

Lexical Access Patterns of Second Language Speakers of English

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ABSTRACT

Vocabulary plays a major role in concept formation, acculturation, articulation, and all aspects of learning. Unfortunately, although learners may have internalized complex vocabulary through formal learning, they may not have the ability to retrieve known words and concepts or have access to the right words, or lexical access, effectively. This study explores the lexical access patterns of second language speakers of English (ESL). Fifty students from the Faculty of Social Sciences and Humanities, Universiti Kebangsaan Malaysia, participated in this research. Twenty-five represented the more proficient ESL speakers whereas the other 25 represented the less proficient ESL speakers. Four pieces of paper, each with a high-frequency word (i.e., “man”, “people”, “time”, “day”) printed at the centre of the paper, were distributed to the participants as stimuli for them to create four sets of semantic maps. This paper thus presents a qualitative analysis of the semantic mapping of the word “man” and results show that English language proficiency does affect the way participants activate the words from their mental lexicon. The frequency of the words that were activated from the word “man” in the participants’ environment also affects the mapping. The semantic maps produced by the participants reflect ESL speakers’ pattern of lexical access, particularly in the manner the words are categorised in their mental lexicon. This study proposes that semantic mapping activity can be used to reflect and analyse ESL speakers’ vocabulary development, as well as to reflect ESL speakers’ weaknesses in accessing words and their thought patterns in the English language.

Keywords: Lexical Access; Semantic Mapping; Vocabulary Learning; Mental Lexicon; Semantic Relations

INTRODUCTION

The size of an individual’s vocabulary has always been used as the yardstick to measure his or her intelligence and cultural development (Gerstenberg, 2015; Mohd Nordin, Stapa & Darus, 2015). This is due to the fact that vocabulary plays a major role in concept formation, acculturation, articulation, and all aspects of learning (Gerstenberg, 2015). Studies on vocabulary knowledge have often been focusing on the pedagogical aspects such as vocabulary learning strategies (e.g., Asgari & Mustapha, 2011; Kulikova, 2015), incidental vocabulary acquisition in extensive reading (e.g., Ghanbari & Marzban, 2014; Webb & Chang, 2014), and vocabulary acquisition in several conditions (e.g., Sadeghi, Ellis & Khezrlou, 2017; Teng, 2016). Researchers (e.g., Joyse, 2015, Kaur, 2013; Ng & Sappathy 2011) have also established the importance of vocabulary knowledge, not only in the first language (henceforth, L1) but also in the second language (henceforth, L2).

Unlike L1 speakers, L2 speakers are not regularly being exposed to the large vocabulary of their target language (Kaur; 2015; Mohd Nordin et al., 2015). This is because not all of the words in the L2 vocabulary are relevant in the L2 learners' daily conversation (Sulaiman, Salehuddin & Khairudin, 2018). Alqahtani (2015), for example, highlighted that in the majority of cases, learners tend to recycle their vocabulary usage in their daily conversation. In fact, Nadarajan (2011) had earlier found that L2 learners often failed to select more precise words in their production tasks. This, according to Nadarajan (2011) and Sulaiman et al. (2018), happened because although learners may have internalized larger and complex vocabulary through formal learning, they may not have understood how the words should be used in their writing.

Reviews on vocabulary learning suggest that almost any technique which draws attention to word parts or word meanings has a positive effect on word acquisition. According to Dilek and Yürük (2013), when individuals are presented with new concepts, these concepts will not be explicitly understood until they are linked in a meaningful way to pre-existing concepts. For example, if someone learns the word 'terrified', it is important to help the learner form a connection with other relevant words that share similar forms such as 'horrified' and 'petrified'. It is also important to help the learners form a connection with words such as 'afraid' and 'scared' which are similar but distinct in meaning (Field, 2003). This form of connections can help students to process words and store them in their mental lexicon. As pointed out by Duñabeitia and Molinaro (2013), words are not stored independently in our mental lexicon; in fact, it is stored with a link that associates one word to other words.

Gholami and Khezrlou (2013), for example, found that the elaboration of word meanings, when accompanied by thematic summaries, resulted in improved vocabulary development. Words that carry meanings are the only ones that are stored in the lexicon; as a result, language users tend to use certain words based on how they are related to certain contexts (Duñabeitia & Molinaro, 2013; Field, 2003). There are words that are learned in isolation; in this situation, learners do not make connections between these words and related concepts (Sulaiman et al. 2018). When this happens, learners tend to recycle the same words to convey the same meaning.

It is proven that semantic mapping would help in the retrieval of known words and concepts for unfamiliar words (Ahmed Hamza, Mohd Yasin & Aladdin, 2015; Dilek & Yürük, 2013; Mukoroli, 2011;). Avrianti (2015), in a classroom action research involving the use of semantic mapping, concluded that semantic mapping is an effective pre-reading activity. She pointed out that semantic mapping can activate readers' prior knowledge about the context of the words and at the same time link newly acquired vocabulary to learners' prior knowledge. This is because the act of mapping allows new information to be related to prior knowledge (Avrianti, 2015; Kasim & Wahyuni, 2016). All these prove that background information is a necessary prerequisite to the addition of new concepts and vocabulary.

Semantic maps can be defined as graphic diagrams that show the relationships among words or groups of words. Other terms include "semantic webbing", "semantic networking", "bibbling", and "plot maps" (Heimlich & Pittelman, 1986). McAleese (1998) mentioned that semantic maps are used to identify techniques that describe a variety of strategies designed to show how keywords or concepts are related to one another through graphic representations. These techniques are also known as "word webbing" or "idea mapping". McAleese also mentioned that semantic maps portray the pattern of the schematic relations between words that compose a concept. It is assumed that there are multiple relations between a concept and the knowledge that is associated with it. Thus, for any concept in any language learning, there are at least three types of concept associations, namely, (i) the class: the order of things

(selection) the concept falls into; (ii) the property: the attributes that define the concept; and (iii) the example: the exemplars of the concept (McAleese 1998).

