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The Relationship Between Mental Lexicon and Psychology Comparative Study of Psycholinguistic

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Abstract

For a long time, the process of lexical acquisition in the minds of language learners was explained in part by the idea of associative language learning. The results of L2 research in this area have been less certain so far. It is the goal of this study to delve into some important issues and learn more about how words are stored in the brain—or, to put it another way, how lexical expansion is linked to the process of word association (WA). This study is being conducted to gain a better grasp of how the mental lexicon is linked to lexical semantics, to learn more about how mental links between lexical items in the mental lexicon are established, in line with previous findings, the word associations of native speakers and non-native speakers differ in certain aspects. If you're a native English speaker, you'll notice a distinct difference in the way you talk. Besides underlining the importance of lexical semantics and phonological features during word acquisition, the results also address the need to create a rigorous approach for the analysis of word association. In this section, we look at the implications for WA research, the mental lexicon, and L2 language learning and teaching.

Introduction

Research in this area focuses on the mental processes involved in understanding and producing language. It's reasonable to ask, "How are the words we use connected with the concepts they help to express?" Such a seemingly simple question, however, is far from easy and decisive. The first step in translating one's abstract concepts into real words (spoken, written, or signed) is to first conceptualize and organize these words in a way that is easily accessible. The mental lexicon refers to the system we use to organize the words in our heads. Because language output would be laborious and inaccurate without a working mental lexicon, developing one is essential for effective language usage. As an analogy to a lexicon, a printed dictionary is sometimes used to convey the concept of the "mental dictionary." Human language use, on the other hand, is much more complicated and does not follow a dictionary-like structure, thus this analogy falls flat very quickly. The alphabetical order of words in dictionaries is the sole way to access them, and not their other characteristics (such as their meaning) (Fellbaum, 1998). In an effort to explain how people's knowledge and (at times irregular) use of words follow patterns and regularities, flexible mental lexicon models have been proposed. For the reason that these rules are not always obvious, several models and methodologies have been created throughout the years. Some of these models and the issues they raise will be discussed in this section. These models and their accompanying challenges will be discussed here.

The vocabulary knowledge of typical native speakers of a language is clearly a part of their linguistic abilities (or lexical items). Academics generally agree that humans have a large vocabulary and can learn new words in a split second (Muller, 2008). To be able to recall such a big number of words with such ease shows that they are not just stored at random (Gairns, 1986). Word knowledge, on the other hand, is controversial in terms of its specific meaning and how it is conveyed in the mind.

It's generally agreed among academics (Aitchison, 2003) that there is very little understood about the mental vocabulary, and that all attempts to explain it rely on metaphors (Peppard, 2007). Some have likened it to a dictionary, while others have likened it to the internet (Hoff, 2005). (Brown, 2006). It's more like the Internet than a dictionary since the material in your mental vocabulary is always being updated. New terminologies are coined, old ones are reconnected, and obsolete terms may be obliterated (Aitchison, 2003). "Words in a language" are referred to as "mental lexicon" by Bruze and colleagues (2009). (p.363). According to Takac (2008), it is a "memory system that has accumulated a significant number of words through time." Mental lexicon is Bonin's (2004) definition of "the mental storehouse of all images naturally connected with words." Many questions remain concerning how a native language learner builds the mental links inside his mental lexicon for the native language's structure, given that language acquisition may occur at different times of an individual's physical and mental development. [page needed] (Post, 2007). Assumptions, however, have been made regarding how this information is represented and organized in the mind. According to Bonin (2004), the mental lexicon is comprised of phonological, semantic, morphological, and orthographic representations. Levelt (1995) adds to Bonin (ibid.) that mental knowledge, the reservoir of declarative information, has four properties. In the first place, the item's meaning must be defined. The verb to eat means "to devour for nourishment or pleasure," according to the Oxford English Dictionary. An further syntactic feature is the category of the entry; for example, to eat is a verb and its syntactic arguments are the external subject and internal object. To eat. Its morphological properties, such as the third person singular for the verb "to go," are also included in this section. To round things out, there's phonological data in there. An understanding of a word's phonetic structure is essential to its comprehension (Randall, 2007). As Randhall (2007) points out, an item is also accompanied by supplementary information. One discourse setting may be more appropriate than another because of its pragmatic, stylistic, and affective aspects. According to Levelt (1995), there is a logical connection between these four categories of knowledge. For illustration's sake, let's look at the term painter. The suffix '- er' denotes that it refers to a real-world person or organization.

