The Organization of the Mental Lexicon

The Dispute Between Monosemy and Polysemy

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ABSTRACT

In linguistics, there are two views on how senses of polysemous words are organized in the mental lexicon. The *monosemic* view states that there is one core meaning from which all other meanings are derived through context. The *polysemic* view states that multiple senses of a word are separately stored. This study investigated the validity of these two standpoints experimentally. The process of conversion was applied to twelve Dutch nouns in order to create twelve novel verbs. In this way, participants had not encountered these words before and by that, the process of constructing meanings of words could be further explored. Four tasks were performed: (1) an association task, in which the participants had to come up with their own meaning of the verbs, (2) a prototype task, in which four meaning possibilities were presented to the participants from which they had to choose the most prototypical one, (3) a sorting task, in which the participants had to sort these meanings into three categories: 'concrete meanings', 'abstract meanings' and 'other meanings', and (4) a rating task, in which the participants had to rate three sentence pairs (concrete meaning-concrete meaning, concrete-other, concrete-abstract) per novel verb. The results of the experiment are presented in a newly proposed model: The Core Meaning Model. This model consists of three types: (1) there are words that have a strong core meaning, this corresponds to the monosemic view, (2) there are words that have an average core meaning with other meanings activated as well, this supports a combination of the monosemic and polysemic view, (3) there are words that have a weak core meaning with other meanings highly activated as well, this mainly supports the polysemic view.

Keywords: monosemy, polysemy, mental lexicon, conversion, The Core Meaning Model.

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1. INTRODUCTION

It is possible for a word to mean more than one thing. A word can have different meanings that are very distant from each other (e.g., *bank* can mean 'a financial institution' or 'the side of a river'), but it is also possible that the different meanings are related to each other. This is the case for the word *paper*. *Paper* can have meanings like 'a newspaper', 'a blank sheet' or 'a printed article'. These meanings, also called senses, are related, because they are all adaptations of the same substance: paper (Klein and Murphy, 2001). When a word has different related meanings, this word is described to be polysemous. In the field of cognitive linguistics, there are different views on how polysemous words are organized in the mental lexicon. This is better known as the dispute between monosemy and polysemy. The paper of Rice (1992) provides a rational explanation of these two views. The *monosemic* view can be seen as a prism. A word has one core meaning and when the core meaning 'hits the prism', or in other words, is used in a specific context, then other possible meanings may be derived from that core meaning. The *polysemic* view is like a chameleon. One word has multiple meanings separately stored, and the right meaning is activated when it has to be activated. Just like a chameleon can change his color through his circumstances.

This study will further explore the dispute between monosemy and polysemy, and will bring more insight into the organization of meanings in the mental lexicon. The research question is whether this organization is monosemic or polysemic. The validity of the hypotheses will be explored experimentally. The experiment consists of four tasks. At first, an association task will be performed, during which participants have to assign a meaning to twelve denominal verbs. Secondly, a prototype task is performed, in which the participants will choose which invented meanings of the novel verbs are the most prototypical. Thirdly, the participants are asked to sort the different meanings from the second task into three categories: 'concrete meanings', 'abstract meanings' and 'other meanings'. The fourth task is a rating task, in which the participants have to rate three sentence pairs per novel verb. The prediction of the monosemy hypothesis is that the participants will give similar responses. This would suggest that the nouns have a core meaning and that the participants used this core meaning to give a meaning to the novel verbs. The prediction of the polysemy hypothesis is the other way around. If the participants vary a lot in their decisions, it would support the polysemic view, because it would mean that every participant has used different core meanings of the nouns. This would suggest the nouns do not have one core meaning, but several meanings that can be activated. The results of the experiments support the monosemic view of the organization of the mental

lexicon to a great extent. However, there are three important notes that need to be added to this statement. The results will be presented in The Core Meaning Model, which is proposed by me. This model consists of three types: at first, there are verbs that show a strong core meaning (the monosemic view). Secondly, there are verbs that show an average core meaning with other meanings activated as well. This shows a combination of the monosemic and polysemic view. Thirdly, there are verbs that support the polysemic view the most, but still a weak core meaning is present.

This study is organized as follows: section 2 discusses the related issues on the dispute between the monosemic view and the polysemic view. It will provide a theoretical explanation of relevant linguistic terms and an overview of the relevant research in section 2.1. Section 2.2 discusses the relevance of the process of conversion to investigate this dispute.[1] In section 3, the pilot study, and the method, the materials and the results of the main study are presented. Section 4 discusses the results from the main experiment by presenting The Core Meaning Model. This section also discusses improvements and suggestions for further research. Finally, the conclusion of this study will be given in section 5.

2. THEORETICAL BACKGROUND

2.1 Homonyms, polysemy and monosemy

2.1.1 Theoretical explanation of terms

2.1.1.1 The boundaries of polysemous senses. Some senses of words are more related to each other than other senses. The boundaries of polysemous senses can differ from very distant and unrelated senses to very close and related senses. Croft and Cruse (2004) have argued that the most distant, completely different, senses occur with homonyms. Homonyms have the same spelling and sound, but different, unrelated senses. A dictionary would therefore sort homonyms into different main headings (bank1, bank2), as separate words. Homonyms have full sense boundaries between their meanings, because a clear distinction can be made between them. For instance, as mentioned in the introduction, the word *bank* can mean 'a financial institution', but also 'the side of a river'. Because these meanings are not related to each other, *bank* is treated as a homonym. Cruse (2000) uses the term *antagonism* to refer to the 'fight' for autonomy these different senses undergo. This means that without the right

[1] Henceforth, the word *conversion* is used as a term to refer to 'the conversion from a noun to a verb', unless other specified. The term *denominal verb* refers to 'the conversion from a noun to a verb' as well.

contextual information there is no possibility to choose a 'winner' from the different senses of *bank*. For instance, in sentence (1), it is not clear if *bank* is referring to 'the river bank' or 'the financial institution'. When a sentence is furnished with the contextual information, as in (2), one meaning will outperform the other meaning(s).

(1) They finally reached the bank.
(2) They finally reached the bank to rob it.

Polysemous words, on the other hand, show it is also possible for a word to have two or more related meanings. As mentioned in the introduction, the word *paper* can have meanings like 'newspaper', 'blank sheet' or 'printed article', because all these meanings are related in that they are adaptations of the same substance: paper. A dictionary would list the different related meanings under the same heading (Klein and Murpy, 2001). The senses of such words do not have full sense boundaries. Cruse (2000) explained the phenomenon of sense spectra, which means that the senses of polysemous words are dots on a semantic continuum. For example, the senses 'a newspaper' and 'a printed article' would be closer to each other on the spectrum than 'a blank sheet', because a newspaper and a printed article both contain information, while a blank sheet has no information at all.

It may occur that senses are not very easily separated from each other. These senses are called *facets* (Cruse, 2000; Croft and Cruse, 2004). A famous example of facets is the word *book*. In sentence (3) and (4), different senses of *book* are referred to. Sentence (3) tells something about the book as an object (a yellow-colored book) and sentence (4) is referring to the book as the content of the book (the text of the book is fascinating).

(3) A yellow book.
(4) A fascinating book.

In some cases, it is unclear which sense is referred to, because multiple senses can fit the context. Consider sentence (5), it is unspecified whether *book* is referring to the object or the text. The adjective *unreadable* may refer to the text (e.g., the use of difficult words makes it hard to read the book) or it may refer to the object (e.g., the book is falling apart because it is a very old book). In this case, the language user is not pushed into one direction. There is no 'fight' for autonomy going on, because it is unspecified which meaning is attempted to be used.

(5) Put this book back on the shelf: it is quite unreadable.

The last type of senses are *microsenses* (Croft and Cruse, 2004), or, as Cruse (2000) called it, *subsenses*. These senses occur with words that consist of one hyperonymic reading and multiple hyponymous readings. For example, *knife*. The word *knife* can refer to many different types of knives and it is always the case that contextual information decides to which kind of knife is referred. In sentence (6) and (7) *knife* refers to different types of knives (the hyponymous readings).

(6) He threatened them with a knife.

(7) You eat dinner with a fork and a knife.

In case of microsenses, there are many sense possibilities. The range of different knives is large. It is worth noting that the hyperonymic reading of words with microsenses always needs contextual specification explicitly referred to in words. It may be possible to ask for a knife while having dinner, because all people on the table know which knife is referred to. This is not the case for knives in general (the hyperonymic reading). Only by explicitly stating that you are referring to knives in general, it is possible to activate the hyperonymic reading, as in: *you can buy all kinds of knives here*. A sentence like, *you can buy knives here*, would most certainly raise the question: what kind of knives? Language users immediately want to specify the meaning of *knife*, because many different knives (the microsenses) exist (Croft and Cruse, 2004).