Semantic mapping is also referred to as a form of graphic organizer which can be developed by students and teacher together, by students in groups, or by students individually (Dilek & Yürük, 2013; Heimlich & Pittelman, 1986; Mukoroli, 2011). Mukoroli (2011) also highlighted in his research that semantic mapping can be used by students as a form of an outline to be developed prior to reading and writing essays, reports, and stories. The interactive nature of semantic mapping has been found to be an effective instructional tool in the learning of content area concepts (Ahmed Hamza et al., 2015). Following this, some researchers have found semantic mapping to be an effective teaching strategy in different areas of knowledge. A general procedure to develop a semantic map is by having a group discussion. In a situation like this, it is almost inevitable that the three types of concept associations will emerge (McAllese 1998).

The present study focuses on the patterns of ESL speakers' manner of accessing words in their minds when they need the word. Known as Lexical Access (or lexical retrieval) (Duñabeitia & Molinaro, 2013; Field, 2003), this study relies on the Semantic Priming phenomenon, which refers to an observation that the response to a target (e.g., dog) is facilitated when it is preceded by a semantically related prime (e.g., cat) compared with when the prime is unrelated (e.g., car) (Heyman, Rensbergen, Storms, Hutchison & De Deyne, 2014). Most semantic priming is explained using the speed or accuracy of words reflected in responding to a stimulus of a word or a picture that is being primed (Heyman et al., 2014; Khairudin, Valipour & Zainah, 2012). For example, when participants are given a word and are asked to select a word that comes across his/her mind, the response times for the related prime-target pairs (e.g., doctor–nurse) are expected to be fast and the accuracy is expected to be higher than the non-target pairs (e.g., doctor–apple) (Heyman et al., 2014).

Semantic priming can also be observed through semantic mapping, particularly in relation to Collins and Loftus' (1975) Spreading Activation Model. This is because the spreading activation model proposes the idea that concepts are connected via nodes in the aspect of its relatedness; the strength of the connection is represented by the distance between the nodes. Field (2003) also suggested three important points that need to be taken into account in order to describe the activation that happen; (i) it is a reflection on how words are closely related to one another; (ii) it reflects frequency in terms of familiarity; (iii) it allows language users to choose words that best fit the word in input although the form of it is not accurate or precise. In other words, semantic mapping reflects speakers' way of accessing words from their mental lexicon. The semantic network from the semantic mapping represents the semantic relations between concepts. Often, each concept is represented by a word or a set of words. Most semantic network is cognitive-based and consists of nodes which can be organized in a taxonomic hierarchy (i.e., synonym, hyponym, hypernym, antonym, connotation, coordination, denotation). In other words, each word in the network is associated with a lexical entry, which is like a data file that specifies all the necessary linguistic properties of the words such as their forms, (i.e. phonological/orthographical, morphological) and meanings (i.e., syntax and a range of senses) (Duñabeitia & Molinaro, 2013; Field, 2003).

Semantic mapping can be a visual strategy that is used to enhance students' lexical access and to observe students' vocabulary expansion and extension of knowledge by displaying the concepts of words that are related to one another (Dilek & Yürük, 2013; Mukoroli, 2011). The concepts shown in the mapping are drawn based on participants' prior knowledge or schema. Such information can be used to analyse how words are organized and related to one another in the speakers' cognition.

As pointed out by Ayala (1984), Duñabeitia & Molinaro (2013), and Field (2003), through discussions in creating semantic maps, students will have the opportunity to (i) learn the meanings and the context of new words, thus, be involved in retrieving familiar related words or concepts, (ii) hear the words spoken whilst seeing the words categorically being mapped and written, and (iii) discuss the meanings and interrelationships that occur between words. On the other hand, semantic maps will also reveal students' knowledge of words and reveal their own experiences; this, in turn, facilitates the process of teaching as the instructors are well-known with students' pattern of thinking and their background knowledge on certain topics and ideas (Ayala, 1984; Duñabeitia & Molinaro, 2013; Field, 2003). If readers tend to categorize and map information in their memory, the process of acquiring new vocabulary will be facilitated if the strategies to capitalize on these processes were used.

According to Chia (2006), research on semantic development or cognitive mapping has rarely been the focus of L2 acquisition research. In fact, the mapping process has often been excluded in L2 acquisition (Jiang, 2002). Their study shows that L2 learners tend to learn their L2 vocabulary by translating it to their L1; hence, the concept onto which their L2 word is mapped was indeed an L1 concept. As a result, a full knowledge on L2 semantic specification was never achieved in their study (Jiang, 2002). Chia (2006) also found that L2 learners did not only find learning words through translation very time consuming; they also expressed that they were not able to see how the new words they learned are related to one another through translation. This is the point where semantic restructuring should receive more attention in L2 acquisition. Yet researchers often focused on the initial process of mapping meaning onto the form and have tended to ignore the learner's on-going process of constructing and reorganizing their L2 semantic networks (Chia, 2006; Jiang 2002).

Students with different L1 backgrounds have different patterns of thinking and different problems in accessing their L2 words in their mental lexicon (Al-Mahbashi, Mohd Noor & Amir, 2015; Mohd Nordin et al., 2015; Plat, Lowie & De Bot, 2018). Therefore, there is a need to understand and analyse Malaysian students' developmental pattern of L2 vocabulary and its relation to the theoretical models. Being a multilingual country with English as a second language, it is important to investigate how L2 speakers of English in Malaysia categorise their thoughts. These insights will provide information that can be used to improve their language proficiency. The understanding of the way they think and the way they access the L2 words can help future educators in designing specific L2 curricula that will facilitate the semantic development in Malaysian students' L2 vocabulary acquisition.

Despite the fact that the earliest word recognition experiment conducted by Marslen-Wilson (1975) suggested that lexical access is almost the same for all in the human's cognition, different languages have a unique system of its own; incidentally, the way the mental lexicon is stored and developed is different (Kavitha & Kannan, 2015; Maera, 2009). With this in mind, this paper presents a study that explores the pattern of lexical access among Malaysian ESL students. Specifically, it hopes to (i) list the words available in the mental lexicon of ESL speakers for the priming word given to them and the different categories that emerged from the semantic mapping; (ii) identify the typical and atypical words in the developmental pattern of ESL speakers; and (iii) describe how the words are related to one another and how they are categorized in the cognition of ESL speakers. The outcome of this research can be used to facilitate the process of English vocabulary learning.

