dog. Following Rauscher et al. (1996) and Nicoladis (2007), a cartoon was chosen as the stimulus because people often gesture while retelling a cartoon (McNeill, 1992). It is known that motion events contain both path and manner information that promote gesturing (Akhavan, Goksun & Nasari, 2018). In view of this, an episode that contained a larger amount of motion events was chosen as a stimulus.

The participants were told that we were collecting stimuli for a research on how accurately people memorize animated stories described through speech. No instructions regarding gesture use were provided. Therefore, the participants-speakers were focused on memorizing and describing the content of the story rather than on their linguistic competence or body language. The speakers were allowed to watch the cartoon multiple times before the re-telling task and were asked to reproduce the story as accurately as possible. The story retellings were videotaped.

Most listeners were unfamiliar with the story. The listeners who were asked to assist multiple speakers were familiar with the story but pretended to be unfamiliar with it. They were allowed to ask speakers questions during the retellings. Despite the fact that only cases of self-sustained lexical retrieval were needed for analysis, listeners were not prohibited from assisting the speaker. This choice was made in order to maximally imitate a natural condition of spontaneous speech and to avoid disclosure of the purpose of the study.

Control conditions were avoided in order to guarantee naturally elicited speech. The two language conditions were passed on two different days, separated by 1-3 weeks, with the order of the languages counterbalanced. 17 cases of iconic gestures accompanying non-juncture pauses were elicited, transcribed and investigated.

### *Transcription of speech*

The speech during English sessions was transcribed in normal English orthography. The non-English speech fragments (Spanish, French, Russian) were transcribed both in the original orthography and English orthography. All non-English narratives included in the analysis were translated into English. Both filled and unfilled non-juncture pauses were indicated in the speech transcription.

### *Coding*

In order to investigate manifestations of lexical retrieval struggle, the analysis targets and classifies repeating patterns of multimodal actions produced by speakers during lexical retrieval pauses. As to exploring the facilitating role of iconic gestures in accessing lexical memory, the analysis includes fully transcribed cases of iconic gestures used during word retrieval pauses.

Narrative fragments that include these cases were elicited for analysis. A narrative fragment usually includes one sentence. Exceptions include cases in which the sentence is not complete or does not provide enough information to understand the place of the content of the sentence in the story. When this is the case, an expanded narrative fragment is elicited instead in order to provide necessary context. This is done by adding the preceding or the following sentence. All complete fragments that included successful lexical retrieval pauses were elicited, transcribed and coded by the author. A subset of data in Italian and Spanish was observed by a second coder for reliability. All fragments were translated into English.

All cases of lexical dysfluencies were elicited from the data and analyzed. The first study on non-juncture pauses in spontaneous speech offers a criterion by which a speech gap is considered a pause if it is longer than 250 ms (Goldman-Eisler, 1957). A more recent study by Macias (2006) investigates the connection of silent pauses to fluency and suggests to examine pauses of length greater than or equal to two seconds. Even though the duration of silent pauses has been taken into account in identifying disfluency by previous researchers, it was concluded in this study that variety in speech rate makes the criterium of pause duration less reliable. More research on this topic led to the aforementioned suggestion that lexical disfluencies manifest themselves not solely through silent pauses or non-lexical fillers and include several other multimodal characteristics that are shared among different cases of lexical retrieval difficulties. The study supposes that a silent pause that manifests disfluency can be targeted by its position in speech rather than its length. Furthermore, a pause manifests disfluency if it disrupts the flow of speech in which words are joined together.

To avoid cases of imitating a TOT-state, this study targets solved lexical retrieval pauses where the speaker did not receive assistance from the listener. This excludes the possibility of including cases where lexical retrieval pauses are caused by absent knowledge about the word rather than by difficulties in accessing the word in the speaker's mental lexicon.

It is important to distinguish lexical retrieval pauses from both normal pauses that occur in fluent speech and pauses caused by a lack of knowledge on the topic or issues of discourse organization. A usable criterion is that pauses caused by non-lexical reasons are usually located between sentences, while lexical difficulties usually manifest themselves in non-juncture pauses. Of course, there are cases in which the speaker has difficulties in eliciting the first lexical item in a sentence. However, it is supposed that these cases are rare because most speakers tend to start sentences with words they are more confident in using. If the observed pause includes a non-lexical filler, it is more likely to manifest disfluency rather than a silent pause. However, it must be noted that a pause alone can never manifest lexical disfluency. Co-existing manifestations of lexical retrieval struggle that be assigned the role of indicators of lexical difficulties are to be observed in the analysis of this case study.

The transcription of gestures has been made manually based on the methods and conventions summarized by McNeill (1992). Gestures were categorized based on the classification of priorly distinguished dimensions. Gestures were therefore classified into four groups: iconic gestures, deictic gestures, beat gestures, and emblematic gestures.

1) Iconic gestures are gestures that present form or manner of concrete entities and/or actions. They represent picturable aspects of semantic content described in speech.

2) Metaphoric gestures consist of an abstract visual aspect of semantic content.

3) Deictic gestures are used to locate entities or actions in space. The most common example is pointing using the index finger.

4) Beat gestures are flicks of the hands that usually correspond to the rhythm of speech. They are described as repetitive gestures used for additional emphasis. Beat gestures are meant to be synchronized with the speech rhythm. For this reason, their timing depends on the stream of speech rather than a lexical affiliate. Beat gestures produced during silent pauses are unusual and violate the notion of synchronicity of speech and gesture. For this reason, this study considers them to be a strong signifier of disfluency and these cases are to be included in the data.

The analysis includes all gestures that occur during lexical retrieval pauses. Iconic and metaphoric gestures are transcribed in more detail (with gesture phases) in order to explore the link between the property of the gestures and lexical access. For the purposes of analysis, this study unites iconic and metaphoric gestures into one category of iconic gestures. Firstly, metaphoric gestures are included as iconic because both metaphoric and iconic gestures visually resemble the form or manner of a described concept. Secondly, there has been no evidence that speakers use iconic (concrete) and metaphoric gestures differently (Krauss & Hadar, 1999; Nicoladis, 2007). We must take into account that none of these gesture categories are truly categorical and gestures differ across dimensions of iconicity and metaphoricity, deixis, temporal highlighting, and social interactivity. Therefore, one gesture can be classified into more than one category. In cases where the lexical item represents a manipulable object, an iconic gesture may be classified either as a functional gesture (represents the function of the implied item) or as a volumetric gesture (represents the form of the implied item) (Bub, Masson & Bukach, 2003). In order to receive more insight into the role of gestures in activating visual or functional knowledge during word retrieval, the analysis takes this distinguishment into account.

As noted by Kendon (1980), a gesture is considered to consist of a preparation, stroke, and retraction. Following McNeill (2005), the study also takes into account pre and poststroke hold phases distinguished by Kita (1990). It is agreed that gestures must precede the words whose retrieval we contend they facilitate. To be certain that the cases we elicit are valid, the analysis takes into account solely gesture cases where the stroke occurs before the production of the lexical affiliate in speech. Cases in which the speaker retrieved a synonym of the implied word were included in the analysis as less successful cases of lexical retrieval that still have a positive outcome. Cases where the speaker retrieves a synonym are recognized by 1) extended hesitation (the speaker manifests hesitation both before and after the word is produced), 2) request for approval by the listener on the chosen word (addresses the speaker with questioning the word choice), 3) the speaker admitting to the listener that they have chosen a substitute word.

Lexical retrieval is generally characterized as a process that consists of a series of stages of activation from the presentation of a stimulus (the concept) to the selection of an appropriate lexical item. Most models of language production suppose that lexical retrieval includes two distinct lexical processing levels: 1) meaning-based lexical retrieval process, which includes the choice of a lexical representation; 2) form-based lexical retrieval process, which includes the retrieval of a word form, selection of phonological segments, and syllabification (Garrett, 1975). Many researchers offer a distinction between the morphological level (formulating) and

phonological level (articulating) (Levelt, 1989). In order to focus the semantic phase of lexical retrieval, the analysis observes difficulties that occur in the initial stage of the lexical stage and excludes cases of phonological or morphological difficulties.

#### *Language sessions*

The order of the language conditions was counterbalanced. 8 participants have passed the high proficiency condition before the low-medium proficiency condition, 8 other participants have passed the low-medium proficiency condition first. One participant has not been available for the second language session. Therefore, only data from their first language session (low-medium proficiency) was included in the analysis.

### 3. Analysis

29 instances of self-resolved lexical retrieval struggle were identified in the reported corpus of naturalistic narrations. They were identified based on the Methodology and occurred in the speech of 13 participants regardless of the proficiency level. All the instances are characterized by non-juncture pauses accompanied by multimodal manifestations of lexical retrieval struggle. Non-lexical were expected to be a common sign of lexical difficulties and, as expected, have been found in almost every instance of a lexical pause. The majority of lexical retrieval pauses (13 among 29) include iconic gestures that refer to the searched word, most of which include further signs of lexical difficulties. 13 lexical retrieval pauses were solved without iconic gesture and include further sign of lexical difficulties, including non-lexical gestures that have found to manifest memory-related cognitive and/or emotional load.

A lexical retrieval was considered successful when it was resolved by the speaker without the listener's assistance. For cases that involve iconic gestures during a lexical pause, the searched word was identified based on when the pause and hesitation ends and to which concept the gesture corresponds to. For cases that do not involve iconic gestures, the searched word was identified based on when the speaker completes expressing hesitation. Hesitation can be expressed through non-juncture pauses, rising intonation, and interruption of eye contact with the listener. However, there are less straightforward cases in which the speaker shows hesitation after producing the word and in which a more accurate lexical item could have been chosen for the described concept. Since the pre-phonological stage of lexical retrieval includes the process of choosing a word for the concept and the process of accessing the form of the word in the speaker's lexicon, it is suggested that those cases manifest changes of word planning during the stage of a lexical retrieval process in which the speaker chooses a lexical representation for the implied concept. If the produced alternative word corresponds to the initially implied meaning and does not disrupt the accuracy and intelligibility of the retold narrative, the lexical retrieval struggle is argued to be resolved successfully.

As previously noted, none of the manifestations of lexical retrieval can be used as sign of lexical retrieval struggle separately. They are considered indicators of lexical struggle because they co-occur in non-juncture pauses in various combinations.

The corpus provides examples of these manifestations that are separated into sections and described throughout the chapter.

The most common signs of struggle which were identified include:

- 1) non-lexical fillers, an expected indicator of lexical struggle noted in previous research on language disfluency
- 2) use of iconic gesture during pauses, which was included based on the function of such gestures as a speech filler
- 3) use of iconic gestures that refer to the searched word during lexical pauses
- 4) increase of motoric gestures and other movements as disfluency increases
- 5) code-switching, a manifestation of multilingualism or second-language speech that is argued to indicate lexical retrieval difficulties when combined with a non-juncture pause
- 4) requests for assistance, a manifestation of second-language speech that is argued to be direct indicator of word retrieval struggle when combined with a non-juncture pause
- 5) Finger snapping during non-juncture pauses

- 6) Dental clicks during non-juncture pauses
- 7) Hand-to-face gestures during non-juncture pauses
- 8) Redirection of gaze during non-juncture pauses

Each example represents at least two indicators of lexical struggle simultaneously.

### 3.1 Non-lexical (and lexical) fillers during lexical retrieval pauses

Non-lexical fillers have been known to be a sign of disfluency from the very start of research on non-juncture pauses and are one of the most known signs of lexical disfluency (Goldman-Eisler, 1957). They have been shown to be the most common sign of struggle found in the data. Among 13 lexical retrieval pauses solved without iconic gesture, 12 involved at least one non-lexical filler. Among 19 lexical retrieval pauses solved with iconic gesture, each one included at least one non-lexical filler. The targeted fillers are <uh>, <m>, <hm>, <eh>, and their second-language variations (as the Russian <em>). Furthermore, four lexical fillers were targeted in the data. They include <like> and fillers from the second languages of the speakers (for example, *kak by*, *nu* and *tipa* from Russian). This study considers lexical fillers to have the same function as non-lexical fillers. This is because lexical fillers are words deprived of their lexical function when used to fill a speech pause. Their only difference from traditional non-lexical fillers is that the word(s) that they consist of has a commonly used lexical function. Words defined as lexical fillers possess or lack a lexical function depending on the context and the speaker's choice. A classic example is the lexical filler *sort of*. Depending on the context, it can be either an informal synonym for the phrase *to some extent*, or a pause filler.