The Mental Lexicon

The mental lexicon, as defined by psycholinguists, is at the heart of this inquiry. It encompasses all of a person's mental word representations. Words are organized, accessed, and remembered in the brain using this term (Aitchison 2003; Zhang, 2009), and it is often considered to relate to the mental skill that enables us to perform our 'total linguistic agility' (Altman, 2001). However, Aitchison's (2003, p. 248) word seems to be relevant for this investigation: The primary focus of the mental lexicon is on connections rather than specific geographic locations. If you can't figure out where a word's knowledge ends, this method concentrates on its core rather than its periphery. This is more important than the details, which are added on as the speech progresses... When we think of a dictionary or lexicon, we tend to think of a collection of words. Words in the mental lexicon are grouped together to form a lexicon that includes contextual, personal, as well as interpersonal aspects of meaning and promotes language acquisition, retention, and expression. It follows that for L2 learners, the focus of lexical development should be on building a strong mental lexicon, since it is this skill that allows and promotes subsequent language learning.

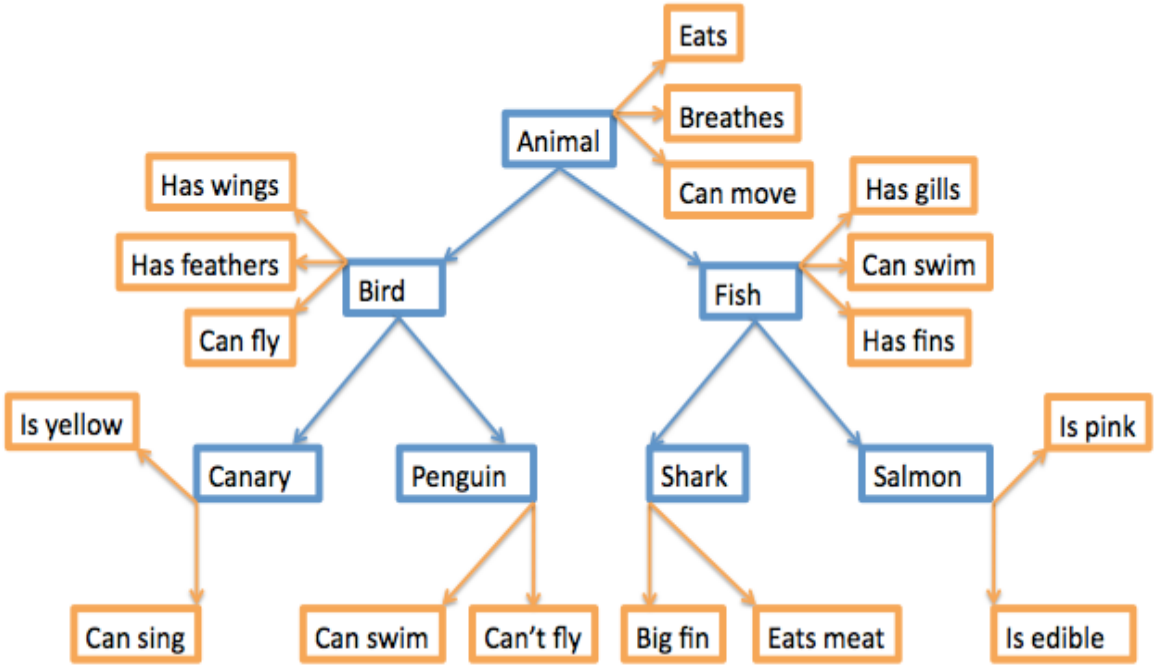
Semantic Models of the Mental Lexicon

1. The Hierarchical Network Model

The mental lexicon was first studied in the context of semantic memory construction by early academics. The focus is on meaning rather than form in this theory, which holds that

