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CONCEPTUAL METAPHOR THEORY AS A FRAMEWORK FOR ANALYSING, CONCEPTUALIZING AND CONVEYING THE SYNAESTHETIC EXPERIENCE

Master's Thesis

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Tartu
2020

I have written the Master's Thesis myself, independently. All of the other authors' texts, main viewpoints and all data from other resources have been referred to.

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INTRODUCTION

Synaesthesia, defined as "[...] an experience in which stimulation in one sensory or cognitive stream leads to associated experiences in a second, unstimulated stream" (Hubbard 2007: 193), is an involuntary, automatic, durable, memorable and noetic experience in which the trigger (inducer), such as the concept of "July", produces an idiosyncratic, unidirectional additional experience (concurrent) from other modality, such as "blue colour". This rare neurobiological condition has been a matter of philosophical and scientific debate for more than a century.

In recent years, the focus in synaesthesia research has shifted from seeing it as a cross-sensory phenomena towards acknowledging the semantic nature and the role of meaning-extraction from stimuli in determining the synaesthetic experiences in most of its types, giving way to notion of *ideaesthesia* as meaning-mediated, or conceptual synaesthesia (e.g. Nikolić 2009; Jürgens, Nikolić 2012; Chiou, Rich 2014; Mroczko-Wąsowicz, Nikolić 2014; Van Leeuwen *et al* 2015). This way, ideaesthesia can be defined as "[...] a phenomenon in which a mental activation of a certain concept or idea is associated consistently with a certain perception-like experience." (Nikolić 2009: 28). The undoubtedly conceptual nature of the most prevalent synaesthesia types –such as experience of colour in response to the concept of letters, digits or time units– is supported by related theories of the role of learning in the emergence and development of synaesthesia.

There is an instantly observable similarity between synaesthetic perception and cognition, and the notion of conceptual metaphor (CM), defined by Lakoff and Johnson as "understanding and experiencing one kind of thing in terms of another" (Lakoff; Johnson 1980: 35) and defined by Kövecses (2017) as "[…] a systematic set of correspondences between two domains of experience" within conceptual metaphor theory (CMT). Just like CM maps aspects of a concrete conceptual source domain onto an abstract one, most common synaesthesia and ideaesthesia types map a concrete, percept-like experience, such as colour, onto the semantics of an abstract concept, such as musical pitch. Moreover, synaesthetic experience can be described in terms of metaforms or "the result of sense-inference – the simulative process guided by the conscious inferences people make about the abstract referents they are attempting to encode" (Sebeok; Danesi 2000: 73) via attribution of

properties from the source to the target domain, similarly to CM (e.g. [days of the week = colours], [sounds = tastes], etc.). Therefore, the nature of the structuring of synaesthesia is compatible with the definition and basic structuring of CM.

While the current state of CMT offers an already quite elaborate, structured way of describing and analysing human metaphoric perception and cognitive processes involved in it, the tools for describing synaesthesia are most often confined to descriptions of inducer-concurrent relationships, types, and accounts of the psychological realities of the affected individuals. Synaesthesia often finds outlet in art, which, arguably, is the most precise and intuitive way to express the synaesthetic experience. However, such outlet is not necessarily the most convenient for conveying the underlying processes and explaining their structure.

Synaesthesia can be hard to conceptualize and present in a schematic, structured way, due to the complexities of inducer-concurrent relationships, its highly idiosyncratic nature and, at times, the lack of "real life" equivalents of induced colour qualia. Meanwhile, the workings and reasoning behind CM are generally accessible and understandable for a wide audience via language, and, in the framework of CMT, through formal notions. The prevalence of synaesthesia in general society is low –affecting around 4,4% of the population (Simner *et al.* 2006: 1028)–. Due to this reason, the application of CMT's formal notions to conceptualizing the synaesthetic experience could make the phenomenon better understandable and easier to conceptualize, grasp and make sense of, at the same time elucidating its underlying structural and functional mechanisms.

Given the above, the aims of this thesis are the following:

1) to establish points of convergence and divergence of the structural and functional properties of synaesthesia and CM, as put forward by the CMT.

2) to determine, how and to what extent the existent CMT's notions, such as those of *source* and *target domain*, *orientational, ontological* and *structural metaphor*, and modelling system theory's (MST) three levels of connective modelling (*metaforms, meta-metaforms* and *meta-symbols*) can be applied to analyse, conceptualize and convey the synaesthetic experience.

3) to determine, how and to what extent the current discussion in CMT can contribute to synaesthesia research by providing formal notions for analysing, conceptualizing and conveying the synaesthetic experience.

These research aims intend to answer the following research question: what are the

implications of the apparent similarity between the structuring of CM and synaesthetic experience on the applicability of CMT's formal models for analysing, conceptualizing and conveying of the synaesthetic experiences?

By researching relevant theoretical and evidence-based literature on synaesthesia and CMT, this research analyses the concepts, structuring and functioning of both synaesthesia and CM to observe and establish parallels, points of convergence and divergence between the two. The objective of this is to arrive at conclusions about how and to what extent CMT can help in analysing, conceptualizing and conveying the synaesthetic experience and its psychological reality, and what are the limitations of such approach. Subsequently, by emphasizing the intricate similarities of the structuring and functioning of synaesthesia and CM, the research will make some additional inferences about the workings of both synaesthesia and CM, as well as their relation.

The first chapter of this thesis introduces (1) the notion of synaesthesia, current trends in its research with emphasis on theories on ideaesthesia as semantically-mediated synaesthesia; and (2) establishes the main functional and structural traits of synaesthesia, its links to other synaesthesia-like phenomena, and introduces separately the type of ideaesthesia that is central to this thesis: time unit→colour.

The second chapter, following the structure of the first, introduces the research on CMT, with particular analysis of the structural and functional traits of conceptual metaphors, as well as modelling system theory's (MST) three levels of connective modelling, to which metaphor pertains.

Subsequently, the third chapter (1) provides analysis of the points of convergence and divergence of synaesthesia and conceptual metaphor based on the definitions, structural and functional properties and other peculiarities of the two phenomena; and (2) determines the applicability and implications of CMT's notions of source and target domains, orientational, ontological and structural metaphor, as well as MST's metaform, meta-metaform and meta-symbol in describing the synaesthetic experience.

1. SYNAESTHETIC EXPERIENCE: CONCEPT AND STRUCTURING

The aim of this chapter is to introduce the concept of synaesthesia and to describe the essential functional and structural traits of vivid synaesthesia in order to offer grounding for further analysis of the vividly synaesthetic experience in the framework of conceptual metaphor theory in the subsequent chapters of this thesis.

To achieve this aim, first of all, introduction to the concept of neurobiological condition of synaesthesia will be given, including the most prevalent definitions of the condition, delimitation of the notion of synaesthesia within this thesis, current state of synaesthesia research, main theories about the aetiology of the condition, and its functional implications on the phenomenological reality of the affected individual. Similarly, possible links with other synaesthesia-like tendencies in non-synaesthetic human sensory processing and cognition will be commented upon, to further emphasize the rationale behind the choice of analysing, conceptualizing and conveying the vividly synaesthetic phenomena in the framework of conceptual metaphor theory.

Subsequently, main structural characteristics of synaesthesia will be introduced, with special attention to synaesthetic inducers, concurrents and their relations. In the light of the above, a specific type of synaesthesia will be analysed: time unit→colour synaesthesia, explaining the peculiarities and complexities of this type.

1.1. Synaesthesia: concept, main theories and functioning

Currently, a spectrum of different definitions of the neurobiological condition of synaesthesia exist, explained by the variety of approaches regarding the underlying mechanisms of this condition, and with varying emphasis on the perceptual and conceptual aspects that form the synaesthetic experience.

Some of the most comprehensive definitions describe synaesthesia as "[...] an experience in which stimulation in one **sensory** or **cognitive** stream leads to associated experiences in a second, unstimulated stream" (Hubbard 2007: 193), or "[…] **anomalous perceptual experiences** that are **triggered by activity in another sensory modality** (e.g.

sounds triggering colours as well as auditory experiences) **or by cognitive activity** (e.g. numbers triggering colours)" (Ward *et al.* 2008: 128). In this regard, the stimulus that triggers the synaesthetic experience is commonly referred to as **inducer**, while the additionally experienced qualia is called **concurrent**. (Rouw *et al.* 2011: 214). Accordingly, the inducer (X) and concurrent (Y) relationships give way to identifying synaesthesia types in the form of X→Y. For example, a type of synaesthesia where feeling touch triggers the experience of colour is called tactile→colour synaesthesia, while experience of sound in response to the concept of time units (such as days of the week or months) is called time unit→sound synaesthesia. The structural properties of synaesthetic inducer-concurrent mappings will be analysed in more detail in subchapter 1.2.

By etymology, *synaesthesia* derives from Greek notions of a union or combination (*syn-*) of sensations or perceptions (*-aisthesis*). The first to use this term in its modern sense was Swiss psychologist Théodore Flournoy, who included it in his book *Des Phénomènes de Synopsie* (1893). However, two thousand years earlier Aristotle used the Greek verb *sunaisthanesai* when discussing friendship in *Eudemian Ethics* and *Nicomachean Ethics,* most probably, to refer to some feeling shared by various persons, "a feeling in common" (Marks 2011: 48–61).

However, in recent years, the amounting evidence of the role of meaning and inducer's semantics in most types of synaesthesia (e.g. Nikolić 2009; Mroczko-Wąsowicz, Nikolić 2014; Chiou, Rich 2014; Leeuwen *et al* 2015) has raised controversy regarding the traditional accounts of seeing synaesthesia as a purely sensory, or cross-modal phenomenon. This has led to strong suggestions that it is, essentially, the meaning, and not the physical properties of inducer stimulus that determines and triggers the concurrent experience in most cases. These processes can be clearly observed in several of the most prevalent synaesthesia types, such as grapheme→colour, where the same concurrent experience is triggered by different representations of the same inducer (such as by seeing a printed digit, hearing its name, thinking about it, seeing it represented as dots on a dice etc.), and the observed dependence of concurrent on the interpretation of the inducer in cases of ambiguous stimuli (e.g. if "V" is interpreted as a letter or as a Roman numeral) (Mroczko-Wąsowicz, Nikolić 2014: 6). In this regard, an alternative term ***ideaesthesia*** (from Greek *idea* + *aisthesis*, or "sensing concepts") has been proposed, re-defining synaesthesia as "**[...] a phenomenon in which a mental activation of a certain concept or idea is associated consistently with a certain**

perception-like experience." (Nikolić 2009: 28).

In this regard, synaesthesia can be regarded to as a meaning-making process whereby the inducer (e.g. "three", "3", "2+1", "..." or other representation of the concept "number 3") stands for the concurrent (e.g., green colour) in a similar way as the object (meaning of "number 3"). In other words, while the object (meaning of concept) determines the representamen (conventional signs denoting "number 3"), the interpretant (the concurrent) is determined by the representamen (the inducer) and the object (meaning, or semantics extracted from the inducer) alike. Such synaesthetic interpretant does not eliminate other possible interpretants that are shared with non-synaesthetic persons, and which would form the overall semantic network associated with a certain concept. Instead, the concurrent could be deemed as an attribute of the interpretant with a physically perceived nature: a rather extreme mental effect, especially in cases of synaesthetes-projectors, which is activated whenever the concept is activated. It would not be unfounded to deem such interpretant as the most immediate, or strongest one, due to its sensory nature, automaticity, consistency and strongly ingrained nature in synaesthetic person's thinking. As stated by Chiou and Rich (2104: 2), synaesthesia, or ideaesthesia can be seen as a "benign anomaly of the general mechanisms for representing object concepts".

Notion of ideaesthesia as meaning-mediated synaesthesia can be linked to similar classifications made by other researchers, such as Day's (2005) ***cognitive/category synaesthesia.*** Similarly, Ramachandran & Hubbard's (2001a) notion of ***higher*** **synaesthesia** explains individual peculiarity in the experience of the induced qualia as triggered via top-down aspects in higher levels of processing, such as the concurrent being triggered by the concept of the inducer (e.g. meaning of the letter), as opposed to ***lower*** **synaesthesia**, where the concurrent experience in a synaesthetic person is triggered by bottom-up aspects in early stages of processing of stimuli, such as the colour concurrent being triggered by the physical properties of the inducer (e.g. the shape of the letter). The latter has been elsewhere referred to as *synaesthesia proper* (Day 2005) or *prototypical* cross-modal or cross-dimensional synaesthesia (Marks 2011 61–62), which, compared to the prevalence of ideaesthetic types, is statistically very rare.

Up until the 19th century documented cases of manifestations of synaesthetic phenomena were scarce and of arguable authenticity (see Jewanski *et al.* 2009: 295–296 and van Campen 2009: 3). Rise of synaesthesia research from 19th century onwards has been

closely linked to advances in psychology in the 19th century, cognitive science research of the 20th century, as well as the medical and technological advances of the 21st century, such as brain imaging, allowing for an in-depth study of synaesthetic meaning-making processes in human brain (for a review, see Hupé; Dojat 2015).

The expanding list of documented synaesthesia types currently includes more than 73 different linkages, involving both **sensory** inducers and concurrents, such as tastes, sounds, colours, touches and smells, as well as **abstract**, **culture-specific** units such as emotions, personalities, days of the week, concepts, etc. Aspects such as proprioception, spatial location, time perception and kinetics have also been documented as possible synaesthetic inducers or concurrents (Day 2005). Theoretically, any two (or more) senses can become linked in the synaesthetic experience. However, the abundance of synaesthesias with conceptual inducers, and increased evidence of role of semantics in synaesthesia suggests that the nature of synaesthesia extends it far beyond the boundaries of a purely cross-modal or cross-sensory phenomena.

The prevalence of one or several types of neurobiological synaesthesia among general population is estimated around 4,4% (Simner *et al.* 2006: 1028). Importantly, some types are significantly more common than others. In this regard, most common inducers are abstract, linguistic concepts, while vision stands out as the most widespread modality of synaesthetic concurrents. For example, 68,8 % of synaesthetes experience grapheme→colour synaesthesia, 18,5 % perceive coloured musical sounds, while some of the rarest types include personality→smell (0,1 %) and vision→touch (0,8 %) (Day 2005: 15). Partial overlap of types is also possible, as the same inducer can, in some synaesthetes, trigger concurrents from different modalities simultaneously, a process called *synaesthetic synthesis* (e.g. the experience of music can trigger the experience of colour and taste at the same time), as opposed to *synaesthetic analysis*, which supposes a single concurrent (Rogowska 2011: 221). Similarly, in most synaesthetes, the condition is expressed as having several, not only one type of synaesthesia (Rouw *et al.* 2011:233).