1)

*Et après Silvester essaye de approcher Tweety avec <m> / <uh> / un de / <uh> / costume de bebe?*

*And after Silvester tried to approach Twittie with <m> / <uh> / a the / <uh> / costume of a baby?*

The retrieved lexical item was *costume* (*costume*). The self-rated proficiency of the speaker is 5 out of 10, which means she was limited in her vocabulary choice and syntactic planning. It is possible that that is why instead of a more accurate variant as *approached Tweety dressed as a baby*, she chooses *approached Tweety with a costume of a baby*. However, both ways manage to describe the event of the narrative. The listener knows that the story consists of attempts of Sylvester to approach and catch Tweety. Therefore, the ungrammatical choice of the speaker does not cause ambiguity of meaning. The listener has enough knowledge to understand that the speaker must have meant that Sylvester approached Tweety dressed as a baby rather than carrying a 'costume' of a baby. It is arguable whether the word *costume* is an accurate way to describe a type of everyday clothes. Furthermore, based on the rising intonation of the phrase, the speaker must have experienced hesitation about the chosen word. However, hesitation and a limited group of words for a completely accurate word choice are natural for this proficiency condition. (The self-rated proficiency of this participant is 6 from 10). Moreover, any lexical retrieval process is a process of choice, during which different options which share overlapping



components of meaning can be considered and cancelled. The components of the chosen word's meaning do not impact the accuracy of the narrative and do not violate intelligibility. Therefore, the lexical retrieval struggle has been solved successfully.

In this pause, the speaker uses two non-lexical fillers, one of which (*uh*) has been repeated a second time: <*uh*> and <*m*>. The first two (<*m*> and <*um*>) are divided between each other with a silent pause. Between the second and the third filler, the speaker attempts to start articulating the implied noun by producing the corresponding article, first the indefinite article (*un*), afterwards the definite article (*de*).

Another example that involves a non-lexical filler was provided by a participant who is a heritage speaker of Russian. Heritage speakers can be defined as individuals raised in homes or communities where a language other than the target language is spoken and who are to some degree bilingual in their target ('outside') language and heritage language (Peyton, Ranard, & McGinnis). They are characterized by often sounding native-like, by a common lack of exposure to formal grammar and morphological paradigms (Valdés, 2000). This speaker's self-rated proficiency in Russian is 5 out of 10.

2)

*Potom on [sdelat' takoj bol'shoj <nu> <tipa> / maschina/ ] he did it himself.*  
 iconic

*Then he [do a big <uh> <like> / a machine /] he did it himself.*  
 iconic

She uses two lexical fillers in this narrative. Interestingly, both of them are in Russian instead of the language of higher proficiency. The fillers are <*nu*> and <*tipa*>. The lexical filler *nu* can be translated as the English lexical filler *you know*. It has three grammatical functions, one of which is lexical. It can function as an exclamation, a particle, or a filler. Depending on the intonation, the exclamation expresses a range of meanings that include surprise (both positive and negative), agreement, and impatience. However, the main lexical function of the exclamation is expressing persuasive anticipation which is close to the meaning of *come on*. This short word with a broad range of lexical functions is a common filler in Russian.

The lexical item retrieved in this example is *maschina* (eng. *machine*). The lexical retrieval pause is accompanied by an iconic gesture that does not correspond to the retrieved word (*machine*), but rather to the preceding lexical item *bol'shoi*. *Bol'shoi* is an adjective that means *big* and characterizes the word *machine* that it precedes. Since the gesture is co-expressive with the argument rather than the retrieved noun, this case was not included in the range of cases where iconic gestures participate in lexical retrieval.

A further example of the use of multiple non-lexical fillers is demonstrated in the speech of another participant in the low-medium proficiency condition.

The following example involves non-lexical fillers used by another speaker in the low-medium proficiency condition.

3)

*Nu eto-eto kot ne hochet etogo konechno / i on <uh> vzjal / <um> <uh> pis[toilet]*

beat

<uh> <uh> [va]-[vo]-vodnyj pistolet?

beat beat

So-so the cat doesn't want that of course / and he <uh> grabbed / <um> <uh> a gun <uh>

beat beat

<uh> ..-...-water gun?

beat

In this case, the speaker produces several non-lexical fillers. The first non-lexical filler (<uh>) is used during the lexical retrieval of the lexical item *vzjal* (eng. *grabbed*). This word was not included into cases of lexical retrieval difficulties because the pause preceding was too short to disrupt the fluent stream of speech.

Lexical retrieval difficulties are targeted in association with the words *pistolet* (gun) and *vodnyj* (water). Two non-lexical fillers (*um* and *uh*) are produced in a row during the lexical retrieval of the first word *pistolet*. After producing the word, the speaker twice uses the non-lexical filler (<uh>) before retrieving the second word *vodnyj*. Both in English and Russian the adjective normally precedes the noun. It is supposed that the noun was produced first because the speaker recalled it before the adjective. This example also demonstrates how beat gestures can accompany fillers or silent pause.

The majority of cases of lexical retrieval difficulties in the data is accompanied with non-lexical fillers that co-occur with other signs of lexical struggle. Hence, more examples of non-lexical fillers are to be provided in the following chapters.

### 3.2 Gestural behavior during lexical retrieval struggle

Previous research has found that production difficulties result in an increase of movement. To provide insight into the question of the link between lexical struggle and use of particular types of gesture, the analysis has included examples of repeated gestural behavior patterns that accompanied lexical retrieval pauses. As noted, the majority of targeted patterns include the use of iconic gesture or beat gestures during lexical retrieval pauses and increase of beat gesture as disfluency increases. Further manifestations include unexpected patterns as the use of hand-to-face gestures and finger tapping.

19 lexical retrieval pauses from 29 produced by 8 participants were accompanied with iconic gestures that represented the retrieved lexical item. The most prominent cases are presented below:

4)

*I ona zvonit/ <uh> v <uh> / <dental click> pet shop <uh> v magazin <uh> <m>*

- *zhivotnyh*

- *m?*

- *zhivotnyh*

- *zhivotnyh* da i govorit chto <uh> ona hochet <uh> esh'e odnovo ko'[ta potomu]

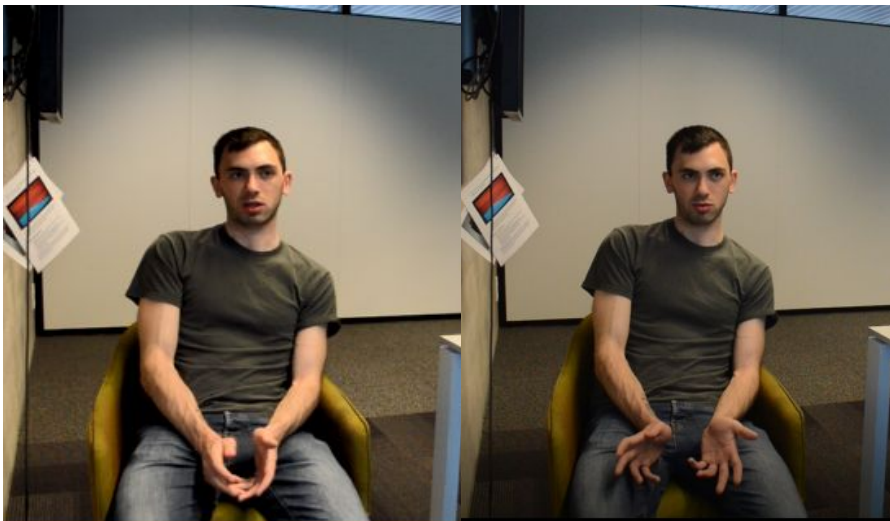
<sup>beat</sup>  
 chto <uh> [u nego net] [bol']she ko[tov] [chtoby] [/] <uh> chtoby to [have fun]  
<sup>beat</sup> <sup>beat</sup> <sup>beat</sup> <sup>beat</sup> <sup>beat</sup> <sup>beat</sup>  
 chtoby <uh> razvlekat'sja.

And she calls <uh> to <uh> / <dental> pet shop (eng) <uh> store <uh> <m>  
 - pet store?  
 - pet store yes and says that <uh> she wants <uh> one more [cat because] <uh> [he  
<sup>beat</sup> <sup>beat</sup>

doesn't have] [any o]ther [cats] [to] [/] <uh> to [have fun with (eng)] <uh> to  
<sup>beat</sup> <sup>beat</sup> <sup>beat</sup> <sup>beat</sup> <sup>beat</sup> <sup>beat</sup>  
have fun.

This example was provided by a participant in the low-medium proficiency condition. The first fragment of this a narrative (*And she calls <uh> to <uh> / <dental> pet shop (eng) <uh> store <uh> <m>*) demonstrates the use of dental click and code-switching which are argued to be further manifestations of lexical retrieval difficulties and will be discussed in the further sections.

As to gestures, the second part of the narrative fragment shows a prominent increase of beat gesture preceding the lexical struggle. It includes a range of 8 beat gestures most of which are similar to each other. The retrieved lexical item is *razvlekat'sja* (*to have fun*). The first beat gesture in this fragment involves a movement where the speaker unclenches his hands, moves them slightly apart, and holds both palms directed towards the listener. After a short stroke hold, he folds his hands back towards each other.



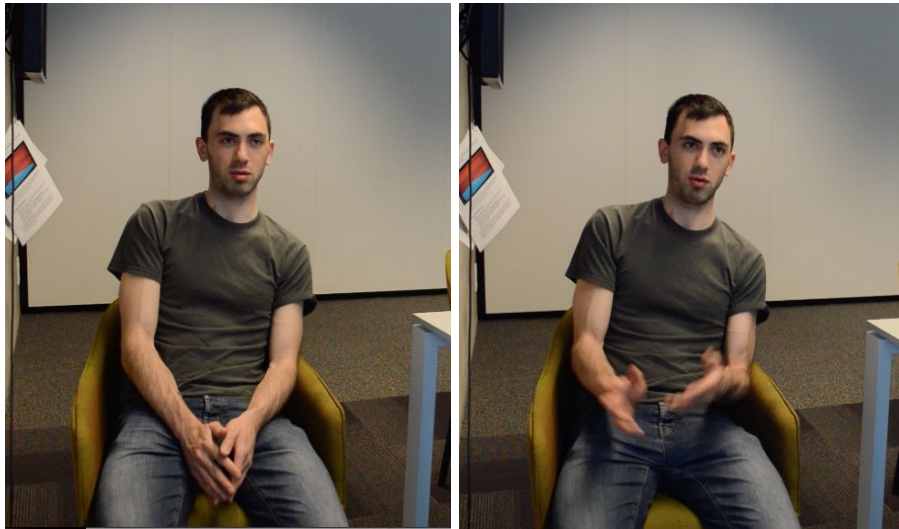
**Figure 1** Stroke [*kota*, cat]



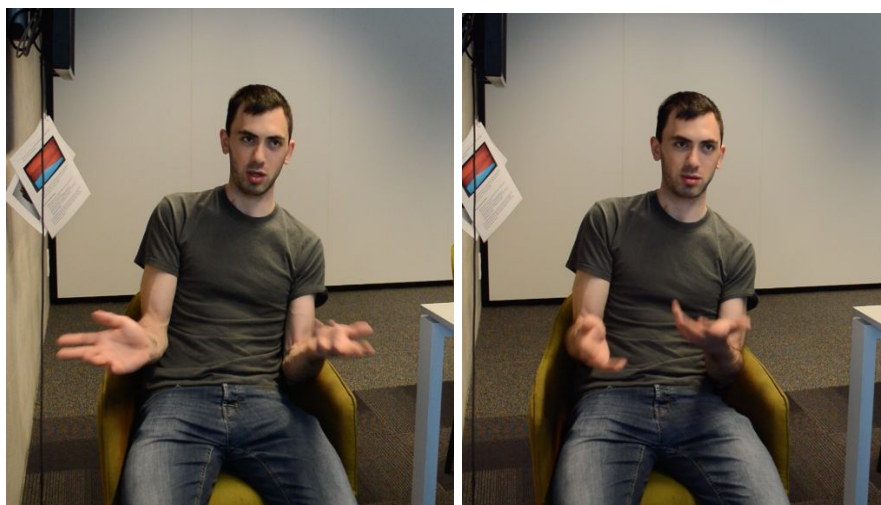
**Figure 2** Stroke hold and retraction [*potomu* chto, because]

The next 5 beat gestures could be seen as either a range of gestures or as one beat gesture with a dynamic stroke hold phase. It is analyzed as a beat gesture that consists of 5 beat strokes.