2.1.1.2 Ways-Of-Seeing. As shown above, there are different kind of relations between meanings. Meanings can be completely unrelated, but it is also possible to have closer senses. More in general, Cruse (2000) and Croft and Cruse (2004) introduced Ways-Of-Seeing (WOS) to refer to different aspects of objects, and use these different aspects to unpack and analyze ambiguous expressions like *a delightful hotel*. There are different kind of WOS which are listed below (Croft and Cruse, 2004, p. 137):

(8) a. The part-whole WOS: views an entity as a whole with parts (e.g., a horse as viewed by a vet).

b. The kind WOS: views an entity as a kind among other kinds (e.g. a horse as viewed by a zoologist).

c. The functional WOS: views an entity in terms of its interactions with other entities (e.g. a horse as viewed by a jockey).

d. The life-history WOS: views an entity in terms of its life-history, especially its coming into being (e.g. a book as viewed by an author or publisher).

The sentence *a delightful hotel* can be analyzed as a part-whole WOS (a hotel that is delightful to look at because of the perfect composition of its parts) or as a functional WOS (a hotel that is delightful to stay at). Later in this paper, these Ways-Of-Seeing will be re-introduced in the form of Qualia Structures of Pustejovsky (Fabrizio, 2013). This will be useful to organize the different meanings of novel denominal verbs.

2.1.1.3 Ambiguity and vagueness. To close this theoretical background of homonyms and polysemy, it is important to discuss the terms *ambiguity* and *vagueness*. Klein and Murphy (2001) described homonyms as ambiguous words, because homonyms have two or more unrelated meanings. They described polysemous words as unambiguous words, because polysemous words have related meanings and are therefore not ambiguous. Other linguists may refer to both homonyms and polysemous words as ambiguous, because in both cases the words can be interpreted in different ways. Tuggy (2006) contrasted ambiguity with vagueness. He claimed that ambiguity corresponds to the separation of word senses and vagueness to the unity of senses. In this view, homonyms can still be seen as ambiguous words, but polysemous words have senses that are vague or ambiguous in contrast to each other. He used the example *to paint* to illustrate this. This verb can have a lot of different meanings, from 'to paint a landscape' to 'to put make-up on your face'. Consider the following sentence:

(9) John painted and Mary did so as well.

This sentence works if it means that John and Mary are both painting a painting. Even if John is oil-drawing a portrait and Mary is using aquarelle to paint a landscape, this sentence works. Although oil-drawing and using aquarelle are different senses of *to paint*, these senses can be unified under this verb and therefore, illustrate vagueness. This is not the case when John is oil-drawing a portrait and Mary is putting make-up on her face. These senses are too distant from each other to unify them under one reading. This illustrates ambiguity therefore, although it is still a case of polysemy here. This is against the definition of Klein and Murphy (2001).

2.1.2 The representation of polysemy in the mental lexicon

The representation of words in the mental lexicon can be looked at from different viewpoints. Many researchers agree about the representation of homonyms in the mental lexicon (Klein and Murphy, 2001). The two or more different meanings from a homonym are stored separately as different lemmas. Similarly, a dictionary would treat them as separate words (i.e. list them under different main headings). For polysemy, it is harder to tell how the different senses of a word are stored. The senses may be stored as different lemmas (referring to the text of a book is

something else than referring to the object itself), but a word may also have one central meaning from which the other senses are derived. This corresponds to two views: first, the monosemic view (a word has one core meaning) and secondly, the polysemic view (word senses are separately stored).

2.1.2.1 The monosemic view. Nunberg's article (1979, in Klein and Murphy, 2001) fits in the monosemic view. He noticed the use of pragmatic principles and plausible reasoning while deriving word senses of a word. According to Nunberg, senses are not separately prestored in the lexicon, but are computed from context. For example, it is very easy to change the meaning of *chicken* as animal to *chicken* as food through context. The research of Caramazza and Grober (1976, in Klein and Murphy, 2001) connects to this monosemic view, because they found the word *line* has 26 related senses and they suggested that these senses are all connected and related to a core meaning. Anderson and Ortony (1975) also agreed with monosemy. They claimed the representation of a word with multiple senses is derived through context, together with word knowledge. The semantic memory of those words is not enough to interpret them. A word has a core meaning, and through contextual information other senses of a word are activated.

Williams (1992, in Klein and Murphy, 2001) has used a lexical decision task to find out more about the representation of homonyms and polysemous words in the lexicon. He found that in context the irrelevant meanings of homonyms are not active for a long time. In contrast, the irrelevant senses of polysemous words stay active 'even over long delays' (pp. 261). These results support the mostly accepted view of the representation of homonyms in the lexicon (the meanings are separately stored), because otherwise the not useful meanings of the words would have stayed active for a longer time. For polysemy, this experiment suggested that senses of polysemous words are not separately stored, but instead connected to a common core. Otherwise, it would be easier to inhibit the irrelevant senses. For example, when a task consists of a context about money, the interpretation of *bank* as 'a river bank' would not be active for a long time, because that interpretation would not fit the context. While in a context about media, the interpretation of *paper* as 'a blank sheet of paper' would still be active after some time, although *paper* was intended to get the meaning of 'newspaper'. So, William's findings also support the monosemic view. However, the question is whether all senses of polysemous words stay active, because it seems not plausible that all 26 senses of *line* (Caramazza and Grober, 1976) will stay active in such tasks.

Briefly mentioned in Klein and Murphy (2001) are two statements that show the two ends of the spectrum of monosemy versus polysemy. Ruhl (1989, in Klein and Murphy, 2001) is clearly against the polysemic view, because he claimed there is only one defining sense for words (‘even most homonyms’, p. 261) and other senses of a word are not even created or stored that much. The core meaning explains all the uses of the word. In contrast with this, is the statement of Zgusta (1971, in Klein and Murphy, 2001), who claimed that, in the end, it is impossible to find one basic core meaning of a word. So, he is clearly against the monosemic view.

2.1.2.2 The polysemic view. Klein and Murphy (2001) claim that many linguists believe in the polysemic view. They also noticed that the polysemic view raises a lot of questions, because it is not clear how many senses are represented, if one sense still has the role of the core meaning, which senses are separated (are senses like dog as an animal class/an individual, and chicken as a living animal/food separately stored?) and when a sense is fully represented.

Lehrer (1990, in Klein and Murphy, 2001), came with a more integrated view of monosemy and polysemy. She agreed with Nunberg (in Klein and Murphy, 2001) that there are principles to change or extend the meaning of a word, but she noted that those principles are not applicable to all words. Not every word changes or extends a meaning in the same way. Lehrer therefore suggested a mental representation of words where some senses are individually represented, while other senses are derived through context and other pragmatic principles.

Rice (1992) narrowed the empirical field down to prepositions and their monosemous or polysemous aspects. The results of her research corroborate the polysemic view. Rice (1992) claimed that prepositions have some canonical meanings, which can get additional meanings over time in unique ways or following certain patterns. Prepositions are represented by related senses. Some senses are close to each other, but others are very distant from each other. Another work on prepositions is that of Brugman and Lakoff (2006). They narrowed their focus to the preposition *over*. While analyzing the multiple senses of *over*, they took a central sense (a combination of the elements *above* and *across*) to begin with their schema. This would assume a monosemic view, but while analyzing the senses, they composed a complex schema with many connections between senses without connecting to the central sense. They also distinguished meanings that tend to be core meanings as well. This network shows the preposition *over* has a polysemous organization in the mental lexicon. Senses are not derived through context, but are linked to and derived from other senses or multiple core senses. Gibbs

and Lonergan (2007) did not agree with Brugman and Lakoff's choice to pick out a core sense, because there is no proof of words having a core meaning. Another sense of *over* could also be the core sense. They also claimed no linguist has ever managed to determine the core meaning of a word. The monosemic view seems to be very unlikely therefore, because even the process of coming to a core meaning is already too difficult. This is in line with Zgusta's statement (1971, in Klein and Murphy, 2001).

2.1.3 Extending senses of polysemous words

Some senses of words are established (Cruse, 2000). This means the sense is permanently stored in the mental lexicon. For example, the sense 'a financial institution' and 'the bank of the river' are established and permanently stored. When a new sense of a word is introduced, the 'new' meaning of this word is not yet established. Such new senses may come from enriched meanings (Cruse, 2000). That is, for example, when semantic content is added to enrich a sense or to give a sense a more specific meaning, see sentence (10).

(10) *He has a temperature* (the meaning of *temperature* is specified to 'high temperature', which refers to a fever).

Interestingly, these enrichments and new senses are following certain patterns. Klein and Murphy (2001) mentioned the following recurring semantic relations between senses of polysemous words: object/substance, object/representation of the object, type/token and text/object containing that text. This corresponds to the earlier mentioned facets (book as object/book as text). Murphy (2006) showed these relations are also available in novel words. When MP3 files were introduced on the global market, people first gave the word *MP3* the meaning of 'a kind of format for encoding music' (pp. 3). Later, the sense of *MP3* extended. This happened in a similar way as the facets of *book*. *MP3* also became a word to refer to the content of MP3's. For example, *a good MP3* would refer to a good song. Another pattern would occur, for example, when a new kind of animal is being discovered, for example, a *billo*. At first, the animal class *billo* would be the only sense of *billo*, but this sense can easily extend when *billo* is used in a different context. Through patterns like chicken as animal/chicken as food, it is immediately clear that *billo* in *billo tastes very weird* would refer to *billo* as food. Murphy (2006) claims it is hard to believe that these new senses are all derived from a common core sense, because it is already possible to understand such new senses through these patterns. He also claims that after many occurrences of new senses these new senses are learned, and therefore, stored in the mental lexicon.