METHODOLOGY

This research is qualitative in nature. It involves an interpretative approach, focusing on disclosing the categorization of words shown in the developmental patterns of vocabulary whilst showing and explaining the lexical access in ESL speakers. The rationale for using this

approach was to generate important and observable outcomes while allowing the researchers to recognize the connection between both phenomena, thus using the outcomes to facilitate the process of learning English vocabulary in future.

PARTICIPANTS

The participants of this study were fifty students from the Faculty of Social Sciences and Humanities (FSSK), Universiti Kebangsaan Malaysia (UKM). Students' Malaysia University Entrance Test (MUET) was used as an indicator to group the students as the test assesses students' proficiency in English language in all four different components, namely listening, speaking, reading, and writing. The higher the scores/bands, the higher the students' communicative ability, task performance, and comprehension. Therefore, to reflect the distribution of ESL speakers in Malaysia (i.e., more proficient vs. less proficient ESL speakers), 25 undergraduates who scored between Bands 3 (described as "fairly fluent in their transcripts) and 5 ("fluent") in their MUET were categorized as the "more proficient" group whereas the other 25 who obtained between Bands 2 and 1 in their MUET (described as "not fluent" and "hardly able to work with the language" respectively in the transcript) were categorized as the "less proficient" group.

RESEARCH INSTRUMENT

The activity was designed primarily to obtain the semantic mapping pattern of Malaysian ESL speakers in order to explore their lexical access pattern. The semantic mapping used in this study adopted McAleese's (1988) suggestion on the types of association found in semantic mapping and Zaid's (1995) semantic mapping on vocabulary expansion and extension. A pen and four sheets of papers for each participant were used as the instruments to collect the data for this research. The word "man", "people", "time", and "day" were printed at the centre of each one of the four sheets of papers respectively. The four words were among the top 5000 list of words in English taken from two types of sources, namely *Corpus of Contemporary American English* and *Sitton Spelling Sourcebook Series* by Egger Publishing, Inc. As stated in those sources, these words are ranked in the first 100th high frequency words. To illustrate, the word "time" is ranked 32nd, the word "people" is 62nd, the word "day" is 90th, and the word "man" is 94th. The "priming" words selected from the list are limited to nouns as having nouns as the "priming" words will allow students to elaborate their ideas more and will enhance them to associate one word to other words in their mental lexicon.

DATA COLLECTION PROCEDURE

The data collection process took place on an individual basis. All instructions were administered by one of the authors throughout the whole activity. A set of hand-outs, which included a consent form, a personal information form, instructions, and four sheets of papers with one word at the centre of each sheet were given to the participants. The participants were first briefed on the nature of the experiment after they completed reading the consent form; all questions that the participants had in relation to the data collection procedure were answered at this stage. The purpose of the study however was not explained in detail so as to ensure that the students' choice of words in completing the task was not influenced by any factors that might limit the spreading of the primed words in the data collection. Once this was done, the participants began to fill in their personal information required for this research which consisted of their MUET scores (Band) and the courses and year that they were currently enrolled in UKM.

Before moving on to the semantic mapping task, a demonstration was conducted to ensure that all students understood what they had to do. The instructions stated explicitly that they were given a maximum of five minutes to complete each sheet. The steps undertaken for the semantic mapping task were as follows:

- 1) The participants were given four sheets of papers with an English word (e.g., “shoe”) typed in a circle at the center of each paper (named Circle 1) (See Figure 1).
- 2) They were asked to draw at least four lines branching out from Circle 1.
- 3) The participants were then required to draw a circle at the end of each line that branches off from the main circle. The branching circles were used to fill in the words that are directly related to the word in “Circle 1”. Participants were highly recommended to add more branches (e.g., Circle 1A, Circle 1B...) according to the number of words that they can relate immediately to the word in Circle 1 (i.e., the word “shoe” in Figure 1). In each of the branching circles (e.g., “Circle 1A” in Figure 1), participants were then required to write the words that are closely related to the word in the main circle that cross their mind (Circle 1).

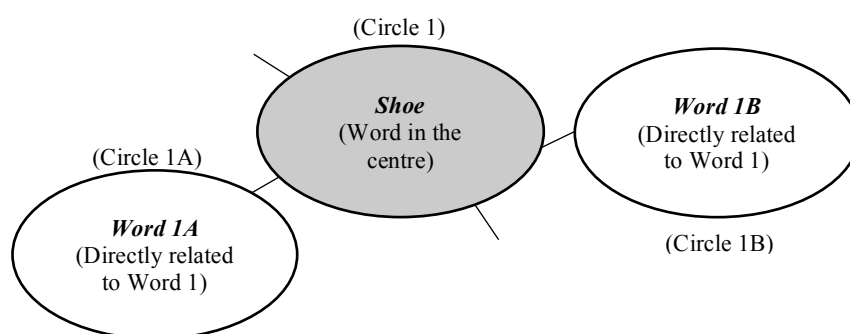


FIGURE 1. Example of the 1st set of branching

- 4) The participants were then required to draw more lines extending from each of the branching circles (e.g., Circle 1A, Circle 1B...) (See Figure 2) that were now “home” for a word each. They were also asked to add a circle at the end of each new line (This new circle at the end of each new branching is “Circle 1Ai, 1Aii... in Figure 2).
- 5) Participants were highly recommended to continuously add more words that they think were related to the words in each circle. They were advised that each circle is not restricted to one related word only as they can draw more than one line for each of them (e.g., Circle 1Ai-a, Circle 1Ai-b... or Circle 1Aii-a, Circle 1Aii-b....)
- 6) Steps 4 and 5 were repeated continuously as long as there are words that the participants manage to access from their memory.