words have the same lexical entry in both their forms and meanings. Using Collins and Quillian's notion of a hierarchical network as the foundation (Collins & Quillian, 1969). This method arranges all concepts into a network of "nodes," or lexical entries, that are connected one to the next. The most abstract ideas are found at the top of the pyramid, while more specific instances are found one level below. There would be distinct nodes for the concept of "bulldog" and every other occurrence of "dog" on the pyramid's lower levels. "dog" is the overarching concept that connects each member of this cluster (see Figure 1). A dog is a mammal, which is a subcategory of "Animal," the most general category of all. To further identify ideas from one another, the feature that distinguishes each node is also indicated underneath each node. According to Collins and Quillian, since traits like "having legs" wouldn't need to be recorded at every level of the hierarchy, this was a better use of cognitive resources. When there are more direct links between two concepts, drawing conclusions about their relationship takes longer.

This paradigm, on the other hand, may be broken down in many different ways. In addition to the fact that deciding whether a "dog" is an animal (higher level) takes longer than deciding if it is a "mammal" (lower level), there is no organization for a "wing" by itself (e.g. Appendages>Wings), so an attribute like "wing" would have to be placed under two nodes, "bird" and "bat" (Collins & Loftus, 1975) fix this). Last but not least, the task used to evaluate this model is skewed in favor of a meaning-based technique, which entails deciding on word meanings rather than word usage (if there is more than one layer of lexical entry).



The Collin and Quillian Hierarchical Model (1969)

2. The Semantic Feature Mode

As a result of the substantial flaws in Collins and Quillian's (1969) approach, Smith and colleagues (1974) developed a paradigm in which word meanings were seen as collections of semantic features or quality (Smith et al., 1974). These features fall into two categories: defining and defining. For example, a concept's most prominent aspect is one of its defining

traits, but it is not one of its distinctive features. When it comes to "robins," "red-breasted" is a quality, but "small" is the most important characteristic. When thoughts are grouped together in the mental lexicon, they share a greater number of differentiating traits. "Robin" and "bird," which share three qualities, are in a separate category than "bird," which has just two traits in common with "ostrich," as can be shown by comparing their shared features (see Figure 2). According to the hierarchical paradigm, “ostrich” and “robin” would both be placed next to “bird.” As a result, this paradigm allows node connections to be more flexible and to have several levels (lexical entries). As a part of this paradigm, it's crucial to note that tangible ideas have more distinguishing properties and are easier to compare to other concepts. Semantic categorization makes it easier to answer the question, "Is a toaster a dog?" rather than, "Is an animal a thinker?"

