

If music be the food of love, play on;
give me excess of it, that, surfeiting,
the appetite may sicken, and so die.
That strain of melancholy fall:
O, it came o'er my senses like sweet
sound, That made the very bank of
violets, Strewed with odour. Her
sounds of music Creep in our ears:
soft stillness and the night Become the
touches pierce your mistress' ear, And
draw her home with music. I heard, I
look'd: two senses both at once. *Soft
music* like a perfume, and *sweet light*
Golden with *audible odours* exquisite
Swathe me with cerements for
eternity

SEMANTIC CHANGE:

SYNAESTHETIC METAPHORS

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DEGREE: ENGLISH STUDIES

YEAR: 2014-2015

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AREA: HISTORY OF ENGLISH LANGUAGE

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ABSTRACT

Every word has its own history. Semantic change does not follow strict rules as other domains, such as phonological change sometimes does, but it does not happen randomly either. In this paper we will analyze a phenomenon which could represent a law in semantic change, and at the same time help explaining how our cognitive system processes Language, *synaesthetic metaphor (SM)*, a kind of metaphor in which the two terms belong to different sensorial domains, as in 'sweet smell'.

Words change in order to fulfil a need; they change to ease communication and to help conceptualizing the changing world. Scholars have struggled to find a law for semantic change for several years but up to now they have not found any firm pattern. The evolution of a word cannot be foreseen, but there are some natural tendencies that new lexicalizations tend to follow. For instance, abstract concepts, which are difficult to grasp, are usually understood in terms of concrete ones, which can be understood more easily, so, words for the latter are used for referring to the former. In the case of SM, however, we can find more than a simple tendency; we have a regularity that is almost an exceptionless law: the *directionality thesis*. The directionality thesis analyses the order of mapping in the synaesthetic transfer. Several authors have analysed verbal synaesthesia from different perspectives and conclude that the mapping goes from the lower to the higher senses. The directionality thesis mirrors a natural tendency: transfer of meaning usually goes from concrete to abstract.

On the other hand, we will see that metaphor and especially SM cannot be accounted within the boundaries of semantics, pragmatics or any linguistic theory. We need a cognitive approach such as *the conceptual metaphor theory*. The conceptual metaphor theory defends that metaphors, and SM, can be processed because our cognitive system is metaphorical in nature and we are prepared to understand one thing in terms of another. In this approach, metaphor is not considered the exception of a rule anymore, it is seen as the norm. Moreover, another kind of synaesthesia, the *perceptual or strong synaesthesia*, provides evidence to show how our cognitive system works. The fact that some people, synaesthetes, experience real co-sensation, makes us believe that our cognitive system works in an analogical manner. Synaesthesia provides linguists with a path to analyse the functioning of Language.

Key Terms: Directionality thesis, cognitive system, synaesthetic metaphor, perceptual synaesthesia.

1. INTRODUCTION

The world we live in evolves and, consequently, words become obsolete. Due to that reason, new terms are constantly being created. It is understandable that those new concepts appear for several reasons and by means of a number of mechanisms. But, do new terms happen randomly? Finding a law in semantic change has been a concern since long ago. Linguists struggle to provide theories of how we understand meaning of both existing words and the new ones. So far we know that our cognitive system plays an important role, Language cannot be explained within the boundaries of syntax, semantics or even pragmatics.

The next section introduces the notion of semantic change and proposes some natural tendencies. The aim of the section will be to introduce the topic to later on focus on a very regular tendency: the *directionality thesis*, a law of semantic change which predicts the mapping of sense words which is found in synaesthetic transfer. In the third section we will approach synaesthesia from different perspectives. On the one hand synaesthesia will be described as a kind of metaphor, that is, synaesthetic metaphor (SM). Hence, we need to provide approaches accounting for metaphor in order to analyze whether those theories could account for SM as well. On the other hand synaesthesia will be analysed from a neurological point of view. In other words, we will describe *perceptual synaesthesia*, a real condition some people experience and which provides evidence in favour of explaining metaphor in terms of cognitive theories. Section four is devoted to the previously mentioned directionality thesis. Several authors who have analysed the phenomenon will be presented. The scholars have analysed the directionality thesis from different perspectives and provide evidence supporting the hypothesis since, as it will be seen later on in this paper, they all arrived at the same conclusion: the mapping always follows the same direction.

Considering all the data, we will discuss that the directionality thesis simply mirrors a natural tendency (from concrete to abstract). The main conclusion of this paper would be that "synaesthesia is a key in the evolution of language" (Ramachandran & Hubbard, 2001): it shows regularity in semantic change and provides evidence to prove that our cognitive system is analogical in nature.

The aim of this paper would be, therefore, twofold:

- i. to show the regularity in the mapping of synaesthetic metaphors: directionality thesis.
- ii. to analyze how our cognitive system processes synaesthetic metaphors.

2. SEMANTIC CHANGE

Language is a process rather than a product (Coseriu, 1958). It is used to communicate; that is, to intentionally and overtly transmit information. When uttering a string of words, the speaker is performing an action, carrying out a speech act. The communicator could be promising, asking, offering or simply describing a state of affairs.