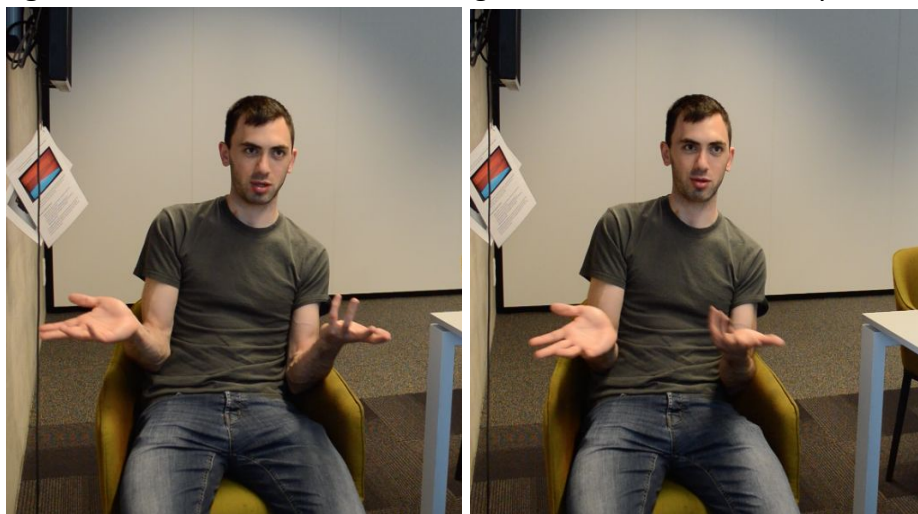
The increased gesturing has started exactly with the start of the clause that involves the lexical affiliate (*he does not have a cat to [pause] [searched word]*). The speaker holds his palms in the demonstrated position and repeatedly moves his hands synchronically to the speech rhythm.



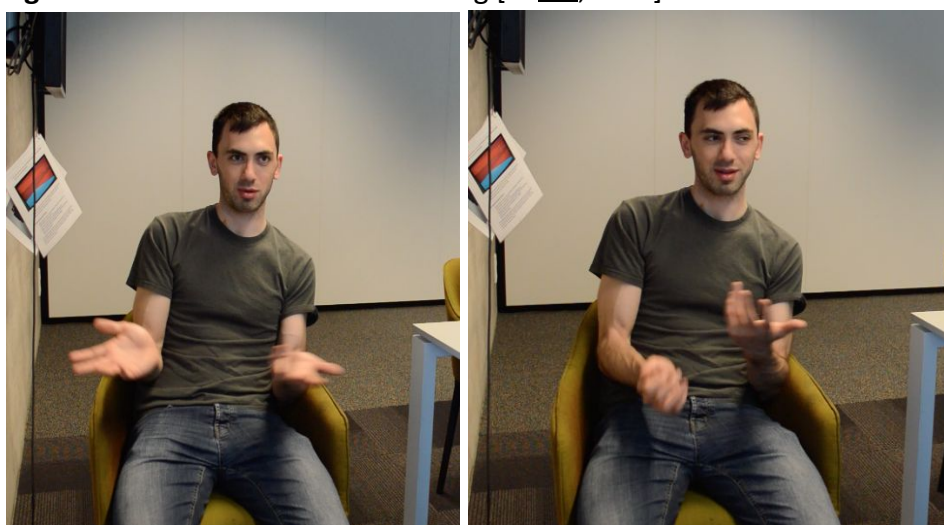
**Figure 3** Beat movement during [*u nego*, he does]



**Figure 4** Two beat movements during [*net bol'she*, not have any]



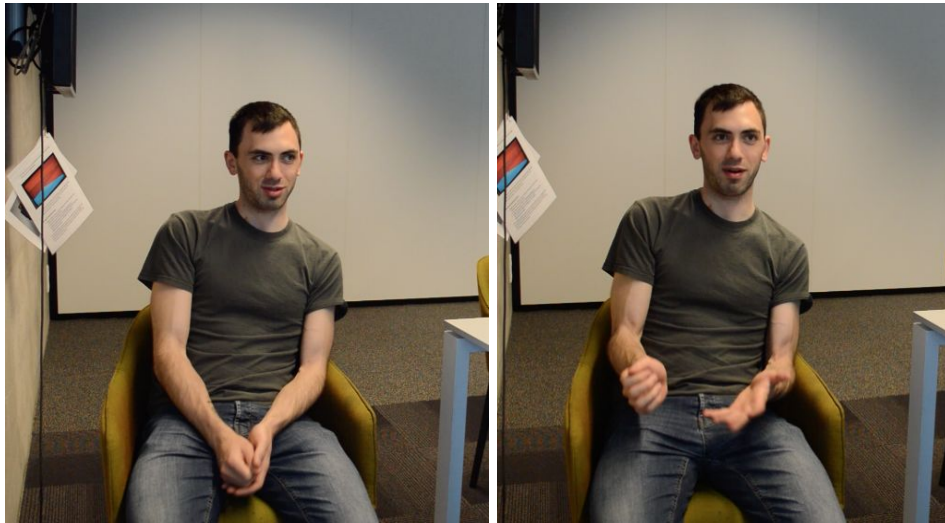
**Figure 5** Two beat movements during [*kotov*, cats ]



**Figure 6** Two beat strokes [*chtoby* <uh>, to <uh>]

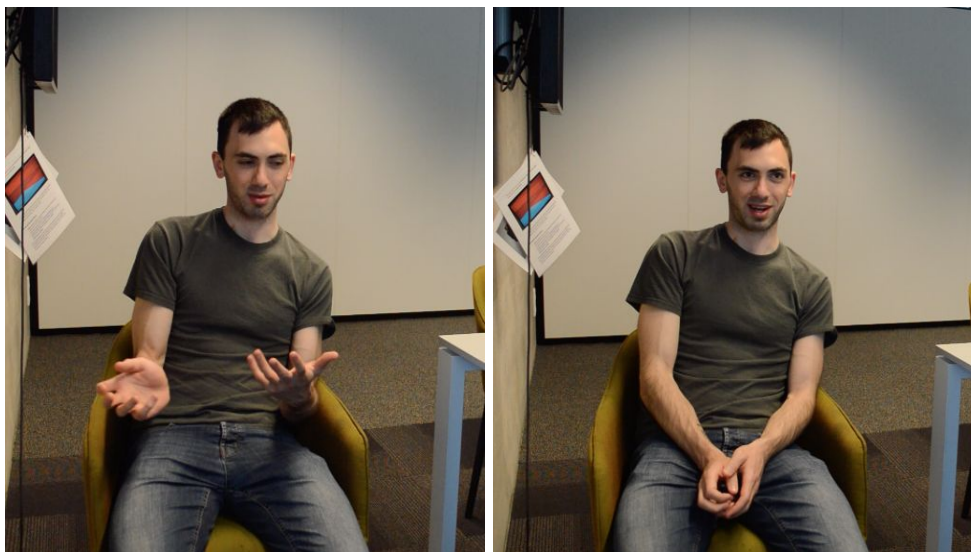


A retraction occurs during the non-lexical filler, after which the speaker uses a beat gesture when producing the word in English (code-switching):



**Figure 7** Beat stroke and start of stroke hold [*<uh> to have fun*]

The stroke hold continues as the speaker produces another non-lexical filler when attempting to recall the word in Russian. The retraction occurs right before the speaker produces the correct word.



**Figure 8** Continuation of stroke hold and retraction

This case of lexical retrieval struggle demonstrated multiple non-lexical fillers and an increase of beat gestures as lexical struggle arises. This speaker did not produce any gestures in the narrative until the imminence of lexical difficulties. As the speech became less fluent and more interrupted with pauses, the use of beat gestures has increased.

The next case shows a sequence of beat gestures produced during lexical retrieval difficulties in the high proficiency condition. They were produced within an iconic gesture that precedes its lexical affiliate:

5)

*And the next scene was maybe / yeah it was the next scene / <um> / [[Tweetie goes to the /*  
*prep* *stroke*

*how do you say it <like>] / <cough>[ upper level [like]][in the building / ] [<like> really high*  
*hold* *retr* *prep* *stroke* *stroke* *stroke* *hold* *retr* *stroke* *stroke*  
*floor] and then Sylvester tries to get the Tweetie there so he how do you say eats bubble gum*  
*retr*  
*so he [kind of fly] in Tweet's level*  
*iconic*

This lexical pause for the word *floor* includes non-lexical fillers, request for assistance (*how do you say it*), and an iconic gesture with multiple beat movements. The dynamic gesture represents escalation. It was used during the whole lexical retrieval pause and terminated exactly when the searched word was produced.

The first sequence of beat gestures accompanies the phrase *Tweety goes to the how do you say it like* and is interrupted with the a cough.



**Figure 9** Preparation and stroke [*Tweetie goes to the*]



**Figure 10** Continuation of stroke, upwards beat movement [*how do you say it*]



**Figure 11** Retraction [*<like> <cough>*]

The gesture resumes as the speech and lexical retrieval struggle continues:





**Figure 12** Stroke and beat movement within stroke hold [*upper level*] ][*in the building* / ]

*Upper level in the building* may have been a first attempt to express the meaning *high floor* because these phrases are synonymous and precede each other, especially since the filler in between the phrases (*like*) in this position can have a lexical meaning similar to *as*. The fact that they are synonymous also shows that the lexical retrieval difficulties must have been associated with the word *floor*. Furthermore, they are not likely to be associated with either of words that preceded *floor* (*really* or *high*) because these words are too frequent to cause difficulties in a high-proficiency condition.



**Figure 13** Stroke 2 and beat movement [<*like*> *really high*]

The speaker retracts the gesture as soon as they retrieve and produce the searched word *floor*:



**Figure 14** Retraction [*floor*]

This case has shown not only a request for assistance, non-lexical fillers, and an iconic gesture during the lexical pause, but also increase of beat movements as the disfluency increased. The beat movements within the iconic gesture completed at the same moment the word was produced and the iconic gesture was terminated.

The next examples focus on iconic gestures during lexical retrieval pauses.

6)

*So. It was a story of Sylvester cat / [ and a / chick ]? / I will call [it chick] i don't [know] the  
prep hold stroke beat beat*

*name in English but / basically a [ story of the cat is trying to <uh> / chase the chick in  
beat gesture(s)*

*different ways] and was trying to catch the chick so it [started ] so that the cat was behind a  
beat*

*newspaper hiding and-and pretending not the be there and the chick [ was taking a bath in  
prep stroke*

*a <like> / water / ] [fountain] or so / and um / the [went to the chick and the chick  
stroke emblematic beat*

*didn't even notice at first] but then he noticed and he [started to run].  
beat*

This narrative fragment has two lexical retrieval pauses associated with the words *chick* and *fountain*. Both of them are represented with metaphoric gestures. The pause for the word *chick* involved a silent interruption of the speech flow and an iconic gesture that shows the size of the bird:



**Figure 15** Preparation and stroke [*and a <pause>*]



**Figure 16** Continuation of stroke and retraction [*chick*]

The following word retrieval pause is associated with the word *fountain*. It involves a dynamic iconic gesture that demonstrates the trajectory of water in a fountain. It is repeated twice during the phrase [*was taking a bath in a <like> / water*]:







**Figure 17** Stroke



**Figure 18** Retraction

There are reasons to suppose that both of the retrieved words are not the exact lexical items the speaker was looking for initially. This can be concluded from the rising intonation in articulating of the word *chick* ('*chick?*'). Furthermore, it becomes obvious from the forthcoming comment *I will call it chick i don't know the name in English*, where the speaker indirectly states that they do not know the more suitable word. As for the second lexical retrieval pause, we can see this from the emblematic gesture (air quotes) during the word *fountain*. Moreover, the word *fountain* is followed by the phrase *or so*.