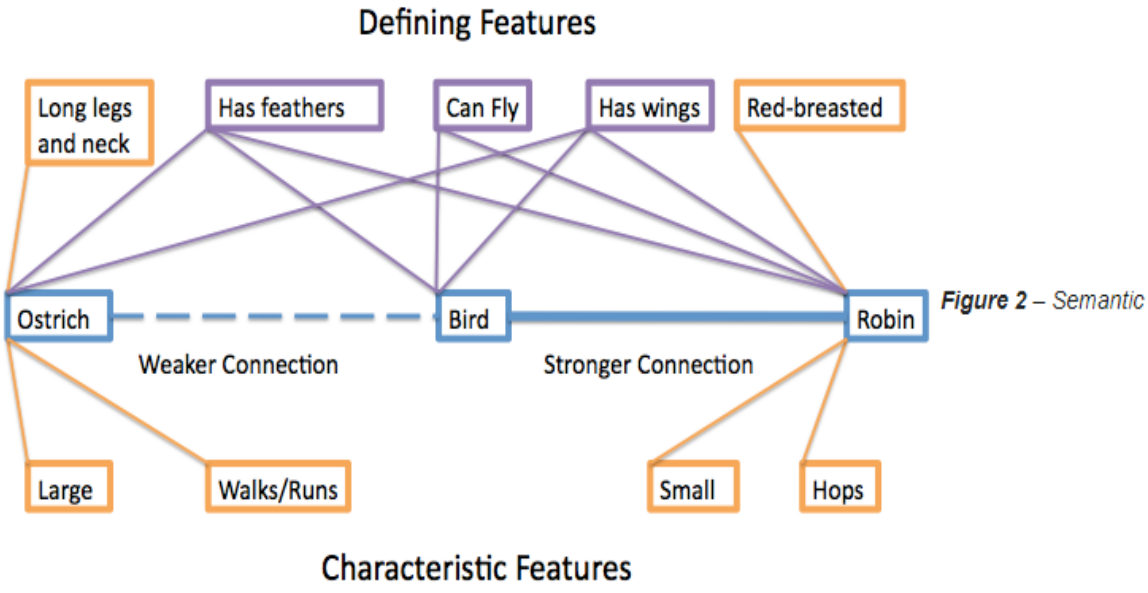


Figure 2 *– Semantic*

Aspects of the Model (adapted from Smith et al., 1974)

Smith and colleagues (1974) argued that the brain examines generic lists of words' meanings before making semantic judgments (both defining and characteristic). Defined characteristics are used to make a "yes" or "no" decision if the similarity between these lists is unclear. Response times on a semantic categorization exercise supported this theory, although it had certain limitations. A few category names responded slowly when used in conjunction with other terms, and reaction times for particularly large categories took longer than expected. "Animal" is a good fit for both of these definitions.

3. The ACT and WordNet Models

More recently, a number of mental lexicon models based on computation have been established. Like previous models, this one makes the case that the lexicon is structured primarily according to semantics. Words and their meanings (concepts) are separate in these frameworks, though. For this reason, it is possible to have an idea without a word, but it is impossible to have a word without an idea (Fellbaum, 1998). Furthermore, the context in which a thought is most prominent restricts knowledge of that concept and its connections to other concepts.

It differs from previous semantic models in that it doesn't only order words based on their relationships with declarative knowledge or factual meaning. The ACT Model Another method used by the ACT Model to organize its words is procedural knowledge (or the functional links among words). Learning how often words occur together and subsequently activating "chunk" structures is taught through the ACT Model. "Game" is put beside "play" because it is often used in the same sense as "play." A more pragmatic approach to word order is taken by the ACT Model (Anderson, 1996).

Synsets of words in WordNet's electronic lexical database are then placed in a hierarchical network. There are many ways to represent the same idea in different contexts, but one of the most common is via a sysnet. Drink, injection, and pellet are all terms that may be described by the phrase "shot." The various synonyms for "shot" cannot be grouped into a single synset (Fellbaum, 1998). You'd just need to offer this one word or phrase for each synset to differentiate it from the rest of the group. It begs the issue of how systems may be linked in order to establish a complete hierarchy for all words when not all lexical entries have accurate analogues. In the case of nouns, the notions of hyponymy and hypernymy, which are non-exact synonymy, are used to get around this problem. Example: "robin/bird" is a word pair in which "bird" is a hypernym for its hyponym "robin." There are two types of noun hierarchies: the "unique starter" and the "unique starter." The "unique starter" nouns are those that appear at the very top of noun hierarchies, and they are referred to as "unique starters." Collins and Quillian's method cannot be used here since words like "net," "racquet," and "ball" are functionally related in specific contexts. "The Tennis problem" refers to the model's inability to account for semantic priming between these concepts, which does not present in reality (Fellbaum, 1998). For these "discourse semantics," this model is not as capable as the ACT and spreading activation models.