An example of the possible branching is as shown in Figure 2:

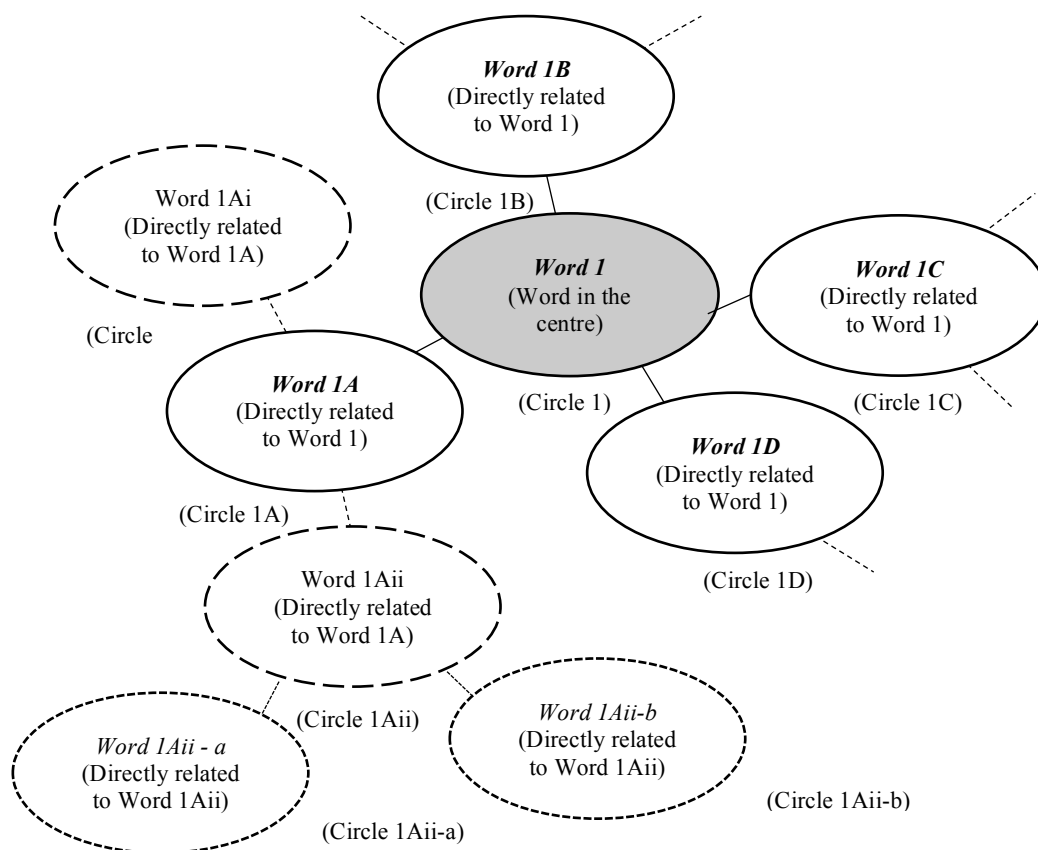


FIGURE 2. Example of the possible pattern of branching

- 7) Participants were informed that the different types of circle outlines shown in Figure 2 were just to show the different levels of branching. It was up to the participants if they wanted to use the different types of circle outlines or not.
- 8) Participants were told to return all the four sheets of papers to the researcher as soon as the time allocated for them to complete the tasks ended.

After completing the task within the specified time, each student then submitted their semantic maps. The pattern produced by each participant reflects the distinct developmental pattern of vocabulary in the form of semantic maps that will help explain the way Malaysian students think and how they retrieve English words from their mental lexicon. The findings from this semantic mapping can eventually be used to facilitate the process of English vocabulary teaching and learning in the future.

DATA COLLECTION AND ANALYSIS

The data analysis focused on the differences and the patterns found in students' vocabulary development. The semantic maps produced by the students provide an opportunity for the researchers to investigate the multiple relations that occur between a concept and the knowledge that is associated with the concept. However, despite the fact that the semantic maps of all four priming words were analysed in this study, due to the constraint of space, this paper only discusses the semantic mappings of the word "man".

To answer the first objective, the number of words produced by the participants was calculated manually to determine if there were any differences between the two groups of participants in relation to their proficiency in the English language. The differences in the

percentages of words produced by both groups for the word “man” and the mean number of words that both groups could relate to the word “man” were calculated. Next, the list of words shown in the first set of branching was computed in the form of a table to examine the frequency of each word that the participants managed to firstly associate with the word “man”. This will demonstrate the participants’ mental lexicon in relation to the word “man” and how this word, in turn, enhances participants’ lexical access.

To answer the second objective, each of the words produced by each participant was tabulated and the total frequency of the words were calculated to make it easier to separate the typical and atypical words. Words that occurred more than 5 times were categorised as “typical words” and those that occur only once were categorised as “atypical words”. Both categories were presented in the form of a table. The typical words represent words that are easily available in the participants’ environment in terms of their forms and functions, whereas the atypical words represent the opposite (Steele & Mills, 2011). The frequency of the words from the participants’ semantic mapping were presented together with the frequency stated in *Corpus of Contemporary American English* word list to show how familiarity or availability of particular words in the participants’ environment can influence their lexical decisions in accessing those words from their mental lexicon. In order to elaborate more on this matter, the differences between the range of word frequencies between the typical category and atypical category were also compared and discussed.

To answer the third objective, each of the semantic mapping patterns produced by the participants was qualitatively analysed. Participants who managed to produce the largest number of words and the semantic mapping that would best reflect all participants’ way of activating or accessing words from their mental lexicon were selected. As mentioned earlier, Collins and Loftus’ (1975) Spreading Activation Model proposed the idea that concepts are connected via nodes and the strength of the connection is represented by the distance between the nodes. The focus was on how words are spread through the links when one word is activated. The more properties of two words have in common, the more links there are between the nodes and the more closely related are the concepts of the words (Collins & Loftus 1975). The elements stated in The Spreading Activation Model concept are applied and referred to whilst developing a pattern of ESL speakers’ lexical access that is manifested in their semantic mapping.

The patterns are presented in the form of images and explained in the form of a narrative. The pattern would focus on three different variables that may occur which are (a) words in the lexical network that sound like the “priming” word, (b) concepts in the semantic network related to the “priming” word, or (c) words in the lexical network corresponding to the concepts in (b).

In addition to this, the classification of words reflected in the patterns on the aspect of (i) the association of class in the order of things the concept falls into; (ii) associations of property which is the attributes that define the concept; and (iii) associations of example which is the exemplars of the concept, will help in the process of explaining and selecting certain associations preferred by the participants. The number of associations produced by the participants would highlight participants’ ability in finding words that are semantically or lexically related, or both, and at the same time would reflect the way the words are organized and related to one another in their cognition.