**Figure 19** air quote gesture

Despite the noted observation, these cases are still considered to be successful lexical retrieval pauses. To some extent, lexical retrieval always implies a process of choice in which different options can be considered and canceled. Furthermore, the retrieved words crudely correspond to the implied meaning, directly correspond to the iconic gestures, and do not disrupt the intelligibility of the narrative.

The next case shows an iconic gesture with non-lexical fillers.

7)

*A / potom / [ptichka / voz'met / <um> // lopatka / bol'shaja /] [ i vot b'et ] / etogo kot*

*prep*

*stroke*

*stroke hold*

*stroke hold beat movement*

*tozhe.*

*And / then /[ the bird / takes / <um> // a shovel / a big one /] [and beats] / that cat too.*

*prep*

*stroke*

*stroke hold with beat movement*

*stroke hold beat movement*

The iconic gesture representing the word *shovel* has started before the explicit lexical pause and remained in stroke hold during the silent pause.



**Figure 20** Preparation [*Ptichka*, the bird]

The gesture preparation describes the action of grabbing and precedes the word *vzjal* (*to take, to grab*). The speaker's palms clench into the position that represents holding a long object. The stroke stage shows the speaker holding and slightly shaking the implied object. This movement gives information on the size of the object as well as motoric information on how the object is usually held.



**Figure 21** Stroke [*voz'met* <um>, takes <um>]



**Figure 22** Stroke hold with beat movement [*lopatka / bol'shaja, a big / shovel*]

This is one of the unusual cases where the iconic gesture does not end as the word is retrieved. Instead, the speaker keeps the gesture adds a beat movement it during the phrase *i vot<sup>1</sup> b'et* (and beats). After the word shovel was produced, the meaning of the gesture therefore expanded from *shovel* to *beat with a shovel*. The gesture expressed both the form of the object and the function that the story's character has applied to it. It can be argued that the particle (*vot*) that precedes beats is a filler and that the non-juncture pause before the phrase and beats (*i vot b'et*) is a word retrieval pause. If that is the case, then this gesture is associated with word retrieval of both the words *shovel* and *to beat*.

It has been found that among 29 cases of lexical difficulties, 3 words have twice caused lexical retrieval difficulties. Those are the words *shovel*, *block of metal*, and *bird bath*. Since the vocabulary of low-medium proficiency speakers usually includes the most frequent and useful words in everyday speech, the speakers may lack active vocabulary knowledge on these lexical items because of the low frequency of their low frequency in everyday speech.

The next narrative fragment was provided by a different participant from the high proficiency group and is a second case of a word retrieval pause associated with *shovel*. This case was included because the iconic gesture has occurred during a silent non-juncture pause that preceded the searched word. Since iconic gestures (or at least their initial or final phase) are synchronized with their lexical affiliate in fluent speech, this iconic gesture that ends right before before the word is argued to be a manifestation of disfluency.

8)

*The / cat wants to hit / or hits the dog with a [ / ] shovel <uh> when he [wants] to hit the cat*  
stroke beat  
*-the bird but he [misses so] he hits the dog / the dog gets angry / and [chases] the cat/*  
beat beat

<sup>1</sup> The word *vot* is a non-translatable filler that as a separate word means *this is* or *here you are*. It was not included as a filler associated with word retrieval difficulties because it did not disrupt the natural flow of speech.





**Figure 23** Stroke [*silent pause*]



**Figure 24** Retraction aligns with the start of producing *shovel*

As the previous participant, this speaker expressed the word shovel through an iconic gesture that imitates holding a long thin object.

The next case shows lexical retrieval difficulties with the Spanish preposition *detrás* (*behind*):

9)

*El gato / disimule con el [ / <uh> / <laugh> detras / no / yeah detras de le ho- / jo- / journal*

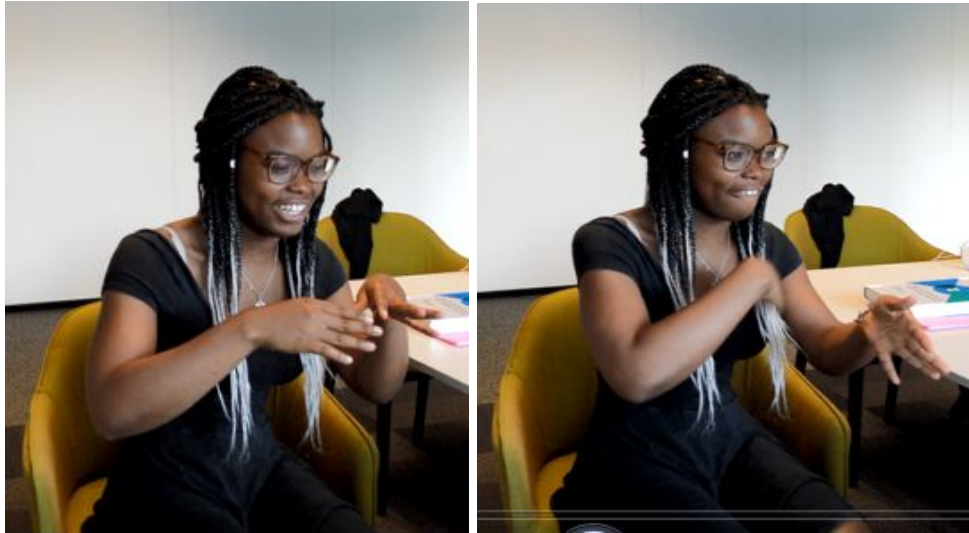
stroke                  retr                  stroke



*journal?*

*The cat / hides with the [ / <uh> / <laugh> behind / no / yeah behind the [ho-] / [jo-] / newspaper?  
stroke retr stroke*

The speaker expresses the meaning of the proposition *behind* by moving their right hand behind their left hand.



**Figure 25** Preparation and stroke (/ <uh> /)



**Figure 26** Retraction (<laugh>)

The continuation of the hesitation expressed through a *no* preceding *yeah* may have been associated with the speaker keeping doubts about whether the word was accurate or whether the accurate phonological form was produced. The flow of speech re-establishes with the following *yeah*.

An iconic gesture resembles the implied concept with shape, size, or manner. Some iconic

gestures have shown to present the size and form for concrete objects, while others expressed the manner of an action or components of the meaning for actions and abstract concepts. For example, one of the participants has shown the word *to attract* with a pulling movement of their hand towards themselves. The word *bird bath* has shown in more detail by the speaker tracing the object's form with their hands. In two examples from the previous cases, two participants have shown shovel through imitating the action of holding a long thin object.

It is a common notion that iconic gestures provide listeners information that is missing from the speech or additional information about the speech content perceived by the listener. This study suggests that the more specific to the concept the features of the iconic gesture refers to are, the more likely it is to function that way. They are opposed to iconic gestures that vaguely represent the implied concept and cannot provide information to the listener on what concept is implied. Many of the targeted iconic gestures represent few aspects of the entity behind the lexical affiliate. For instance, speakers have shown to imitate holding the implied object in order to represent its size and give a general idea about the object's form. An example is where a speaker showed the word *chick* through clenching their palm into a size of a small object. This gesture can refer to several nouns from different semantic groups and cannot lead to the listener guessing the word without relying on the context. If this gesture was used for the listener, it would have included, or instance, such movements as tracing the object's form through hands or imitating actions that involve the object (for example, flapping wings). This type of iconic gestures are argued to highlight that iconic gestures used during lexical pauses have a self-oriented aspect. If they would have been oriented towards the listener, they'd provide more sufficient information in the word.

More cases involving iconic gestures and increase of movement will be shown in further chapters since they overlap with cases that represent further manifestations of lexical difficulties.

### **3.3. Finger snapping**

Finger snapping (or clicking) is the act of creating a clicking sounds with one's fingers. It is usually done by pressing the thumb and another (index, middle, or ring) finger to each other and then moving the other finger forcefully downward so it hits the palm of the same hand at high speed and creates a 'click'. There are cases in the Longman Written American Corpus that show that finger snapping often has an emblematic meaning of intending to catch attention.

*He gave a royal snort, either of disappointment or relief, and snapped his fingers for a another round of wine. (Mayor, 2009)*

When finger snapping occurs in non-juncture pauses, it often contains solely a click between the thumb and another (usually index) finger and does not involve the palm. Sometimes, the gesture is similar to rubbing fingers, a movement which has an emblematic meaning 'money'. Many people in everyday life repetitively snap their fingers when trying to recall something from their memory (for instance, a person's name). Examples of such usage are provided by this study's data. Everyday observations (which are confirmed only by non-academic sources about the English-speaking world) shows that the one-time finger click has found to signify that the speaker has remembered something. To my knowledge, there is no experimental evidence in support of this observation. Even though this gesture is culturally learned, its usage seems to be part of implicit knowledge. Unlike emblematic gestures, it is less a communicative gesture and more a gesture that informs on a cognitive process in a non-direct way. Furthermore, the information it

The following example shows a multitude of signs of lexical struggle: non-lexical fillers, two hand-face gestures (will be observed in detail in the corresponding chapter), a finger click, and a statement of struggle (*how to say*). The pause is associated with the word *dog*. At first sight it may not be clear whether the lexical struggle is associated with the word *dog* or both the words *cat* (*gato*) and *dog* (*pero*). However, it is clear from the fact that the word *cat* has been produced by this speaker in previous narrative segments.

*Tiene mucho amigos como un* <um>[ / ] *como decir* <uh> [ / ] *[gato et]*  
*un* [pero].  
*deictic* *hand-to-face gesture* *beat* *finger-snapping* *hand-to-face*

In regard to the phrase *how to say*, the dropping intonation and briefness of this utterance show that it is used in this case more as a filler rather than an actual question or statement of lexical struggle. Furthermore, the speaker does not offer any information on the definition to the searched word. In other words, they do not offer information on what word they are trying to recall, which makes the comment non-communicative.

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**Figure 36** shrug

In this case, the shrug gesture is likely to express the temporary incapacity to recall the word, whereas the repetitive finger clicks signal the process of recalling an item from memory.



**Figure 37** finger clicks with left hand

The finger clicks are followed by the first attempt to retrieve the word (at first they say *see* instead of *saw*), a quick beat gesture, and a self-correction based on the listener's assistance (the listener offers the correct form *see*). This case is an example of repetitive finger clicks functioning remotely as a filler. The repetition of these clicks also manifest an overall increase of movement during the lexical pause.

The next described case includes the rubbing-fingers movement used during a lexical retrieval pause. It is addressed in this section because the rubbing-fingers movement is very similar to a finger-click gesture that does not involve the palm. They differ from each other only

based on the speed and intensity with which a speaker's index finger and thumb apply pressure to each other.

This next case involves a request of assistance, non-lexical fillers, and a rubbing-fingers gesture.

12)

- Y pues <uh> el pajarito <uh> / no me recuerdo el como pero / <uh> [fue]  
beat

<uh> en un <uh> [/un] <uh> / un / piso muy alto?  
rubbing fingers

- Mhm!

- And after <uh> the bird <uh> / i don't remember how it is but / <uh> [was]  
beat

<uh> in a <uh> [/a] <uh> / a / very high floor?  
rubbing fingers

- Mhm!