The Connectionist (Associative) Approach

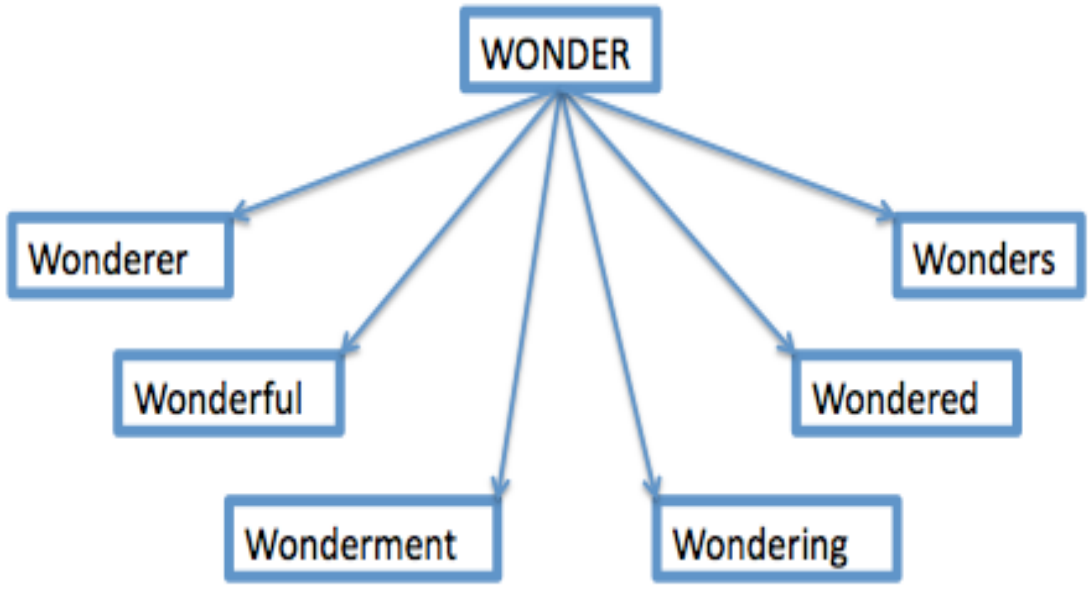
Currently available theories assume that words are arranged in the brain's mental lexicon only according to the common meanings they share. According to Seidenberg and McClelland (1989), there may be no "mental lexicon" and that word knowledge might be viewed as any other kind of information. These researchers' connectionist technique is known as a spreading activation model (or Parallel Scattered Processing model), and it involves dispersing information about the lexical representation of a word over many nodes, as opposed to Collins and Loftus, 1975. "Word information is maintained as a set of weights on connections between processing units reflecting orthographic, phonological, and semantic qualities of words, as well as the correlations between these elements," scientists write in a statement (Seidenberg & McClelland, 1989, p. 560).

The connections between phonology, orthography, and meaning expand in the same way neurons do when they fire and link in the brain when all three are engaged at once (R. E. Brown & Milner, 2003). Small numbers of "hidden units" link a large number of "input units" representing orthography, phonology, and meaning in a bottom-up process. The unnoticed units combine inputs that occur at the same time (or "fire"). When the weights between units are adjusted over time, computer testing of connectionist models tends to classify words according to categories such as "noun," "verb," "animal," etc (Elman, 2004). Contrary to the top-down thinking described above, this logical word grouping is the result of a bottom-up process. Rather than relying on "hard-wired" principles, this theory contends that words are only sorted in the brain depending on the connections between them when they are encountered in the environment.

The Morphological (Rule-based) Approach

Mental lexicon models often ignore morphology, a characteristic of words. Others (such as connectionist models) dispute the need of a rule-based framework for organizing words, while other theories merely acknowledge that morphology exists in the background (Pinker & Prince, 1988). Morphology was incorporated in the model of Bock and Levelt (1994), but the authors did not explain the degree to which it may vary from one level to another.