Murphy (2006) mentions that it is very hard to get evidence for the process behind these new senses. Most likely, every language user has been presented different words and different senses through their entire life. It is not possible to tell whether a sense is already stored in their mental lexicon or whether a sense is new to them. Rice (1992) also mentioned that language users can create concepts or lexical items in many ways. So, it is not always possible to use the patterns described above.

Murphy (1997, in Murphy, 2006) found a way to study the polysemic patterns. He created novel words referring to not existing objects. In this way, he was certain the participants did not encounter these words before. This also made it possible to determine senses for these words in order to impose these senses to the participants. This may show if people would follow certain patterns while processing new senses of these new words besides the already given senses of these new words. The results of Murphy's study (1997, in Klein and Murphy, 2001) showed that the new senses that were closely linked to the given senses were more acceptable than more distant senses. It may suggest that polysemy is processed as a chain. New senses are constructed on the already existing senses. This would suggest a more monosemic view, but this does not mean that all senses are derived by context, but instead of that, from the already available senses. It is also possible that the more a person encounters a sense the more that sense will be stored in the mental lexicon, as Murphy (2006) also claimed. This study tried to investigate the process behind the storage of meanings as well. Another way of creating novel words, and therefore investigate the organization of word meanings, can be done by using the process of conversion.

2.2 Conversion

2.2.1 The process of conversion

A conversion occurs when a word is changed, so that the original word class shifts to another word class without changing the stem of the word. This can be done in many ways. Sentence (1) shows the shift of a noun to an adjective, sentence (2) the shift of a verb to a noun, and (3) the shift from a noun to a verb.

(1) fun (N) > fun (A)

(2) to fight (V) > the fight (N)

(3) bottle (N) > to bottle (V)

According to Aitchison (2012), the conversion of a noun to a verb is more common than the conversion of a verb to a noun. This is mainly because nouns are more present in a language than verbs. This research will focus on conversions from nouns to verbs.

The literature shows different views on how to interpret these conversions. Fabrizio (2013) used three Italian examples to illustrate how different the interpretation of those conversions can be:

(4) figlio 'son' > figliare '*to son*, to generate a son'
(5) astrologo 'astrologer' > astrologare '*to astrology*, to practice astrology'
(6) falcone 'falcon' > falconare '*to falcon*, to train and to use falcons to hawk'

There is no clear pattern coming forward, although all three meanings have something to do with the original noun stem (henceforth, NS). In contrast to these examples, the Dutch word *bomen* shows a denominal verb does not have to refer to the NS explicitly, as portraited in (7) and (8).

(7) boom 'tree' > bomen '*to tree*, to use a punting pole to propel a ship'
(8) boom 'tree' > bomen '*to tree*, to have a cosy conversation'

The meaning of *bomen* only has a link to the NS *boom*, because the punting pole in Dutch is called the *vaarboom* (literal translation: the sail tree). In example (8), it is even harder to find a possible connection between the verb and the NS. This meaning of *bomen* is derived from an old Indian expression *bomen opzetten* (etymologiebank.nl), which means 'to set up trees'. In this case, the link between the NS and the verb is not easy to make. Fabrizio (2013) used the Qualia Structures of Pustejovsky as semantic templates to discover and organize the meaning of conversions. In general, these structures correspond to the Ways-Of-Seeing as previously mentioned.[2] The Qualia Structures are used to classify nouns by their semantic features and properties. They are listed below (p. 182-183):

(9) a. Constitutive Quale: what N is made of, how it is composed, which are its constitutive parts and what is the relation between these parts and the whole.
For example, *tigre* 'tiger' > *tigrare* '*to tiger*, to make something stripy'. The stripy fur of a tiger is a part of the tiger.

[2] The part-whole WOS corresponds to the Constitutive Quale. The kind WOS corresponds to the Formal Quale. The functional WOS corresponds to the Telic Quale. The life-history WOS corresponds to the Agentive Quale.

b. Formal Quale: what N is (with reference to a superordinate/hyperonymic level): i.e., the basic category that distinguishes the object within a larger domain.
For example, *argento* 'silver' > *argentare* 'to silver, to coat or plate with silver'. "Silver is a natural substance with specific organoleptic properties" (Fabrizio, 2013, pp. 193).
c. Telic Quale: what is the function, the purpose or the typical activity of the NS. For example, 'hammer' > 'to hammer'. The typical activity of a hammer is to hammer something.
d. Agentive Quale: factors involved in N's origin or coming into being. For example, 'biography' > 'to biographize'. The event of bringing a biography into existence, i.e. creating a biography.

According to Fabrizio's data, the most common Quale activated in denominal verbs is the Telic Quale, which made up 54% of her corpus. The examples above show only one activated Quale per conversion, but it may also be possible for a conversion to have two activated Qualia. This is the case for transitive verbs, for example, *piastrellare il bagno* (to tile the bathroom). The first Quale is activated, because of the NS of the denominal verb. In this case, the Telic Quale is activated, because of *tile*. The typical use of tiles is to put them on a surface. The second Quale is activated because of the direct object. In this case, The Constitutive Quale is activated, because of *bathroom*. A bathroom consists of surfaces, for example, the floor and walls. The tiles can be put on those surfaces.

As Murphy (2006) found patterns in interpreting new senses of polysemous words, Fabrizio (2013) found patterns in the meaning of denominal verbs. Conversions of nouns from the category *natural types* mostly activate the Constitutive and Formal Quale (e.g., *tigrare*, see (9a)), but also the Telic Quale may occur. The category of *complex types* refers to the facets mentioned before, the little difference in senses of words (e.g., book as object/book as text). When a conversion is made from these words, only one sense is used in the meaning of the verb. The Italian conversion for *to lunch* only refers to lunch as food (the food you eat while having lunch), and not to lunch as event (where, with who, when and what you eat for lunch). Because of that, only the Qualia Structure of that specific sense is activated in the conversion. Conversions derived from nouns of the category *artifactual types* (objects that are not natural and have been created for a purpose) mostly activate the Telic Quale (e.g., *to hammer*, see (9c)) or in some cases, the Agentive Quale (e.g., *to biographize*, see (9d)).

2.2.2 Creating novel words through conversion

It is possible for a speaker to apply conversion to create novel words. When it comes to the meaning of these innovative conversions, Aitchison (2012) claimed there are only two meaning possibilities for adults: (1) the meaning of the verb describes the use of the NS in a characteristic way (e.g., to hammer) and (2) the verb describes whether something is put in the NS (e.g., to kennel). Beside these two meaning possibilities, children may also have a third meaning possibility: to describe an action (e.g., *to soup* would mean 'to eat soup'), but this is not very common in adult language.

Clark and Clark (1979) made a distinction between innovative conversions that are derived from common nouns and proper nouns. They claimed innovative conversions are contextuals. Context makes it possible to create multiple senses of denominal verbs. For verbs derived from common nouns, Clark and Clark (1979) also gave two meaning possibilities, namely (1) the usual manner of the NS and (2) the purpose for which the NS was designed. They mentioned that those meaning possibilities may change because of context. Depending on which time and place and in which circumstances the verb is used, the meaning of the verb can change. For example, the verb *to hairpin* in the sentence *to hairpin the lock open* does not describe the typical use of the NS, but has a shifted meaning because of context. This fits in the monosemic view, because they claimed the meaning of a conversion derived from common nouns would be one of the two meaning possibilities, but through context these meanings can change.

For verbs derived from proper nouns, the meaning of the verb is based on the mutual knowledge of the proper noun between the interlocuters. It is possible to create multiple senses, but most of the times only one sense is being referred to in a conversation, because the proper noun that is used, often only has one particular aspect that that person/personage/institution (etcetera) is known for. For example, the verb *to google* means 'to search for information on Google'. Because the mutual knowledge of the interlocutors is the main function of Google (to search for information), only the act of searching for information on Google is being activated as the meaning for *to google* in a conversation. At this point, Clark and Clark (1979) fit in the monosemic view again, because they claimed these types of conversions only have one meaning possibility, which shows similarities with the core meaning of the monosemic view.

2.2.3 The choice for this domain

The process of conversion is useful for this research, because it is an easy way to create novel words. Novel words are useful, as Murphy (2006) similarly reasoned, because participants do

not know these words yet. People are therefore open to interpret the novel words in their own way, and this may show if patterns occur while giving meaning to a verb. Conversions are also useful, because the noun that the verb is derived from already has a meaning. It is interesting to see whether participants use the meaning of the noun in their meaning of the novel denominal verb. This may show patterns like Fabrizio (2013), Aitchison (2012) and Clark and Clark (1979) mentioned. The use of existing words makes it harder to reveal something about the representation of senses in the mental lexicon, because it is hard to tell which senses are already stored, and there is a lot of variation between people in their storage (Murphy, 2006). Also, the amount of senses can be very varied. This is, for example, the case for prepositions, as Rice (1992) showed. Prepositions also undergo a lot of changes over time (diachronic change). For novel conversions, it is a case of synchronic development. The conversions can be interpreted in an unbiased way, because there has never been given a meaning to them, so they have never undergone diachronic change.