Five non-lexical fillers were produced in this narrative. The speaker produced two identical non-lexical fillers (<uh>) that were set apart by the comment on difficulties recalling the word. The phrase is *no me recuerdo el como pero* and can be translated as *i don't remember how you say it but*. Formally, the lexical retrieval pause lies between *pero* and the lexical affiliate *piso*. However, the early comment on word retrieval struggle (*i don't remember how it is but*) shows where the speaker started planning to produce the word.

Interestingly, the lexical pause has a rubbing-fingers gesture. This study argues that rubbing fingers, along with movements finger snapping may be associated with memory load in corresponding contexts.



**Figure 31** Rubbing-fingers gesture [*<pause> (un) <uh>*]

Apart from manifestations of lexical retrieval struggle, this example has manifestations of doubts about a word choice. Firstly, the speaker produces the retrieved word with a rising intonation, as in a question (*piso muy alto?* / *a very high floor?*). Secondly, the preposition used for the word *floor* is *in* and does not match with the noun *floor*. Since in the original narrative the character entered a high building, the speaker was likely to mean to say *in a high building* instead of *in a high floor*.

Thirdly, the speaker unfolds his palms and slightly lifts his shoulders after saying the word. This is a second example of the shrug gesture that is known to ensemble different components: lifting the shoulders, rotating the forearms outwards with extended fingers to a “palm up” position, pulling the lips downwards with mouth firmly closed (the “mouth shrug”). It can be combined with raising the eyebrows and tilting the head to one side (Debras, 2017). These components are noted to unite in various combinations. All the main elements of the shrug were observed in the participant’s following gesture, as well as an additional component of raising eyebrows.



**Figure 32** The shrug gesture which follows the phrase [*piso muy alto*]

The shrug is a widely shared gesture that is shown to express incapacity, powerlessness, indetermination, indifference, or obviousness (Debras, 2017). It is supposed that the shrug, in this case, expresses incapacity to offer a more accurate lexical item.

### 3.4. Hand-to-face gestures

Many books on body language distinguish and characterize hand-over-face gestures as signs of the state of choosing, thinking, evaluating, or being bored.

Obviously, the meanings behind all of these gestures cannot be interpreted separately and are strongly context-dependent. However, many of them are known to be culturally attached to the indicated meanings. An interesting observation proved by previous experimental research is that spontaneous facial self-touch increases with emotional and cognitive load (Grunwald et. al, 2014). What is meant by emotional load is the process of regulating emotions. Since lexical retrieval struggle is a state of cognitive load and can create emotional load by affecting language performance, spontaneous hand-to-face gestures can function as indicators of the cognitive and/or emotional load behind lexical struggle.

Data shows examples of hand-to-face gesture accompanying and signifying the circumstances of this load.

13)

*I on delajet kakie-to* [*<uh>* / *zvuki <uh>*] *chtoby* [*<um>*/ *<dental click>*] [*to attract*]  
*beat* *hand-to-face* *hand-to-face* *iconic*  
*<uh>/] privlekat' pticu.*

*And he does some* [*<uh>* / *sounds <uh>*] *to* [*<um>*/*<dental click>*] [*to attract (eng.)*]



<uh>/] to attract the bird.

*hand-to-face*

*iconic*

The hand-to-face gesture of this participant is present throughout the whole lexical retrieval pause. It overlaps with two other word retrieval struggle indicators, non-lexical fillers and a dental click. The gesture is interrupted only by the iconic gesture associated with the word *to attract*. Since these gestures are not separated by retraction phases, the iconic gesture was transcribed as a gesture within the hand-to-face gesture.



**Figure 38** hand-to-face gesture [<um>/ <dental click>]

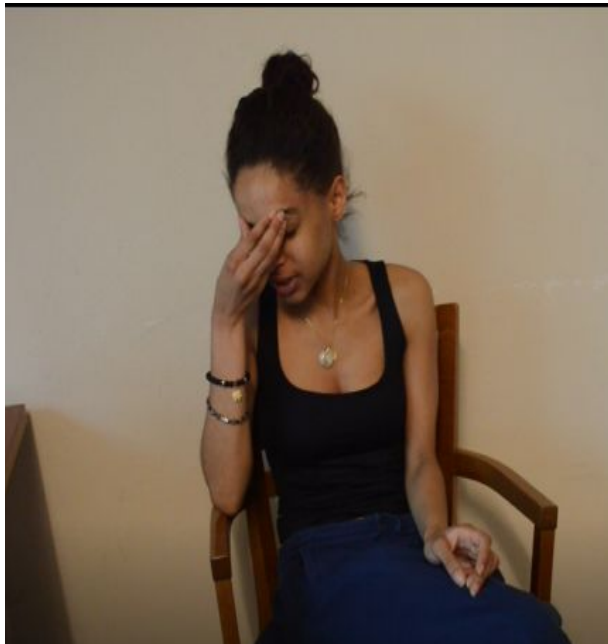


**Figure 38** hand-to-face gesture [*to attract*]





**Figure 40** Preparation of hand-to-face gesture [*como decir <uh>, how do you say <uh>*]



**Figure 41** Hand-to-face gesture [*during silent pause*]

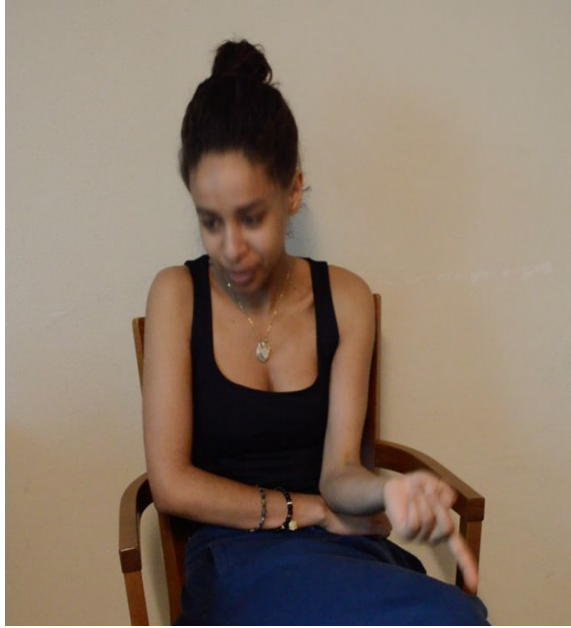
After the following beat gesture and finger snapping gesture, the speaker produces a second hand-to-face movement with their other hand.



**Figure 42** Stroke in hand-to-face gesture [*cat and?*]

This gesture overlaps with the phrase *cat and* (*gato et*) which the speaker articulates with noticeably lower volume. Interestingly, this phrase may have played a facilitating role in the speaker's retrieval of the word *pero* (*dog*). The pronunciation of *et* shows that it is not a non-lexical filler like <eh>, but is rather the conjunction *and* (*et* in French) that transferred from the speaker's first language (which is French). The phrase *gato et?* therefore means *cat and?* and may have helped in recalling the word *dog*. Recalling the noun *cat* may have played a facilitating role for two reasons. Firstly, the cat and dog are interacting in the narrative the speaker is re-telling, which means they are attached to each other in the speaker's memories about the story. Secondly, the words *cat* and *dog* belong to the same semantic group of pet animals and are often learned together in second language vocabulary acquisition. More evidence must be provided to support this claim, but this observation suggests a (partly) intuitive notion that retrieving a known word closely associated to the searched word may help by facilitating access to the accurate area of mental lexicon.

Another curious observation is the deictic gesture that is used as soon as the searched word is recalled and produced.



**Figure 43** Deictic gesture [un pero, a dog]

More evidence is necessary to support this following claim, but everyday observations show that a spontaneous deictic gesture (especially directed upwards) in some cases may signal that a searched item from memory has been recalled, or signify a sudden problem-solving idea. The next case shows a speaker that produces and keeps a deictic gesture throughout a lexical retrieval pause but makes a pointing movement only as the searched lexical item is produced. This deictic gesture overlaps with other manifestations of lexical struggle: two non-lexical fillers and the hand-to-face movement.

15)

*Et [Tweety / [el-elle va] / <mm>] [elle ve <uh>] [chercher [l'aide] / l'aide? / de l'aide / pour la femme].*  
                   deictic                   beat                                   hand-to-face gesture                   deictic                   beat

*And [Tweety / [she goes] / <mm>] [she went <uh>] [to search [help] / help? / help for the woman].*  
                   deictic                   beat                                   hand-to-face                   deictic                   . beat

The hand-to-face gesture overlaps with a self-correction of the verb form in preceding phrase *elle va* (*she goes*) and a non-lexical filler.



**Figure 44** Hand-to-face gesture derives from the deictic gesture [*<mm> [elle ve <uh>*]



**Figure 45** deictic-beat gesture and redirection of gaze [*to search [help] / help? / help for the woman*]

Based on the examples on gestural behaviour during word retrieval struggle it is easy to notice that many speakers tend to redirect their gaze away from the listener when experiencing a lexical retrieval pause. This will be addressed in detail in further sections.

### **3. 5. Code-switching during lexical retrieval pauses**

As noted, previous research characterizes code-switching as a common trait of second language speech or multilingualism. For multilingual speakers, code-switching can be caused by language transfer or a

Since all the participants of this study speak English, the speakers switched to English to formulate lexical representations that they had difficulties accessing in the initial language. This usually causes the listener to retrieve the word for the speaker. Cases of code-switching where a listener assisted the speaker by offering the word excluded from the analysis because they do not demonstrate self-resolved lexical retrieval difficulties.

Two cases of code-switching during lexical retrieval have been shown in one of the aforementioned narrative fragments. It is duplicated below for convenience.

-pet store yes and says that <uh> she wants <uh> one more cat because <uh> he doesn't have anymore cats to / <uh> **to have fun** (eng.) to <uh> **have fun.**

The second retrieved word in this fragment is *razvlekat'sja* (*to have fun*). It follows a shorter lexical retrieval pause that includes aforementioned code-switching (*to have fun*) and two

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uses of the non-lexical filler <uh>.

The following example shows two word retrieval struggle manifestations, non-lexical fillers and code-switching.

16)

*Nu znachit ptichka op'jat' <um> <uh> survived perezhil.*  
beat

*So the bird again <um> <uh> survived (eng.) survived (rus.)*  
beat

This beat gesture overlaps with the second non-lexical filler and ends with producing the word in the language of higher proficiency. In this case, the speaker retrieved the Russian version of the word immediately after producing it in English.

The next example provides several manifestations of word retrieval difficulties, including the use of an iconic-deictic gesture and code-switching.

17)

*- De esta manera la mujer toca el gato en sus [ / <uh> / legs en sus <laugh> / i have this!*  
beat iconic stroke stroke stroke retr stroke  
*/ oh this is so bad / en sus / <uh> gambas? / no gambas es la [ / ] <laugh>*  
hold retr iconic

*- <laugh> piernas.*

*- Yeah!*

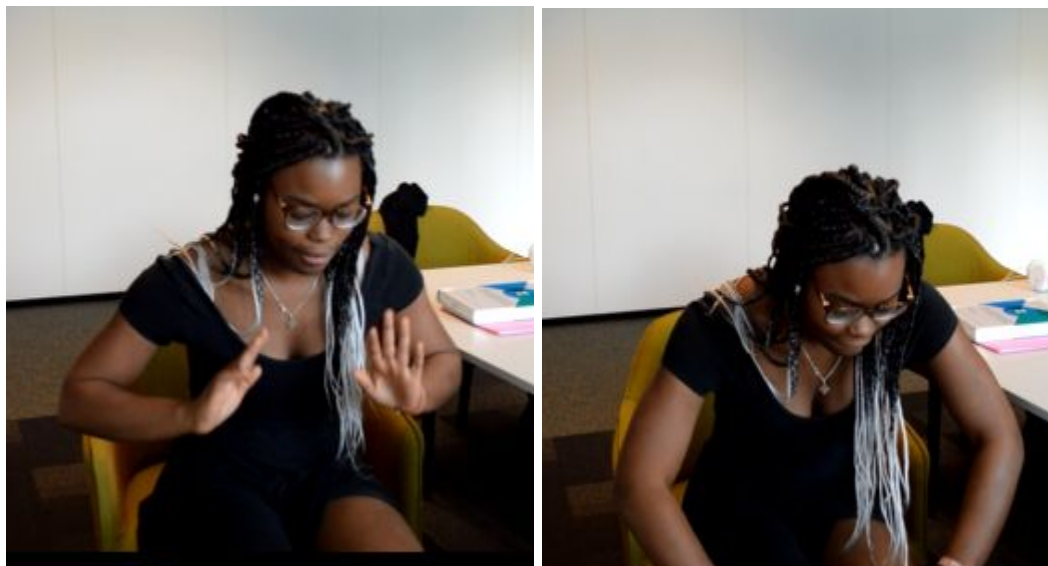
*- To do this the woman took [put] the cat on her [ / <uh> / legs (eng.) on her <laugh> / i*  
beat beat stroke stroke stroke retr  
*have this! / oh this is so bad / on her / <uh> gambas? / no / gambas mean [ / ]*  
stroke hold retr iconic  
*<laugh>*  
*- <laugh> legs. (spanish)*  
*- Yeah!*

The speaker describes part of the narrative where a character in the story takes a cat and puts them on their lap. The word that caused lexical difficulties was *piernas* (legs).