Depending on the context, the same sentence could translate into different propositions. For example, imagine a woman utters 'I am cold' to his husband while going for a walk. In this case, we would all agree that she clearly means 'I want to borrow your jacket'. However, if the very same sentence is uttered by the same woman when sitting in the living room, where a window is opened, we will understand that she wants for the husband to close the window. Another source of language variation is register. We would never refer to a friend with the same string of words that we would utter to the queen even if we want to transmit the same message. Equally, the words we use today are quite apart from those that were used 100 years ago. In sum, we need to adapt the words to different situations, and by doing so, we add new meanings to the words. Sometimes, adapting a word is not enough and a completely new term has to be created.

It is understandable that the world we live in keeps changing, and so has to do our language. Words need to evolve in order for us to communicate successfully, to be understood, acceptable and achieve our goal. For instance, there are some topics that society does not feel comfortable talking about, such as death. As a result, new terms, *euphemisms*, are used to refer to death, such as 'pass away, rest in peace, give up the ghost', etc. Once those new words become familiar they ought to change again and so on and so forth. The same phenomenon takes place with hyperbole; when we want to exaggerate new terms have to be used in order to shock the audience. Eventually those

expressions become normalized, and, as a consequence, neutral; therefore, *nouveaux intensifiers* need to be created.

Change of meaning, although unpredictable, is not a chaotic process. There are several processes by which the associations that a word has change. Below some of the most productive mechanisms for semantic change are listed:

i. **Narrowing and broadening:** the scope of things to which a word can apply may vary. In the case of *narrowing* the range of meanings a word denotes decreases. For example, the word 'meat' used to mean food in general, but now, its meaning has been reduced to 'food of flesh'. *Broadening* refers to the opposite process: the range of meanings which a word denotes increase. For instance, 'barn' used to denote 'a storehouse for barley', by eliminating one of the features, 'for barley', the scope has been extended to denote 'a storehouse for any kind of grain'.

ii. **Transfer of meaning:** We can transfer meaning (i) by *metaphor* (association of ideas due to analogy), for example, when we use the word 'foot' (lowest extremity of an animal) for all sorts of things, as in 'foot of a mountain'; (ii) by *metonymy* (association of ideas due to contiguity), when a concept is referred to not by its own name but rather by the name of something associated in meaning with that concept. For instance, 'board' (table) came to mean 'daily meals'; or (iii) by *synaesthesia* (transfer from one sensory faculty to another) as when we apply clear, with principal reference to sight to hearing 'clear sounding'.

iii. **Pejoration and Amelioration:** The associations of a word may worsen or improve. In the case of *pejoration*, the meaning of a word becomes negative over a period of time, as 'silly', from Middle English 'seely' (blessed, innocent), which has come to mean 'showing a lack of good sense, frivolous'. *Amelioration* consists in an elevation of the meaning of a word, as in the word 'nice', which has achieved its modern meaning by amelioration from the earlier sense 'foolish, silly'.

So far we have made clear that words need to change, and we have looked at some of the semantic changes that words undergo. An important question remains still unresolved: is there a law that controls the semantic evolution of words? In the next section we will answer this question.

2.1. GENERAL TENDENCIES IN SEMANTIC CHANGE

There is not a law as such in semantic change. Scholars have analysed the phenomenon over a span of time and all they can offer are some *statistical tendencies* that words are liable to follow. By tendencies we mean, for instance, that it can be expected that a word which is neutral may polarize, but it cannot be predicted what meaning a neutral word will acquire or if that given word will change at all. The following tendencies, many of them taken from Williams (1975) are examples of how words tend to change:

- i. Words for abstractions generally develop out of words for physical experience (comprehend, grasp, etc.)
- ii. Sense words (sharp, sour, low, bright, etc.) are often transferred to the description of abstract concepts, e.g. personality (a bright person, be sharp of mind)
- iii. Neutral terms tend to polarize; become positive or negative (doom, frame, predicament, etc.)
- iv. Words indicating strong emotional response tend to weaken because they are used to exaggerate (awful, terrific, tremendous, etc.)
- v. Insulting terms are picked from animal names or low classes (rat, dog, villain, cad, etc.)
- vi. Metaphors will be drawn from those aspects of experience most relevant to us (i.e. eye of a needle, finger of land) or most intense in our experience (i.e. turn on, spaced out, freaked out, etc.)
- vii. Words originally describing low economic status come to denote bad manners in moral blame (chuck, villain, etc.)
- viii. Words describing skill or knowledge tend to pejorate (cunning, etc.)
- ix. Precise meanings become vague
- x. Words meaning "immediately" tend to change into "in a little while" (i.e. soon)
- xi. Related words or variant forms of the same word usually diverge in meaning with time (flour/flower, shirt/skirt)

As it has been mentioned before, these are just general tendencies. There are, however, some generalizations which are claimed to be exceptionless, but they are usually restricted to an extremely narrow range of data, within a very restricted time period. For instance, it could be generalized that, in English, words meaning 'rapidly' before 1300 came to mean 'immediately'.