Synaesthesia is, essentially, **involuntary** and **automatic** (“passive”, “unsupressable” and elicited by a clearly distinguishable stimulus), **durable** (persistent and consistent over lifetime), **memorable** and **emotional** (involving sense of certitude, realness and validity of the experience), **noetic** (providing knowledge about the world) (Cytowic 1995) and **idiosyncratic** experience. While some scarce common tendencies among synaesthetes might

exist (see Auvray; Deroy 2015: 2-3), each synaesthete exhibits highly specific and unique synaesthetic inducer-concurrent relationships on quantitative and qualitative level. Synaesthesia usually has an early onset in life (dating back as long as the person can remember), meaning that the synaesthetic links are constantly present in perception over the lifetime (Rogowska 2011: 213). As a result, two synaesthetes, even within the same synaesthesia type, will reliably and persistently have very different experiences in response the same inducer stimulus (for example, one time unit→colour synaesthete may perceive Monday as white, while other would experience it as light blue and sweet). Additionally, inducer-concurrent relationships are generally **unidirectional** (e.g. letter "A" induces taste of lemon, but the taste of lemon does not induce the letter "A") (Bargary; Mithcell 2008: 336).

Essentially, synaesthetic concurrents can be experienced in two fundamentally different ways: either **externally** ("out there"), or **internally** ("in the mind's eye"). This allows to roughly divide synaesthetes into two categories: **projectors** and **associators** (Dixon *et al.* 2004: 336). The link between synaesthetic inducer and concurrent can be triggered either via direct **physical representation** of the inducer (e.g. seeing a printed letter and perceiving an induced qualia of colour), or via "**more internal, mental, endogenous representation**s" (Letalleur-Sommer 2015: 30), for example, **thinking about, remembering or imagining the letter and experiencing the additional colour qualia**. The former case can be classified as "**synaesthetic perception**", while the latter, "**synaesthetic conception**" (Grossenbacher; Lovelace 2001: 36).

As the term *synaesthesia* is finding alternate, extended and sometimes inconcrete uses in fields such as linguistics and art, it is important to point out that in the neurobiological sense of the term, synaesthesia is a physical experience of an involuntary nature, and "Its phenomenology clearly distinguishes it from metaphor, literary tropes, sound symbolism, and deliberate artistic contrivances that sometimes employ the term "synaesthesia" to describe their multisensory joinings." (Cytowic 1995: 1). Similarly, the persistence and consistence of synaesthesia sets it apart from acquired or temporary synaesthesia-like states emerging due to brain damage, drug use or hypnosis (Rogowska 2011: 217-218). Moreover, the genuine character of synaesthesia as a condition has been repeatedly confirmed via methods such as Stroop inference tests and brain imaging, setting the phenomenology of synaesthesia apart from processes such as imagination or vague memory association (Ramachandran, Hubbard 2003: 50-51).

The structuring and phenomenology of synaesthesia is closely related to the corresponding processes and neural substrates in the synaestehtic person's brain, genetics as well as epigenetic factors, such as learning and exposure to culture. Currently, most researchers agree on the genetic roots of the *predisposition* to evolve synaesthesia, since the condition seems to run in family, with around 40% of synaesthetes having a first-degree relative with the same condition (Rouw *et al.* 2011: 214). This posits synaesthesia as heritable, however, this trait extends only to the *propensity* to develop the condition, and in no way affects the types, their combinations or the specific inducer-concurrent pairings, which remain idiosyncratic even among monozygotic twins (Deroy, Spence 2013: 647).

Moreover, general agreement exists that synaesthesia has **neural basis** (Rothen *et al.* 2012: 1953). Various studies have shown that synaesthetes have functional and structural differences in brain, showing an increased amount of white matter and increased grey matter volume and density, predominantly in brain areas involved in processing of inducer and concurrent stimuli (Leeuwen *et al* 2015:5), as well as better connectivity between adjacent or nearby sensory brain regions (Brang; Ramachandran 2011: 1). Regarding the aetiology of neurobiological synaesthesia, currently two main theories prevail. Disinhibited feedback theory (Grossenbacher; Lovelace 2001) explains synaesthesia as "[…] diminution of inhibition travelling through feedback pathways" with later stages of processing possibly influencing the earlier stages of processing in a top-down (or "late conceptual") manner (Curwen 2018: 97–98); while hyperconnectivity theory (Ramachandran; Hubbard 2001b) explains the condition as based on direct connections (cross-wirings) existing between brain areas responsible for inducer and concurrent stimuli, and as a bottom-up ("early perceptual") process. However, the exact mechanisms of these genetic mutations leading to altered white matter pathways and the reason of the conservation of such genetic mutations in the population are still unclear (Brang; Ramachandran 2011: 1).

Despite alterations in brain structure and functionality being one of the most prevalent explanations for the atypical sensory and cognitive experiences in synaesthesia, it is important to emphasize that synaesthesia is not considered a disorder. It is not generally related to cognitive dysfunction (Rothen *et al* 2012: 1953), does not impair normal daily functioning and is deemed a rather positive and pleasant experience (Hubbard 2007: 194), and can be seen as a "natural variation in healthy human cognition" (Rouw *et al* 2011:215), yielding several cognitive benefits. Synaesthesia has even been characterized as "[…] a normal brain process

that is prematurely displayed to consciousness in a minority of individuals" (Cytowic 1995), with several researchers stating that the study of synaesthesia could yield crucial results in understanding the mechanisms underlying non-synaesthetic (neurotypical) experience in areas such as numerical and language processing, imagery, attention, emotion and consciousness (Cohen Cadosh, Henik 2007).

The evidence of the role of meaning-extraction from the inducer, or semantic mediation in synaesthesia, are supporting the notions of close relationship between synaesthesia and learning. Growing body of evidence (e.g. Watson *et al* 2014, Chiou, Rich 2014) suggests that learning, and associated processes of naming, discrimination and categorization might lay at the core of all synaesthetic inducers, including both more obvious examples of abstract inducers, such as letters, numbers, weekdays, months or musical pitch, as well as more sensory-type inducers, such as pains or smells, whose recognition involves and requires a certain degree of categorization (Watson *et al* 2014: 2-3).

In this regard, synaesthesia can be seen as a "fossilized" residue from childhood associations serving as a learning aid to make sense of abstract concepts (such as letters) by associating them with concrete characteristics (such as colour or taste). This way, the origins of synaesthesia could be traced to, but not confined to, childhood learning processes as children learn to recognize inducers that are perceptually and conceptually challenging (Letalleur-Sommer 2015; Watson *et al* 2014). This is in congruence with the previously introduced Nikolić's notion of semantically-mediated synaesthesia as ideaesthesia, according to which the problem of absence of sensory "grounding" during the learning of abstract concepts ("semantic vacuum"), particularly in childhood, would lead to creation of synaesthetic associations from ontogenetically earlier sensory modalities (such as colour) to facilitate the learning and enhance the process of meaning-attribution to a new semantic network (such as alphabet) (Leeuwen *et al* 2015:3). However, such processes are proven to not be confined to childhood learning, as quick and spontaneous transfer of synaesthetic links based on their semantic content has been observed, for example, during the learning of a novel alphabet system (Jürgens, Nikolić 2012: 2). This way, creation of new synaesthetic links over the lifetime can be explained as mapping the novel inducer material onto a previously learned semantic system.

Importantly, the theories regarding the role of learning and meaning-extraction are not incompatible with evidence on genetic and neural basis for synaesthesia, and they should not

be seen as mutually exclusive, as neither of them can solely account for the full range of expression of synaesthesia as a condition, its multifaceted nature and idiosyncratic unfolding. As summed up by Ward (2019), the disposition to develop synaesthesia is, most likely, an interplay of genetics, brain architecture, cognition, as well as environment influences, which can lead to many ways in which synaesthesia eventually does (or does not) develop. Similarly, Rouw, Schölte and Colizoli (2011: 235–236) propose that the relationship from gene to structural brain properties to behaviour, also could have a reverse direction: from behaviour back to (structural) brain differences" (Rouw *et al.* 2011: 236), with both these processes being hardly distinguishable in adult brain (Leeuwen *et al* 2015:5). Taken together, the theories regarding the crucial role of learning in synaesthesia have a strong explanatory force for the high prevalence of synaesthesias with inducers that are learned and culture-specific categories (e.g. time units, numbers, alphabet, etc.), to which children usually are not consciously exposed until a certain age. In the same way vision/colour as the most prevalent synaesthetic concurrent can be explained, since vision is deemed the strongest of human senses.

The **systematic and integral character** of synaesthetic experiences in the cognition and psychological reality of the affected individual have been pointed out by a number of researchers. Already in 1922, after studying the sensory, perceptual and cognitive processes in a blind synaesthete, Wheeler and Cutsforth concluded that "Synaesthesis [...] is a cognitive process per se, [...] functionally it differs in no respect from any process of meaning. Synaesthesis is a **process of meaning**" (Wheeler, Cutsforth 1922: 102).

In a similar regard Marks (2011) states that "[…] to call [...] synaesthesia "**semantic**" is to acknowledge the benefit of synaesthesia to cognition", reminding that a long tradition of synaesthesia research has concluded that "[…] synaesthesia **comprises a system of meanings, operating much in the way that semantic systems do in non-synaesthetes**", with meaning being **connotative**, just like the metaphorical meanings of language (Marks 2011: 73). Moreover, as put forth by Hunt, evidence supports the notion that adult synaesthesias are "**imagistic forms of semantic reference**", or "**felt meanings**", that, functioning as felt synonyms, have a deep impact on synaesthetic person's **modes of thinking** (Hunt 2005: 29-34) and knowledge, allowing to use the synaesthetic concurrent as means not only for encoding information about the inducer, but also retrieving, retaining and manipulating it (Watson *et al* 2014: 6).

Several other cognitive benefits have been shown to be present in synaesthetic individuals, such as better colour detection in grapheme-colour synaesthetes, enhanced ability to tell apart very similar colours in number-colour synaesthetes, as well as increased processing of colour information, tactile acuity, more accurate processing of rhythmic visual stimuli, and even an increased communication between senses that do not directly participate in their synaesthetic experiences. Taken together, these aspects have led to a hypothesis that synaesthesia might "[...] serve as cognitive and perceptual anchor to aid in the detection, processing and retention of critical stimuli in the world [...]" (Brang; Ramachandran 2011: 3). In this regard, the number of synaesthesia types a person has would determine the intensity of one's cognition and phenomenology (Ward 2019: 19).

Additionally, synaesthesia is known to have implications on aspects such as **memory**, with enhanced memory abilities in synaesthetes being explained by structural and functional changes in the synaesthetic brain, as compared to the general population. Despite supposedly **richer encoding of the inducer material**, memory benefits appear to be not necessarily confined to the synaesthetic experience itself, but extend to other materials as well (Rothen *et al.* 2012). Increased **propensity to arts and metaphor** in synaesthetes has also been observed, explained particularly by the enhanced cross-wiring among brain regions responsible for abstract concepts (Ramachandran; Hubbard 2011a: 3). In this regard, Ward (2019: 30) posits synaesthesia as "colourful sideshow": an evolutionary spandrel (or by-product) for adaptive traits such as creativity, memory and perception.

1.1.1. Synaesthesia and related phenomena

The phenomenology of neurobiological synaesthesia as an involuntary, automatic, persistent, consistent and idiosyncratic link between two sensory and/or conceptual domains resulting in a physical experience *distinguishes* it from related phenomena that can exhibit some shared characteristics, such as the deliberative use of metaphor in artistic setting or imagery. However, several authors and notions point to the intrinsic *similarities* between synaesthetic perception and cognition (experienced by a small percentage of people) and the general population, suggesting that the underlying mechanisms of vivid synaesthesia, in some degree or kind, might by shared by almost everyone (see Marks 2009& 2011; Hunt 2005& 2011;

Ramachandran, Hubbard 2001a; Ward 2019). Given the nature of this thesis, and taking into account that some of the widely prevalent synaesthetic tendencies can have and influence on, or overlap with vividly synaesthetic experiences (see subchapter 1.2.), some considerations about possible links between synaesthesia and other related phenomena are worth of pointing out.

Several approaches exist towards defining what counts and what does not count as *synaesthesia*, when including or excluding phenomena such as **cross-modal metaphor**, perception of **cross-modal similarity**, **induced cross-modal imagery** (*synaesthetic tendencies*) and **induced perceptual experience** (*vivid synaesthesia*). In this regard, Marks (2009; 2011) distinguishes three approaches: synaesthetic *monism, dualism* and *pluralism*, which hold different stance towards the discreteness or continuity between the above mentioned phenomena, and their qualitative or quantitative differences.

While the prevalence of people affected by vivid synaesthesia is low, several **cross-sensory correspondences and similarities are perceived** by general human population almost universally, and to some extent are observed in higher apes as well (for discussion, see Ludwig *et al* 2011, Ravignani, Sonnweber 2017). General tendency exists to link higher frequencies with greater luminosity, and lower sounds to darker colours (e.g. sneeze is "brighter" than cough), resulting in correspondence between sound pitch and visual lightness/ darkness; louder sounds to brighter colours, higher pitches to smaller images, higher pitches to sharper angles (Marks 2011: 52-53), which establish correspondences similar to those characteristic to *vivid synaesthesia*. Certain synaesthetic tendencies seem to develop at certain ages, with 4-year-olds acknowledging similarities between pitch and loudness, as well as loudness and brightness, and older children from the age of 11 years perceiving links between pitch and size (Marks 2011: 58), with the former being more close to similarity, and the latter, to metaphorical capacity.

Cross-modal similarity, in turn, finds its expression in **cross-modal metaphor** (e.g. "sweet melody" or "bitter sight") which is omnipresent in language, and follows a certain "lower-to-higher" (touch-taste-smell-sound-vision) modality mapping tendency across different cultures and languages, in both poetic and non-poetic use. Such mapping hierarchy makes the metaphor easier to interpret, as opposed to if the mapping direction was inverse. (Shen, Aisenman 2008: 118-119). This allows to suggest that mapping hierarchy preferences in cross-modal metaphor roughly follow the trends of mapping preferences in vivid

synaesthesia, as colour is the most common synaesthetic concurrent, but rare as an inducer. Taken together, these observations allow to suggest that the nature and use of cross-modal metaphor is constrained by both cognitive, neurological and cultural factors (Day 1996; Ramachandran, Hubbard 2001). Linguistic capacities therefore appear to be essential for more cognitive-type synaesthesias and synaesthetic tendencies (such as cultural concepts and metaphor).