This is a continuous lexical pause that involved several elements. The first are non-lexical fillers which are at the start and end of the lexical pause. In between there is 1) code-switching (legs), 2) a comment on the TOT-state (*i have this*), 3) a comment on the word retrieval struggle (*this is so bad*), and a gesture which is to be discussed in detail.

The whole pause involves iconic-deictic gesturing in which the speaker shows the word by repeatedly moving their hands downwards towards their knees.





**Figure 27** Stroke



**Figure 28** Second stroke

As demonstrated, the speaker expresses the lexical item legs by referring to her lap, especially since the narrative is about a cat on a character's lap. Since gesture dimensions are not defined as categorical, such cases can be considered to be an overlap of iconic and deictic dimensions. The gesture retracts as she retrieves the word *gambas*. The speaker pronounces the word *gambas* as a question (with rising intonation). This means doubt about the lexical choice. This hesitation is also manifested in the fact that the speaker continues to search for a more accurate word after the first choice and speaks on doubting what the word means. The speaker may have recalled that the first meaning of *gambas* is *prawn* because she proceeded to self-correct though the comment *no / gambas mean* followed by a hand gesture that imitates holding a tiny object with two fingers. That gesture must have represented *prawn*.

Even though the word *lap* would be a more accurate choice, this case was still taken into account because *gambas* does mean legs, but in informal Spanish. (The listener stopped the

speaker from resuming the word search by suggesting the more accurate word *piernas*. )

It must be noted that there were more cases of code-switching among lexical retrieval pauses. However, they were terminated by receiving assistance from the listener. This is an expectable pattern because when a second language speaker inserts a word from the language of higher proficiency/first language, it encourages the interlocutor to provide a translation of that word into the language they agreed on using. Providing the correct word is a common way of assisting, especially in second language dialogues.

### 3. 6. Requests for assistance and informing on struggle during lexical retrieval pauses

Requests for assistance are usually mentioned in research as a trait of second language dialogues because it covers cases in which L2 speakers request assistance from an L1 interlocutor during disfluencies. The most common cases include requests to remind or offer a correct word or word form. Examples of requests for assistance shown in the collected corpus include asking a direct question (*how do you say...?*). Examples of comments of word retrieval struggle include phrases as *i don't know it in [target language]*. By stating a struggle in finding the word, the speaker acknowledges and explains a failure of providing the accurate lexical representation to the listener. Sometimes, the request for assistance or comment on word retrieval struggle is followed by the speaker offering a definition of the word instead of the most accurate word itself. A case like this was shown in Example 5 and is duplicated below for convenience.

*And the next scene was maybe / yeah it was the next scene / <um> / [[Twee*  
*tie goes to the /*  
*prep stroke*  
*how do you say it <like>] / <cough>[ upper level [like]] [in the building / ] [<like> really high*  
*hold retr prep stroke stroke stroke hold retr stroke stroke*  
*floor] and then Sylvester tries to get the Twee*  
*tie there so he how do you say eats bubble gum hold*  
*retr*  
*so he [kind of fly] in Tweet's level*  
*iconic*

It is not clear whether comments as *how do you say* are actual questions rather than fillers that reflect difficulties and steps in the lexical process. This can be in some cases evaluated based on the context. For instance, if a comment as *how do you say* is followed by a definition of the word, the definition may be used to ask the speaker to suggest an accurate word. However, it can be argued that the comment and word definition simply reflect the speaker's inner process of word search. A speaker may be describing the concept to facilitate access to its lexical representation. It must be noted that the self-oriented function and communicative function of such comments are not mutually exclusive.

An observed lexical pause associated with the word *correr* (*run*) involves not only an iconic gesture and non-lexical fillers, but also both a request for assistance and a statement informing about the lexical retrieval struggle.

18)

*Despues [sea / sea] <hm> comienza a una [ / ] <laugh> [<uh>] las dos <oh god>[ / ]*  
*beat stroke beat stroke*

[<uh>] i don't even have this in English / like the word so <laugh> de tus / se empeza una  
beat

(sut)?

- <uh>

- A una <um> les dos (turner)? / does it exist / no it doesn't [ / <uh> ] a una / a una [plaza /]  
stroke retr beat

(...) <uh> se occura en una parco y hay una sculptura y las dos [comienza a / correr  
stroke

<laugh>] yeah.  
retr

After [(s)he was] / was <hm> started a [ / ] <laugh> <uh> the two <oh god> [ / ] [<uh>] i  
beat stroke beat stroke beat  
don't even have this in English / like the word so <laugh> the (tus) / started a (sut)<sup>3</sup>?

- <uh>

- A a <um> the two (turner)? / does it exist / no it doesn't [ / <uh> ] to a / to a [place /] (...)  
stroke retr beat  
<uh> it happened in a park and there was a statue and the two [started to / run <laugh>] yeah.  
stroke retr

The speaker's statement shows difficulties in retrieving the word both in English and the target language (Spanish): *I don't even have this in English, <like> the word*. This leads to expecting the word to be a lexical item which is not commonly used by the speaker. Furthermore, it is another indication that lexical retrieval difficulties do not depend on the speaker's proficiency.

The following request for assistance in this narrative fragment is the speaker's question *does it exist?*. This shows doubt in the word choice and a request for reassurance or assistance from the listener. In other words, the speaker is asking whether their first word choice (*tourner*) is intelligible and correct.

It was expected that the searched word will turn out to be of low frequency since the speaker expressed difficulties in recalling it in both languages. However, the speaker has closed the lexical retrieval pause by choosing a word of basic vocabulary (*run*). Further analysis confirms that *correr* may not correspond to the lexical item that the speaker planned initially.

The speaker employed two iconic gestures which were both associated with the lexical pause. Despite the chapter being devoted to requests for assistance, this sequence of iconic

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<sup>3</sup> round brackets indicate words that were not recognized by the listener and coder

gesture is analysed in detail because it provides insight on the word choice process. The first three gestures are a repetition of a gesture that shows running in circles. The first two ones occurred during silent pauses, the third one during a pause with the filler <uh>.



**Figure 29** Stroke (twice during a silent pause [/] and during the fragment [/ <uh>])

After the request for assistance and informing on the lexical struggle, the speaker produced a third gesture that shows a related but more broad concept of running. The speaker employs her second hand to show subjects running after each other.



**Figure 30** Stroke [comienza a /, started to / ]

The retraction of the gesture was simultaneous with the following word *correr* (run).

Based on the analysis of this sequence, the initially planned word could be *chasing*. *Chasing* is more difficult to retrieve than the word *run* and corresponds to both gestures.

This example is another representation of lexical retrieval being a process of choice in which the speaker may shift the direction of their word choice, rather than continue trying to recall the exact initially planned lexical item.

The next example shows a second case of difficulties with recalling the word *bird bath*. (In the previous case, a speaker replaced this word with *fountain*).

19)

*Znachit nachalas' / nachinalos' eto tak [chto / [Tweetie kupalas' ili kupalsja] [ja ne znaju*  
*/] <uh> / kupalsja [/ <um>] / ne [kak gde] / [dlja ptic]] [est' takije special'nyje eti*  
*samyje / kak vannyy tam] / [on ili ona kupalas'].*  
*retr beat stroke beat beat pre-stroke stroke*

*So she started / it started with [how / Tweetie taking a bath<sup>4</sup> (fem.) or taking a bath (masc.)] [I*  
*beat*

*don't know /] <uh> / he was taking a bath [/ <um>] / like / [how where] [there are these*  
*beat beat beat pre-stroke*

*special things for birds these / like a bath there] / [he or she was taking a bath].*  
*stroke retr beat*

During this lexical retrieval pause, the speaker articulated 4 non-lexical fillers (*uh*, *um*, *like*), an affirmation of lexical struggle through the phrase *i don't know*, and offered an explanation of the searched word (*there are these special things for birds these / like a bath*). Moreover, during the explanation, the speaker twice produced an iconic gesture that represents the form of the implied object (*bird bath*). The speaker must be not only communicating the word to the listener, but also facilitating their own access to the world by focusing on the features of the implied object. This is highlighted by the speaker's redirection of gaze from the listener.

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<sup>4</sup> In Russian, taking a bath is a one-word verb, *kupat'sja*



**Figure 33** The stroke that occurs during the filler <uh> and phrase [*est' takije special'nyje eti, there are these special*]



**Figure 34** retraction and start of beat gestures (*vanny tam*)

### 3.7. Redirection of gaze

This aforementioned pattern is the process of the speaker shifting their gaze away from the listener to another direction (usually sideways or downwards) during a lexical retrieval pause.

A previous study has provided experimental evidence that changes in gaze patterns may reflect cognitive processes performed within the milieu of memory functions. Moreover, there is experimental evidence from previous research on gaze aversion that has shown that adults and children tend to shift their gaze away from visual displays and from the questioner both in face-to-face and in live video link situations (Micic, D., Ehrlichman, H., & Chen, R. 2010). The study supports the notion that that redirection of gaze is linked to memory load and argues that redirection of gaze can therefore manifest lexical retrieval struggle.

Redirection of gaze from the listener during lexical retrieval pauses has occurred in the majority of the observed cases of lexical struggle. For instance, among 19 cases of lexical retrieval pauses that include iconic gesture, 12 contain this kind of gaze shift. Gaze estrangement



can be especially demonstrative when accompanying iconic gesture because iconic gestures are often expected to be directed towards the listener. Cases in which the gaze returns to the speaker when the word is accessed were acknowledged the most. These cases are shown in Example 7 and Example 8. A further example is provided below.

20)

*After this there is /<um/ Sylvester putting basically a trap for / uh / for Tweetie so he's*

*using a box / like a [carton box] /< um>/ [with a- with a / stick/] to / to build an*  
*beat beat stroke hold retr*  
*angel like [this thing].*  
*iconic*

In this case, the speaker shifted his gaze from the listener as soon as the lexical pause started, simultaneously with producing the connected non-lexical filler <um>. Throughout the pause, the speaker produces an iconic gesture. It expresses the length of the implied object (both endings of the implied item are shown with both hands) and its size (the left hand shows to be holding the object and the palm girth corresponds to its size). The speaker's gaze is directed away from listener and downwards towards the iconic gesture.



**Figure 46** iconic gesture [*with a- with a /*]

When the word is accessed, the speaker completes the iconic gesture with a momentous deictic gesture and returns his gaze towards the listener.





**Figure 47** [*stick*/]

Incidentally, is a third example that shows that a spontaneous deictic gesture can in particular contexts signal that a searched item from memory has been recalled or in general signify a sudden problem-solving idea.