Some scholars have analysed generalizations that do not belong solely to a particular language and which, according to some linguists, could reflect how our cognitive system processes language. The most regular semantic change that has been found so far, one that could be even considered a law, is found in synaesthetic transfer: *the directionality thesis*. But, before embarking on the analysis of the tendency, we need to explain what synaesthesia is.

3. SYNAESTHETIC METAPHOR

Scholars consider verbal synaesthesia to be a kind of metaphor in which the two terms belong to different sensorial domains, i.e. 'warm colour'. The main concern is if the approaches that explain how metaphor is processed are valid when dealing with synaesthetic metaphor. To start with we need to clarify what a metaphor is and how we process them.

3.1. METAPHOR

According to the Oxford Advanced Learners' Dictionary (2010), a metaphor is "a word or phrase used to describe something else, in a way that is different from its normal use, in order to show that the two things have the same qualities and to make the description more powerful". Some examples are 'She has a heart of a stone', 'the curtain of night' or 'all the world's a stage'. The main concern of linguistics has been to find out how we are able to understand metaphors. There are several approaches dealing with this issue, starting from the conventional approaches to the cognitive approaches we have nowadays.

Conventional approaches did not go beyond semantics. An example would be *the comparison theory*, (in Levinson, 1983 p.151-153) an approach which simply states that metaphors are similes in which the item indicating similarity has been suppressed.

According to this theory a metaphor such as 1 could be understood by restoring the item *like*, as in 2:

1. Your teeth are pearls
2. Your teeth are *like* pearls

Obviously, there are metaphors than cannot be explained following this assumption. For instance, we need to restore much more than a predicate of similarity to go from 3 to 4. In like manner, it is indubitable that this account is far from resolving a synaesthetic metaphor such as 5:

3. The government is going the wrong way down a one-way street
4. The government is pursuing policies like a car going the wrong way down a one-way street.
5. A violin gave a sour sound.

Up until now we have seen that metaphors cannot be explained within the boundaries of semantics. Next we will move on to a pragmatic approach, one which at least distinguishes between literal and figurative meaning. The philosopher Paul Grice accounted for metaphor and other cases of figurative speech within his more general pragmatic theory of conversation. Grice (1975) developed his theory around what he called the *cooperative principle*, which assumes that:

" our talk exchanges do not normally consist of a succession of disconnected remarks, and would not be rational if they did. They are characteristically, to some degree at least, cooperative efforts, and each participant recognizes in them, to some extent, a common purpose or a set of purposes, or at least a mutually accepted direction" (Grice, 1975).

To explain what should be understood by *cooperative efforts* he proposes four general maxims governing conversation. The maxims have to do with the amount of information given (maxim of quantity), its truthfulness (maxim of quality), its relevance (maxim of relation), and with the formal characteristics of the linguistic expression used by the speaker (maxim of manner).

The maxims may be obeyed or disobeyed, and both sorts of speaker behaviour may give rise to meanings inferred from 'what is said', which he called *conversational implicatures*. On Grice's account, a metaphor is considered a flouting of the maxim of quality 1 "Do not say what you believe to be false", that is, a case where the speaker violates a maxim on purpose and so that the hearer notices. The speaker produces an utterance which, if taken literally, seems untrue or implausible in order for the hearer to infer a proposition which is true. For example, when the speaker utters 6, the hearer will notice its falsity and look for a related implicature which could be true. For instance "you are as sweet as the cream in my coffee".

6. You are the cream in my coffee.

Thus, on Grice's account, metaphors are described as deviations from a general norm of truthfulness governing speech.

Counterevidence for Grice's approach can be found in Levinson (1983). The scholar explains that a metaphor is not necessarily false, as we can see in example 7 below. In a similar line, a sentence can be metaphorical and true at the same time. Sentence 8 could be true if the philosopher actually lived there; and, metaphorical, if we meant that his theories are still alive in a certain place. The flouting of the maxim cannot explain either how questions, 10, and imperatives, 9, are understood as true or false. Furthermore, it does not explain how to derive an implicature and, when doing so, how to decide whether the implicature is the opposite utterance, a similar one, or if it is weaker or stronger. All things considered, this approach offers a way to recognize metaphors, but really little about how to interpret them. An important question remains unresolved: How do we go from the recognition to the interpretation of a metaphor?

7. Your defence is an impregnable castle

8. Freud lived here

9. Be an angel

10. Is John an angel?

Searle's pragmatic approach (1979) offers suggestions for the problem of how to interpret metaphors. According to the author, the hearer follows three steps in order to understand metaphorical expressions, that is, to understand *S is R* (example 12) when the speaker has uttered *S is P* (example 11). First of all, the defectivity of sentence *S is P*, if taken literally, has to be recognized (Sally, [+ animate] cannot be a block of ice, which is [-animate]), and, consequently, the hearer must look for an utterance meaning that differs from the sentence meaning. Secondly, the hearer needs to consider different values for R, that is, look for salient features of P things (a block of ice is cold). The last step consists in restricting the range of possible values for R (Sally has the coldness of a block of ice, she is unfriendly and emotionless).