As described by Marks (2011: 58) synaesthesia can be seen as a sensory phenomenon that has in it **fundamental similarities with the coding of sensory information in different modalities**. Even though non-synaesthetes do not have the vivid cross-modal experiences, they still have the **linguistic access to cross-modal similarities**, suggesting that both synaesthesia and metaphor might have the same perceptual roots:

> These similarities express themselves **initially in perception, from which they become available, through development, to more abstract representations in language, suggesting that** metaphor's roots may also reside, like those of synaesthesia, in fundamental cross-modal perceptual similarities. Therefore, the perceptual roots of vivid synaesthesia might also serve as a root of metaphor *per se.* (Marks 2011: 58)

Induced cross-modal imagery, such as the fairly widespread tendency to internally experience colourful shapes or scenarios when listening to music, shares several characteristics with vivid synaesthesia. Such imagery usually arises in the "mind's eye", it is, to some extent, involuntary, and is elicited without direct sensory stimulus (e.g. having a mental image of blue sea while listening to a sonata, without any direct sensory stimulus that could be classified as a blue colour). However, induced cross-modal imagery is not consistent over time, it is flexible, bidirectional and lacks automaticity (Marks 2011), which sets it apart from real synaesthesia. However, people experiencing vivid synaesthesia are shown to possess increased and more vivid mental imagery, while the exact overlap of neural correlates between visual imagery and synaesthetic concurrent experience are still under discussion (Barnett, Newell 2007).

Vivid synaesthesia and the above-mentioned synaesthetic *tendencies*, while sharing several characteristics, differ phenomenologically. Vivid synaesthetic experiences, as stated earlier, are, essentially, highly persistent, involuntary, idiosyncratic and consistent, whereas synaesthetic tendencies, such as cross-modal similarity, imagery and cross-modal metaphor

are much more relative and context-dependent –such as linking the brightest colour to the highest pitch or vice versa, which implies a lack of a direct conscious perceptual concurrent (Deroy, Spence 2013: 644)– as well as flexible (inconsistent), transient and non-idiosyncratic (common and, to some degree, almost universally shared).

Synaesthetic ***monism*** hypothesis views the above explained phenomena as a perceptual-behavioural spectrum ranging from least synaesthetic (cross-modal metaphor, cross-modal similarity) to most synaesthetic (induced imagery and experience). This stance provides the most fluid link between vivid synaesthesia and human metaphorical thinking as sharing similar perceptual roots, as it assumes a predominantly quantitative difference between the different cross-modal phenomena. Among researchers sharing this stance, Hunt (2005; 2011) views adult (vivid) synaesthesias as primarily based on childhood physiognomic associations whose importance usually declines around early teen age, as these "felt meanings" are internalized as full metaphoric understanding/ use). Additionally, Hunt states the relevance of vivid synaesthesias as introspective windows into metacognition and experiential basis of semantic cross-modality characteristic to metaphor, arts, spirituality and human (collective) consciousness (Hunt 2011). Similarly, Ramachandran & Hubbard (2001) propose that synaesthesia-like processes might have served as the initial impetus for human proto-language origins and evolution, as language origins can be traced to a cluster of phylogenetically earlier cross-modal mechanisms exaptated for other means. This way synaesthesia can be regarded as a tool for studying metaphor and creativity, since metaphor implies cross-activation of conceptual maps in a similar way as cross-activation of perceptual maps, or link between conceptual and perceptual maps in synaesthesia.

Importantly, *monistic* views do not fully disregard the amounting evidence of neural and genetic preconditions and differences present in people with vivid synaesthesia, nor do they deny the phenomenological differences of vivid synaesthesias vs synaesthetic tendencies. Instead, the emphasis is placed on possibly different neural correlates accounting for different intensity and expression of cross-modal phenomena in synaesthetes vs non-synaesthetes, which, however, are built upon similar underlying mechanisms (Martino, Marks 2001). This has led to suggestions that elucidating the mechanisms of synaesthesia might help to better understand the functioning of metaphor, since the working principles of synaesthesia (such as the possibility of relatively clearly identify inducers) are more accessible to examination than those of metaphor (Anaki, Henik 2017: 154-155).

Alternatively, ***dualism*** view, while acknowledging similarities with *synaesthetic tendencies* (cf. Ward 2019), explicitly confines the realm of synaesthesia to percept-like, consistent, automatic and involuntary experiences and establishes a strict qualitative difference between the experiences of synaesthetic and non-synaesthetic individuals. This stance is inclined towards a sort of a reductionist approach in quest for defining the vivid synaesthesia in terms of related genetic, neural, physiological correlates and mechanisms leading to its distinctive phenomenology (Marks 2011: 70), and strictly denying the possibility of quantitative difference between synaesthesia and cross-modal phenomena (for discussion, see Deroy, Spence 2013).

Pluralism, apart from distinguishing synaesthesia from non-synaesthesia supposes a kind of a genus-species approach, treating synaesthesia as an "umbrella term" for referring to functionally and phenomenologically different phenomena that nevertheless are sufficiently similar to be linked. This way, for example, sound-induced visual imagery can be treated under the term *synaesthesia*, while cross-modal similarity in perception and language might fall out of this realm (Marks 2009& 2011).

Evidently, the distinction between synaesthetic and non-synaesthetic does not suppose that synaesthetes do not simultaneously experience non-synaesthetic cross-modal correspondences, such as perception of cross-modal similarities. On the contrary: as introduced previously, evidence suggests that synaesthetes show increased intensity and propensity to the different cross-modal phenomena that fall under the denomination of *synaesthetic tendencies*, including metaphor, cross-modal similarity and more vivid imagery, suggesting that the difference between these categories might indeed be both of a degree, as well as of kind. This thesis is focused on synaesthesia as understood by the *dualism* stance: as clearly distinguished from non-synaesthesia (other cross-modal phenomena sharing some similar characteristics), based on above introduced evidence of genetic/neural basis and distinctive phenomenological landscape. Still, the shared similarities between synaesthesia and other forms of cross-modal meaning-making are acknowledged, based on the notion that the study of the mechanisms of synaesthesia can be useful for elucidating the mechanisms of other related phenomena and vice versa, as is the case of metaphor.

1.2. Synaesthesia: structural properties

As stated earlier, synaesthesia can be characterized as a condition whereby a particular sensory (perceptual) or cognitive (conceptual, semantic) processing triggers a specific additional involuntary and automatic percept-like experience pertaining to other sensory modality, such as a letter "G" resulting in experience of green colour. As mentioned before, the basic structural elements of synaesthesia are those of inducer (the trigger: for example, taste of cherry) and concurrent (the additional experience: for example, blue colour). When seen on the level of corresponding inducer and concurrent domain, these relationships give name to synaesthesia *types*, such as grapheme→taste or sound→colour. Within the particular synaesthesia type, these relations can be used to indicate the concrete instantiations of inducer and concurrent domains, such as "Z"→sour" or "sound of flute→violet". Such synaesthetic links can be triggered either by sensory input (which directly, or indirectly (via meaning-extraction) determines the concurrent) or by mental representation of the inducer stimuli. In turn, the concurrent can be experienced externally (e.g. seeing a projected colour over a printed letter) or internally (e.g. seeing the corresponding concurrent as a mental image).

However, the nature and relationships between different kinds of inducers and concurrents and their combinations requires and deserves more detailed attention, as both the quantitative and qualitative aspects of synaesthesia (such as the number and kind of synaesthesia types a person has) has direct effect on the layering, intensity and nature of the induced experience. Given the abundant and often contradictory character of the existing evidence and theories regarding the possible underlying mechanisms of synaesthesia, and taking into account that the number and kind of types of synaesthesia a concrete person has may be an expression of different processing mechanisms on an individual level (e.g. the distinction of "higher" vs "lower" synaesthetes, or associators vs projectors), it would be almost impossible to draw some kind of a unified framework which would properly account for all the possible expressions of synaesthesia on a functional level, as the physiological basis of phenomenal experiences continues to be quite a mystery (Leeuwen *et al* 2015: 2). Hence, the following is an attempt to sketch a generalized outline of the structural properties of synaesthetic inducers and concurrents separately, as well as in their relationship, by drawing some inferences from the synthesis of scarce accounts of existing research on structural properties of synaesthesia.

1.2.1. Synaesthetic inducer

Inducer, or the trigger stimulus in synaesthesia, **usually belongs to a sensory** (e.g. a colour, sound, taste, touch or smell) **or conceptual** (e.g. time unit, personality or general concept) **domain,** corresponding, accordingly, to inducer's sensory or semantic properties. As mentioned before, it can appear either as physical (e.g. hearing sound) or mental (e,g. imagining or thinking about the sound) representation of the stimulus, corresponding to synaesthetic *perception* and *conception*, respectively. It has been widely observed that the inducer can trigger relatively same concurrent independently of the way in which it is presented (Chiou, Rich 2014: 3). This way, for example, seeing, hearing or imagining letter "Z" would elicit relatively same colour, taste or other response, exemplifying the importance of meaning-extraction processes in determining the concurrent in majority of cases. Essentially, the inducer can be regarded to as the element which is encoded by its concurrent.

As has been briefly introduced earlier in this thesis, documented evidence shows that the **most common inducers** are graphemes (such as letters or numbers), time units (months, weekdays) and musical sounds, all of which imply a strong element of aspects such as learning, categorization and meaning-attribution, supporting the need to consider the role of meaning of the inducer in triggering synaesthetic response, at least in the most obvious cases where the inducer is linguistically mediated. Other, **rarer inducers include** emotions, pain, personality, touch, kinetics and proprioception (Day 2005), which, arguably, can also involve aspects of meaning-extraction and learned categorization (e.g. different kinds of pain, taste or touch inducing different concurrents).

It can be argued that, in comparison with concurrents, which are confined to the subjective perceptual experiences of the synaesthetic individuals, **inducers are somehow more concrete and identifiable**, and can be manipulated externally, as changes in inducer material would subsequently alter the concurrent (Auvray, Deroy 2015: 5), allowing to talk about **inducer-concurrent relationships in terms of *supervenient causation*** (Sidoroff-Dorso 2018). Moreover, the identification and description of the inducer may seem an easier task than that of concurrent, since the inducer pertains to commonly shared, in a way, "objective" reality, which is structured according to culturally-determined categorization systems accessible and known to everyone.

It can be suggested that some inducers are, however, more concretely identifiable than

others: for example, as **several of the most widespread synaesthesia types build upon inducers of the separate elements of culturally-defined sequential systems** (such as the sequences of months, weekdays, alphabet, musical pitch), such inducers can be deemed more **static** than, for example, inducers that unfold in time and combine a wide range of integral elements, allowing to refer to such inducers as more **dynamic** (such as, for example, the interplay of different instruments, tempos, timbres, pitches and harmonies in a musical piece serving as a single inducer). Such interplay, or **synthesis** of inducers, made more extreme in cases when a person exhibits several types of synaesthesia, is an essential, yet not widely researched problem (Ward 2019). In a similar regard, **some of the semiotic systems of inducers can be regarded to as closed** (such as systems with predefined number of elements, e.g. alphabets), **while others are rather open** (e.g. flavours, noises) (Sidoroff-Dorso 2018:6).

1.2.2. Synaesthetic concurrent

Unlike inducers, who can pertain to either sensory or conceptual modalities, concurrents are of sensory nature, and are experienced by person as perceptual events which take place either externally (seen as projections) or internally (seen in the "mind's eye").

By definition, concurrent experience is dependent on the inducer, as **there can, arguably, be no concurrent without the previous inducer stimulus**, a characteristic that sets synaesthesia apart from phenomena such as hallucinations. However, intriguing evidence of cases of semantically-mediated synaesthesia suggests that the concurrent percept can, indeed, be perceived without direct input of the inducer. Such are the cases when the semantic content, such as the mathematical sequence of 3+4 =, corresponding to the meaning of number "7", would induce the experience of the colour attributed to this number, without it being directly presented to the person (see Mroczko-Wąsowicz, Nikolić 2014:3), or in the case of tip-of-the-tongue states where the intention to remember the name of the inducer (such as the name of a rarely used object) would nevertheless induce the corresponding concurrent (such as the "taste" of this concept) (Ward 2019).

In comparison with inducers, the experience of concurrents has long had a kind of a mystified aura around it, not only due to rareness and idiosyncrasy of synaesthesia, but also due to its highly subjective nature which can be hard to convey in words, or can even be

deemed “indescribable” (Auvray, Deroy 2015: 5). As concurrent experience is integral part of everyday life of the synaesthetic person, and automatically and consistently present in all perceptual and mental events involving the inducer, it can sometimes be, for the person, hard to initially acknowledge that their condition, perceived as perfectly natural, is, in fact, an idiosyncratic rarity. Hence, accounts of synaesthetic concurrents are largely confined to subjective descriptions. While brain imagining increasingly provides insights about the brain regions possibly involved in different synaesthesia types, it cannot currently explain the particular synaesthetic inducer-concurrent mappings within the type (see Hupé, Dojat 2015).

As stated before, concurrents are, generally, sensory experiences pertaining to a certain sensory modality, such as vision or sound, taste, smell or touch, of which significant amount are mediated by the meaning of the inducer stimulus. The most common concurrents are visual (e.g. colour), while some much more rare types include concurrents such as temperature, kinetics, emotions and personifications, as well as spatial location (Day 2005). The latter aspect of spatialization is particularly characteristic to synaesthesias with inducers that are part of a learned categorization system, as is the case of weekdays or months (Mroczko-Wąsowicz, Nikolić 2014:6). Such spatializations may include not only certain spatial coordinates for the separate elements of the system to which the inducers belong, but also result in more complex semiotic systems, such as colourful, detailed mental calendars (e.g. Rothen *et al* 2012: 1956), arguably providing for a richer and more “tangible” sensory encoding, or grounding for the abstract elements of such systems, and the system as a whole.

Taken together, the above introduced aspects suggest that synaesthetic concurrents, while, technically, pertaining to more concrete and ontogenetically earlier categories of sensory perception, can still be considered very complex and multilayered, especially in cases when multiple synaesthesia types are co-ocurring. Such processes of multiplicity of concurrents (e.g. experience of colour, shape, texture and movement in response to taste) have been regarded to as **synthetic**, as opposed to **analytical**, which supposes a single concurrent (e.g. experiencing only colour in response to taste) (Rogowska 2011: 221).