Novel words are not (yet) existing words and do not have a meaning yet. To let the participants deal with verbs derived from existing nouns, it can show the internal storage of the senses of the nouns. When the participants will construct the same meaning for the verbs, the participants used the same senses of the nouns. This suggest the nouns have a core meaning and support the monosemic view. When the participants will construct multiple meanings of the verbs, the participants used different senses of the nouns. This suggests the nouns have multiple senses separately stored and therefore support the polysemic view. These hypotheses have been examined in the main experiment of this study.

3. EXPERIMENTS

3.1 Pilot study

3.1.1 Method

In this pilot study, six people were asked to invent their own meaning of ten Dutch novel denominal verbs. The ten conversions were *lippen* (to lip), *bijbelen* (to bible), *gordijnen* (to curtain), *lampen* (to lamp), *wimperen* (to eyelash), *voeten* (to foot), *kapperen* (to hairdresser), *muren* (to wall), *stoelen* (to chair) and *magnetronnen* (to microwave). These conversions were randomly selected. After that, the participants had to complete a prototype task. They had to rank four sentences, in which four different meanings, specified independently in the experiment, of the conversion were used, from best meaning to least good meaning. The four

sentences consist of a very concrete meaning of the verb, a very abstract meaning and two other meanings between concrete and abstract. The research materials for this pilot study are presented in Appendix A.

3.1.2 Results

The results of the association task show a very broad range of associations and interpretations of the novel verbs. In general, all verbs showed the same pattern. All meanings can be summarized as: to use the NS (in a typical way). This does not mean all meaning associations were the same, but all meanings, besides five exceptions, showed this pattern. For example, *bijbelen* was interpreted as browsing through the bible, reading the bible or studying the bible. *Gordijnen* had meanings like: closing/opening the curtains, choosing new curtains, to hide yourself/something behind the curtains and ironing curtains. Per verb, there was a lot of variation in the amount of the same meanings. For *magnetronnen*, all participants constructed the meaning 'to heat something in the microwave'. For *gordijnen* and *bijbelen*, as presented above, the meanings did not show a clear preference meaning.

The results of the prototype task showed a similar pattern. In almost all cases, the majority of the participants chose the sentence with the most concrete meaning as most prototypical meaning for the verb. This concrete meaning also had a (typical) way of using the NS in it. The only verb that did not show this pattern was *lampen*, but this is the case because there was no sentence in which the NS was used in a very typical way.

The results of the association task correspond to the articles of Fabrizio (2013), Aitchison (2012) and Clark and Clark (1979). They also mentioned that, mostly, the meaning of conversions is *to use the NS (in a typical way)*. The results of the prototype also fit in this pattern, because the most concrete meaning in which the NS was used (in a typical way), always was chosen as most prototypical. This pilot study shows how people react to performing such tasks and their responses helped to reorganize the stimuli for the main experiment.

3.2 Main experiment

3.2.1 Research materials

In order to perform the main experiment to obtain more information about the organization of words in the mental lexicon, twelve Dutch denominal verbs were invented (some of them were also used in the pilot study). New verbs were added to give the stimuli more structure. The verbs were divided in the following three categories: *body parts*, *instruments* and *furniture* (see Table 1).

Table 1. An overview of the research materials.

Categories	Denominal verbs			
Body parts	*Lippen* (to lip)	*Wimperen* (to eyelash)	*Voeten* (to foot)	*Huiden* (to skin)
Instruments	*Magnetronnen* (to microwave)	*Messen* (to knife)	*Kasten* (to closet)	*Vazen* (to vase)
Furniture	*Gordijnen* (to curtain)	*Lampen* (to lamp)	*Tafelen* (to table)	*Stoelen* (to chair)

3.2.1.1 The four tasks. The research consisted of four tasks. Like the pilot study, the first task was an association task in which the participants had to invent their own meaning of the verb. The participants were allowed to invent more than one meaning. This task was performed before the other tasks, because this would prevent people from already attaching a meaning to the verb, because of the meanings given in the other tasks. The hypotheses were the following: participants would use a sense of the noun that is mainly stored in the lexicon when constructing the meaning of the verb. If the participants would come up with the same meanings, it would support the monosemic view, because they all used the same sense in order to assign a meaning to the verb. If the participants would come up with varied meanings, it would support the polysemic view, because the participants used different senses in order to assign a meaning to the verb.

Secondly, the prototype task from the pilot study was performed. The participants had to rank four randomly ordered sentences on best meaning to least adequate meaning for the verb. The meanings of the verbs were divided into categories. The categories ‘concrete’ and ‘abstract’ consisted both of one sentence, of which the concrete sentence describes a very typical use of the NS. The category ‘other’ (not very concrete meanings, but not abstract either) consisted of two sentences. One of them (Other-1) was closer to a concrete meaning and the other one (Other-2) was closer to an abstract meaning (see Appendix B). The hypotheses were the following: if the majority of the participants would prefer a certain meaning as most prototypical, it would suggest that the sense of the noun from which the verb is derived from, is more present to the participants than the other senses. This would support the monosemic view. More variety in preferences would support the polysemic view.

In the third task, the sentences of the prototype task were presented to the participants again. The participants had to sort the sentences in the categories ‘concrete’, ‘other’ and ‘abstract’. These are the same categories in which the sentences were divided while constructing the stimuli. This sorting task replicates the method used by Rice, Sandra and Vanrespaille

(1999), where participants had to sort sentences with prepositions into the categories ‘spatial’, ‘temporal’ and ‘abstract’ uses of the prepositions. The participants did not receive a definition of ‘concrete’, ‘abstract’ and ‘other’, so this task would show whether the participants agree if the given meanings are concrete or abstract to them.

Finally, a rating task was performed. The participants had to compare two sentences and rate whether the meanings of the verbs were complete different or absolutely identical. The participants had to rate on a scale from 0 to 100, where 0 stands for ‘completely different’ and 100 for ‘absolutely identical’. Each novel verb had three different sentence pairs: CON-CON (a concrete meaning of the verb ‘in contrast with’ the same concrete meaning of the verb), CON-OTH (a concrete meaning of the verb in contrast with a meaning of the verb from the category ‘other’) and CON-ABS (a concrete meaning of the verb in contrast with an abstract meaning of the verb (see appendix B). This task also replicates the method used by Rice et al. (1999) and will show how close or how distant people organize the different meanings of the novel verbs and therefore, it will show more about the distance between the senses of the noun. The hypotheses were the following: if a low score was given at the sentence pairs, it would suggest the different meanings are stored very distant from each other. If a high score was given to the sentence pairs, it suggests the opposite.

3.2.1.2 Predictions. According to Fabrizio (2013), Aitchison (2012), Clark and Clark (1979) and the pilot study, the predictions were that, in the first task, the majority of the participants would create meanings in which the NS is used (in a typical way), i.e. deriving the meaning from the core meaning of a noun. The predictions for the prototype task were that the most concrete meaning of the verbs would be preferred above other sentences. When it comes to the newly added sorting task, the prediction is that the participants would probably sort the most concrete and most abstract sentences into the right category. The two other sentences would raise more doubt, but it was predicted that the sentence that is more concrete (Other-1) would be sorted into ‘concrete’ or ‘other’ and the sentence that is more abstract (Other-2) would be sorted into ‘abstract’ or ‘other’. The predictions of the last task were that the CON-CON sentence pairs would get very high scores and the CON-ABS sentence pairs very low scores, because the meanings are respectively very similar and different in these pairs. The CON-OTH sentence pairs are more similar to each other than the CON-ABS sentence pairs, and therefore, a higher score was predicted for the CON-OTH pairs in contrast to the CON-ABS sentence pairs.

3.2.1.3 Procedure. An online survey was made in order to perform the research. Seventeen participants responded to this survey. The participants had an average age of 37 years (in a range from 20 to 60). Five participants were men, twelve were women.

3.2.2 Results

The results are presented per task.[3]

3.2.2.1 Results of the association task. The results of the association task show three different patterns: (1) there is one meaning that (almost) all participants wrote down, (2) there is one meaning that has been written down the most (with other meanings only occurring three times or less), (3) there is a wide range of different meanings written down, but still one meaning occurred the most. All most occurring meanings correspond to the most concrete sentences that were constructed for the other tasks. For some conversions, participants wrote down more than one meaning. The amount of meanings may be higher than the number of participants therefore. The meanings have been sorted into the Qualia Structures (Fabrizio, 2013). When a very abstract meaning was written down, this meaning has been sorted in a fifth category, 'abstract'. The results show one pattern. The meanings that occurred the most belong to the Telic Quale, independent of the verb. When other meanings were created, these meanings also mostly belonged to the Telic Quale. See Appendix C1 for a more detailed analysis.

3.2.2.2 Results of the prototype task. The results of the prototype task show that, in general, 67% of the times the concrete sentences were chosen as most prototypical meaning of the verbs. Per verb, there is a lot of variation in the preferences of the participants, but for every verb the concrete sentence was chosen the most. *Magnetronnen* showed the clearest preference, because all participants agreed the concrete sentence was the most prototypical. *Gordijnen*, *messen*, *stoelen* and *huiden* did not have a very clear preference, but still the concrete sentence was in all cases chosen as most prototypical. See Appendix C2 for an overview of the results.