11. Sally is a block of ice (*S is P*)

12. Sally is unfriendly and emotionless. (*S is R*)

He suggests that once the metaphor is recognized, the speaker applies what he called the *principles of interpretation*, in order to compute *R* given *P*. Searle proposes 8 examples, such as 'Things which are P are by definition R', or, 'things which are P are contingently R' but he states that there may be many others.

There has been criticism against Searle's approach as well. Cooper (1986) defended that according to Searle's proposal (i) Speakers are supposed to demetaphorise each metaphorical expression and restore it to full grammaticality. In many cases it is almost impossible to find an equivalent non-metaphorical expression without losing the original meaning.(ii) It makes no sense to explain metaphor in terms of rule breaking because metaphor is ubiquitous, as we will see in the conceptual theory below. (iii) The pervasiveness of metaphor argues against the deviance hypothesis. Metaphor is the norm, not an exception. (iv) To end with, it makes no sense to believe that a speaker will produce a certain utterance *S is P* hoping the listener will use his pragmatic principles to arrive at the intended meaning *S is R*. Why would the elocutionist not say the intended meaning directly?

Leaving the semantic and pragmatic theories behind, the contemporary approach of metaphor rejects the assumption that metaphor is rule breaking. Lakoff and Johnson (1980) propose *the conceptual metaphor theory*. The authors defend in their book that metaphors are part of people's way of conceptualizing the world. Language users can process metaphors which require understanding and experiencing one thing in terms of another because it is part of their cognitive system, on account of their ability to think analogically.

Metaphor is, therefore, a means for understanding. Abstract ideas are conceptualised on to concrete ones in order to be grasped more easily. As an illustration we have the concept [TIME IS MONEY] thanks to it we can comprehend the examples 11-13. There are thousands of conceptualizations such as [LOVE IS A JOURNEY], [ARGUMENT IS WAR], [IDEAS ARE OBJECTS], etc.

13. You are wasting my time
14. You're running out of time
15. Is that worth your while?

Interestingly, the conceptualizations change from language to language. Hewson & Hamlyn (1985), compared Sotho languages of Southern Africa to English. For Sotho speakers, [HOT IS BAD] and 'being hot' translates as bereavement, physical pain, illness, or extreme tiredness. In English, on the contrary, the conceptualization is the opposite, [HOT IS GOOD], such as in 'a hot club', 'to be hot on something' or 'to get hot'. Sotho's negative mapping can be easily understood if we consider that for them search for water is a concern. Therefore, we can conclude that the physical environment of the speaker influences upon their conceptualizations.

In this section we have seen that a language theory alone cannot account for metaphor. Speakers are capable of understanding metaphorical expressions because their cognitive system is prepared to do so. They have mental representations of mappings that explain abstract things by means of concrete things. This last cognitive approach perfectly fits synaesthetic metaphor, a highly productive kind of metaphor that will be approached in the next section.

3.2. SYNAESTHETIC METAPHOR

A synaesthetic metaphor is a kind of metaphor which exploits a similarity between experiences in different sense modalities. For instance, in the expression 'warm colour' there is a sensory mismatch between 'warm', which is perceived through touch, and 'colour', which is perceived through sight. More examples of describing one sense modality in terms of another could be: sweet smell, bright sound, delicate taste, noisy colour, cold words, soft green, loud colour or dark sound.

In the previous section we proposed that the way our cognitive system is organised is what enables us to understand metaphorical synaesthesia. We are capable of understanding one thing in terms of another because of our ability to think analogically. This hypothesis is supported by another kind of synaesthesia that exceeds the realm of language: *perceptual synaesthesia*.

3.3. PERCEPTUAL SYNAESTHESIA

Above we have analysed verbal synaesthesia, a type of metaphor in which two terms belonging to different sensorial domains are put together to create a new concept. This kind of synaesthesia, according to Mark (2001) is called *weak synaesthesia*. There is, however, another kind of synaesthesia that does not refer to verbal expressions: strong or perceptual synaesthesia. Next we are going to compare the two kinds of synaesthesia.

The term *weak synaesthesia* refers to cross-sensory connections revealed through language and perception. *Strong* or perceptual synaesthesia refers to the real co-sensation some people, the *synaesthetes* (explained below), experience. The main difference is that everyone is capable of processing a synaesthetic metaphor (weak synaesthesia), but only approximately 1 in 2000 people actually experience real co-sensation (strong synaesthesia).

Those atypical citizens are called *synaesthetes*. Synaesthetes involuntarily experience physical cross-modal association; the stimulation of one sensory modality (inducer) causes a perception in one or more different senses (concurrent). Some of them perceive colours in response to music or spoken words; shapes in response to taste, colours in response to pain, etc.

According to Cytowic (1997) synaesthetes have five diagnostic features:

- i. Synaesthesia is a passive experience, involuntarily elicited by a stimulus. It is unsuppressable since it cannot be dismissed at will.
- ii. Synaesthesia is projected. It is perceived externally in *peri-personal* space, the space within reach of any of their limbs.
- iii. Synaesthetic perceptions are durable and unelaborated. Durable because cross-sensory associations do not change over time, they show high consistency.
- iv. Synaesthetic perceptions are memorable. Memories of synaesthetes are usually excellent since their 'extra-bit' helps them remembering. For example, if a synaesthete experiences forms in different colours, his 'extra bit', a faculty which other people do not have, will help him remember forms, such as Chinese letters.
- v. Synaesthetes are emotional. Synaesthetes share a sense of certitude, they all are convinced that what they feel is real and valid.