Formal units of meaning in words are called morphemes, which are the most basic units. Morphemes such as "cleaner" are formed by the morphemes "er" (adjective) followed by a verb (one who performs verb). It is possible that the mental lexicon is organized (in part) by these form-meaning overlaps, which are consistent and frequently work in a rule-like way. Stanners and colleagues performed the first study to back up this hypothesis in 1979. (Stanners, Neiser, Hernon, & Hall, 1979). They found that words with the inflected past tense "ed" form were primed more quickly than those with the irregular past tense form. After Forster and Davis (1984) identified aural-visual priming for root words preceded by one of their (morphologically derived) forms, Marlsen-Wilson and colleagues (1994) revealed aural-visual priming for root words preceded by one of their orthographical and semantically related pairs. For monolinguals, words that share a morphological root may be classified together in the mental lexicon under that root, according to these studies. Though the evidence is currently sparse, some researchers are beginning to wonder if this anatomical mental organization is universally true for bilinguals (Voga & Grainger, 2007). In terms of words that seem to share a root but do not (for example, "corn" and lexical category", "corner"), a proposal has been made to classify them separately. It is also necessary to memorize irregular past tense forms of verbs as whole words, rather than only the irregular verb's present-tense form (Pinker, 1991).



Model of Morphology (adapted from Voga and Grainger, 2007)

The morphological organization of the mental lexicon may be supported by biased tests, similar to how semantic models are supported by semantic categorization tasks. Lexical choice tests, according to Seidenberg and McLelland, don't adequately access the semantic components of words, which leads to morphology being preferred (Seidenberg & McClelland, 1989). Morphology, according to Seidenberg and other connectionists, doesn't fit neatly into a separate input unit or layer in the model, but rather is stored in the mental lexicon in the same

way that words are stored. For the purposes of this paper, the term "morphology" refers to the relationship between form and meaning, which they describe as "the consequence of interactions in a dynamic system that maps meanings onto forms and vice versa" (Gonnerman, Seidenberg, & Andersen, 2007, p. 341).

That's not the case, according to many recent studies. According to the results of these investigations, morphological priming is more powerful than the sum of orthography (or phonology) and semantic priming effects (Marslen-Wilson, Bozic, & Randall, 2008; Feldman, 2000; Rastle, Davis, Marslen-Wilson, & Tyler, 2000). The morphology of words shows that there is something that surpasses the fundamental form-meaning overlap seen in morphologically similar terms, showing that it is uniquely reflected in the lexicon. Conclusion: Although considerable evidence suggests that morphology has its own unique representation in the mental lexicon, the question of whether it is the most basic level of organization is still hotly debated.

1. Neuroimaging and the Mental Lexicon

This is the first time we've spoken about models of the mental lexicon that highlight connections between nodes and infer the lexicon's "spatial" design based on these connections, which we've described before. Is the brain's physiological structure able to support these notions, or are they only pretty to look at? Many neuroimaging studies suggest that the various parts of the lexicon are widely scattered across the language areas of the brain. These findings suggest that the brain's ability to classify words is much more complex than previously thought. Newman and colleagues examined brain activity using fMRI and syntactic and semantic violation tests to uncover differences in syntactic and semantic processing (Newman, Pancheva, Ozawa, Neville, & Ullman, 2001). During syntactic processing, frontal brain areas were more active, whereas temporal and parietal lobe regions were more active during semantic processing.

Open-class or content words, such as nouns and verbs, seem to be differentiated from closed-class or function words, such as conjunctions and prepositions, on a hemisphere basis. The (frontal) left hemisphere's N400 wave is more pronounced in response to closed-class expressions (C. M. Brown, Hagoort, & ter Keurs, 1999). Open-class words are more prominent in the right hemisphere, while closed-class words are more common in the left.