Next, focus was also given on the token of occurrence of other patterns found in the semantic mapping such as the semantic relations between words, the tendencies in repeating and elaborating word using sentences, and the tendency in using exemplars that can be related to the word in primed. The comparison between the participants’ semantic maps from one to another provides an opportunity to understand the phenomena suggested in The Spreading Activation Model within the participants’ mental lexicon while completing the

task. By analysing this aspect, a lexical access pattern that may be unique to Malaysian ELS speakers can be derived.

RESULTS

OBJECTIVE 1: WORDS AND SEMANTIC CATEGORIES

From the semantic maps for the word “man” collected from all 50 participants, 737 words were produced. The ratio of words produced by the more proficient group to the less proficient group was 3:2. As shown in Table 1, the more proficient ESL participants produced more words than those who are less proficient.

TABLE 1. Mean number of words produced for the word “man” by both groups of participants.

Group	Man
More proficient	17.8
Less proficient	11.72

There were 233 words produced in the first set branching. The most frequent words branching from “man” (as shown in Figure 3) were “handsome”, (15 times), “father” (11 times), “businessman” (10 times), “strong” (9 times), and “masculine” (9 times). “Husband” was listed 7 times whereas “brother”, “football”, and “superman” were listed 6 times. The remaining 154 were words that occurred less than 5 times.

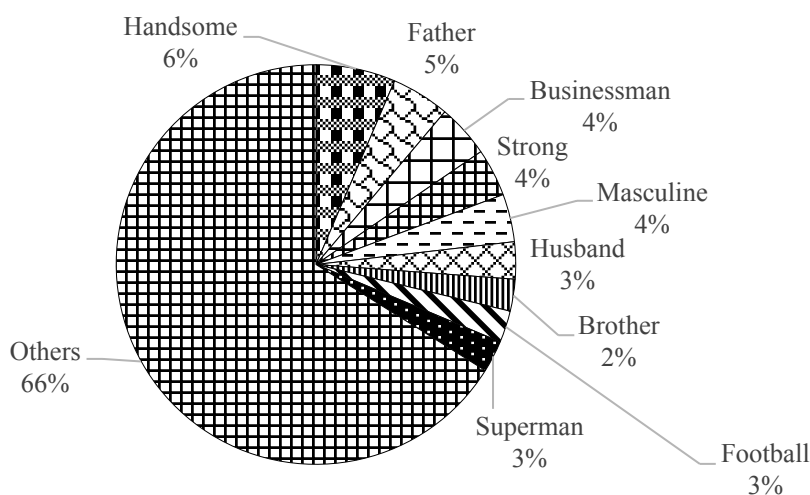


FIGURE 3. Percentage of words produced related to “man”

The presentation of the word “man” activated 29 words which represent “roles” (e.g., father, husband, lecturer), 24 words on “personalities” (e.g., responsible, kind, funny) and 16 words on “characteristics” (e.g., masculine, strong, handsome). 8 words related to “activities” (e.g., football, rugby, flirting), 8 words related to “sex” (e.g., male, female, boy), and 4 words listed as “items” (e.g., money, car, superbike). The remaining 7 words cannot be categorized into any categories (e.g., manual, Darwin’s Theory, earth). The division of the word categories can be seen in Figure 4.

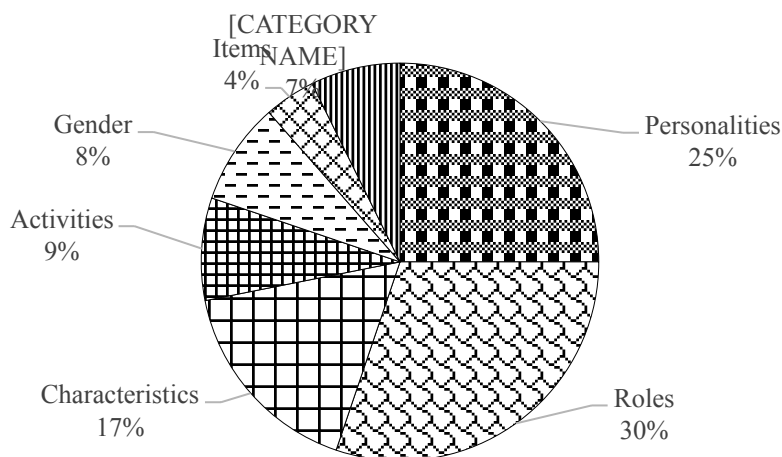


FIGURE 4. Words categories for “man”

OBJECTIVE 2: TYPICAL AND ATYPICAL WORDS

The top 10 words that occurred more than 5 times from the 50 sheets of semantic maps of the stimulus “man” are presented in Table 2. Because of their high frequency, the words are categorised as “typical words”. When compared with the *Corpus of Contemporary American English*, all the 10 words range between 3000th and 200,000th respectively.

TABLE 2. List of Typical Words Related to “Man”

Words	Frequency	Frequency by Corpus
Handsome	15	10,463
Father	11	15,4069
Businessman	10	6,095
Strong	9	93,096
Masculine	9	3,638
Husband	7	63,860
Brother	6	61,690
Football	6	39,959

The 10 words that occurred only 1 time are categorised as “atypical words” because of their low frequency. When compared with the *Corpus of Contemporary American English*, all the 10 words range between 1st and 1500th (Table 3).

TABLE 3. List of Atypical Words Related to “Man”

Words	Frequency	Frequency by Corpus
Misogynist	1	267
Caliph	1	339
Six packs	1	9
Businesswoman	1	681
Muscly	1	10
Yummy	1	703
Ironman	1	323
Moustache	1	822

OBJECTIVE 3: WORD RELATIONS & CATEGORIZATION

The data shows that among the patterns that can be seen in this semantic mapping is the high frequency of binary oppositions such as “man-woman”, “misogynist-feminist”, “masculine-feminine”, “gentle-hard” and “father-mother”. Although the set of words for the “misogynist-feminist” and “father-mother” pairs are not connected in the same set of branching, it can be presumed that the activation would still tend to list out the same set of collocation as it had already managed to recall one of the antonyms from the mental lexicon. As shown in Figure 5, when the word “male” is primed, the word “father” is activated. It is presumed that the word “father” simultaneously activated the word “mother” as both words often habitually appear together and thereby conveys meaning by association with each other. However, since the focus on that time was the words that are related to the concept portrayed by the word “male”, the activation may not be strong enough, or the participants themselves may tend to ignore it and try to focus on the main nodes. The word “mother” is strengthened when “woman” is activated, due to the fact that the semantic relatedness between those words is stronger.