All these features have been tested in several researches and provide data to prove strong synaesthesia is real and is experienced automatically and immediately after the stimuli. Other evidence to prove the phenomenon is its genetic character, that is, perceptual synaesthesia is believed to run in families. Galton (1980) discovered that twins usually experience the same kind of synaesthesia.

One interesting case study is Jiw's (Ward & Simner, 2003). The subject experiences taste in response to particular words. The concurrent he perceives depends on the phonemes of the induced word. For instance the phoneme /k/ always brings about a particular taste. The stunning fact is that he shows not phonological awareness at all. This example provides clear evidence to prove the perception involuntary.

There is plenty of evidence to prove that synaesthesia exists (Baron-Cohen, 1996). Nonetheless, the reason why it occurs remains a mystery. However, there are two explanations for the phenomenon: *congenital explanation* and the *learning explanation*:

- i. The congenital or neonatal hypothesis defends that we are all born synaesthetes but the 'knowledge' is progressively lost. Allegedly, early in infancy we experience all sensory input in an undifferentiated way. That is to say, sound triggers audition, vision, and tact. We all have a phase of synaesthesia; but, later, the sensation becomes increasingly modular. Adult synaesthesia is believed to be caused due to a breakdown in modularization (Lyons, 2001)

- ii. The learning explanation maintains synaesthesia is due to implicit learning during childhood. For instance, Human (2014), describes the case of a woman who identified each letter of the alphabet as having a distinct colour. She discovered that her association came from an alphabet hanging on her elementary school classroom. "In learning to read and write, she may have subconsciously absorbed the colour as well as the shape of the letters" (Human, 2014, p.1)

Most scholars believe that both hypotheses are not a dichotomy rather a continuum. Synaesthesia is shaped by several factors: genes, brain (cognition) and environment or perceptual experience. What is clear is that if synaesthesia is not neonatal, it begins early in infancy. We can find evidence supporting this belief in Jiw's case (mentioned above). The single exception to his perception was found when providing alcoholic names. Such anomaly would be expected if the associations had been developed in (or were present since) childhood when alcohol was presumably not encountered.

All in all, the mechanism underlying synaesthetes' experiences should be no different from that which makes us capable of processing synaesthetic metaphors. How our brain works is still a mystery but synaesthesia provides us with path for looking for the mechanism. Ramachandran & Hubbard (2001) have gone so far as to assert that "synaesthesia is a key in the evolution of language [...] the solution to the riddle of language origins comes from synaesthesia" (p. 19)

To close this section, we need to mention that in general terms the kind of synaesthesia that synaesthetes experience varies from one synaesthete to another. In some instances, nonetheless, experiences can be remarkably similar among different individuals (Ramachandran and Hubbard, 2001). In any case, associations are never random:

"When asked to associate a shape with a sound, synaesthetes and non-synaesthetes tend to behave in the same way. These observations have led scholars to hypothesize that at least some perceptual synaesthesia may be an extension of the cross-modal mechanisms common to all adults" (Ronga, 2012, p. 140)

In a similar line, synaesthetic metaphors are mapped following a pattern as we will see in the following section.

4. DIRECTIONALITY THESIS

This paper has shown that synaesthetic metaphors can be understood because our cognitive system is metaphorical in nature. We have also learned that, when creating metaphors, the transfer follows a natural tendency, that is, we tend to translate abstract terms into concrete ones in order to understand concepts more easily. In the same way, we would expect synaesthetic metaphors to follow a tendency rather than transferring randomly.

Ullmann was the first to make this hypothesis and proposed the *directionality thesis*: an approach which analyses the direction of the mappings in synaesthetic transfers. After him, several authors have analysed the phenomenon from different perspectives and provided more evidence. Below, a chronological analysis of the approaches proposed by some distinguished authors will be conducted.

4.1. ULLMANN'S DIRECTIONALITY THESIS (1957)

Ullmann (1957) proposed an approach to account for semantic change, the *panchronistic* approach to meaning. Pan-, from Greek "all, wholly, altogether", pertaining to or designating linguistic study applied to all languages at all stages of their development. It was based on the previous interest in universal or general grammar, and it differs from conventional approaches in that:

"The new method [...] points to something deeper and more permanent behind them, an abiding tendency which owed its materialisation in the various languages to a specific set of favourable conditions and circumstances- precisely those which had previously been adduced as efficient causes".(Ullmann, 1957 p. 267)

He saw there could be a semantic law in the mapping of synaesthetic transfers. Therefore, based on English, French and Hungarian poetry written by the romantics in the 19th century, Ullmann carried out research to test whether the synaesthetic associations followed general tendencies. The author was not really concerned with marginal cases since what was important for him was the "law of large numbers"; and, from the very beginning, recursive patterns were found.