### **3.8. Dental clicks during lexical retrieval pauses**

As defined by Gil (2013), dental clicks are acoustically salient speech sounds formed by the sudden opening of a closure resulting in a sharp inflow of air towards a secondary occlusion at the back of the mouth. Linguistic research has provided evidence on a limited distribution of phonemic clicks: only in southern Africa and Tanzania. Dental clicks have shown to express negation in Hebrew and many Arabic dialects and other languages. Elsewhere they are known to be absent in words and to have a solely paralinguistic function. They convey a range of meaning across cultures which include expressing emotions. The English dental click (spelled as *tut tut* or *tsk tsk*) is usually repeated two or more times and is most commonly used to express feelings as irritation, impatience or disappointment. The usage is characterized as expressing negative affect. A less common usage is expressing positive affect, particularly amazement and appreciation. Interestingly, the dental click may express positive or negative affect depending on the multiplicity of time it is produced in such languages as Minangkabau, Swahili, Japanese, Kalam, and O’odham (Gil, 2013). In Russian, the singular dental click often expresses irritation, annoyance, or disappointment, while the repeating click usually expresses disapproval (own knowledge).

This study provides examples of clicks used as non-verbal fillers in lexical retrieval pauses. It is supposed that these clicks may be caused not directly from the lexical retrieval

difficulties and that they do not function as fillers. They are likely to be used here corresponding to their culturally shared meaning by expressing possible frustration or irritation caused by the struggle to access an item from memory.

One of these cases is reflected in the first segment of aforementioned Example 5.

*I ona zvonit v <uh> v <uh> / <dental click> pet shop <uh> magazin*

*- zhivotnyh?*

*- m?*

*- zhivotnyh da*

*- And she calls to <uh> to <uh> / <dental click> pet shop <uh> store*

*- pet store?*

*- m?*

*-pet store yes*

The dental click in this case was produced in the middle of a lexical retrieval pause. It follows two non-lexical fillers with a silent pause and precedes code-switching that precedes a last non-lexical filler. The articulation of the searched word in English (*pet shop*) confirms that the dental click expresses the speaker's reaction to a temporary incapability to retrieve the word in the agreed language.

The next example has a lexical retrieval pause that consists of a non-lexical filler, dental click, a preposition with an article (*with a*), a second non-lexical filler, a sigh, and a second dental click.

21)

*A cô[té] il ya un [chat] qui se [cache <um> <dental click> a- avec un une <uh>*

*beat beat*

*iconic*

*<sigh> <um> <dental click> / un journal!]*

*beat*

*beat*

*Nearby there was a cat who was hiding <um> <dental click> a- with a <uh> [*<sigh>*]*

*beat beat*

*beat*

*beat*

*<um> [*<dental click>*] / a newspaper!*

*beat*

The speaker retrieved the searched word *journal* after a short pause following the last dental

click.

A short sigh usually has a paralinguistic meaning of tiredness, sadness, disappointment, or relief. This is confirmed by everyday observations, the existence of the idiom *a sign of relief*, and the expressions as *to say with a sigh*.

*'I wish he was here,' she sighed* (Cambridge University Press, 2008).

Considering the meaning behind the sigh, it is not surprising to encounter them in lexical retrieval pauses. Similar to dental clicks and hand-to-face gestures, it is likely that they represent emotional load related to lexical struggle.

#### 4. Discussion

This study argues that lexical retrieval struggle is likely to be caused by difficulties in accessing the word in the speaker's active lexical knowledge regardless of proficiency. The data has shown lexical retrieval pauses to occur both in low-medium and high proficiency conditions, which confirms the possibility of that notion.

The speech of multilingual speakers in the reported corpus includes lexical items that they rarely use in both their first and second languages. For instance, the words *bird bath* and *shovel* caused a lexical pause for participants in both proficiency groups. It is argued that the lexical difficulties associated with these words are linked to their position across the productive and passive word knowledge. Manifestations of lexical retrieval were expected to occur mostly in the pauses preceding low-frequency words. However, there were many cases of high-frequency words causing lexical difficulties, especially in the condition of low proficiency (examples include words as the preposition *behind*). This may be explained in two ways.

1) Lexical retrieval difficulties are more likely to occur in the condition of low-medium proficiency. Furthermore, lexical difficulties are more likely to occur with high-frequent words in low-proficiency conditions because high-frequent lexical items from a language of lower proficiency are less likely to be established in active word knowledge. As for high-frequent lexical items from a language of higher proficiency, they have a fixed position in active the vocabulary of the speaker because of consistent exposure and production associated with them.

2) The speaker collects concepts from the story and employs words from their mental lexicon to express them. Many of these words are necessary for the retelling task but may not be used by the speaker in everyday life. Words of high frequency in the specific language do not always imply a high frequency of their use by the speaker. Words that cause lexical difficulties may include not only low-frequency words in general, but words from semantic groups that are distant from the speaker's activities. For example, a gardener with low proficiency may be faster in recalling the word *shovel* than a person with high proficiency who is rarely exposed to that word.

Following the methodology, only self-resolved lexical pauses were included in the analysis in order to observe manifestations that indicate lexical struggle and the possible facilitating role of few of these behaviours in word retrieval. A lexical retrieval was considered to be successful if the speaker resolved it themselves regardless of the length of the pause. Cases where the speaker made changes in the word choice within the lexical pause can be argued to be cases of substitution. However, it is noted that these cases reflect the step within the initial stage of lexical retrieval when a speaker chooses an accurate lexical representation for the expressed concept. They also reflect that lexical retrieval is in general a process of choice where words can be considered and dropped from consideration. As long as the different options share overlapping components of meaning and are associated with one concept, they fall into one lexical retrieval process.

The analysis take into account the difference between productive word knowledge,

controlled productive knowledge, and active productive knowledge. It suggests that the more likely the speaker is to use this word frequently, the more freely it is produced, and the less facilitating behaviour is needed. If facilitating behaviour or assistance is necessary to recall the word, this means the speaker has controlled active knowledge but not yet the less constrained 'free' active knowledge.

The present study has identified various behaviours which accompany lexical disfluencies in speech. It is known that these pauses are caused by lexical retrieval struggle because they co-occur with non-juncture pauses or fillers that precede a particular word (and are completed when the word is articulated). The patterns occur across modalities and include comments on word retrieval difficulties and non-synchronized speech and gesture (the use of beat and iconic gesture during pauses and increase of beat gestures with disfluency. Less expected manifestations found in the observed cases are dental clicks, redirection of gaze, and auxiliary non-motoric gestures as finger-snapping, finger tapping, and hand-to-face gestures.

As noted, none of the found manifestations of lexical retrieval difficulties can be used as sign of lexical retrieval struggle separately. They are considered indicators of lexical struggle they co-occur in non-juncture pauses in various combinations. Elements of modes interact and produce a meaning that is bigger than the sum of the elements. For this reason when we analyse language across modalities, we must interpret it taking into account the modes in interaction (Norris, 2009). While disfluency can also be caused by difficulties in discourse planning, grammar, or lack of knowledge about the content, it is argued that when one of listed manifestations co-occur with a non-juncture pause or filler, the case can be identified as a disfluency that is caused particularly by lexical retrieval difficulties. This notion takes into account that lexical difficulties usually manifest themselves in non-juncture pauses since speakers do not tend to start sentences with words that they struggle with activating.

It is known that elements of behaviour can communicate meanings or states both intentionally or unintentionally. For example, the combination of the action of stretching arms and the action of sighing combined can be evaluated as a manifestation of boredom and tiredness (depending on the context). However, this does not mean the actor has intended to communicate the state that their actions can be assumed to manifest. Furthermore, research on posture provides many examples of how body position can express communicative intentions and mental states of interlocutors, as well as the social relationships between them (Bohle, 2013). It has been found that while there are manifestations that express lexical difficulties explicitly, there are further manifestations that implicitly indicate lexical retrieval difficulties by manifesting the memory-related cognitive or emotional load associated with it. A manifestation of lexical retrieval that is assumed to be explicit are requests for assistance (for example, statements or questions as *how do you say...?* or *I don't remember the word*). However, the distinction can be ambiguous in cases when these statements are made somewhat automatically, when they are not followed by an explanation of which word is searched, and when the speaker's gaze direction shows that these utterances are not directed towards the listener.

Less explicit manifestations of lexical retrieval would include beat gestures, redirection of gaze, dental clicks, increase of beat gesture, iconic gestures or beat gestures used as fillers, and auxiliary non-motoric gestures as finger snapping, finger tapping, and hand-to-face gestures.

The first group of indicators of lexical struggles that will be addressed is the targeted gestural behaviour patterns during word retrieval pauses. This study notes that the relationship between speech and gesture (especially between disfluency and gesture) is too complex to directly assign gestures a role in lexical retrieval based on their category. Factors such as the properties of gesture, the temporal relationship between gesture and speech, and the context have shown to influence what role a particular gesture plays in speech. For instance, the same iconic gesture can be used to replace speech in one case, to give additional information in another second case, and assist the speaker in a third case. Several functions can be carried by one gesture dimension and these functions often overlap. This is why it is supposed that the role of gestures in lexical disfluency can be observed only based on separate cases that stay attached to their context. However, it is convenient to analyze functions of gestures while considering the category they belong to in order to target the link between the gesture's properties and their potential to facilitate access to lexical representations.

Iconic gestures are more elaborate gestures that have a particular lexical affiliate and are supposed to play a more direct role in lexical retrieval. The study follows the theory that by reflecting spatio-dynamic features of concepts, lexical gestures participate in lexical retrieval through the process of cross-modal activation (Krauss, 1998). In other words, activating the visual format of a lexical item with lexical gestures helps to activate the linguistic format of that item. This study suggests that an iconic gesture is more likely to function this way when the speaker shows increased awareness towards the gesture. In some degree, awareness can be evaluated based on gaze direction. The data has shown cases in which the speaker uses an iconic gesture that they focus their gaze while recalling the lexical affiliate. When the word is recalled, the speaker terminates the gesture, returns their gaze towards the speaker, and produces the searched word. The topic of redirection of gaze (how speakers redirect their gaze from the listeners during lexical pauses) will be addressed in detail further in the chapter.

According to the idea of priming in psychology, a first stimulus activates parts of a memory previously associated with the stimulus. It is logical to suppose that a visual stimulus that refers to the concept's image facilitates access to relevant linguistic knowledge in a similar way. Another possible reason iconic gestures play a facilitating role in lexical retrieval can be directly linked to focusing on the concept of the implied word. It has been noted that word retrieval causes difficulties for lexical items within passive or controlled productive knowledge. Since controlled productive knowledge is activated by a task that targets that word (Laufer, 1998), we can argue that activating the visual format of its semantic content may strengthen the speaker's focus on the word-production task.

Another observation that highlights the self-oriented role of iconic gestures during word retrieval struggle is that many of them demonstrate only one feature of the implied object (for

example, size). These gestures are argued to function more for the speaker than listener because they do not provide enough information to guess the word. They would play a role for the listener if they included movements as tracing the object's form through hands or imitating actions that are specific to the object.

Iconic gesture not only activates visual representation of a word but also activates the functional knowledge associated with it. Functional knowledge resides in functional iconic gestures (e.g., gestures that resemble the function of an object instead of its form). This analysis has taken into account the distinction between the functional gestures (which express actions with the use of the object) and volumetric gestures (which express its visual characteristics) (Bub, Masson & Bukach (2003). Two gestures with functional iconic properties have been found in the data. They refer to the same object (*shovel*) and were used by two different speakers. The speaker's choice between a volumetric and functional gesture is likely to depend on what is more convenient based on its semantic characteristics. For instance, manipulable objects are the group of words that is likely to be described through actions involving those objects. Concerning the role of functional gestures in lexical retrieval, supposedly it is the case that functional gestures activate both visual and motoric memory related to the implied object (especially if the speaker has motoric experience with it). In terms of priming, such iconic gestures would play a role of stimulus for two parts of memory associated with the concept, visual and motoric.

Another possible reason iconic gestures play a facilitating role in lexical retrieval is linked to focusing on the concept. It has been noted that word retrieval causes difficulties for lexical items within passive or controlled productive knowledge. Since controlled productive knowledge is activated by a task that targets that word, activating the visual format of its semantic content may strengthen the speaker's focus on the concept.