The type of association that the participants tend to use or project while accessing words from their mental lexicon is another feature that can also be seen in the semantic mapping. As shown in Figure 5, when the word “man” was primed, the words “masculine” and “male” were activated. These prove that activation also revolves around the attributes that define the concept of the word that is being primed (i.e., “masculine is a quality traditionally ascribed to a man” and “male is the characteristics of a man or a boy”). Each of those words would then prime either the attributions associated with the concept, the examples to the concept it brought, or both types of association. As shown in the data, the word “male” is then linked to the word “gender” and “father”, both reflecting the types of association, namely, attributes (i.e., one of the gender types is male) and exemplars (i.e., an example of a male person is a father).

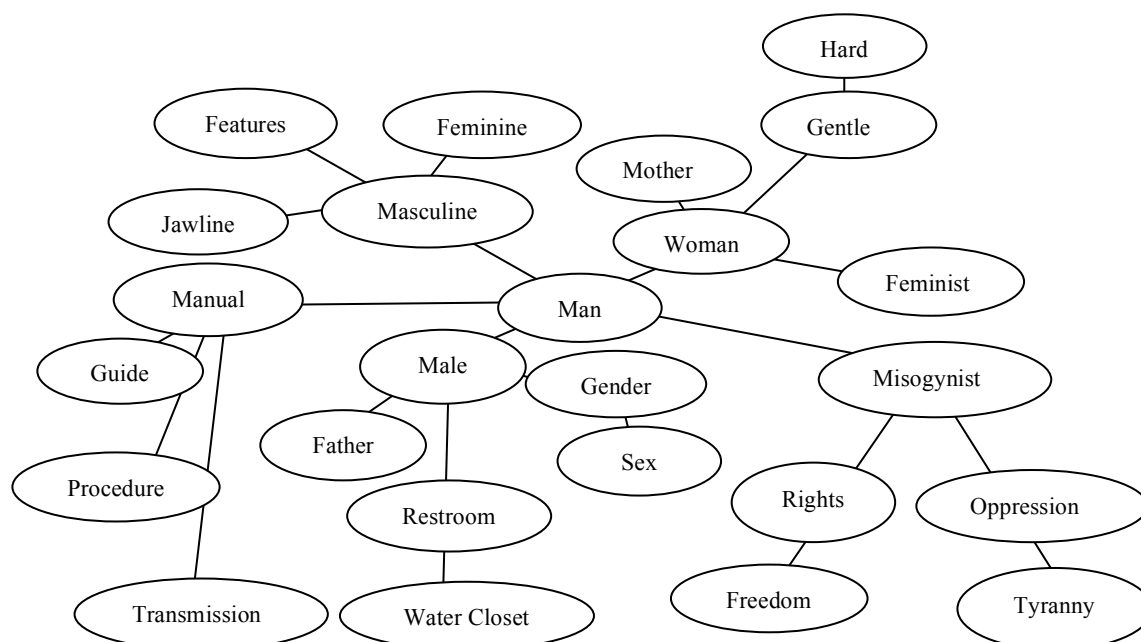


FIGURE 5. Patterns found in a semantic mapping produced by a participant (i.e., P3) on the stimulus “Man”

The data presented in Figure 6 is almost the same as the data presented in Figure 5. The division of words remains the same, except for some additional nodes that were added in

order to show the semantic relatedness between one word and the other word, or between one concept and the other concept. The longer nodes (e.g., man-manual) represent lower interconnection between the words whilst the shorter nodes represent the stronger interconnection between one word to another (e.g., shorter node man-woman). The term that would be used in this aspect is “How much does the term “A” have to do with term “B”?” Based on the data presented, some of the short nodes that can be seen are the nodes that exist between the relation of the words “male”, “gender”, and “sex”. It is presumed that the connection between each of the words is stronger as each of it has an individual connection with the concepts in the semantic network related to the word “male”. On the other hand, the longer nodes can be seen from the length of the node that exists between the word “man” and “misogynist” as it is presumed to have scarcity of interconnections between both words.

It is also presumed that if the word “man” is primed, the activation that spreads to the word “manual” did not prime the word “misogynist”, “male”, or “woman” to any greater extent because there are so few connections that exist between these concepts. Instead, “manual” only primed words related to the concept such as “guide”; “woman” only primed the word “mother” and so forth. Hence, the activation would not only be diffused following the concepts that are being primed but the same amount of activation would be divided equally among a greater number of concepts.

In summary, each set of branching would have words that are either semantically or lexically related to the word that is being primed previously. The analysis would also reflect how those words are organized orderly in the participants’ lexical access. For example, the word “woman” is much closer to the word “man” than the word “hard”. Before being able to have access to the word “hard” from the word “man”, the participant has to go through several priming words first. The same does not apply to the word “woman”; “woman” has a stronger association to the word “man” and this is reflected in the position of both words in the semantic network that takes place in the participant’s mental lexicon.