3.2.2.3 Results of the sorting task. The overall results of the sorting task show that a very high amount of the concrete sentences and abstract sentences were correctly sorted into 'concrete' and 'abstract'. The Other-1 category, which consisted of sentences with a slightly less concrete meaning of the verb than the concrete sentences, is mostly sorted into 'concrete'. Apparently, the participants chose to sort them into 'concrete' instead of 'other'. The same goes for the Other-2 sentences. The participants did not sort them into 'other', but tried to sort them into 'concrete' or 'abstract'. The sentences of Other-2 were more abstract than concrete, which

[3] Because the number of participants is low, no statistical methods were performed/applied to the data.

corresponds to the responds of the participants, because they sort the sentences mostly into 'abstract'. See Appendix C3 for an overview of the general results of this task.

3.2.2.4 Results of the rating task. The results of the rating task show similar results as the prototype task. In general, the CON-CON sentence pairs get a score of 80. The CON-OTH sentence pairs follow with a score of 30, followed by the CON-ABS sentence pairs with a score of 12. There is a lot of variation per verb, but in all cases the general results show the same pattern: the CON-CON sentence pairs get the highest score, followed by CON-OTH, followed by CON-ABS. The CON-OTH sentence pairs show the most variation. For some verbs, it gets a very high score, and for other verbs, a very low score. See Appendix C4 for a more detailed overview of the results.

3.2.2.5 Determining monosemy. To link the results to the theoretical background, four scores were given to each verb. The four scores correspond to the four tasks and represent in which extent the results support the monosemic view. This will be further explained in section 4. For the association task, the scores correspond to the most frequent meaning of the verbs. For the prototype task, the scores correspond to the most preferred meaning. For the sorting task, the scores correspond to the right sorting of the concrete sentence into 'concrete'. For the rating task, the scores correspond to the scores of the CON-CON sentence pairs. An overview of the scores and the average score per verb is presented in Table 2.

Table 2. An overview of the scores per verb and per task (the scores of the association, prototype and sorting task are in %).

Verb	Association task	Prototype task	Sorting task	Rating task	Average
Magnetronnen	94	100	100	98	98
Tafelen	94	94	88	86	91
Vazen	94	76	100	83	88
Kasten	53	88	94	90	81
Lippen	50	65	100	80	74
Lampen	40	76	100	74	73
Gordijnen	52	47	100	90	72
Wimperen	45	65	100	73	71
Stoelen	35	47	82	94	65
Voeten	24	59	88	77	62
Messen	39	47	94	65	61
Huiden	17	41	94	45	49

4. DISCUSSION

The results of the four tasks will be presented in a new model, that I will propose here: The Core Meaning Model. This model states that a word can have three different types of core meanings: a strong core meaning, an average core meaning and a weak core meaning. The division between the different types of core meanings is based on the patterns found in the average scores per verb (see Table 2). The model mainly supports the monosemic view, although Type 2 and Type 3 of the CMM also show some effects that support the polysemic view.[4]

4.1 The Core Meaning Model

4.1.1 Type 1: A strong core meaning

The verbs that fit in this type are *tafelen*, *vazen* en *magnetronnen*, because the average score of these verbs was 88 or higher. These verbs seem to have a core meaning, because in the association task all participants (except for one) invented the same meanings. This suggests the participants used the same aspect of the noun in order to create a meaning for the denominal verb, which means the nouns also seem to have a core meaning. The most occurring meanings correspond to the most concrete meanings that were constructed for the other tasks (this is also the case for Type 2 and Type 3). In the prototype task, this meaning was chosen as most prototypical meaning of the verb as well. This shows the core is indeed very strong. The sorting task shows the concrete meaning is also correctly sorted into 'concrete' most of the times, in contrast to the Other-1 sentences that also contained a very concrete meaning. It shows the meaning of this concrete sentence is very clear. In the rating task, the CON-CON sentence pairs were given a very high score. This shows that the participants in different contexts still understand the same concrete meaning of the verbs, otherwise they would rate them lower. This can be seen for the CON-OTH and CON-ABS sentence pairs, in which indeed a lower score is found, because a different context changed the interpretation of the verb.

[4] While analyzing the results, no effects of the categories *body parts*, *instruments* or *furniture* were found, so these categories will not be discussed.

Figure 1. Type 1 of The Core Meaning Model: A strong core meaning (CM = core meaning).

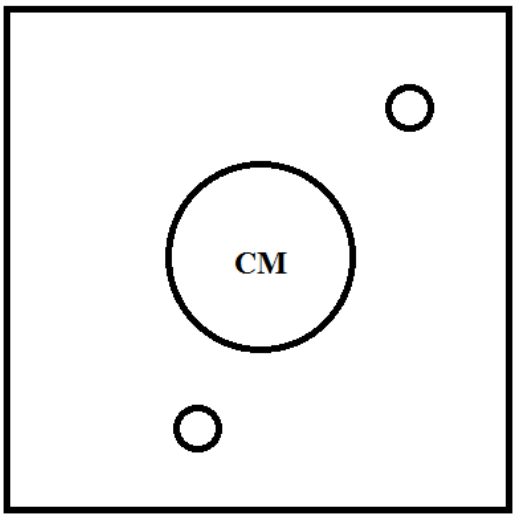

Figure 1 shows a visual representation of the first type of the CMM. One core meaning is stored in the mental lexicon with a few other meanings (the small circles). Type 1 of the CMM supports the monosemic view in this way.

4.1.2 Type 2: An average core meaning.

The scores of the novel verbs *gordijnen*, *lippen*, *wimperen* and *lampen* were between 71 and 74. These verbs also show a certain core meaning while looking at the results of the association task, but other meanings were suggested by the participants as well. Again, this most occurring meaning was preferred as most prototypical meaning of the verb in the prototype task, but this preference is less strong than the Type 1-verbs. This supports that the core meaning is less strong for these verbs, and therefore, the core meaning of the nouns as well. The results of the sorting task were similar to the results of the Type 1-verbs, but the rating task also shows a weaker preference for the core meaning. In general, the CON-CON sentence pairs received the highest scores, but these scores were lower than the verbs from Type 1.

The verb *kasten* can be sorted into this type as well. The average score is higher than the other four verbs, but the score of the association task is very similar to the other verbs of this type. The association task was decisive to sort *kasten* into this type, because, of all four tasks, the association task shows the clearest distinction between all twelve verbs.

Figure 2. Type 2 of The Core Meaning Model: An average core meaning (CM = core meaning).

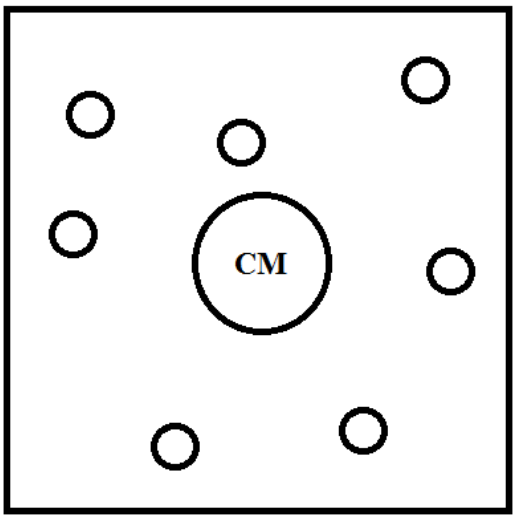

Figure 2 shows a visual representation of the second type of the CMM. The CM-circle is smaller than for Type 1, because the core meaning is less present in the mental lexicon. The small circles around the core meaning represent the other meanings that are also stored and present. Type 2 of the CMM supports the monosemic view in this way, but the fact that other meanings are also active shows features of the polysemic view as well.

4.1.3 Type 3: A weak core meaning.

The scores of the last four novel verbs *messen*, *stoelen*, *voeten* and *huiden* were the lowest (65 or lower). In the association task, one meaning is the most common, but not very strongly present. Again, these very weak core meanings correspond to the concrete meanings that were constructed for the other tasks. This shows, especially in this type with many preferred meanings, there is a certain preference to create a very concrete meaning of the verb. The prototype task also shows the most concrete meaning is preferred the most, but not very unanimously. The correct sorting of the concrete sentences into 'concrete' and the high scores of the CON-CON sentence pairs also support the core meaning of these verbs to a certain extent. Because all results were lower than the other types, the evidence is not that strong, but therefore, they do suggest a weak core meaning of these verbs. This means the nouns also have a weaker core meaning, because again, the participants have used a certain meaning of the noun the most in order to construct a meaning of the verb, but to a small extent.

Figure 3. Type 3 of The Core Meaning Model: A weak core meaning (CM = core meaning).