The often “undescribable” character of the synaesthetic concurrent owes to the findings supporting the notion that some of the synaesthetically induced qualia might, in fact, be unavailable for non-synaesthetes. For example, as neural activation bypasses processing stages at retina, sounds can trigger colours that are not found in the everyday life (process known as “**martian colour effect**”) (Ramachandran; Hubbard 2001a: 30; 2003: 53). While

induced colour may *resemble* real colour, evidence shows that it has different functional implications as normally perceived colour, as it is not constrained to the location of inducer, leading to suggestions that synaesthetic colour might involve **semantic knowledge** about colour (Chiou *et al* 2018). This leads to a curious implication that something that might have evolved to "give flesh" to the abstract by mapping the concrete onto it, results in an experience that cannot actually be compared to "real life" or actual colour perception.

1.2.3. Inducer-concurrent link

As stated before, far from being merely cross-modal, synaesthetic inducer-concurrent links include also cross-domain mappings, such as those between sense modalities and different bodily or emotional states, as well as concepts. (Mroczko-Wąsowicz, Nikolić 2014: 4).

In discussing the relationship between the synaesthetic inducer and concurrent, the notion of arbitrariness raises several questions. Does the inducer "choose" its own concurrent? Is it assigned by chance? If so, how is it possible that such a random attribution, such as number "4" inducing the taste of peach, is maintained, almost invariably, over lifetime?

Analysis of the nature of the most prevalent synaesthesia types (see Day 2005), supported by the theories emphasizing the role of learning and implicit ontogenetic and cultural constraints (e.g. sensory modalities being developmentally earlier than culture-bound, learned categories and language) shows a **clear tendency to link a more abstract inducer (e.g. a number) with a more concrete concurrent** (e.g. colour). Mappings between abstract and abstract, and from abstract to concrete, are very rare. Synaesthesias involving concrete referents, such as touch→colour or sound→flavour are more common, yet still significantly less prevalent than types with linguistic, abstract inducers. These easily observable tendencies allow to suggest some **kind of a natural constraint, or rather preference, for synaesthetic mappings** on the level of type, which generally support the notions of the role of learning in the emergence of major part of cases of synaesthesia, as well as the role of "the concrete" (e.g. colour) in encoding "the abstract" (e.g. time units).

There exists no unanimous view whether, within the type, or on the level of individual expression of the type, the attribution of concurrent to a particular inducer is entirely **arbitrary** or not. In cases of learned material, evidence exists that the idiosyncratic

synaesthetic concurrents might be, to an extent, **influenced** (but not predetermined) by the structure of the semiotic systems they are encoding, and by the person's individual experience during the learning process. For example, the frequency of use and positioning of the discrete element (such as letter) within the semiotic system (such as alphabet), can influence the concurrent qualities experienced in response to it –namely, more widely used letters, like "E" inducing brighter colours (such as blue)–. Similarly, semantic associations between the elements can also play a role in determining the synaesthetic links in some people (such as blue colour inducing the taste of ink) (Watson *et al* 2014).

Another aspect of natural constraints, or influences on the qualities of synaesthetic couplings may come from the earlier described almost universally perceived cross-modal similarities, which may intertwine with the synaesthetic experience. For example, in grapheme→colour synaesthetes, higher-pitched vowels (such as "I" or "E") generally induce brighter colours, and vice versa. Similarly, in case of sound→colour synaesthesia, musical pitch tends to trigger brighter and more luminous colour hues in higher octaves, and darker and more dim in lower ones (see Marks 2011: 50; Day 1999: 177). While influences of generally shared perceptions of cross-modal similarities in synaesthetic experience seem only natural, and are relatively easy to detect, same is not true for the "fossilized" influences from childhood learning, which may be hard, or even impossible to decode in adult synaesthetes.

However, despite some scarce trends or influences in some inducer-concurrent relationships, overall inducer-concurrent couplings on individual level remain highly idiosyncratic and arbitrary (Bargary, Mitchell 2008; Deroy, Spence 2013), as no two synaesthetes, even within the same synaesthesia type, have the same, or even remotely similar concurrent systems, allowing to refer to the synaesthetic mappings as systematic and arbitrary at the same time (Hupé, Dojat 2015), forming some kind of a personal "code".

It can be suggested that, in most cases, **synaesthesia supposes systematic mapping between discrete units pertaining to either an artificially created semiotic system** (alphabet, numeric sequence, etc., e.g. "number 4 tastes sweet"), **or a categorization of sensory stimuli** (e.g. different kinds of pain ("cramps feel red"), scents ("scent of apples sounds like rain"), taste ("sweet taste is pink") musical pitch ("G sharp tastes sour")). **Such categorizations of sensory stimuli can, arguably, be "functionally identical to semiotic systems"** (Sidoroff-Dorso 2018: 5). In turn, the discreteness of concurrents seems to be more complex. It is known that synaesthetes can describe of the induced experiences in great detail

(e.g. “Thursday is moss green with light yellow stripes”), meaning that the qualities of the concurrent are very specific and often complex. However, as the concurrents are stable and, with minor exceptions, invariable over the lifetime, they function as discrete units, often “cut out” from intrinsically continuous spectrum (such as the spectrum of colour), **and can be regarded to as forming a connotative, supervenient system in regard to the inducer system** (Sidoroff-Dorso 2018: 6).

Several approaches exist for conceptualizing the structural nature of the inducer-concurrent relationship, with various views about **whether inducers and concurrents should be seen as two separate entities, or rather as a single, unified experience**. Synaesthesia is generally referred to as additive or supplementary (e.g. Day 1999; Hupé, Dojat 2015), meaning that no fusion occurs: the person is still aware that, for example, the letter “D”, synaesthetically perceived as brown, is actually printed in black, and that it is indeed the letter that is inducing this additional sensation (however, in some synaesthetes (particularly projectors), the sense-inference can lead to longer time needed for recognizing and naming the actual colour of the inducer stimulus (Day 1999:171).). This corresponds to the view that synaesthetic experiences can, essentially, be divided in two separate experiences, one of which (the inducer) can be experienced by everyone, while the additional concurrent is exclusively accessible for the synaesthetic person. Others warn against such dualist approach, emphasizing that, instead of dividing synaesthesia into two separate elements, the synaesthetic experience is better describable as “enriched” and unified, whereby “an additional sensory attribute gets hosted in the perceptual experience of the inducer” (Auvray, Deroy 2015: 1). In this regard, the notion of conceptually-mediated synaesthesia as *ideaesthesia* allows to refer to concurrents as both additional as well as unified with the inducer, as the conceptual map, including attributes common to non-synaesthetes, is enriched by an additional sensory attribute that is activated simultaneously with the concept (Jürgens, Nikolić 2012:9-10).

There exists general agreement that, in conscious individual experience, synaesthesia is **unidirectional** (inducer triggers the concurrent, and not vice versa). However, especially in cases of conceptually-mediated synaesthesias, the directionality aspect deserves some additional consideration. Evidence of **possible implicit bidirectionality** has been observed, such as in cases where grapheme-colour synaesthetes are quicker to determine which number is bigger, if the numbers have colour that is associated with digits with bigger numerical distance (e.g. if numbers “4” and “5” have colours associated with digits such as “1” and “7”).

Therefore it can be assumed that implicit bidirectionality can be observed in certain mental tasks (for discussion, see Anaki, Henik 2017). In a similar regard, Meier (2013) explains unidirectionality with the sizes of semantic networks corresponding to inducers and concurrents. As inducers tend to be more abstract (such as Tuesday) their semantic network is narrower than that of the corresponding concurrent (usually more concrete, such as yellow colour). Therefore it is easier for the association to be consciously perceived in a certain direction. However, synaesthetes might have the capacity to form novel associations more easily on the basis of the concurrents that pertain to a concrete semantic network (e.g. semantic network of "blue" including connections shared with non-synaesthetes, such as sea, sky or ink, as well as specifically synaesthetic ones, such as Wednesday, taste of carrot or sound of violin) (Meier 2013).

This facilitated mapping between different conceptual domains is in congruence with evidence of increased propensity to creativity, arts and metaphor in synaesthetes (e.g. Brang, Ramachandran 2011; Ward 2019), as well as the notion that the way mappings between synaesthetic inducers and concurrents are established (e.g. "tomato tastes blue") may show similarities with the ways conceptual mappings are established between objects and their perceptual attributes (e.g. "sky is blue"). This way, as suggested by Chiou and Rich (2014), the link between inducer and concurrent can be described as "conceptual level representation". This way, the concurrents, while having particular phenomenology, can be seen as akin to semantic knowledge, or perceptual memory (Chiou, Rich 2014: 15).

Importantly, the evidence of the pre-eminence of meaning of the inducer stimulus over its sensory properties in major part of documented synaesthesias does not rule out the possibility that some types of synaesthesia might, indeed, be purely perceptually induced. Instead, the emphasis is on the clear learning and categorization aspect in most types of synaesthesia, versus the relatively low prevalence of what would be called typically cross-modal synaesthesias, even though also in these cases, as explained earlier, the element of categorization might be crucial for the determination of the inducer. Similarly, the possibility of individual stimulus processing differences among synaesthetes ("bottom-up" in "lower" synaesthetes vs "top-down" in "higher" synaesthetes) cannot be entirely ruled out, as in "lower" synaesthesias the perceptual qualities of the inducer would indeed be decisive. Moreover, as a clarification, it is important to emphasize that the role of inducer's meaning in triggering and determining the concurrent does not suppose that the inducer cannot appear in

a way that can be perceived with senses, or that it exists merely as an abstraction. For example, "Saturday", or number "9" are abstract concepts, but they are, nevertheless, mediated via language (written or spoken), or other representations (such as dots on a dice, mathematical equations, etc.) Therefore, top-down processes based on physical input (van Leeuwen *et al* 2015: 3-4) (e.g. printed word "Wednesday") are being translated into semantics (meaning of "Wednesday") and then mediated back as a percept (e.g. a blue colour).

1.2.4. Time unit→colour synaesthesia

Time unit→colour synaesthesia can be **defined** as a type of semantically mediated synaesthesia, or ideasthesia, in which "[...] **weekdays or months are associated with colours, distinct spatial positions and with other concurrents**" (Mroczko-Wąsowicz, Nikolić 2014: 1), such as the concept of "June" inducing the experience of light grey colour, or "Wednesday" being perceived as round, blue and bigger than other days in the spatial sequence or mental calendar of the days of the week.

This type has been chosen for particular analysis, firstly, as an example of synaesthesia of **purely conceptual, semantically mediated nature**: the inducers of time unit→colour synaesthesia, such as weekdays or moths, exist as abstract concepts lacking direct sensory grounding, as opposed to, for example, inducers such as touch or taste. Weekdays and months can be regarded to as cultural constructs with scarce sensory attributes (Jürgens, Nikolić 2012: 11). Even though, theoretically, concepts such as "September" or "weekend" could be linked with the perception of the flow of time, it cannot be deemed as sufficient sensory experience to specifically distinguish and differentiate, for example, between Monday and Tuesday. Therefore, the synaesthetic experience in case of time unit→colour synaesthesia can be deemed as a prototypical example of semantically-mediated synaesthesia, as the additional sensory concurrent experience is not triggered by the sensory attributes of the inducer (which are lacking), but, instead, by the meaning of the stimulus – the activation of the concept.

Secondly, along with grapheme→colour and sound→colour types of synaesthesia, it is one of the **most prevalent synaesthesia types**, affecting roughly 1 in 4 (23,4 %) synaesthetes (Day 2005: 15). The nature of inducer and concurrent in this type exemplifies the widespread trend in synaesthesia prevalence, as the inducer (concept of a weekday/ month), which

pertains to learned, culture-specific and linguistic category triggers the concurrent which belongs to a sensory category (colour), establishing mappings between elements of an abstract domain (weekday or month sequence), and concrete (sensory) domain.

The conceptual nature of inducers in time unit→colour synaesthesia allows to fit it comfortably within the interrelated categories of *cognitive-perceptual* (Marks 2011), *higher* (Ramachandran, Hubbard 2001a), *category* (Day 2005) synaesthesia. Additionally, its conceptual, semantic nature as well as its high prevalence and the "sensed concept" nature of this type allows to suggest the relevance of learning-oriented theories of synaesthesia. In time unit→colour synaesthesia the inducer (weekday or month) is indisputably a learned category: the need to assign meaning to the concepts of weekdays and months arises as a demand of the learning processes of childhood. Therefore, neural theories (hyperconnectivity vs disinhibited feedback), cannot solely account for the emergence of this type of synaesthesia. Instead, it is more likely that genetic predisposition to synaesthesia is allowing to unconsciously map new material, especially of the kind that is lacking direct sensory grounding and produces the so-called "semantic vacuum", onto an earlier category, such as colour, resulting in a link between the abstract (the concept) and the concrete sensory attribute (colour). After the internalization of this link, such as "December" being perceived as dark brown, it is retained for lifetime (Leeuwen *et al* 2015:3), and functions as a directly experienced attribute of a conceptual map, facilitating tasks such as memory, as the sensory attribute (concurrent) is automatically and reliably co-present in all cognitive activity involving the particular semantic content (inducer). It has even been suggested that the explicit perceptual manifestation of the conceptual content could be explained as disinhibited cognition-perception link essential to embodied cognition (Gray, Simner 2015: 3).

Inducers and concurrents within time unit→colour type are relatively easy to identify as discrete units, as they inherently belong to a categorization system. Firstly, **inducer** here is the semantics, or meaning of an abstract concept: day of the week (Monday-Sunday) or a month (January-December). Even though these concepts lack any direct sensory grounding in themselves, they are, nevertheless, linguistically mediated. Therefore, it can be concluded that the inducer can take the form of either a physical, linguistic representation of these concepts (e.g. spoken or written word "Tuesday"), or an internal representation (e.g. thinking about, imagining, remembering the concept).

In turn, the concurrent here is an internally (in synaesthetes-associators) or externally

(in synaesthetes-projectors) perceived experience pertaining to the modality of vision. Such concurrent can either consist of colour only, or include aspects of other visually perceivable characteristics, such as spatial coordinates, shape, size or texture. Even though usually time units induce concurrents of a colour that differs from colours that are induced by the corresponding graphemes forming the linguistic representation of the concept (Mroczko-Wąsowicz, Nikolić 2014:2), inferences from other learned conceptual material can contribute to the concurrent stimulus. For example, grapheme→colour synaesthesia may affect the concurrents of some weekday→colour synaesthetes, as the colour concurrent for the concept of the particular weekday may show strong influence from the first letter of the word for this day (e.g. "Friday" experienced as violet, similarly as the letter "F") (Ramachandran, Hubbard 2003: 54). The concurrents in time unit→colour synaesthesia, do not typically unfold in time. However, they still may exhibit a strong spatial location/ spatial coordinate element, resulting in a concurrent experience akin to a visually perceived mental map or calendar (coloured sequence or spatial sequence). Such spatialisation is common in synaesthesias with inducers that are part of a learned sequence, as are the cases of weekdays and months. (Mroczko-Wąsowicz, Nikolić 2014:6).