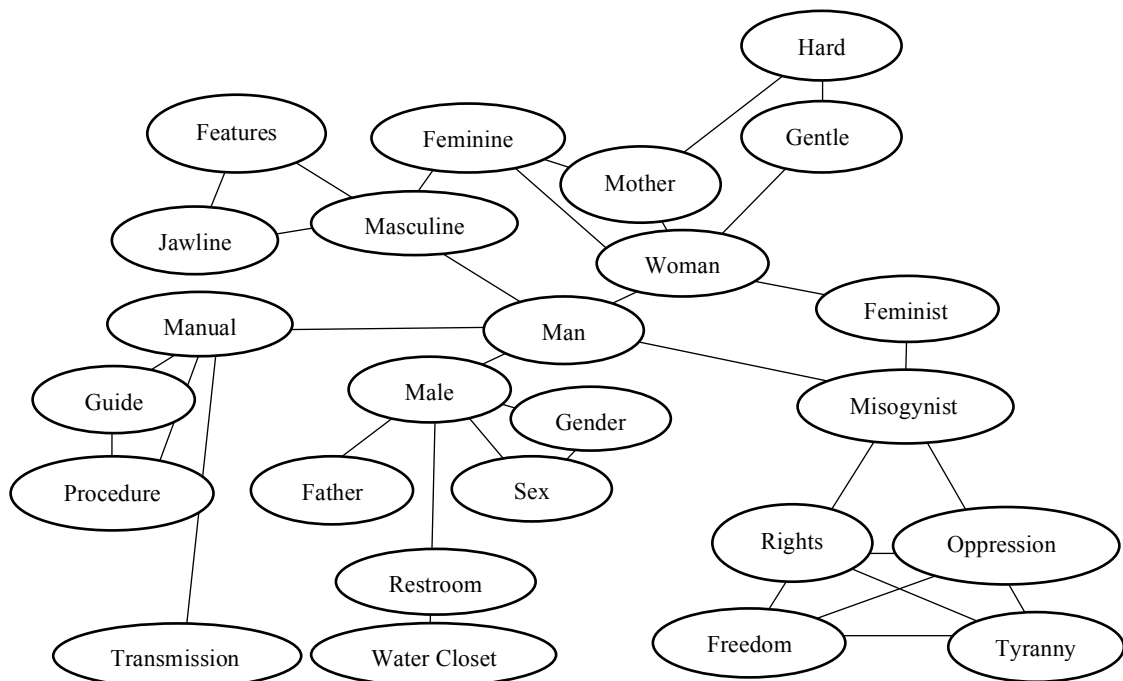


FIGURE 6. Semantic mapping showing semantic relatedness between words

Based on the data presented in Figure 7, among the patterns that can be seen in the participant's semantic mapping are the tendencies to project words that are related to their interests and personal examples or experience. As shown in Figure 7, when the word "man" is primed, the first set of branching tended to focus more on the characteristics that describe a man (e.g., funny, strong, cool, handsome). However, in the second set of branching, the participant tended to list out a series of persons' names assumed to be the exemplars to the concept brought by each of those characteristics (e.g., funny: Johan, Zizan, handsome: Aaron Aziz and Awal Ashaari, strong: Superman, Ironman, Batman; and cool: Theo James, Tom Cruise).

The pattern explained above proved that the way the words are organized in the semantic mapping also depends on the participant's pattern of organizing his/her prior knowledge regarding certain concepts as some participants may focus more on the words that often associate with one another whereas some may focus more on how close those words are to their interests.

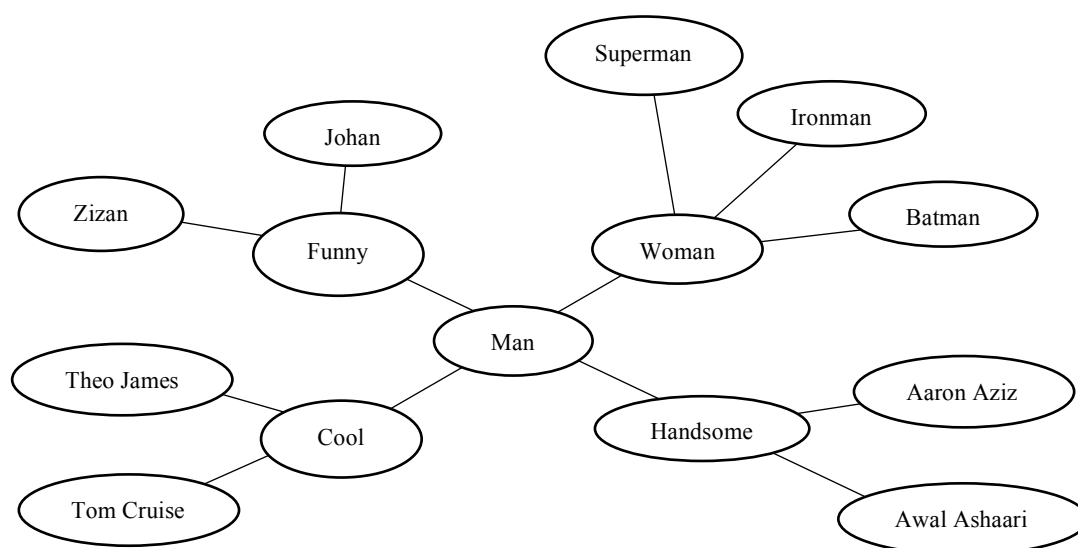


FIGURE 7. Semantic mapping showing words related to participants' interests and personal examples.

DISCUSSION

This study was conducted with the aim of exploring the lexical access of ESL speakers, particularly Malaysian students. Findings found from the semantic maps produced by 50 UKM students who participated in this research were categorized into (i) the students' level of proficiency in English, (ii) the effects of priming on students' lexical access and the concepts reflected, (iii) the influence of word exposure frequency onto students' lexical decisions, and (iv) the pattern of phenomenon found in L2 semantic mapping.

As mentioned earlier, semantic mapping is a form of graphic organizer which can be developed by students and teachers together, both in groups or individually (Dilek & Yürük, 2013; Heimlich & Pittelman 1986; Mukoroli, 2011). Therefore, the findings of this study reflect the participants' lexical access patterns. As presented in the findings, more proficient ESL speakers produced twice as many English words as less proficient speakers did. The total number of words produced indicates the students' ability to access the words in their mental lexicon; thus, it is safe to assume that the larger the number of words produced by a participant, the more proficient he/she is, especially in the aspect of vocabulary acquisition.

Hence, this shows that semantic mapping activity is capable to reflect ESL speakers' proficiency in English. This is because, when a word is primed, speakers would naturally activate words in their mental lexicon and try to connect each one of those words in order to create a few branches of semantic mapping. The more proficient ESL speakers may not have problems to relate one word with another as they would already have prior knowledge on how English words are related to one another in their mental lexicon. Their knowledge of the English language enables them to understand the linguistic features (i.e., sound, spelling, and meaning) and the semantic relations (i.e., synonym, hyponym, and antonym) between those words. The less proficient ESL speakers, however, may struggle in their search for words as their knowledge on how English words are related to one another may be limited or the vocabulary is non-existent for them. As a result, they face problems in developing the semantic mapping related to the "priming" word.