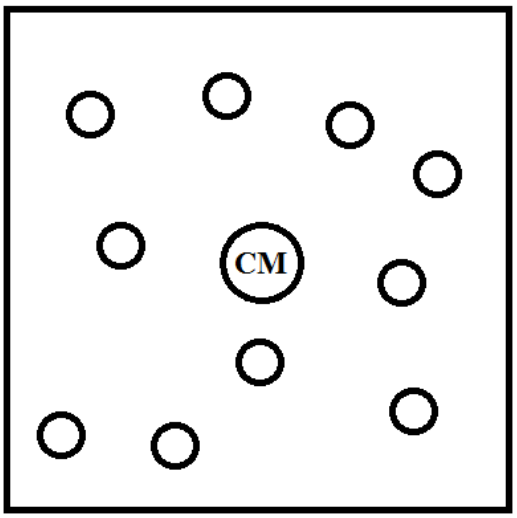

Figure 3 shows a visual representation of the third type of the CMM. The CM-circle is smaller than for Type 1 and Type 2 of the CMM and represents a weak core meaning stored in the mental lexicon. There are more little circles illustrated, because more other meanings are also very present in the mental lexicon and, therefore, very easily activated. The present weak core meaning supports the monosemic view, but the other activated meanings also show features of the polysemic view.

4.1.4 Explanation of the results.

The explanation of the three different types can be found in the typical uses of the noun. The nouns from the category *instruments* and *furniture* belong to the category *artifactual types* (Fabrizio, 2013), because all these objects are created for a certain purpose. These artifactual types mostly activate the Telic Quale when a verb is derived from it. The nouns from the category *body parts* belong to the category *natural types*. These types mostly activate the Constitutive and Formal Quale, but the Telic Quale may also occur. The core meanings as found in the experiment all fit in this Telic Quale. When other meanings are created, most meanings fit in this Telic Quale as well. This corresponds to Fabrizio (2013), but also to Aitchison (2012) and Clark and Clark (1979).

The Telic Quale describes ‘the function, the purpose or the typical activity of the NS’. The explanation of the three types of the CMM can therefore be found here. The objects in Type 1 show one very clear use and other uses are possible but not very common (so, for example, because a microwave is mainly used to heat something, *magnetronnen* should mean ‘to heat something in the microwave’). The objects in Type 2 show a very typical activity, but the

objects are regularly also used in other ways (e.g., a lamp is mainly used to switch it on or off, but it may also be used to shine a light on someone/something, etcetera). At last, the objects in Type 3 have multiple uses, but without a very clear mainly used usage (e.g., a knife is used to cut something, but it is also common to use a knife to stab). Whether a noun has multiple uses or not, determines whether a noun has a strong, an average or a weak core meaning.

The example of *knife* also has something to do with the earlier mentioned microsenses, because there are many types of knives which can be used in different contexts and for different purposes. Microsenses do not seem to play a role in The Core Meaning Model, because the verbs *huiden* and *voeten* are also from Type 3. These verbs do not have microsenses (there are not many types of feet or skins). In contrast, it seems acceptable to claim that *table* does have microsenses, because there are many different tables (dinner tables, meeting tables, picnic tables), but *tafelen* belongs goes to Type 1 of the CMM. The same goes for *lampen* (Type 2).

4.2 Improvements and suggestions for further research.

In this study, The Core Meaning Model is based on the results found in the experiments, but this model needs more investigation to give it more support. There are certain aspects that need improvements.

At first, a bigger number of participants will allow statistical methods. The results of this study show some patterns, but statistical analyses may obtain stronger evidence in favor of The Core Meaning Model. Another improvement of the participants would be a more balanced research group. Age and gender did not play a role in gaining results. A clear division in gender and specific age groups will also strengthen the research. It will allow researchers to look for effects of gender or age as well. Other variables like region, social class or ethnicity (etcetera) may also influence the results.

Another improvement of this research would be to make the stimuli more structured. This is especially the case for the rating task. The CON-CON sentence pair of *huiden* had a very small difference in meaning, namely the difference between skin on skin and skin on clothes. The participants therefore gave this CON-CON sentence pair a low score in contrast with the other verbs. The CON-OTH sentence pair of *stoelen* had a very close meaning, namely the difference between ‘intransitive’ and ‘transitive’. That pair, therefore, gets a very high score in contrast with the other verbs. It is a difficult task to generate sentence pairs in which the meaning distance between the sentence pairs is the same for all verbs, but with more time and accuracy it is possible to create stronger stimuli.

The research procedure shows limitations as well. By using an online survey, it is not clear how someone participated in the experiments. When the researcher is face-to-face with the participant, the participant will take the experiment even more securely, which will lead to better, more realistic, results.

Lastly, it would also be interesting to see how participants handle other processes of conversion in these types of research. For example, which aspects of a verb will be used in order to give meaning to a novel noun? These other ways of testing monosemy and polysemy may also support or tackle The Core Meaning Model.

5. CONCLUSION

This study started by describing the different ways in which words can have more than one meaning. Different meanings of words can be distant and unrelated to each other, but close and related as well. In linguistics, there are two theories about the storage of those close, related, meanings in the mental lexicon. The monosemic view states that there is one core meaning from which all other meanings are derived. The polysemic view states that multiple senses of a word are separately stored. This study investigated the validity of these two views by performing four experiments: (1) an association task, (2) a prototype task, (3) a sorting task, and (4) a rating task. The stimuli for these experiments consisted of novel verbs, created by applying the process of conversion to nouns. Because the novel verbs were derived from existing nouns, the participants could therefore be influenced by the meaning(s) of the noun. The results were presented in a newly proposed model: The Core Meaning Model. This model claims a word can have three different types of core meanings. Type 1 states there is a strong core meaning of a word, with a few other meanings very less present. This type supports the monosemic view. Type 2 states there is an average core meaning, but other meanings are present as well. This type supports the monosemic view, but the other activated meanings show aspects of the polysemic view. Type 3 states there is a weak core meaning with other meanings highly activated as well. The weak core meaning supports the monosemic view, but the polysemic view is supported as well. All found core meanings belong to the Telic Quale (Fabrizio, 2013), which means the meaning describes the function, purpose or typical activity of the noun. Because all core meanings and most other created meanings belong to the Telic Quale, the three different types have to do something with the number of uses of the noun. When a noun is mainly used for one certain thing, the noun belongs to Type 1. When a noun has a typical use,

but other uses are regular as well, the noun belongs to Type 2. When a noun has many different uses without a very clear main use, the noun belongs to Type 3.

To summarize, this study showed that the organization of word meanings in the mental lexicon is mainly monosemic, but there is a difference in strength of the core meaning, as presented in The Core Meaning Model. In this model, Type 2 and Type 3 also show features of the polysemic view.

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7. APPENDIX

7.1 Appendix A: Stimuli for pilot study.

1. **Lippen**
    a. Zij lippen elkaar elke avond voor ze gaan slapen.
    b. Het meisje lipte vandaag met labello in plaats van lippenstift.
    c. Zij lippen zachtjes over de jongen naast hen.
    d. Hij lipte dat de hoofdpersoon het niet zou overleven.
2. **Bijbelen**
    a. De dominee bijbelt Psalm 117 elke zondag weer.
    b. Wij gaan bijbelen in de krottenwijken van Zuid-Afrika om het christendom daar meer bekendheid te geven.
    c. Ik moet m'n tekst nog wat bijbelen, maar daarna is die perfect!
    d. Zij is altijd aan het bijbelen. Ze heeft met iedereen het beste voor.
3. **Gordijnen**
    a. Zoals altijd gordijnt ook vandaag om twaalf uur 's avonds de dag.
    b. Hij gordijnde zijn kamer pas twee weken nadat die verhuisd was.
    c. Lotte gordijnt elke avond stipt om zeven uur haar woonkamer.
    d. Vol trots gordijnen de auteurs hun nieuwste boek.
4. **Lampen**
    a. De zangeres wordt gelampt.
    b. Zijn ogen lampen door de weerkaatsing van het licht.
    c. Dan lamp ik nu de conclusie, want daar zaten nog wel wat foutjes in.
    d. Hij begon te lampen toen hij zijn vriendje aan zag komen.
5. **Wimperen**
    a. Meisjes wimperen zichzelf met mascara.
    b. Zij wimpert naar die leuke jongen.
    c. Wow, die raceauto's wimperen voorbij!
    d. Mijn hart gaat heel snel wimperen als ik zenuwachtig ben.
6. **Voeten**
    a. Om te ontspannen ging ze voeten door het bos.
    b. Ik voet de kaarsen die ik van mijn moeder kreeg op een schaaltje.
    c. Wat raar, in de winkel voetten deze schoenen nog perfect!
    d. Om de vergadering te voeten wil ik zeggen dat de volgende vergadering over twee weken is.
7. **Kapperen**
    a. Ik word altijd gekapperd door mijn moeder. Dat scheelt geld.
    b. Zij kappert altijd de hele dag aan één stuk door, ze is nooit eens even stil.
    c. Die frietzaak kappert de aardappelen zelf tot patat.
    d. Hij kappert de aflevering in stukjes omdat hij weinig tijd heeft.
8. **Muren**
    a. Hij muurde de heg die was omgevallen.
    b. We muren ons steeds meer naar de buren.
    c. Eindelijk hebben zij die posters gemuurd.
    d. De crimineel werd gemuurd in de gevangenis van Utrecht.
9. **Stoelen**
    a. Kan jij die mensen even stoelen? Ze lopen nu maar wat rond.
    b. Ik heb behoefte om te stoelen na deze wandeling.

c. Dat krukje moet gestoeld worden, dan krijgt mijn vader minder last van zijn rug als hij er op zit.
d. Ik ga dat misverstand snel stoelen, want anders loopt het uit de hand.