In this regard, time unit→colour synaesthesia as ideaesthesia is an excellent example of how the semantic content of a concept can be activated in different ways: seeing the word for weekday written down (e.g., in calendar), hearing someone say the name of the day, or even merely thinking/ imagining the name of the day triggers the same, or very slightly altered concurrent visual experience (Mroczko-Wąsowicz, Nikolić 2014:2), supporting the claim that in time unit→colour synaesthesia it is indeed the meaning of the inducer that triggers the concurrent.

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Conclusions

Synaesthesia is an involuntary, automatic, durable, memorable and noetic experience in which the trigger (inducer) in one sensory or cognitive stream produces an idiosyncratic, unidirectional additional experience (concurrent) in other sensory or cognitive modality, resulting in an integral linkage between two sensory and/or cognitive domains.

Evidence of genetic, neural, as well as epigenetic and learning influences in synaesthesia allow to refer to synaesthesia, in majority of cases, as a sensory experience triggered by activation of a conceptual map, or, in other words, translation from sensory input (e.g. written word "May") to semantics (e.g. meaning of "May"), and back to the additional sensory experience (e.g. "red colour"), as is the case of time unit→colour synaesthesia.

The function of meaning, meaning-making and meaning-attribution processes in synaesthesia is multifold. Firstly, inducer's meaning, or semantics, is crucial in determining the concurrent in, arguably, most cases of synaesthesia (or, more precisely, ideaesthesia). Secondly, in light of learning-centered theories of synaesthesia, synaesthesia functions as a facilitator of meaning-making processes in individuals with genetic and neural predisposition, as it, arguably, emerges and develops in response to meaning-attribution demands of [childhood] learning processes, aiding in the acquisition of new systems of meaning, such as alphabet, numeric, weekday, month, musical pitch or other culturally-determined sequences or categorizations of abstract entities. Hence, synaesthetic concurrent encodes the elements of the semiotic system to which the inducer belongs, as well as the system as a whole, and concurrents form a supervenient system in regard to inducers. Therefore adult synaesthesias are, arguably, fossilized remnants of meaning-attribution processes of early childhood, automatically and consistently functioning as person-specific "felt meanings", or physically perceived sensory attributes to predominantly abstract inducers. Phenomenology of synaesthesia allows to refer to it as an integral mode of thinking which provides cognitive benefits both directly and indirectly related to the condition itself, in realms of memory, sensory acuity, creativity and propensity to cross-modality (with which it shares several commonalities), among others.

Structurally, synaesthesia is a systematic and integral link between the inducer (the trigger, predominantly abstract/ semantic) and the concurrent (one or several additional sensory experiences), whereby, for the synaesthetic person, inducer (representamen) stands

for the concurrent (interpretant) in the same way the inducer's meaning (object) does. In perception, the inducer-concurrent link unfolds as inducer→concurrent, meaning that inducer comes first, followed by the simultaneous experience of the concurrent qualia. However, in terms of mapping or encoding, especially in light of learning-centered hypotheses, it would be better exemplified as a link going from concurrent (the known, or the concrete (e.g. colour)), which is mapped unto the inducer (the new, often abstract (e.g. the concept of a weekday)), as it is the concurrent that encodes the inducer, and not vice versa. Regarding the domains to which the inducers and concurrents belong, clear tendency exists to map a more concrete, tangible sensory concurrent, such as colour, onto a more abstract inducer, such as the concept of a number or month. While the inducer-concurrent pairings remain highly idiosyncratic even among family members, some natural constraints and propensities for synaesthetic mappings tend to be shared among synaesthetes, allowing to suggest that the inducer-concurrent links are not fully arbitrary: while individual synaesthetic links are idiosyncratic, some synaesthesia types and mapping preferences on the level of type are significantly more common than others (most common are types with linguistic, learned inducers and colour concurrents). Within the type, some scarce propensities exist to link particular inducers with particular concurrents. Moreover, universally shared perceptions of cross-modal similarity tend to influence, or overlap with synaesthetic experiences (e.g. same pitch perceived as lighter in higher octaves, and vice versa).

The abundance of the manifestations of synaesthesia, including the high number of documented types, different inducer-concurrent relationships, as well as possibility of having several types of synaesthesia account for a complex, multilayered and highly idiosyncratic phenomenological reality for the affected individual. The conveying of this reality in a schematic and structured way, which is the main focus of this thesis, is an issue that will inevitably pose challenges and constraints.

2. CONCEPTUAL METAPHOR: CONCEPT AND STRUCTURING

The aim of this chapter is to introduce conceptual metaphor theory (CMT) and the notion of *conceptual metaphor*, in order to establish the fundamental **structural** and **functional** traits of conceptual metaphors as linguistic manifestations of the metaphorical nature of human conceptual system. In this regard, the main working mechanisms of conceptual metaphors will be analyzed, explaining their roots, mode of action and main premises regarding their integral character in human language and thinking. Subsequently, structural and functional properties of conceptual metaphors will be analyzed, followed by introduction of Sebeok and Danesi's three levels of connective modelling (*metaforms, meta-metaforms* and *meta-symbols*). While Sebeok and Danesi's approach formally belongs to modelling systems theory, their approach to connective modelling is based upon Lakoff & Johnson's CMT, and is chosen as tool for analysis within this thesis due to its relevance and applicability. This, along with the previous chapter, will serve as the basis for comparison of main points of convergence and divergence between time unit→colour synaesthesia and CMT, and the practical application of CMT's formal tools for the analysis, conceptualization and conveying of the synaesthetic experience, while also pointing to some probable limitations and impossibilities of such approach.

2.1. CMT: main concepts and functioning

Conceptual metaphor theory **defines** metaphor, essentially, as "understanding and experiencing one kind of thing in terms of another" (Lakoff; Johnson 1980: 35), or "[…] a systematic set of correspondences between two domains of experience" (Kövecses 2017). CMT emerged in 1980, fundamentally, with George Lakoff's and Mark Johnson's book *Metaphors We Live By*, in response to a long tradition of metaphor theories that could not fully account for the complex and integral nature, expression and effect of metaphor on multitude of aspects of human life.

With Lakoff& Johnson (1980; 2003), CMT states that metaphor is not a fancy poetic device that few of us use in our daily lives: on the contrary, metaphors underlie human thought processes in a significant way. They are so pervasive in everyday life and language that we hardly ever notice them, yet our conceptual system defines our daily lives, structuring

what we perceive, and therefore analysis of our language can help us trace and unveil these unconscious processes. Lakoff& Johnson emphasize the metaphorical nature of human perceptual system and the metaphorical processes of human thought, stating that metaphor as a linguistic entity is made possible exactly because our conceptual system contains metaphors (Lakoff; Johnson 1980: 6).

The **main structural elements** of CM are those of the source domain (usually more concrete and delineated) and target domain (abstract, less clearly delineated), with the relationship being based, predominantly, on inference, mapping, projection or blending. The result is a correspondence in form CONCEPTUAL DOMAIN A IS CONCEPTUAL DOMAIN B, where conceptual domain A is the target domain, while B – source domain, with *conceptual domain* being defined as "any coherent organization of experience" (Kövecses 2010: 4). Subsequently, such processes give way to conceptual metaphors in the form of, for example, LOVE [target domain] IS A JOURNEY [source domain], IDEAS ARE FOOD, MORE IS UP, to name but a few, whereupon certain corresponding structural elements and dynamic relations from the source domain are mapped onto the target domain (Kövecses 2017). These, in turn, give way to specific instantiations of the conceptual metaphor, such as expressions *this relationship is going nowhere*, *this information was hard to swallow*, or *prices are rising*, accordingly.

The definition of conceptual metaphor as a systematic set of correspondences between two domains of human understanding and experience, as well as its basic structural aspects allow for immediate comparison with synaesthesia, which also supposes a set of very specific and rigid cross-domain mappings, which, just as source and target domains of conceptual metaphors, usually establish links from the more concrete and tangible domain to a more abstract domain, such as when a colour is added to the abstract notions of months or musical pitches. Just as in our daily language we are used to talking and thinking about ideas in terms of buildings, or time in terms of money, a synaesthete, depending on the type of synaesthesia he or she is affected by, would perceive, and if it was necessary, talk about concepts and experiences in a similar way: about sounds in terms of colours, months in terms of spatiotemporal entities, names in terms of tastes, etc.

Metaphor has been a matter of philosophical and scientific endeavour at least since **Aristotelian** times. Aristotle himself understood metaphor as a linguistic operation based on analogy or transfers from species to species, species to genus or vice versa, concentrating on

its practical and structural, as well as cognitive aspects, allowing to see metaphor, among other things, as a tool for cognition and knowledge, and a "natural disposition of the mind" (Eco 1986: 101). Still, one of the most prevalent attitudes towards metaphor over centuries has been to treat metaphor as a purely rhetorical matter, or trope, which has superfluous nature and value, and therefore should be treated with caution in reasoning (Eco 1986: 91-100; Pierce, Garrison 2011: 96).

However, already at the turn of 18th century Giambattista Vico (1668-1744) suggested that the role of metaphor in cognitive processes is integral and dynamic by stating that metaphor is, fundamentally, a result of dynamic interplay of the three parts of mind, namely, memory, imagination and invention, allowing humans to **perform creative process on the basis of the known,** a phenomena called by Vico *poetic logic* (Danesi 2013: 399). This way, the human mind proceeds from sensory input to sensory categorization, concepts and, finally, abstract concepts (Pierce, Garrison 2011: 96). This view stands out for the time being, as it already emphasizes the cognitive value and dynamic aspect of metaphor, in a similar way as CMT which towards the end of the 20th century shifted the notion of metaphor as a linguistic device, to the notion that metaphor is, primarily, a device of thought, or cognitive pattern, which subsequently finds its outlet in language, and can be seen as the main vehicle of creating new meanings (Zheng 2017: xi).

In a similar regard, Eco (1986: 102) has stated that metaphor, at least in its most successful cases, allows to show through "the cultural process, the dynamics itself of semiosis". On a parallel note, synaesthesia research in the last decade has shifted the focus from seeing the phenomenon as purely sensory, or cross-modal, to ideaesthetic, or conceptual, echoing Wheeler and Cutsforth's (1922) claims about the conceptual nature of synaesthesia as meaning-making, stated in early 20th century. However, for synaesthesia, the primary locus of expression has long been considered art, especially music. This view has also shifted towards acknowledging a more integral role of the condition in affected person's life and cognition, extending even beyond direct influences of inducer and concurrent realms.

CMT openly opposes the views on metaphor as purely rhetorical, artificial, artistic and surplus discourse option, seen, fundamentally, as a conscious and deliberate use of language based on similarity and comparison, that can be easily detached from the rest of discourse, human thinking and cognition (Kövecses 2012: ix-x). Similarly, CMT renounces the long-held assumption that human concepts are disembodied, literal and conscious (Lakoff, Johnson

2003: 271) **Main premises** of CMT establish metaphor as, essentially, **omnipresent** and **inevitable**, even **unconscious** in everyday (non-poetic) settings, e.g. **thought** and **language**, having a **psychological reality, structuring human perception** and influencing thought processes in realms of human action such as politics, morality and law. Moreover, CMT posits metaphor as a "**property of concepts**" (Kövecses 2010: x-xii) that **facilitates understanding of abstract concepts by linking them with specific characteristics from more concrete source domains in a motivated and non-arbitrary way.** This way, metaphor is seen as, primarily, a figure, or mode of thought, which then finds its expression in concrete linguistic and other kinds of instantiations. Metaphor and language, thus, are seen as influencing each other in a reciprocal way.

CMT has been substantially expanded and refined over the last four decades. Some of the most prominent additions include **neural theory of metaphor (NTM)** (see Lakoff 2009 [2008]), which sees metaphor as a neural phenomenon, based on fundamental insights provided by 1997 dissertations by Joseph Grady, Christopher Johnson, and Srinivas Narayanan.

NTM explains complex metaphor (e.g. LOVE IS A JOURNEY) as based on universally shared **primary metaphors** (e.g. A RELATIONSHIP IS A CONTAINER and INTIMACY IS CLOSENESS) which arise naturally and automatically from neuron wirings and have their experiential basis in language-independent human sensory and motor experience (Lakoff, Johnson 2003: 254-257; Kövecses 2017). Such primary metaphors are generally shared across different cultures, and learned via Hebbian learning processes, as repeated simultaneous activation of brain areas related to source and target domains result in metaphor circuits, or mappings, linking sensorimotor systems and higher cortical areas. This occurs during normal and natural interaction with the world, when both source and target domains are active in the brain. For example, repeated experience of observed correlation between quantity and height results in mapping between neuronal groups ("nodes") representing sensorimotor and abstract experience, resulting in a primary metaphor MORE IS UP (Grady 2005: 1600).

Importantly, while several primary metaphors appear to be based on causation from source to target, or vice versa, the causation issue is problematic. While some primary metaphors can be explained by causation, such as EMOTION IS TEMPERATURE based on target domain causing the source domain (e.g. increased body temperature in times of anger),

or DIFFICULT IS HEAVY supposing causation of target domain by the source domain (due to difficulty being the result of physical heaviness), other mechanisms, such as **correlation**, as well as **analogy** seem to also be in play in structuring some other primary metaphors (Grady 2005). Primary metaphors, whose numbers extend in hundreds, can involve aspects such as time, emotion, causation, morality, etc. (Lakoff, Johnson 2003: 257).

NTM rests on the notion of semantics-as-simulation, whereby the meaning of physical concepts is understood as a mental simulation (Kövecses 2010:87). In this regard, dreaming, imagining and remembering an action involves many of the same neurons as actually performing the action or movement, which leads to the notions that the meaning of concrete concepts is embodied and is a result of a direct activation of neurons (Lakoff 2009 [2008]: 3).

Another substantial addition to the original CMT is the **conceptual integration** (or **blending, blended spaces**) theory, appearing roughly starting from the early 1990s, with Gilles Fauconnier's and Mark Turner's work. Blending theory sees metaphor as a dynamic process involving at least two input mental spaces (belonging to source and target domains), a generic space (containing common features) and a blended space (space of blended data), resulting in the meaning of the metaphor (Knowles, Moon 2006: 57). *Mental spaces* here are understood as on-line conceptual units, smaller than a domain (Kövecses 2010: 267), or as pre-existing "small mental models of situations structured by our concepts and stored in our conceptual systems" (Lakoff, Johnson 2003 [1980]: 261-262). Blended spaces theory allows to move away from a purely linguistic expression of metaphor: if metaphor is, primarily, thought process, it should be able to be expressed in other modes as well, such as visual arts. Similarly, conceptual integration theory emphasizes the dynamic metaphorical processes characteristic to imagination. Blends can be of two main kinds: either literal, such as ¨Estonian pizza¨, or metaphoric, such as a graph depicting "rising prices" with the use of increasingly higher dots (ibid, 261-263).