Ullmann's design distinguishes six sensorial domains (touch, heat, taste, scent, sound and sight), separating heat from touch because "touch seems to possess a certain measure of psychical autonomy which impressions of pain and kinaesthetic sensations do not command". (p. 278). All the same, the scholar defends that grouping both senses together would only provide more conspicuous evidence.

The method he applied for collecting data was straightforward. Every single example he found was ranked in the corresponding group depending on its source and destination. When conducting the collection of data, i) faded images were excluded, that is, only cases in which synaesthetic provenance was clear were included. ii) Genuine transfers were included as often as they appeared. iii) When the distinction between source and destination was not evident he applied *Jespersen's theory* "the element about which the poet is saying something [...], the higher of the ranks, will supply the destination". iv) In the context of borderline cases, when either the source or the destination are related to more than one sensorial domain themselves, logic was applied. In any case, as mentioned before, he was concerned with the law of large numbers so any of these cases should not affect the general results at all.

The table below contains the results obtained from grouping the data collected from John Keats, and provides an example of how the data was organized. The horizontal lines in the table contain transfers coming from the same source, and the vertical lines transfers which mapped into the same destination. It can be seen at first glance that certain mappings are much more typical than others.

	TOUCH	HEAT	TASTE	SCENT	SOUND	SIGHT	TOTAL
TOUCH	-	1	-	2	39	14	56
HEAT	2	-	-	1	5	11	19
TASTE	1	1	-	1	17	16	36
SCENT	2	-	1	-	2	5	10
SOUND	-	-	-	-	-	12	12
SIGHT	6	2	1	-	31	-	40
TOTAL	11	4	2	4	94	58	173

Table 1: Data collected from John Keats. (p. 281)

By comparing tables covering works from several romantic poets, he discovered various common features and arrived at three main conclusions:

i. **Hierarchical distribution:** Transfers tend to go from the lower to the higher, that is, from the less differentiated sense to the more differentiated and not vice versa. (p. 280). The highest sense would be sight, followed by sound, scent, heat and finally touch, the lowest one. The green line that we can observe in Table 1 is formed by those mappings that are not synaesthetic because both source and destination are the same sense. The line also separates those mappings that are more typical, the ones above the line, from the less common, those that remain below it.

ii. **Predominant source:** The semantic field of tactile experience provides the largest number of lexemes transferred to other sensory modalities. We can appreciate in the table that touch mapped onto a total of 56 destinations out of 173. Moreover, heat is connected with touch, so the predominance of the realm of touch would be even more evident if both heat and touch would be joint.

iii. **Predominant destination:** Here he found a discrepancy, the predominant destination should be sight, which is the highest lever, however it is sound. In the table we see that sight, only receives 58 mappings on contrast with sound which clearly outnumbers this result with 94. Ullmann explains that the reason for this inconsistency is that "visual terminology is incomparably richer than its additional counterpart" (p. 283).

iv. **touch > sound:** The mapping from touch onto sound is the most common one. This last finding seems to naturally follow from the previous tendencies. However, it could be possible that although touch is the predominant source, it would map mainly to other destinations distinct from sound; and, sound, which is the predominant destination would receive mappings primarily from sources other than touch. Therefore, a bigger concentration, such as *touch>taste*, could be possible.

v. Regarding **sound and sight**, the highest senses, both are equally likely to become either source or destination.

In sum, Ullmann's research shows that the mappings follow the tendency from the lower to the higher senses as we can see in figure 1 bellow. Therefore a synaesthetic metaphor "a cold light" (source: cold, touch; destination: light, sight) would be acceptable, and " a lighted coldness" (from higher to lower) would not (example taken from Shen, 1997).

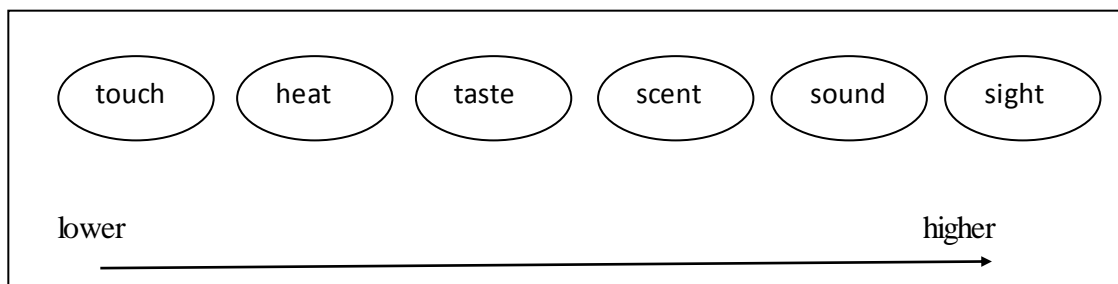


Figure 1: Directionality and the hierarchy of the senses according to Ullmann (1957)

4.2. WILLIAM'S HYPOTHESIS (1976)

In his analysis on the poets of the 19th century, Ullmann concluded that touch was the predominant source and sound the predominant destination in the mapping of synaesthetic transfers. Joseph M. Williams (1976) agreed with this finding but wanted to approach the problem from a different viewpoint. Because Ullmann, although claiming to propose a panchronistic approach, ignores historical semantics completely and concentrates only on the 19th century. Williams believed that the tendencies proposed by Ullmann required to be tested diachronically as well.