10. Magnetronnen

a. Jarenlang magnetronde Jan zijn havermout.
b. Deze sloffen magnetronnen mijn voeten meteen als ik net uit de kou kom.
c. Wij magnetronnen elkaar elke dag weer met lieve berichtjes.
d. In de zon magnetron ik altijd zó snel. Ik moet me goed insmeren.

7.2 Appendix B: Stimuli for main experiment.

7.2.1 Appendix B1: Stimuli for the category: *body parts*.

Task \ Conversion	**Lippen**	**Wimperen**	**Voeten**	**Huiden**
Prototype/sort task	CONCRETE Zij lippen elkaar elke avond voor ze gaan slapen. OTHER-1 Het meisje lipte vandaag met labello in plaats van lippenstift. OTHER-2 Zij lippen zachtjes over de jongen naast hen. ABSTRACT Hij lipte dat de hoofdpersoon het niet zou overleven.	CONCRETE Zij wimpert met haar ogen. OTHER-1 Meisje wimperen met mascara. OTHER-3 Mijn hart gaat heel snel wimperen als ik mijn echtgenoot zie. ABSTRACT Raceauto's wimperen voorbij.	CONCRETE Om te ontspannen ging ze voeten in het bos. OTHER-1 Wat raar, in de winkel voetten deze schoenen nog perfect! OTHER-2 Ik voet de kaarsen die ik van mijn moeder kreeg op een schaaltje. ABSTRACT Om de vergadering te voeten wil ik zeggen dat de volgende vergadering over twee weken is.	CONCRETE In bed huiden wij lekker dicht tegen elkaar aan. OTHER-1 Ik huid mezelf met zonnebrand, zodat ik hopelijk niet snel verbrand. OTHER-2 Ik huid de schubben van de vis. ABSTRACT Zij is altijd heel gesloten tijdens gesprekken. Ik vermoed dat ze zich probeert te huiden, omdat ze erg onzeker is.
Rating task	CON–CON Dat stel zit de hele dag te lippen. – Die man lipt zijn vrouw als hij 's avonds thuiskomt. CON–OTH Marie en Jan durfden elkaar eerst niet te lippen. – Om een vis na te doen, moet je lippen en 'blub' zeggen. CON–ABS Ik heb nog nooit iemand gelipt. – Hij lipte veel te lang door over hoe hij gevallen was met de fiets.	CON–CON Marie wimpert naar leuke jongens. – Ik ga heel snel wimperen als ik iets in mijn oog heb. CON–OTH Om te kunnen huilen zonder dat je verdrietig bent, moet je gewoon een lange tijd niet wimperen. – In die speeltuin zat Marie lekker te wimperen op de schommel. CON–ABS Je wimpert eigenlijk altijd zonder dat je het door hebt. – Die flits wimperde door de lucht, daarna kwam direct de knal.	CON–CON Zullen we nog even gaan voeten? Het is nu nog mooi weer buiten. – Met moeite voette ik me een weg door New York. CON–OTH Ik vind het altijd maar een beetje vreemd als mensen zeggen dat voeten een sport is. – Ik voette hem toen hij langs kwam lopen. Hij viel heel hard op de grond… CON–ABS Als ik dan lekker aan het voeten ben in de bergen, denk ik altijd: dit is het leven. – Hij voette zijn standpunt. Daar kon ik niks tegen in brengen.	CON–CON Zijn hondje huidde zich lekker op mijn schoot. – Eskimo's huidden met hun neus als ze elkaar begroeten. CON–OTH Een pasgeboren baby huidt in de armen van zijn moeder. – Doordat hij blijft eten en eten, stopt hij maar niet met huiden. CON–ABS Als je applaudisseert, huiden je handen telkens heel kort. – Hij probeerde zijn chocoladereep langs de kassa te huiden.

7.2.2 Appendix B1: Stimuli for the category: *instruments*.

Task \ Conversion	**Magnetronnen**	**Messen**	**Kasten**	**Vazen**
Prototype/sort task	CONCRETE Jarenlang magnetronde Jan zijn havermout.	CONCRETE	CONCRETE Jan en Piet kasten de borden en bakjes.	CONCRETE Julia heeft haar nieuwe bloemen gevaasd.

	OTHER-1 Deze sloffen magnetronnen mijn voeten meteen als ik net uit de kou kom. OTHER-2 Mijn huis is zó klein, ik moet zelfs mijn boeken magnetronnen. ABSTRACT Wij magnetronnen elkaar elke dag weer met lieve berichtjes.	Hij werd gemest en overleed later in het ziekenhuis. OTHER-1 De punt van het hek meste de bal. OTHER-2 Hij meste het draad door het oog van de naald. ABSTRACT Hij meste mij met zijn lelijke woorden.	OTHER-1 Ik ga even zes boterhammen kasten. OTHER-2 Ik kaste de bijlage in het mailtje naar mijn oma. ABSTRACT Mijn broer kast het overlijden van onze overgrootvader op een andere manier dan ik.	OTHER-1 Ik vaas dit glas. Dan kan ik daar mijn bloemen in kwijt. OTHER-2 Dat model traint iedere dag zodat ze uiteindelijk prachtig gevaasd is. ABSTRACT Voor nu vaas ik mijn woede even.
Rating task	CON–CON Hoe lang moet ik deze kant-en-klaar maatlijd magnetronnen? – Een pizza moet je niet magnetronnen, die moet in de oven! CON–OTH Als je eten magnetront, wat gebeurt er dan eigenlijk precies? – Deze handschoenen magnetronnen mijn handen niet meer zo goed als het koud is. CON–ABS Ik had de pindasaus te lang gemagnetrond… – Mooie muziek magnetront mijn hele lichaam al bij de eerste toon.	CON–CON Jan meste zijn vlees als eerste. – Marie meste de envelop zodat ze de brief kon gaan lezen. CON–OTH Koks kunnen heel snel messen. – Die bus mest perfect door die tunnel. CON–ABS Ik mes mijn brood in tweeën. – ‘Die jurk is zó 2016’, meste de stylist.	CON–CON Hij kastte al zijn boeken. – Die vrouw kast haar bestek. CON–OTH Zij kastte alle cd’s overzichtelijk bij elkaar. – Hij had het gevoel dat hij na zijn college weer genoeg kennis gekast had. CON–ABS Wij hebben onze tv gekast achter deurtjes, zodat we er niet altijd naar hoeven te kijken. – Mijn moeder zei altijd: ‘Iedereen is anders gekast’.	CON–CON Kan je ook iets anders dan bloemen vazen? – Met kerst vazen wij altijd onze kerstballen. CON–OTH Kan je narcissen vazen, of kan je ze beter in een pot laten? – Het auto-ongeluk waarin ik vorig jaar betrokken was heb ik nog steeds niet kunnen vazen. CON–ABS In plaats van bloemen vaasde Sara het onkruid uit de tuin. – Bij het vak ‘communicative vaardigheden’ leren wij om te vazen, in plaats van oppervlakkig te praten.

7.2.3 Appendix B1: Stimuli for the category: *furniture*.

Task \ Conversion	**Gordijnen**	**Lampen**	**Tafelen**	**Stoelen**
Prototype/sort task	CONCRETE Lotte gordijnt elke avond stipt om zeven uur haar woonkamer. OTHER-1 Hij gordijnde zijn kamer pas twee weken nadat hij verhuisd was. OTHER-2 Zoals altijd gordijnt ook vandaag om twaalf uur ’s avonds de dag. ABSTRACT Tijdens de eerste ontmoeting met zijn schoonouders gordijnde ik mijn kinderlijke kant.	CONCRETE Hij lampte alle lampen in de kamer, omdat het donker begon te worden. OTHER-1 De zangeres wordt gelampt. OTHER-2 Dan lamp ik nu de conclusie, want daar zaten nog wel wat foutjes in. ABSTRACT Hij begon te lampen toen hij zijn vriendje aan zag komen.	CONCRETE Zullen we in dat restaurant gaan tafelen? OTHER-1 Kan jij het broodbeleg nog even tafelen? OTHER-2 Ik tafelde de vraag waarom Jan zich wéér verslapen had. ABSTRACT De sollicitant sprak nauwelijks over zijn gevoel, hij was alleen maar aan het tafelen.	CONCRETE Ik heb behoefte om te stoelen na deze wandeling. OTHER-1 Dat krukje moet gestoeld worden, dan krijgt mijn vader minder last van zijn rug als hij er op zit. OTHER-2 De vergadering werd gestoeld door het oudste lid van de vereniging. ABSTRACT Ik ga dat misverstand snel stoelen, want anders loopt het uit de hand.
Rating task	CON–CON Mijn huis is achter altijd gegordijnd, omdat daar een flat staat en anders iedereen naar binnen kijkt. – Ik kan niet	CON–CON Lamp jij de kamer even? Ik wil niet opstaan. – Onze kamerlamp lampt mooier dan de eetkamerlamp.	CON–CON Jongens, tafelen! We eten patat! – Omdat Kees geen tafel heeft, tafelen we altijd op de bank.	CON–CON Na twee uur lang rechtop staan, moet ik echt stoelen. Anders hou ik het niet vol. – Stoel jezelf maar alvast in de