For the sake of concision and relevance, this thesis concentrates on CMT as defined (and re-defined) by its original authors George Lakoff and Mark Johnson, including related notions from theory´s later developments, predominantly, neural theory of metaphor and embodiment, leaving out notions pertaining to advancements such as blending (conceptual integration) theory. The focus is on linguistic expression of CMT, as the most prevalent synaesthetic inducers, such as time units and graphemes are essentially linguistic in nature. In other words, these inducers are mediated by spoken or written language, and, according to

accounts of the notion of ideaesthesia, the power of the inducer resides in its meaning, or semantics, which can invariably be encoded in a multitude of physically different expressions. While, due to the sensory nature of the concurrent, such synaesthetic experience could be excellently mimicked via various art forms, such as music, painting or multimodal performance, conceptual metaphor theory, explaining metaphorical processes in language and discourse with inherently metaphorical nature of human conceptual system, stands in a similar situation as synaesthesia research, as more ideaesthetic types can be explained by the general propensity to synaesthesia which can find its expression, arguably, in forms ranging from purely cross-modal (not requiring linguistic mediation) to purely conceptual (some of which reside upon a strong linguistic component).

2.1.1. Structural traits of conceptual metaphors

As stated earlier, conceptual metaphor is a cognitive structure whose **main structural elements** are those of the source and the target domain, establishing a link between two domains of human experience. Among them, one (target domain) is abstract, while the other (source domain) is typically physical and concrete. This way, certain aspects of the source domain are mapped onto the target domain, allowing to understand the abstract target domain, such as the emotion of ANGER, in terms of a more concrete source domain, such as HOT FLUID, and establishing a partial structuring of the target domain concept in terms of the more familiar source domain concept (Zheng 2017: 8) The number of documented conceptual metaphors is measured in hundreds (Kövecses 2017).

As stated by Mischler (2013: 40), the **source of conceptualization here is the embodied experience**, which results in conceptual domains. The mapping of these conceptual domains creates conceptual metaphor. The conceptual metaphor itself finds its expression in concrete linguistic instantiations, whose semantic meaning and form are defined by the corresponding conceptual metaphor. Therefore, conceptual metaphor as a linguistic expression is a result of cross-domain mappings characteristic to human conceptual system, which itself is a result of embodied experience arising naturally and unconsciously during normal interaction with the world since the moment of birth. Such interaction inevitably involves both bodily experience, or the constraints of human physical experience, as well as sociocultural and other linguistic and non-linguistic factors (Handl, Schmid 2011: 3-4).

In this regard, the ongoing unfolding of metaphoric capacity and understanding has been observed to arise earlier in domains that are closer to child's daily experiences (such as bodily sensations being understood earlier than emotions) and domains that are used more frequently in a particular culture, with the necessary knowledge for metaphoric understanding being crucial not only in source domains, but in target domains as well (Glaznieks in Handl, Schmid 2011).

In what follows, the structure of conceptual metaphors will be analysed in terms of the constituting **source** and **target domains** and their relation, involving aspects such as **directionality**, **motivation**, **universality**, characteristics of metaphorical **structuring** and **systematicity**.

Source domains of conceptual metaphors are usually more concrete and defined physical concepts, with abundant known physical attributes, such as spatial orientations (UP-DOWN, IN-OUT, FRONT-BACK), physical substances and entities (PLANTS, FOOD, FLUID), as well as more complex concrete concepts (such as WAR, RESOURCE, JOURNEY). Source domains of many conceptual metaphors and primary metaphors are structured by corresponding *image schemas* – "primitives that structure rich images" (Lakoff, Johnson 2003: 254) –, or "abstract, preconceptual structures that emerge from our recurrent experiences of the world" (Kövecses 2017: 6) – whose structure is maintained when thinking about the target conceptual domain. Such schemas include, for example, CONTAINER or SOURCE-PATH-GOAL. Moreover, according to neural theory of metaphor, the physical concepts that form source domains are directly embodied (Lakoff 2009: 3), and therefore image schemas can be regarded to as ¨directly meaningful¨ (Hampe, in Hampe 2005:1).

In turn, **target** conceptual domains are usually more abstract, less clearly defined, with scarce sensory attributes, thus harder to describe on their own. Such concepts include, for example, **emotional states** (e.g. ANGER, DESIRE, LOVE), **qualities** (DARKNESS, DISPARITY), **life experiences** (CHANGE, COMMUNICATION, ILLNESS), thought (THEORIES, IDEAS, BELIEFS) or **social processes** (SOCIETY, POLITICS, ECONOMY), which are partially understood and structured in terms of one or more corresponding source domains (Kövecses 2010: 25-27).

2.1.1.1. Source-target domain relations: mappings and directionality

Source domain-target domain relations, generally, are **unidirectional** (**asymmetric**), **motivated** (**non-arbitrary**), **partial** (supposing **used**/**unused** parts of the source domain), follow a certain concrete-to-abstract **pattern**, are **additive** and based on **correlation or perceived similarity**, as well as have physical representations in human **brain on neural level** (Lakoff, Johnson 1980; Knowles, Moon 2006: 26; Kövecses 2010; Lakoff 2009).

The relation between source and target domains has been conceptualized with various terminology. The most commonplace approach is to describe the source-target domain relations as cross-domain metaphorical **mappings**. As stated by Lakoff and Johnson (2003: 246), such conceptualization, borrowed from mathematics, allows to understand conceptual metaphors as a **set of systematic correspondences**, partial mappings and the structural elements of source and target, while failing to account for the additive character which conceptual metaphors often exhibit. In turn, the conceptualization of metaphors as **projections** sees the source domain and its structure (such as the image schema) as superimposed on the target domain, allowing to account for the additive character of metaphor, while making it problematic to show that metaphorical mappings are partial, not full. With the advent of neural theory of metaphor in 1997 (e.g. Grady 1997), **notions of *map* and *mapping* re-emerged**, this time borrowed from neuroscience which sees metaphor as a physical phenomenon involving physical links in the brain between domains – "highly structured neural ensembles" (Lakoff, Johnson 2003: 254-256).

Metaphorical cross-domain mappings are **unidirectional** (Kövecses 2010: 7), with the abstract target domain being understood in terms of the concrete source domain, but not vice versa. For example, it is commonplace to reason about TIME in terms of MONEY, e.g. *he spends his time wisely*, and not the other way around. In this regard, mappings are asymmetric, going from the concrete to the abstract, a trait that has also been explained within the neural theory of metaphor, as **neurons involved in the functioning of physical human body tend to fire more frequently, resulting in asymmetry of metaphorical maps** (Lakoff 2009: 17). Similarly, as mentioned in the previous chapter, the characteristic asymmetry of mapping in synaesthesia/ ideaesthesia is explained by the differing sizes of semantic networks between the concrete characteristics (e.g. "blueness"), and abstract referents (e.g. "June").

However, there are few occasions where, in the framework of CMT, the

unidirectionality aspect becomes questionable. Firstly, directionality is unsystematic or ambiguous in primary metaphors (Grady 2005), as, in some primary metaphors, the target can be said to cause the source (as in ANGER IS HEAT), while other primary metaphors seem to follow the reverse causation from source to target (as in DIFFICULT IS HEAVY). Secondly, some source-target domains can be reversed for acquiring stylistic shifts in poetic, non-everyday setting (such as reversing ANGER IS STORM metaphor, e.g. *raging storm*) (Kövecses 2010: 28). Thirdly, evidence exists in favour of possible implicit bidirectionality in conceptual metaphor, with target domains and source domains possibly having mutual influence on each other, such as fishy smells inducing suspicion. Similarly, claims have been made about unidirectionality being restricted to linguistic, not psychological aspects of conceptual metaphors (see Anaki, Henik 2017). Other accounts, such as Slepian and Ambady's Simulated Sensorimotor Metaphor model (Slepian, Ambady 2014), suggest that metaphor can be bidirectional, as abstract concept learning includes addition of sensorimotor states to the structure of the concept, which can be activated with the activation of the concept. These cases, however, do not obscure the overall systematic directionality of mappings of conceptual metaphor, but rather allows to suggest, similarly as in the case of implicit bidirectionality in ideaesthesia, a more profound and exciting field for further research and discovery.

2.1.1.2. Source-target domain relations: motivation

Conceptual metaphors are, largely, **persistent** and **systematic** (e.g. Knowles, Moon 2006: 32), as well as **non-arbitrary**, meaning that the particular mappings between conceptual source and target domains are motivated, constrained and grounded by **bodily** and **physiological** aspects (such as physiology of emotion, or human spatial orientation and interaction with environment), **social** (such as correlation between status and power) and **cultural** (such as perceived control by humans over animals) (Lakoff, Johnson 2003), as well as **historical** and **linguistic** aspects (Kövecses 2014). Moreover, the source-target domain linkages, made on conceptual level (Knowles, Moon 2006: 26), are based on **structural correlation** in human experience. For example, in PURPOSES ARE DESTINATIONS metaphor, both source and target domains exhibit elements of 1) starting point where the desire is unfulfilled, 2) desired state as the end-point, 3) action sequence to go from the initial state to final state (Lakoff 1990

[1987]: 277). Similarly, for example, MORE IS UP metaphor derives from the correlation between adding more substance, and increased level of substance in terms of verticality, which is widespread in human daily experience.

Importantly, as opposed to the traditional view on metaphor, conceptual metaphors are **not based on pre-existing similarities** between the domains. As stated by Kövecses (2010; 2017), the correspondences between source and target domains (such as understanding LOVE in terms of a JOURNEY) are a result of the source domain structuring the target domain, and not based on pre-existing similarity, and any kind of similarity between source and target is a derivate of the correlation, not its source (Knowles, Moon 2006: 26). For example, the mapping between travellers and lovers, or journey's destination and relationship's goals in LOVE IS A JOURNEY metaphor is a result of source domain structuring the target domain, and not based on *inherent* structural similarity of the domains.

However, some perceived, non-objective similarities or generic-level similarities can still function as grounding for conceptual metaphor, such as when LIFE is seen as a GAMBLING GAME based on perceived similarities between certain actions and their consequences, or the abstract, generic similarity between the LIFE CYCLE OF HUMAN and the LIFE CYCLE OF A PLANT. **Correlation in experience and similarity, thus, shall be seen as equally important motivation for conceptual metaphor** (Kövecses in Handl, Schmid 2011).

A characteristic aspect of conceptual metaphor structuring is the possibility of the same source domain constructing several different target domains, as well as the target domain being structured by several differing source domains (also called *cultural model*, see 2.2.2.). An example of the first case is the CONTAINER source domain, which structures the abstract target domains of DIFFICULTIES, INVESTMENTS, OBLIGATIONS, SHAPES, BODY, VISUAL FIELD, and TIME, to mention but a few. In the second case, for example, TIME is commonly understood in terms of concrete source domains of LANDSCAPE, PURSUER, RESOURCE, MONEY, FORWARD MOVEMENT, and IDEAS are understood in terms of FOOD, PEOPLE, PLANTS, PRODUCTS, COMMODITIES, RESOURCES, MONEY, CUTTING INSTRUMENTS, FASHIONS and LIGHT SOURCES.

2.1.1.3. Source-target domain relations: partial structuring

When analysing conceptual metaphors as a set of systematic correspondences, it is important to emphasize that the structuring of conceptual metaphor is **partial**, not full, meaning that there always is a "used", as well as "unused" part of the source domain, as not every single aspect can be mapped onto the target domain. In this regard, several views exist regarding the constraints of the mappings between the domains.

As stated by Lakoff and Johnson (1980: 12-13), a conceptual metaphor inevitably highlights some aspects of the conceptual domain (for example, putting emphasis on the battle aspects of ARGUMENT IS WAR), while hides other elements (such as the possible cooperation elements in said metaphor). The partial structuring is inherent to conceptual metaphor, since, if it was not so, it would be more of a matter of synonymy, not metaphorical inference, "[...] one concept would actually *be* the other, not merely understood in terms of it" (Lakoff, Johnson 1980: 12-13).

As summarized by Kövecses (2017), Lakoff's (1990) invariance hypothesis supposes that such constraints lay in the image-schematic structure of the target, as everything from the source can be mapped that does not conflict with it. Alternatively, Grady's (1997) proposal states that these constraints lay in the relation between the source and the target domain, as only the material of the source domain that is based on primary metaphor can be mapped, while Kövecses himself proposes the mapping of the main meaning focus of the source.

The scope of the "used" part of the source domain varies from metaphor to metaphor. Some have extensive "used" parts, such as the THEORIES ARE BUILDINGS metaphor, which has many possible linguistic instantiations, making the metaphor systematic and universal. Meanwhile, some others can be so marginal that only one element of the source domain is mapped, making the metaphor idiosyncratic, unsystematic and isolated, such as the MOUNTAIN IS A PERSON metaphor, which highlights only the *foot* part of the source domain (Lakoff, Johnson 1980: 54). In this regard, the "unused" part of source domain can still have metaphorical use, but in more figurative and inventive language, and the "used"/ "unused" parts of metaphor can be seen as **tools for understanding the preferences and values of a certain culture.**

Similarly, the previously introduced scope of "used" and "unused" part of a certain metaphor results in differing scope of probable linguistic expressions of the same conceptual

metaphor, from one to possibly countless linguistic expressions. These are directly related to the notion of *productivity of metaphor* (Lakoff 1990 [1987]: 384), which can be either lexical (words expressing certain aspects of a conceptual metaphor), or additive (transferring knowledge of source domain to the target domain).

2.1.1.4. Source-target domain relations: universality and specificity

While some conceptual metaphors appear to be almost **universal** and shared across cultures, mostly the ones involving source domains pertaining to human bodily and spatial experience, such as HAPPY IS UP, or primary metaphors, others tend to be strongly culture-specific (Knowles, Moon 2006: 25), such as the conceptualization of the domain of TIME. Moreover, as implied by Lakoff and Johnson (2003: 243-244), individual variance in metaphorical understanding can exist, for example, when different people attribute different source domains to the same target domain, providing varying, or even clashing conceptualizations of matters such as love. Therefore, the universality of conceptual metaphor can be seen as a spectrum. As pointed out by Kövecses (2017:7), metaphors range from universal primary metaphors, such as SIMILARITY IS CLOSENESS, to culture-specific, and even context-induced metaphors, such as in cases when immediate cultural, social, physical or other kind of context influences the metaphor use (see Kövecses 2014).