Therefore Williams' study is diachronic. The scholar collected data from English language covering all the existing adjectives, from the first citations that appeared in the OE dictionary to the present, which referred to any sensory experience. Although his analysis only concerns English, the author believes this generalization may account for other languages. In his classification, Williams groups the sensorial adjectives into touch, taste, smell, dimension, colour and sound.

Analysing the data he obtained, the major generalization would be that if a lexeme transfers from one sensory modality to another, it will follow the schema in Figure 2, which provides the following information:

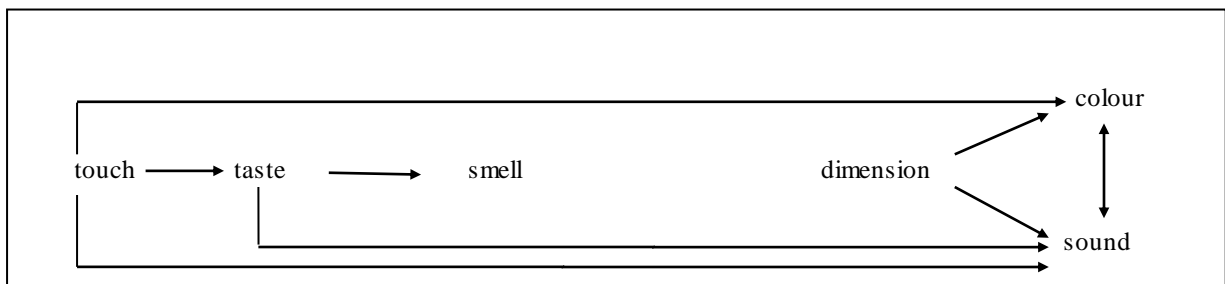


Figure 2: Williams' major generalization (1976)

i. If a lexeme referring to touch transfers, it may do so to taste (sharp tastes), colour (dull colours) or sound (soft sounds). There is one exception to this tendency, tactile words do not change to visual dimension or directly to smell.

touch > taste, colour, sound

ii. Taste does not transfer to touch (backwards) or to dimension (forwards) but only to smell (sour smell) or sounds (dulcet music).

taste > sound, smell

iii. No olfactory word has shifted to other senses.

smell > \emptyset

iv. Dimension tends to transfer to colour (flat colour) or sound (deep sounds).

dimension > colour, sound

v. Colour only shifts to sound (bright sounds) and sound only shifts to colour (quiet colours)

colour > sound *and* sound > colour

Moreover, the author discovered that if a lexeme transfers against the predicted pattern, that new meaning does not tend to maintain itself in Modern Standard English. The author observes that:

"there is no intrinsic reason why this order should be observed. In a forced-choice test 25 undergraduates displayed a high level of agreement on the meaning of metaphors such as loud heights (high or low?), sour blades (sharp or dull?) and quiet angles (acute or obtuse?). Since such metaphors can be understood, there seems to be no reason for them not to develop. But they do not." (p. 465)

A large number of these lexemes transfer to other destinations again. Hence, 'harsh' refers to the senses of 'touch, taste, colour and sound'. A question arises then, whether the new adjectives behave in the same way as first-order transfers did. It is difficult to calculate where the second order transfer is derived from but the author assumed it is

determined by the most advanced sense of a lexeme. He concluded that second-order synaesthetic adjectives follow the same schema shown in Figure 2; and, equally, those transfers that did not, have not maintained themselves in common English.

All in all, Williams' research supports Ullmann's findings plus he provides more evidence and new findings. Next we are going to present an author who supports the directionality thesis by proving evidence from other languages.

4.3. SHEN'S COGNITIVE CONSTRAINTS (1997)

Shen analyses three poetic figures, synaesthesia among them, to test whether cognitive constraints account for regularities in semantic change. He believes the new word forms are created because they are more accessible or "more basic". In other words, the transfer of meaning goes from abstract to concrete.

According to the author, cognitive constraints provide an explanatory mechanism that accounts for regularities characterizing poetic language (and non poetic language too). The regularities we find in semantic change "conform to cognitive rather than linguistic or contextual constraints, i.e. constraints which are derived from our cognitive system and its organizing principles" (Shen, 1997, p.35).

To test his hypothesis, Shen relies on the direction of synaesthetic mapping, since synesthetic poetic metaphors seem to be highly selective with respect to their directionality of mapping. He takes examples from Hebrew poetry, because Ullmann's data was all taken from European writers, so if the findings agree, it will provide more reliable evidence. His results were straightforward, "the lower terms in the hierarchy tend to map on the higher terms significantly more than the other way round. "

The author did not stop there, he wanted to explain why they follow that order. "the tendency follows from the general cognitive constraint which suggests that a mapping from a more accessible or basic concepts onto a less accessible or less basis ones seems more natural, and is therefore preferred" He carried out research on 95 subjects and his hypothesis is supported.