	gordijnen, want ik heb geen gordijnen. CON–OTH Als ik mijn kamer niet gordijnd heb, kan ik echt niet slapen. – Vol trots gordijnen de auteurs hun nieuwste boek. CON–ABS Gordijn jij de kamer even? Ik wil niet opstaan. – Ik moet mijn verdriet gordijnen als ik een verdrietig nummer zing. Ik ben snel emotioneel.	CON–OTH Huh, waarom lampt deze lamp niet meer? – Zijn ogen lampen door de weerkaatsing van het licht. CON–ABS Autolichten lampen als je de auto opent met de afstandsbediening. – Die artiest lampt mij in moeilijke tijden.	CON–OTH Waar zullen we gaan tafelen? In de eetkamer of in de bijkeuken? – Tafel jij de spelletjes alvast? Ik kom er zo aan. CON–ABS Ik hou ervan om lekker te tafelen in de avondzon met een bourgondische maaltijd. – Hij tafelde al zijn angsten, en doodde de spin.	woonkamer, dan zet ik even snel koffie. CON–OTH Die stoel stoelt lekkerder dan deze eetkamerstoel. – Bij dat sollicitatiegesprek werd ik niet tegenover de directeur gestoeld, maar juist ernaast. CON–ABS Als Piet langskomt, dan gaan we gewoon lekker stoelen en wat praten. – Ik heb mijn emoties gestoeld, zodat ik kan kijken waardoor ik mij ongelukkig voel.

7.3 Appendix C: Detailed results of the main experiment.

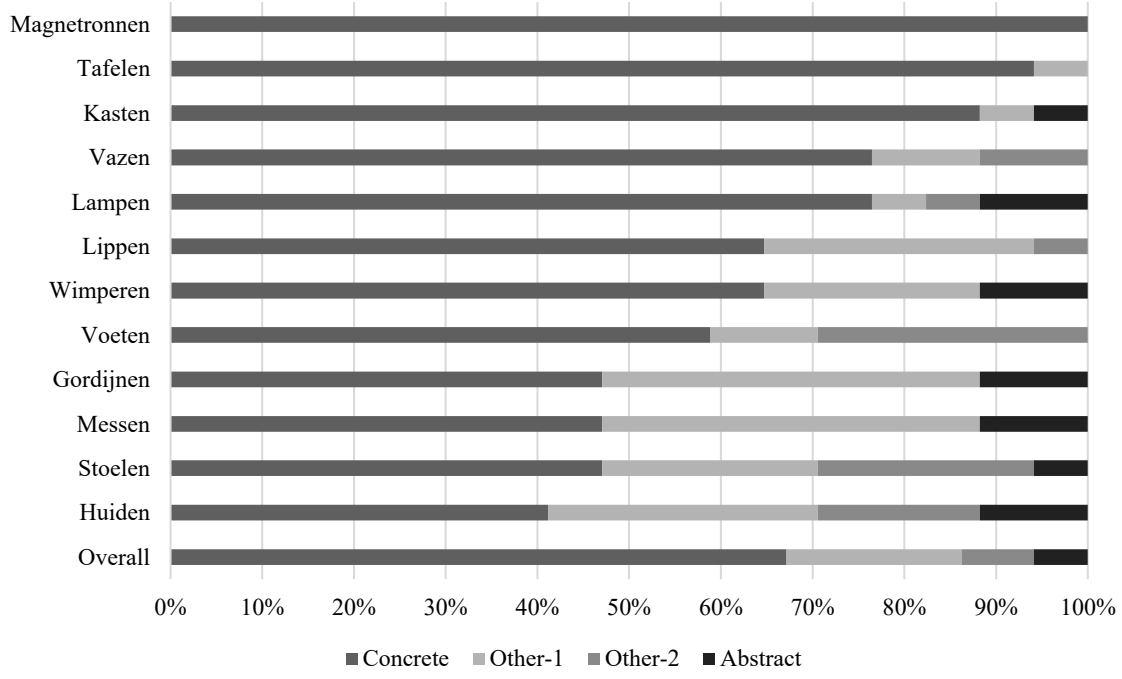
7.3.1 Appendix C1: Detailed results of the association task. A = Abstract, AQ = Agentive Quale, CQ = Constitutive Quale, FQ = Formal Quale, TQ = Telic Quale.

Pattern 1: One meaning			
Verb	Meanings	Category	Occurrence (in times)
Tafelen	To eat on a table	TQ	17
	To lay the table	TQ	1
Vazen	To put something in a vase	TQ	17
	To model vases (like a potter)	AQ	1
Magnetronnen	To heat something in the microwave	TQ	16
	To perform an action with the microwave	TQ	1
Pattern 2: One most present meaning			
Gordijnen	To open/close the curtains	TQ	11
	To straighten the curtains	TQ	1
	To clean the curtains	TQ	1
	To hide behind the curtains	TQ	1
	To hang up curtains	TQ	1
	To iron curtains	TQ	1
	To make curtains	AQ	1
	To sew curtains	AQ	1
	To lift the décolleté	A	1
	To create atmosphere	A	1
	To hide something (feelings or so)	A	1
Kasten	To put something in a closet	TQ	9
	To put something in a closet/vitrine on a specific space to save it there	TQ	1
	To open a closet	TQ	1
	To settle yourself somewhere by putting furniture in it	FQ	1
	To put a close together	AQ	1
	To train to become physically strong	A	1

	To lift weights	A	1
	To stack	A	1
	To chase someone on the closet	A	1
Lippen	To kiss	TQ	9
	To open a can of beer/drink (the little thing that closes the can is called a lip)	TQ	2
	To puse one's lips	TQ	1
	To grab something between your lips	TQ	1
	To put lipstick on	TQ	1
	To pout one's lips	TQ	1
	To feel with our lips	TQ	1
	To lick your lips	TQ	1
	To talk very quiet	A	1
Wimperen	To blink with two eyes	TQ	9
	To blink with one eye	TQ	3
	To put mascara on your eyelashes	TQ	2
	To curl your eyelashes	TQ	1
	To blink undue	TQ	1
	To take a loose eyelash away	TQ	1
	To touch up your eyelashes	TQ	1
	To blink seductive	TQ	1
	To send someone away	A	1
Lampen	To switch the lights on/off	TQ	8
	To shine a light (on something)	TQ	3
	To illuminate	TQ	2
	To look around with a light	TQ	1
	To add light with your mobile phone	AQ	1
	To give light	AQ	1
	To illuminate (philosophical)	A	1
	To make fun with someone	A	1
	To get a great idea	A	1
	To activate ideas	A	1
Pattern 3: Different meanings			
Messen	To cut	TQ	7
	To stab	TQ	3
	To sharpen knives	AQ	4
	To mess things up	A	1
	To mess	A	1
	To make 'sharp' comments	A	1
	To send away	A	1
Stoelen	To (go) sit on a chair	TQ	6
	To set up chairs	TQ	3
	To relax	TQ	1
	To talk cozily while sitting on chairs	TQ	1
	To put something/someone on a chair	TQ	1
	Based on (Dutch expression)	A	1
	To go to the toilet	A	1
	To play 'stoelendans' (a game which involves chairs)	A	1

	To ground	A	1
	To put someone in place/to lace someone's mouth	A	1
Voeten	To walk on bare feet	TQ	4
	To walk	TQ	3
	'Voetje vrijen'	TQ	3
	To touch something/someone with your feet	TQ	2
	To kick	TQ	1
	To take feet callus away	FQ	1
	To put something firmly down	A	1
	To flat something	A	1
	To 'land' on the ground	A	1
Huiden	To have contact between two skins	TQ	3
	To take care of your skin	TQ	2
	To touch something/someone	TQ	2
	To put something on your skin	TQ	2
	To stack skin of cows	TQ	1
	To peel	TQ	1
	To sell skin	TQ	1
	To make leather of an animal	FQ	1
	To skin (an animal)	AQ	1
	To process/edit skin	AQ	1
	To add skin to something	AQ	1
	To put on a coat	A	1
	To lay next to each other	A	1

7.3.2 Appendix C2: Detailed results of the prototype task.



7.3.3 Appendix C3: General results of the sorting task.

	Sentences			
Category	**Concrete**	**Other 1**	**Other 2**	**Abstract**
Concrete	95,1% (n = 193)	79,9% (n = 163)	35% (n = 71)	9,3% (n = 19)
Other	0,5% (n = 1)	10,3% (n = 21)	11,8% (n = 24)	6,9% (n = 14)
Abstract	4,4% (n = 9)	9,8% (n = 20)	53, 2% (n = 108)	83,8% (n = 171)

7.3.4 Appendix C4: Detailed results of the rating task.