2.1.2. Functional traits of conceptual metaphors

As metaphor in CMT is seen as a, primarily figure of thought that occurs, first of all, on conceptual level, it is only logical that these to some extent almost universally shared cognitive structures have effects that are reaching deep into the daily lives of humans, affecting psychological reality beyond the realm of language.

Lakoff and Johnson (1980) distinguish three main types of conceptual metaphor, which Kövecses (2010) equates to the **cognitive functions** carried out by them, namely, orientational, ontological and structural metaphors. In turn, these types of metaphors are based on different kinds of image schemas, some of which can be deemed iconic (such as the ontological metaphors), while some are clearly indexical (like orientational metaphors) (Danesi 2013: 400). Their characteristics are as follows:

1) *orientational (spatialization) metaphors* **"organize a whole system of concepts with respect to one another" by giving them spatial orientation and coherence** (Lakoff, Johnson 1980: 14). Orientational metaphors usually involve binary concepts that are derived from human spatial experience, such as up-down, in-out, near-far, front-back, on-off, deep-shallow, etc. These concepts are defined by the direct experience of our bodies, which itself is deeply intertwined with culture. However, the role of culture in determining spatialization metaphors is less pronounced than in other kinds of metaphor, as spatialization metaphors tend to be almost universally shared across cultures (Knowles, Moon 2006: 31). Orientational metaphors **give a non-arbitrary spatial orientation and a more clearly defined structure to concepts** such as emotion, physical states, time and social aspects, for example, *she is feeling down, high-quality work, upcoming events, deep depression*, etc. Orientational metaphors are overall internally and externally systematic, and are rooted in several physical and social bases, giving a **more tangible aspect to concepts by means of spatialization** (Lakoff, Johnson 1980).

2) *ontological metaphors* involve concepts derived from human experiences with physical objects, substances and entities, and **provide a rational ground for referring to, quantifying, identifying and understanding human experiences such as events, emotions, states, actions, etc., by giving physical properties or personifying** these intangible and often vague concepts. Some widespread ontological metaphors include MIND IS A MACHINE (e.g. *he suffered a mental breakdown*), VISUAL FIELDS ARE CONTAINERS (e.g. *he is out of sight now*), or EMOTIONAL STATES ARE SUBSTANCES (e.g. *he's bursting with euphoria*) (Lakoff, Johnson 1980: 25-32; Knowles, Moon 2006: 31; Kövecses 2010: 39), giving a more tangible and delineated aspect to abstract phenomena about which there is not much known. Ontological metaphors, just like orientational metaphors, have their grounding in systematic correlations provided by human experience (e.g. TIME IS A CONTAINER metaphor being grounded in the observed correlation of concrete space traversed in a concrete time, e.g. *this job can be done in thirty minutes*).

3) *structural metaphors* combine ontological and orientational properties, allowing to "use one highly structured and clearly delineated concept to structure another" (Lakoff, Johnson 1980: 61) and "**understand target A by means of the structure of source B**" (Kövecses

2010: 37), instead of performing the referring, quantifying and spatializing functions inherent to orientational and ontological metaphors separately. Similarly to other kinds of conceptual metaphors, structural metaphors are grounded in correlations from our experience, and have a strong cultural impetus, since the relationship between the highlighted and hidden part of the metaphor reveals preference, importance and value a certain culture assigns to certain aspects. (Lakoff, Johnson 1980: 67). For example, TIME IS MOTION structural metaphor in our culture allows to understand time in terms of the structure of motion, which involves concepts of objects, their location and movement. This way, we perceive time as a moving object in regard to the observer, giving way to expressions such as *Christmas is coming*, *past is behind me, better times are ahead*, etc. (Kövecses 2010: 37-38).

These three kinds of metaphors, serving different cognitive functions, tend to overlap, as "Structural metaphors and orientational metaphors may have ontological functions too, while ontological metaphors depend on having structured source domains" (Knowles, Moon 2006: 31). Similarly, in the 2003 edition of *Metaphors We Live By,* Lakoff and Johnson revisit the three-kind division of metaphor by stating that such categorization is rather "artificial" and all metaphors should be seen as structural and ontological, and many as orientational (Lakoff, Johnson 2003 [1980]: 264-265). In a similar vein, Zheng (2017: 8) points out three other cognitive functions that conceptual metaphor fulfils in human reasoning, namely, **conceptual metaphor structures the conceptual system, conceptualizes the abstract in terms of the concrete, and also allows humans to obtain and improve the understanding of their experience.**

In the light of the importance of interpretation of ambiguous stimuli as a proof for conceptual, or semantic nature of at least some part of synaesthesias (the ideaesthetic types), it is relevant to consider the possibility of ambiguity of metaphor. As stated by Lakoff (2009), such ambiguity not only exists, but also is a proof that "metaphor does not reside in words but in ideas" (Lakoff 2009: 29). Some linguistic metaphors can be ambiguous in the sense that their interpretation depends on which source domain is applied. For example, *going downhill* can mean either "ease" or "worsening of state", and only one of the possible interpretations will be activated.

Moreover, conceptual metaphors as deeply rooted cognitive structures and systems of meaning are proven to have a psychological reality (e.g. Kövecses 2010: xii). Their overarching prevalence can be exemplified by studies showing that, in normal everyday

speech, humans use about four metaphorical expressions per minute, among which around three would be based on conceptual metaphor (see Zheng 2017: 17). With such extent of prevalence it is without surprise that conceptual metaphor, far from being just a discourse option, is indeed its very backbone. As stated by Schmid and Handl (2011:4), the conventional metaphorical expressions of a language "function both as a central determinant and a mirror image of how the minds of the speakers of the language are structured and work", allowing to see how thinking affects the language use, and vice versa.

In this regard, as having far-reaching influence on human thinking and decision-making, conceptual metaphor plays an important role in such important realms as politics, legal field, morality or clinical psychology (Lakoff, Johnson 2003: 243), and is of great interest for a variety of fields not limited to linguistics, but including also psychology, science or philosophy, to name but a few (Zheng 2017:5). Importantly, study of conceptual metaphor is of vital importance for the field of semiotics, as conceptual metaphor is seen, essentially, as a mechanism unveiling the meaning-making processes in human cognition, allowing to study thinking and conceptualization, and can be seen as the "main motivation of the emergence of new meanings" (Zheng 2017: 2) and informant of the conception of certain issues by individuals, groups, cultures and even the whole humanity.

The acquisition and use of conceptual metaphor is largely unconscious and involuntary, until brought to attention. However, conscious use and employment of particular conceptual metaphors, especially when alternatives exist (e.g. liberal/ conservative worldviews as "nurturant parent" or "strict father" regards the "family" of the nation), or the previously introduced possible emphasis on certain aspects ("highlighting") while "hiding" others can consciously be employed for bringing about a certain worldview, evaluation and altering the persons's belief and action system in fields such as news, politics, sports or advertising (Knowles, Moon 2006: 74).

In this regard, Kövecses (2011) establishes three distinct levels on which conceptual metaphor functions: **supra-individual**, which deals with decontextualized source-target domain mappings of a certain language, **individual** level which supposes the incomplete use of the metaphorical resources of supra-individual level and creative metaphorical activity by a concrete individual in a concrete on-line communicative situation, and **sub-individual level**, which encompasses universal, body-motivated metaphors and makes the conceptualization and domain mappings natural and motivated (Kövecses 2011: 25-27).

To better understand the functioning of conceptual metaphors, another aspect must be paid attention to: the way these cognitive structures allow to account for and react to new situations and provide for creativity. As explained previously, the productivity of conceptual metaphor lays, firstly, in the process of transferring elements from the source domain to the target domain, allowing to structure the target domain (e.g. TIME) according to the structure and relations of the source concept (e.g. MONEY), and, according to the source domain, giving the target concept new meaning (Lakoff 1990 [1987]: 384; Lakoff, Johnson 2003: 141-142). Similarly, Pierce and Garrison (2011) call this process a negotiation between the abstract and the concrete, ideas and experiences, which opens new possibilities for meaning. This kind of transfer is commonly referred to as *metaphorical entailment* (see Lakoff 1990 [1987]: 384). In turn, the second measure of productivity of a certain metaphor is the previously introduced possibility of varying scope of possible lexical expressions.

Generally, as stated by Mischler (2013:40), with repeated experience, conceptual metaphor is formed over time, and later allows to react to new experiences through language. In a similar regard, Handl and Schmid (2011: 7) state that new metaphorical expressions are possible as long as they comply with the general human metaphorical framework. Thus it's without surprise that in the latest (2003) edition of *Metaphors We Live By*, Lakoff and Johnson compare human metaphoric understanding to a sense, as important as hearing or vision, vital for human functioning (Lakoff, Johnson 2003: 238-239).

2.2. Modelling systems theory: three levels of connective modelling

In comparison with Lakoff and Johnson's conceptual metaphor theory, Sebeok's and Danesi's modelling systems theory (MST) allows for a more synthetic categorization of the diverse range of human metaphorical activity, there being three explicit levels of connective modelling, all of them unique to anthroposemiosis. In the framework of MST, *model* is defined as:

> [...] a *form* that has been imagined or made externally (through some physical medium) to stand for an object, event, feeling, etc., known as a referent, or for a class of similar (or related) objects, events, feelings etc., known as referential domain. (Sebeok; Danesi 2000: 2)

Such form can have the appearance of either internal *mental image*, or external

representation. What defines **connective modelling** among other modelling types, namely, singularized modelling (giving form to unitary entities with singular referents), composite modelling (giving form to complex referents via combination of several signifiers) and cohesive modelling (a system of signifiers that can be used for various form-giving purposes), is its resulting in human metaphorical activity which highlights the role of sensory perceptions in forming abstract concepts (ibid, 42). In turn, each of these types of modelling unfolds in three levels according to **three different modelling systems**: primary modelling system (sense-based iconic modelling of referent's sensory properties, encoding denotata), secondary modelling system (modelling with indexical and extended primary forms, encoding connotata), and tertiary modelling system (acquisition and use of abstract, culture-specific modelling).

2.2.1. Primary connective models: *metaforms*

Metaphors – defined as special instantiations of **metaforms** – "linkages between abstract notions, [ideas], with concrete source domains containing referents that can be easily seen or drawn" (Sebeok; Danesi 2000: 71) – fall under the category of primary connective models, defined as "the results of metaphorical reasoning processes" (Sebeok; Danesi 2000: 37). The definition of metaphor given by Sebeok and Danesi reveals its structural roots as very similar to those of the synaesthetic experience, especially with the theory of synaesthesia as "learning aid" giving "flesh" (e.g., a colour) to abstract notions (such as days of the week).

Following Lakoff and Johnson's approach, Sebeok and Danesi define metaforms as formed by two domains: an abstract target domain, and a source domain, which uses concrete signifieds to express the target domain. Metaphor is a concrete instantiation of a metaform, which itself is a highly unconscious mental form. For example:

Metaform: [persons] = [perceived features of animals]
Metaphor: My colleague is a *bear*.

According to Sebeok and Danesi, the vehicles contained in the source domain part of the metaform help in "grounding" the abstractness of the target domain. In primary

connective modelling, source domains contain the vehicles ("forms with concrete signifieds" (Sebeok; Danesi 2000: 38)), that convey the meaning of the concrete metaphor. Subsequently, in discourse, each instantiation of a metaphor can be seen as a concrete exemplification of a certain metaform. This is a vital aspect of understanding both metaphorical and synaesthetic perceptions, since it highlights the tendency of humans to think of abstract notions in iconic terms. Moreover, primary connective modelling is based on abduction, and always encodes connotata (the extensional referent), not denotata (the primary referent) (Sebeok, Danesi 2000: 71). Applying the notion of metaform to synaesthesia type, and metaphor – to concrete instantiation of synaesthetic experience, we come up with the following table:

	Target domain (abstract)	**Source domain (concrete)**
Metaform	[human personality] =	[perceived characteristics of animals]
Metaphor	My colleague	(is a) bear
Synaesthesia type as metaform	[days of the week]=	[colours]
Synaesthetic perception as metaphor	Wednesday	(is) blue

Table 1. Conceptualization of synaesthesia as metaform and metaphor

According to the layering principle, on the basis of the metaforms of the primary connective type, higher and more abstract concepts can be built.

2.2.2. Secondary connective models: *meta-metaforms*

Secondary connective modelling processes can be based on two different strategies: **layering** (an already existing abstract metaform in language can serve as a basis (source domain) for a higher level concept layering), and **cultural modelling** (culture-specific model, linking several source domains to one target domain) (Sebeok, Danesi 2000: 113).

Meta-metaforms are linkages or connections among already existing metaforms.

Unlike metaforms themselves, their layering is an unconscious process, such as: [thinking] = [upward+scanning motion], with the level of abstraction and, thus, culture-specificity increasing as the layering intensifies.

Secondary connective models – *cultural models* associate "[...] various source domains to a single target domain": [ideas] = [food], [ideas] = [people], [ideas] = [fashion], [ideas] = [plants], etc., resulting in a culture-specific model of a certain concept, "the complex of all possible source domains to which it is associated" (Sebeok; Danesi 2000: 115-119), serving as a basis for cultural groupthink.

2.2.3. Tertiary connective models: meta-symbols

Meta-symbols are defined as linkages that result in a symbolic form. This is a process involving several steps, for example, [rose = love] meta-symbol comes about via the association of the abstract concept - love (target domain) with source domains that are descriptive of a physical rose, such as [sweet smell], [red colour], [plant] (Sebeok; Danesi 2000: 150-151). As such, meta-symbols can be used "across the spectrum of semiosis" (Danesi 2013: 403), as means of exploring the inner connection among things, and are prevalent as useful tools in fields ranging from poetry to science.

This kind of connective modelling reminds of how a synaesthete might describe his or her experience to a non-synaesthete, or how some complex synaesthesias with several concurrents for the same concept might result in a symbolic form. For example, the abstract notion of [hope] might trigger in a synaesthete the concurrents of [blue colour]; [vast surface]; [salty smell], therefore inducing the image of [sea] and resulting in a meta-symbol [hope = sea]. This way, paraphrasing Sebeok's and Danesi's description of meta-symbols, [hope] is associated with source domains that describe a physical sea (Sebeok; Danesi 2000: 150-151).