4.4. DISCUSSION

All these authors have shown that the mappings in synaesthetic metaphor do not happen randomly. The directionality thesis has been analysed from different points of view and all scholars have arrived at the same conclusion: the mapping goes from the lowest to the highest senses. In my view, in their papers, there are some points that would need clarification.

To begin with, Ullmann (1957) provides no explanation for why touch is considered the lowest of the senses and sight the highest. He simply states that "transfers tend to mount from the lower to the higher reaches of the sensorium, from the less differentiated sensations to the more differentiated ones and not *vice versa*" (p. 280). If we consider the ordinary use of the words, we can hypothesise that the ordering of the senses may have to do with decreasing importance for human survival. Following this assumption, the highest sense would be the most important one, sight, and the least necessary will be the lowest, touch. The resulting order perfectly fits Ullmann's scalarity. Still, the notion of 'differentiation' remains unexplained. Subsequent authors analysing the directionality thesis assume the same scalarity but give no reason for it either.

Secondly, when dealing with the inconsistency he found between sound and sight Ullmann states "visual terminology is incomparably richer than its auditional counterpart". I assume Ullmann means there is a large amount of vocabulary referring to sight, therefore, we do not need to use new words from other modalities to describe visual experiences. Even if this is what Ullmann meant, he provides no evidence supporting the assertion, it seems ad hoc.

Thirdly, each author considers a different number of senses. Ullmann groups the senses into *touch, heat, taste, scent, sound and sight*. He separates *touch* from *heat* because "touch seems to possess a certain measure of psychical autonomy which impressions of pain and kinaesthetic sensations do not command" (p. 278). In any case, as the scholar pointed out, grouping both together would only make his results more evident. Williams (1976), by contrast, groups the senses into *touch, taste, smell, dimension, colour and sound*. I believe *dimension* and *colour* are in this case taken as senses because the author thinks they should form part of the classification considering the data he analyses. In my opinion, the results would be more comparable if all the authors classified the senses in the same way. For instance they could follow the usual distribution: *touch, taste, smell, hearing and sight*.

All in all, the authors mentioned here, together with many others, have arrived at the same conclusion and offered the most regular generalization in semantic change. Moreover, Shen's cognitive approach not only gives evidence supporting the regular order in the mapping but also provides a reason for its happening. According to the author, the order of the mapping simply mirrors a more natural tendency of semantic change: from the abstract to the concrete.

5. CONCLUSION

This paper has shown that semantic change takes place because new words are constantly needed to help us conceptualize the changing world. It is difficult to foresee the evolution of a word, since each word has its own history. However, some changes are more likely to occur, that is, there are some tendencies of semantic change that words usually follow. When dealing with semantic change, one may wonder whether we are creating a really complicated language, and that semantic change and some pieces of *complicated* language, such as metaphors, are unnecessary. Nonetheless, I believe the question is not 'why do we need such a complicated language?', but 'how are we able to produce and understand such a complicated language?' An example of a piece of language which has been considered complicated to process is metaphor.

Metaphor has been a real concern in linguistics lately. Grice and so have considered that metaphor had to be translated into something else in order to be understood. As we have seen in section 3.1, the perspective has evolved and the state of the art is that there is no rule breaking in metaphor. According to the latest theories, we process a metaphor automatically, that is, without translating it into another linguistic expression, and understand it because our cognitive system is prepared to do so. In other words, our cognitive system allows us to understand one thing in terms of another, it is metaphorical in nature. A highly productive kind of metaphor, synaesthetic metaphor, perfectly fits with this last hypotheses.

There are some people who are able to experience real co-sensation: synaesthetes. Synaesthetes actually experience what the rest of the population create through language when building a synaesthetic metaphor. As previously mentioned in section 3.3, according

to some scholars we are all born synaesthetes, and due to modularization, that is, categorization of *touch*, *smell*, *sight*, *sound* and *taste* we progressively lose our synaesthesia. I believe further research has to be done in the field regarding the neo-natal hypothesis, but, in my view, the lexicalization of the notions of *touch*, *smell*, *sight*, *sound* and *taste* conditions our perception of the world.

Regarding perceptual synaesthesia, the kind of association (inducer-concurrent) that synaesthetes experience varies from one person to another. In some instances, nonetheless, experiences can be remarkably similar among different individuals (Ramachandran and Hubbard, 2003). In any case, associations between the senses are never random. In like manner, the mappings of synaesthetic metaphors follow one of the most exceptionless generalizations: the directionality thesis. The directionality of mapping in synaesthetic metaphor follows a rather general pattern, from the lower (touch) to the higher (sight) senses, as several authors have defended. Shen, and subsequently other authors, has stated that it simply mirrors a natural tendency, translating abstract concepts (which are difficult to grasp) into concrete ones, which makes it easier to understand by our system.

In sum, synaesthesia provides a long sought-after law for semantic change and it shows that the language we create is not complicated, since our cognitive system is perfectly capable of processing it with no effort. Synaesthesia opens a path for linguists and scientists to investigate how our cognitive system processes language, but our brain is still a mystery. Further research in science concerning perceptual synaesthesia has to be done so that linguists can further their understanding of language. Fortunately, leading organizations such as the Max Plank Institute for Psycholinguistics are conducting research in the field.

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