2. Organization of the mental lexicon

Various studies have offered indications as to how the mental lexicon is organized. Low-frequency concepts were defined in Gairns (1986) and test respondents were given the definitions and asked to identify the words. Even though not everyone who took the exam answered to the researchers' questions, the answers on the tip of their tongues were crucial. Even though they were phonetically close to the right words, several of the answers were erroneous. There were others who were able to guess the word's beginning or its length, and there were others who found phrases that were comparable in meaning to what the researchers had in mind. The findings showed that the lexicon's structure relies on an interconnected phonological system, a network of meaning connections, and an interconnected system of spelling. However, regardless of which variable is responsible for determining the storage and organization of items (e.g. Kraut et al., 2002; Loftus & Loftus, 1974), there is a complex relationship between all variables involved in the organization of mental lexis, regardless of which variable is responsible. According to Froster (1976, cited in Gairns,1986), all objects are grouped in a single "master file" and that there are many "access files" holding information on spelling, phonetics, syntax and meaning.

3.Findings on storage of words in mind

On the other hand, it's possible to ask how the many parts of the mental vocabulary are related. There are several research on memory that support the idea that words are stored and remembered as a network of associations (Gairns ,1986). Associative patterns may take several shapes and be connected in a number of ways. According to Bruza et al. (2009), "individual words are not remembered as standalone entities in long-term memory, but rather as part of a network of linked words."

Using Collins and Loftus' (1975) Network Model, words are arranged in hierarchical networks and linked by nodes with connections such as hyponymy or superordination, antonymy, collocations, and coordination, among others.

Set Model Theories: According to Katz and Fodor's (1963) semantic feature theory, each word has a core meaning that is surrounded by a number of extraneous facts. According to Katz and Fodor (ibid.), the most essential meaning qualities of a word are listed. In other words, in order to be referred to be a 'bachelor,' a person must be single, human, male, and of legal age to marry or cohabit with another human being (i.e. at least 18 years old).

Prototype Theories: Based on Sripada's (2008) prototype theory, people have previous conceptions about the properties of new objects they encounter. "The heart of the idea of prototype is that a mental dictionary entry is based on a representation of the prototype members of the class that the word denotes," says Sripada (2008). According to Randall (2007), this is an example-based technique of categorizing words. According to him, it is common for people to depend on examples when identifying groups.

4. The second language mental lexicon

When comparing the mental lexicon of a first language with a second language, what differences do you notice? It is claimed by Singleton (1999) that while the L1 and L2 mental lexicons are maintained separately, they are linked and communicate. Wolter (2006) agrees with Singleton (ibid.) that the L1 mental lexicon influences the L2 mental lexicon. As a result, it seems that there are two distinct mental dictionaries (Bastkowski, 2003). Despite the fact that the second language student may not know the second language term for rain, Bastkowski (2003) asserts that the idea that the second language learner has a 'clean' mental vocabulary is unrealistic. When a second language learner acquires their first word in a second language, they have already established an extensive set of assumptions for absorbing and organizing L2 lexical information.

Conclusion

Language experts would benefit greatly from an understanding of the mental lexicon since it touches on all aspects of psycholinguistics. We may analyze our mental lexicon from a variety of angles, as it serves as a bridge between our thoughts and our words. Because of this, the ideal model and whether a universally applicable model is even possible are still up for debate. The models we've looked at here have all added to our understanding of the mental lexicon in some way, but it's important to remember that none of them are worthless.

It's possible for humans to store and remember an enormous number of words in their heads because to their mental lexicon. Multiple research projects have been carried out in an attempt at identifying the most critical element in storing lexical information in the brain. Many other types of representations have been suggested to exist in the mind's lexicon, all of which have complex interrelationships with one another and with other elements. Studies have

demonstrated that words and their meanings are not stored separately in the brain's memory, but rather are linked together via a web of associations. Researchers have found that the L2 lexicon is distinct from the L1 lexicon, despite the fact that both lexicons interact.

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