Semantic priming refers to the speed or accuracy of words reflected in responding to a stimulus of a word or a picture that is being primed (Heyman et al., 2014). When the word "man" is primed, the word that has the highest frequency for both groups of participants is the word "handsome". It can be assumed that the word "handsome" has the shortest time of activation as the same event happened among majority of the participants. However, a further research using psycholinguistic methods, for example, the use of ePrime or DMDX software, needs to be conducted in order to measure the reaction time differences if those words or concepts tend to occur in the same set of branching.

The words that occur in the first set of branching are categorized into the concepts that are presumed to be mutually associated. There is a variety of concepts, that are either semantically or lexically related, produced by the participants. As stated by Granham (1985), it is, however, convenient to think of the lexicon itself as containing not just the meanings of the words but rather, pointers to those meanings which prove the contribution of other context in defining the words itself. Therefore, the findings once again support the idea stated by Granham (1985) with regard to the contribution of other words in relation to its context to define a word. To illustrate, although the word "handsome" has the highest frequency when the word "man" was primed, the word "handsome" is listed in the third highest category ("characteristics" for 17%). As can be seen from the data, the concepts brought by the words referring to the "roles" (30%) and "personalities" (25%) of the word "man" have higher frequencies than the others ("characteristics" (17%), "activities" (8%), "gender" (8%), "others" (7%) and "items" (4%) category). The various concepts, whether they describe the features of the concept primed or the order of it or the examples that can be relate to, prove that although those words are all linked directly to the word in primed, those links do not have to be in any sense equal in criteria and in accessibility, as stated before by Collins and Quillian (1969, 1972).

This study also shows how familiarity or the availability of particular lexis in ESL speakers' environment can influence their lexical decisions in accessing those words from their mental lexicon. Words that have high occurrence (5 times and above) in the participants' semantic mapping have a larger, and a very wide range of frequencies in its usage (as stated in *Corpus of Contemporary American English*) compared to the atypical words. It is presumed that the choices of words chosen by the participants are influenced by the level of exposure that they experienced, whether in the form of the words or by the usage of those words, either through formal learning or informal learning. As stated by Howes and Solomon (1951) and Forster and Chambers (1973), high frequency words appear more commonly in a language corpus which therefore creates a huge opportunity of exposure to the speaker of that language.

There is a possible explanation for this. The words that the participants are familiar with are accessed from their mental lexicon easier than the less familiar words. In addition, as

mentioned earlier, it is presumed that the students' reaction of time to access those words from their mental lexicon is also shorter as the high frequency words have already been repeatedly stored in their mental lexicon. The findings of this study are consistent with previous studies which stated that performance is better for high frequency words than low frequency ones because the representations of high frequency words in long-term memory are either more accessible or more specified than those of low frequency words (Mandler, 1980; Scarborough, Cortese & Scarborough, 1977). The observation made on participants' lexical access also proved that the high frequency words are accessed faster than their low frequency counterparts (Forster & Chambers, 1973; Howes & Solomon, 1951; Zhu, 2015). The more frequently a lexical item is used, the more quickly it is recognized.

How words are being organized in the mental lexicon of ESL speakers is similar to what McAleese (1998) suggested, namely the associations of class (which is the order of things the concept falls into); the associations of property (which is the attributes that define the concept), and the associations of example (which is the exemplars of the concept). For instance, a majority of the participants tended to produce words that reflect the exemplars of the word "man" such as "father", "brother", and "superman". In addition, ESL speakers also have the tendency to produce words that are related to their interests and personal examples or experiences in the semantic maps. For instance, names of celebrities were triggered in response to the word "handsome" and "funny". It is assumed that participants had already stored the knowledge and understood the concept of those words or exemplars in their mental lexicon in order to be able to relate it with the concepts of the words previously primed. This shows that the concepts that they are exposed to more frequently tended to be activated easier when they are related, either semantically or lexically, to the word previously primed.

CONCLUSION

The pattern on semantic relatedness shown in participants' semantic mapping reflects how words in the cognition of ESL speakers are related to one another. For instance, in the first set of branching, participants tended to list out words that have various strength of interconnections either to the word being primed or between each of the responses (words) given. However, in the next set of branching, participants tended to have a strong interconnection or relatedness between the words that are being previously primed. The findings prove that the flow of nodes in participants' mental lexicon moved from various specifications to a more specific interconnection. It also proves that the flow of activation happened gradually (one node to another) following the previously primed word. These findings support the theory by Collins and Quillian (1972) in their research that the activation of a node is triggered one at a time but it continues in parallel from other nodes that are encountered as it spreads out from the node of origin.

Moreover, all the findings at the same time corroborate the idea stated by Collins and Loftus (1975) that a person can control whether he/she wanted to prime words that are related in the semantic network, or words that are related in the lexical network, or both. Based on the list of words produced by the participants in their semantic mapping, there are words in the lexical network that have the same sound with the word in primed (e.g., the relation between the word "man" (/mæn/) and "manual" (/mænjuəl/), and there are also words that represent concepts in semantic network that are related to the primed words (e.g., the word "man" that activated the words "male", "guy", "woman", "father", "boyfriend") and words in lexical network that are related to any of the concepts mentioned before. Hence, although the activation of words in the participants' mental lexicon moved gradually from one node to another, the activation did not neglect the relationships that exist between those words.

Although currently there is no concrete evidence that shows the relationship between students' proficiency in English with the capability of their own lexical access, the findings of this study, although is only based on one word, is important as it can be used as more concrete evidences and highlight insights that can be used to improve students' English language proficiency. In addition, the findings have provided information on the visual strategy for vocabulary expansion and extension of knowledge. The semantic mapping identified in this research will provide an opportunity to cognitive scientists to investigate how ESL speakers in Malaysia categorise their thoughts. The information can be used by language educators to come out with possible ways of teaching vocabulary to less competent L2 English speakers, hence improving their students' proficiency in the language, particularly in vocabulary acquisition. The semantic mapping and the word-relation to other items and contexts can make it easier for students to recognize and learn new words as well as use them in their daily communication. Finally, the study concludes that semantic mapping activity is capable not only to reflect and analyse students' proficiency in English but also to reflect students' weaknesses and pattern of thinking.

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