It has been concluded that iconic gestures that precede a word can not only manifest lexical retrieval but also facilitate lexical retrieval due to their capability to function as a visual and/or motoric stimulus. The further section analyzes the role of further gestures in lexical retrieval and addresses how they can manifest lexical retrieval difficulties.

Beat gestures are known to usually synchronize with the speech rhythm in fluent speech. The data has shown that the synchronicity between beat gestures and speech rhythm is disrupted during periods of speech disfluency. Furthermore, few analyzed examples have shown that the use of beat gestures can tend to increase as the lexical retrieval struggle arises. In one case the increase of gesture was shown to start exactly as the clause which includes the searched word starts. These movements seem to be influenced by the lexical struggle by arising when the speaker plans and/or starts the word search. This reminds of the fact that lexical retrieval is an implicit process and the start of this cognitive process can precede explicit manifestations of lexical struggle.

A possible explanation to the sequences of beat gestures occurring with the approach of the lexical pause can be connected to the notion that gestures decrease tension of the speaker (Krauss, Chen & Gottesman 2001). Lexical struggle deteriorates the speaker's performance,



which is why the problem can cause frustration in some speakers. Since gestures decrease tension that is linked to frustration, the increase of gesture during tension is natural. Moreover, motoric (non-lexical) gestures are more likely to accomplish this function because they require less elaboration. The notion of movements increasing during lexical struggle is especially illustrative through the auxiliary gestures found in the analysis: hand-to-face gestures, finger-snapping, and rubbing-fingers gestures. On the other hand, gesture rate may increase due to increased tension caused by emotional load. In other words, increase of movement may simply reflect the emotional load. The examples from the corpus which involve gesture not only confirm the notion that increased movement is linked to word retrieval struggle but also support the suggested argument that beat gesture can increase as lexical disfluency increases.

Since gestures are co-expressive and synchronized with speech, it is the infringement of this unity that may indicate lexical retrieval. If beat gestures are meant to be synchronized with the speech rhythm, using them during silent or filled pauses may indicate lexical retrieval. Only one beat gesture occurred during a silent pause. In other cases, it co-occurred with a filler or a word in the narrative that either precedes the lexical difficulties or informs about the lexical difficulties. Secondary fillers that accompanied beat gestures were dental clicks, a sigh, or a clap. A further targeted pattern of gestural behaviour was lexical struggle accompanied with iconic gestures that employ beat movements. Such gestures are argued to involve both iconic and beat dimensions.

Despite the focus on the initial (semantic) stage of lexical retrieval, it has been found that iconic gestures were used during the initial stage while beat gestures co-occurred with both the initial and phonological stage. As noted, there are challenges associated with identifying the stage of lexical access in which a speaker produces an iconic gesture during a lexical pause. Difficulties in the pre-articulating stage can be assigned both to conceptualizing and formulating. However, this may show that the facilitating role of iconic gestures functions within the semantic stage of lexical access. This would confirm the notion on the cross-modal-activation role of iconic gestures in conceptualizing and formulating. Words located within passive knowledge have a weaker connection to their conceptual representations than words located within active knowledge. Iconic gestures may facilitate this activation.

Previous research opposes the notion of the compensatory role of gestures in facilitating speech and their role of facilitating speech by decreasing tension. This study suggests that these notions are not mutually exclusive. Gestures can facilitate different aspects of lexical retrieval depending on their properties and the stage of lexical retrieval. Furthermore, different aspects of gesture may aid in more than one aspect of lexical struggle simultaneously, especially for lexical gestures.

Non-lexical gestures appear to facilitate lexical access even when their properties are not associated with the lexical affiliate. Decreasing mental strain through movement may facilitate the cognitive processes behind lexical retrieval and the articulation of words.

Furthermore, previous research have found gestures as finger-snapping to be linked to

cognitive load, especially memory-related cognitive load (when not related to an emblematic meaning). Since lexical retrieval struggle obviously implies memory-related cognitive load, we can argue that they manifest lexical retrieval struggle when combined with a non-juncture pause or filler.

Previous research has shown that spontaneous facial self-touch increases with emotional and cognitive load (Grunwald et. al, 2014). Moreover, the ‘facepalm’ (a subtype of the hand-to-face gesture that happens to have its own emoji) is a culturally known manifestation of frustration, embarrassment, or sarcasm. The position and context in which these gestures occur in data seem to confirm that function of hand-to-face gestures and allow to suggest that these gestures can manifest lexical retrieval difficulties. Lexical retrieval difficulties imply memory-related cognitive load and can often cause emotional load (the necessity to regulate frustration caused by deterioration of speech performance). The study suggests that while gestures as finger-snapping may manifest the memory-related cognitive load of lexical struggle, hand-to-face gestures (facial self-touch) may manifest both the emotional and cognitive load behind lexical struggle.

Dental clicks during lexical pauses are argued to manifest the aspect of lexical retrieval difficulties associated with emotional load. The analysis found that hand-to-face gestures and dental clicks occur in longer lexical retrieval pauses, those which include a sequence fillers interrupted by silent pauses. Longer lexical struggle pauses are more likely to cause an emotional reaction of the speaker (frustration, irritation, or disappointment); cross-cultural analyses have shown that these emotions can be manifested through dental clicks and hand-to-face gestures. These two arguments and examples from the data encourage to claim that dental clicks and hand-to-face gestures are a manifestation of the negative affect that can be easily caused by lexical struggle.

Code-switching and requests for assistance are discussed in previous research as a trait of multilingualism or second language speech. This study argues that they can also be an indicator of word retrieval difficulties when combined with a non-juncture pause or filler. It can be noted that code-switching can function as a request for assistance in particular contexts. When the speaker switches to another language in order to retrieve a word, it informs the listener that the speaker is likely to have difficulties in accessing the word in the target language. This encourages the listener to provide a translation, especially if they have a longer exposure to the language compared to the speaker. The possibility to receive assistance from the listener decreases the load on the speaker by providing accurate linguistic representations of the items of the shared mental model and by allowing them to express the concept prior to (or without) accessing it in the target language. A question for further research would be whether retrieving the word in the language of major exposure can facilitate the retrieval of its linguistic format in the target language. Since different formats of one concept are interrelated and reachable through cross-modal priming, it may be that two language forms are stored in memory as formats of one concept that are both associated with the stimulus. Comments on word retrieval struggle are

considered to be an explicit manifestation of lexical retrieval struggle that can be oriented towards the listener or self-oriented depending on the context and the speaker's intention.

Speakers normally direct their gaze towards their listener(s) in spontaneous speech, especially if the speech is fluent. A noticeable pattern found in the data is the redirection of a speaker's gaze during lexical retrieval pauses. Previous research has confirmed the intuitive notion that people avert their gaze from a visually engaging stimulus while performing cognitively demanding tasks. Since the retrieval of words from passive and controlled productive knowledge is a memory-related cognitively demanding task, the commonly occurring gaze aversion may play a role in avoiding visuo-cognitive overload. However, further experimental evidence has found this pattern to occur in settings with no visual distractions, including in darkness and with closed eyes (Ehrlichman & Barrett, 1983). When the question on the role of gaze aversion in cognitive load has been analyzed in a set of experiments that involved tasks associated with lexical fluency, it has shown that the changes in gaze fixation represent shifts in the levels of activation of recruited memory functions. The authors note we make movements when searching for information believed to exist in our memory but not currently in view (Micic, Ehrlichman, & Chen, 2010). This may be an explanation to the observed gaze aversion during lexical retrieval. This notion supports the suggested idea that gaze aversion may serve as one of the indicators of lexical retrieval by manifesting memory-related aspects of cognitive load. A notion demonstrated by previous authors is that when "viewing" the maintained information, we fixate on it (Micic, Ehrlichman, & Chen, 2010). The study argues that this notion is applicable to iconic gestures and their facilitating role in word retrieval through cross-modal priming and activating controlled productive word knowledge, especially since the data shows examples of speakers fixating on their iconic gestures during lexical struggles. This fixation may be increasing the facilitating function of iconicity as a visual stimulus for cross-modal priming.

Observing deictic gestures in cases of lexical retrieval has shown that pointing can manifest a successful completion of lexical search. There is not yet any experimental evidence to support that notion. Furthermore, the intuitive notion on the function of deictic gestures expressing a problem-solving idea has not been proved.

## **5. Conclusion**

Patterns of gestural behaviour and speech which repeatedly occur within lexical retrieval pauses include use of iconic gesture and beat gesture during pauses, increase of beat gesture with disfluency, hand-to-face gestures, comments on word retrieval difficulties, finger snapping, dental clicks, and redirection of gaze. The research claims that these patterns indicate lexical retrieval difficulties when they co-occur with non-juncture pauses or non-lexical fillers.

The increase of beat gesture found in the data is suggested to reflect the notion on increase of movement with disfluency. The new indicators of lexical retrieval difficulties targeted in the study are dental clicks, hand-to-face gestures, and finger clicks. Second language and multilingual features as code-switching and requests for assistance are argued to function as

manifestations of word retrieval difficulties when targeted in the described context. The data suggests that dental clicks and hand-to-face gestures manifest potential emotion-related reactions to experiencing lexical struggle. The discovered role of hand-to-face gestures and dental clicks in manifesting lexical retrieval difficulties has confirmed the role of the aspect of emotional load associated with lexical retrieval difficulties.

Particular non-motoric gestures as finger-clicking (rubbing fingers, tapping fingers) is argued based on the data to express memory-related cognitive load, however experimental evidence on this topic is lacking in research. Both the data and previous research have shown that gaze aversion manifests lexical struggle by indicating memory-related cognitive load.

This study has shown examples of increase of movement during lexical pauses both for spatial and non-spatial content. Moreover, it was shown that an increase of movement tends to disrupt when the word search is completed. The research claims that this pattern indicates lexical retrieval struggle when combined with non-juncture pauses. Furthermore, it highlights the aforementioned role of movement in decreasing emotional load and/or role of movement in manifesting emotional load.

The study argues that all the listed indicators of word retrieval difficulties serve as manifestations of lexical struggle when occurring in a combination of at least two and accompanied with interruption of the speech flow. The condition of combination is especially important since these manifestations indicate different (and possibly overlapping) aspects of lexical struggle (cognitive load, memory load, and emotional load).

As to the question on whether these manifestations have a facilitating function, different manifestations play a facilitating role in different aspects of lexical retrieval. It has been argued by aforementioned previous researchers that all movements decrease potential tension caused by lexical struggle. This automatically implies a facilitating function for word retrieval. This would definitely include beat gestures, iconic gestures, and particular auxiliary gestures such as finger-clicking.

The manifestations of lexical difficulties that can function as fillers (including gesture) may decrease the fluency difficulties by decreasing the interruptions in the flow of speech, even if it occasionally disrupts the co-expressiveness of speech and gesture. Furthermore, lexical struggle is an implicit process that can start before the explicit lexical pause, which means these manifestations may co-occur with speech fragments which precede the lexical pause.

A further facilitating function of iconic gestures is providing provision of a visual stimulus and/or motoric for cross-modal priming, which is confirmed by cases of the speaker fixating their gaze on their gesture (unless averting it completely away from the listener). In future research, a focusing on both gaze and gestural behaviour during lexical struggle could provide more insight into the link between iconic gesture and memory.

The self-oriented function of gestures shown through the fixation of the speaker's gaze on iconic gesture highlights that iconic gestures may not only facilitate word access through cross-modal priming, but also offer focus on the work-task for the speaker.

Targeting how lexical retrieval difficulties manifest themselves brings valuable insight into the various aspects of the word retrieval process and how speakers solve lexical tasks. However, in order to provide more reliable evidence on the facilitating role of particular manifestations of lexical retrieval difficulties, cases of failed and successful lexical retrieval pauses may need to be compared to each other. The facilitating roles of particular manifestations can be highlighted by showing if their use is likely to lead to successful resolving of lexical

tasks. Further research on the discovered manifestations of memory-related cognitive load and emotional load during lexical retrieval difficulties can offer further insight into the process of lexical retrieval and the function of these manifestations within that process.

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