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Conclusions

Conceptual metaphor is a universally or culturally shared and unconscious cognitive structure establishing unidirectional, motivated and partial mappings between two conceptual domains

of human experience based on correlation in experience or perceived similarity, allowing to structure and understand abstract concepts with the help of more concrete source concepts. Such cognitive structures are rooted in embodied experience, as well as social, cultural, historical and linguistic factors arising naturally over normal interaction with the world, and give way to specific linguistic and other kind of instantiations of the specific conceptual metaphor. This way, CMT opposes the traditional views on metaphor that posit it as an essentially rhetorical, artificial and deliberate discourse option, seen separately from human thinking and cognition.

Structurally, main elements of conceptual metaphor are source domain (concrete and delineated physical concept, such as spatial orientation, substance or entity, largely structured by corresponding image schema), and target domain (abstract, with scarce sensory attributes, such as emotion, qualities, life experiences, processes or thought itself).

Functionally, conceptual metaphors are serving the following purposes: facilitate understanding of abstract concepts by giving them indexical or iconic attributes, such as spatial orientation and coherence, physical properties, personification or structure pertinent to the concrete source domain. Therefore, conceptual metaphor structures, conceptualizes and improves human understanding of their abstract concepts and experiences. As such, it can be seen as a vehicle for emergence of new meaning, and means of studying meaning-attribution processes of abstract concepts.

As deeply rooted thought patterns, conceptual metaphors have a psychological reality and deep impact on conceptualization and understanding of whole realms of human experience, such as politics, law, morality and psychology.

Built upon Lakoff and Johnson's work, Sebeok and Danesi's MST provides a three-level model of analysis of human metaphorical activity. This way, human connective modelling activity results in formation of metaform, meta-metaform and meta-symbol, which, along with the CMT's notions of *source domain* and *target domain*, as well as different kinds of conceptual metaphor (structural, ontological and orientational) will serve as basis for analysis of the synaesthetic experience in the subsequent chapter.

3. DESCRIBING AND CONVEYING THE SYNAESTHETIC EXPERIENCE ACCORDING TO THE NOTIONS OF CMT

The aim of this chapter is to **analyse in detail the points of convergence and divergence of synaesthesia and conceptual metaphor based on the definitions, structural and functional properties and other peculiarities** of the two phenomena, introduced in the previous chapters. The purpose of this analysis is to **point out some intrinsic similarities between synaesthesia and conceptual metaphor, as well as their differences**, **in order to determine how and to what extent the research in conceptual metaphor theory can inform synaesthesia research and vice versa**. Furthermore, by using examples, it will be shown how the synaesthetic experience of time unit→colour type can be conceptualized and conveyed using CMT's notions of *source domain, target domain, ontological/spatialization/structural metaphor*, as well as MST's three levels of connective modelling: *metaforms*, *meta-metaforms* and *meta-symbols*. Before drawing conclusions, some interesting considerations for future research will be suggested.

3.1. Conceptual metaphor and ideaesthesia: shared structural and functional traits

Analysis of the commonalities of structural traits of synaesthesia (in particular, ideaesthesia) and conceptual metaphor has to begin, first of all, on the level of definition, which already suggests some fundamental similarities and differences. As introduced in chapter 1, Hubbard (2007: 193) has defined synaesthesia as "[...] an experience in which stimulation in one **sensory** or **cognitive** stream leads to associated experiences in a second, unstimulated stream", and Nikolić (2009: 28), accounting for the conceptual nature of most types of synaesthesia has proposed an alternative definition of *ideaesthesia* as "[...] **a phenomenon in which a mental activation of a certain concept or idea is associated consistently with a certain perception-like experience.**" (Nikolić 2009: 28). Meanwhile, in the framework of CMT, Lakoff and Johnson (1980: 35) originally defined conceptual metaphor as **"understanding and experiencing one kind of thing in terms of another"**, and Kövecses in 2017 proposed a definition of CM as **"[…] a systematic set of correspondences between**

two domains of experience".

Here it can be observed that the **definitions of conceptual metaphor can relatively easily accommodate for ideaesthesia**, while the reverse is not possible. To paraphrase Lakoff and Johnson's definition, synaesthesia is, essentially, understanding and experiencing one kind of thing – either sensory, such as taste, or conceptual, such as a weekday or musical pitch – in terms of, or with the aid of, another thing – an additional sensory attribute, such as colour, taste, shape or personality. Similarly, the systematicity of synaesthetic links, or correspondences between two domains of experience allow to perfectly apply Kövecses' definition of CMT to the synaesthetic and ideaesthetic experience. However, the reverse is not as easily done, as there is no direct perception-like or sensory experience in CM, despite CM involving activation of concepts and stimulation in cognitive stream (as in ideaesthesia). It is for this reason that ideaesthetic types of synaesthesia, as is time unit→colour, involving link between conceptual domain and sensory modality, are more apt for analysis within the framework of CMT, as both phenomena involve activation of a concept and associated activity in another domain of experience.

As introduced in previous chapters, the **two structural elements** in ideaesthesia are those of inducer and concurrent, while CM's structure is comprised of source and target domains. The very nature of these elements, as well as their relation allows to point out a range of similarities. The ideaesthetic experience begins with the physical perception (e.g. seeing, hearing) or mental activation (e.g. thinking, imagining, dreaming) of the inducer – the sensory or conceptual stimulus that triggers the additional sensory experience of the concurrent via extraction of meaning and activation of the inducer concept. Ideaesthetic inducers are conceptual and abstract, such as weekdays, numbers or musical pitch, with scarce sensory attributes, while concurrents predominantly pertain to a concrete sensory modality and are percept-like.

According to main theories of the origins of ideaesthesia, it serves as a facilitator in (predominantly childhood) learning, categorization and meaning-attribution processes by imbuing elements of abstract concept sequences with developmentally earlier concrete sensory attributes. In this light, it is evident that, while, in real-time, inducer comes first and is followed by the concurrent, the mapping direction here is the opposite: the concrete characteristic is used to encode and facilitate the mental operations involving the abstract concept. This **mapping direction from concrete to abstract**, as explained previously, is the

general tendency among synaesthesia and ideaesthesia types. This supposes a fundamental similarity with the basic structuring of CM, which involves a physical, concrete concept as the source domain that is used to reason about an abstract concept as target domain, allowing to **compare synaesthetic concurrent with CM's source domain, and inducer – with target domain.** This comparison extends to a particular ideaesthesia type (such as time unit→colour), which can, in terms of conceptual metaphor, be paraphrased, for example, as TIME UNITS ARE COLOUR, with specific instantiations of the type (particular inducer-concurrent links) being equiparable to concrete instantiations of the CM, such as *Tuesday is light brown.* Moreover, this concrete-to-abstract mapping trend linking two conceptual and/or perceptual domains has functional implications that will be further analysed in subchapter 3.1.1.

In ideaesthesia, there exists the possibility for the **same inducer to have several concurrents** pertaining to different sensory modalities (such as "Sunday" being perceived as golden, sweet and loud), just as **several source domains can be used to structure a single target domain** (such as OBJECTS, FOOD, FASHIONS etc. structuring IDEAS). Similarly, **several different inducers can have a similar concurrent** (e.g. Friday, letter A and number 5 all being perceived in terms of different shades of red colour), just as the same **source domain can structure different target domains** (e.g. UP structuring GOOD, HAPPY, etc.). This characteristic supposes layering and allows the use of MST's notions of metaform, meta-metaform and meta-symbol, as will be shown later in this chapter.

As mentioned previously, what is common for the link between the structural elements in both ideaesthesia and CM is its **systematic**, **durable**, **involuntary**, **unidirectional** and **noetic** character. While the particular inducer-concurrent mappings seem to be attributed in an arbitrary way, after their internalization (supposedly, in childhood), they remain highly **consistent**, meaning that the same inducer will reliably always induce the same concurrent, allowing to talk about inducer and concurrent sets and relations as forming **persistent** and interdependent systems. Similarly, CM by definition supposes high level of **systematicity** in source-target domain relations, which are based, predominantly, in the systematic correlations of human experience. As such, both mappings of ideaesthesia and CM are durable and persistent, even if new mappings are possible for creative purposes in case of CM, and new inducer-concurrent pairings can occur over exposure and acquisition of new systems of meaning in ideaesthesia.

In turn, the **involuntary** character, common to both ideaesthesia and CM, finds different expressions in each of the phenomena. The involuntary character of ideaesthesia supposes the **automaticity** of experience of the concurrent whenever inducer is activated, and the inability of the person to suppress such automatically experienced association. In both ideaesthesia and CM, the involuntary character is closely linked to **unconscious** functioning and development of the two phenomena: as modes of thought formed over childhood, which, arguably, have corresponding neural substrates, both ideaesthesia and CM are employed largely without conscious awareness, such as in normal everyday language use and normal (for the ideaesthetic person) perception. It could be argued that, once pointed out, the two can be employed consciously for certain means, such as promoting certain preference or worldview in case of CM, or person-specific benefits in memory, recall or other mental manipulations with the ideaesthetic inducers. Moreover, the involuntary character of the two phenomena extends to the layering of mappings, such as the possibility of several ideaesthesia types merging in synaesthetic synthesis with multiple concurrents (e.g. November being perceived as brown and salty), as well as, in case of CM, the automatic and involuntary layering in meta-metaforms and meta-symbols among other cases, as will be analyzed later in this chapter.

Additionally, both ideaesthesia and CM, while having possible implicit aspects of bidirectionality, as already introduced in previous chapters, have asymmetric mappings, meaning that they are **unidirectional**. This way, in majority of cases there exists a mapping of elements from concrete domain onto an abstract one, such as mapping from the domain of FOOD onto domain of IDEAS, or colour onto the concepts of months, but not vice versa. Additionally, such links are **noetic**, meaning that they provide knowledge, even though the nature of this knowledge in the two cases differs, as will be explained in more detail in subchapter 3.2.

On a **functional** level, an array of shared characteristics link ideaesthesia and CM. First of all, both can be regarded to as **cognitive structures, deeply ingrained modes of thought and systems of meaning that arise naturally over childhood** during normal interaction of the body with the environment, culture and language acquisition and other learning processes. In other words, both ideaesthesia and conceptual metaphor normally arise without the person being aware of it and without intentionality, which contributes to the unconscious, involuntary and, in a way, automatic character of the experience: both people

with ideaesthesia as well as the general population that uses CM experiences it unconsciously, as the awareness of having synaesthesia or the use of conceptual metaphor can go unnoticed until pointed out. In other words, both ideaesthesia and CM have a developmental aspect: just like embodied experience creates conceptual domains whose mapping result in CM which can be further expressed, for example, in language, as exemplified by the gradual unfolding of the metaphorical capacity over the childhood, genetic predisposition to ideaesthesia seems to give advantage during (predominantly) early childhood learning processes by allowing to map concrete characteristics onto learned categories and conceptual domains to facilitate their understanding, resulting in a life-long stable and consistent experience of ideaesthetic links.

Moreover, the extent to which both ideaesthesia and conceptual metaphor are of conceptual nature is an interesting point of discussion. Within CMT, there is a general consensus that CM is, primarily, a figure of **thought** that "resides in ideas" (Lakoff 2009: 29) and is a "property of concepts" (Kövecses 2010: x-xii) establishing a mapping from a concrete conceptual domain to an abstract one on the basis of embodiment, observed correlation and perceived similarity. On the other hand, the relative consensus in ideaesthesia research is that, while the inducer is conceptual (corresponding to the meaning or semantics of the stimulus), on the level of concurrent, the experience is of sensory nature or at least percept-like. However, I would like to argue that a variety of characteristics of the ideaesthetic concurrent allow to suggest that ideaesthesia might be linking two concepts just as CM does, with the concurrent being a physical concept just like CM's source domain. In this regard, firstly, evidence suggests that the cognitive-perceptual links in ideaesthesia might be a result of disinhibited embodiment which is normally inhibited in majority of people (e.g. Gray, Simner 2015), or anomalous representation of object concepts (Chiou, Rich 2014: 2), which is in line with the notion of semantics-as-simulation, pertinent to neural theory of metaphor. Secondly, as explained in chapter 1, the nature of concurrent colour sets it apart from normal colour perception, as it is not constrained by the processing stages at the retina. As explained earlier, this aspect has led to support the claim that the nature of induced colour qualia might indeed be conceptual, as induced colour seems to be more akin to semantic knowledge, or "knowing about colour" (Chiou *et al* 2018). This aspect is further supported by the fact that majority of people with ideaesthesia experience the concurrent in the mind's eye, and the fact that the ideaesthetic inducer-concurrent link can be triggered, among other ways, via endogenous representations of the inducer, such as imagining, dreaming, remembering, etc.

Taken together, these aspects point out that the induced colour of synaesthesia might indeed be more akin to disinhibited embodiment of a physical colour *concept*, experienced as mental simulation which in majority of affected people occurs and is perceived internally as an involuntary and automatic percept-like colour experience. This way, ideaesthesia becomes suitable to be likened to a cognitive process with double conceptual mediation, as the extraction of meaning from the inducer stimulus (abstract concept) automatically triggers the link with the associated physical concept of, for example, colour, and is mediated back as the sensory experience of the corresponding colour (e.g. written word "Monday" triggering the concept of Monday, which is encoded by the concept of "white" and is thus experienced as white colour). This suggested model of double conceptual mediation offers a promising material for further elaboration and research.

3.1.1 CMT's *orientational, ontological, structural* metaphors in describing time unit→colour synaesthesia

To further analyse the possible functional convergences between the two phenomena, it is useful to recur to the previously introduced **cognitive functions** of CM in order to see to what extent they overlap with the functions of ideaesthesia. In this regard, as pointed out by Kövecses (2010), different kinds of CM exercise different cognitive functions.

First of all, as stated previously, *orientational (spatialization) metaphors* **"organize a whole system of concepts with respect to one another**" and give the concepts more tangible characteristics such as **spatial orientation and coherence** (Lakoff, Johnson 1980: 14). As mentioned before, this spatialization aspect quite literally is observed in some people with ideaesthesia types that involve categorizational systems, especially time units, whereas "[...] contiguous time units such as months are spatially linked forming idiosyncratically shaped patterns such as ovals, oblongs or circles" (Smilek *et al* 2007: 507). The result of this spatialization is not only each inducer having a concrete spatial location as a concurrent (perceived either "out there" or in the "mind's eye"), but also the whole system of inducers (e.g. months) being encoded in such a way that creates its own system, such as a colourful, detailed mental calendar (e.g. Rothen *et al* 2012: 1956). Such spatialization of, especially, time units, as well as sounds (Day 2005) arguably helps to ground and give tangible characteristics to a whole system of concepts (e.g. months), as well as organize the separate

elements of the system (inducers) with respect to one another, just as orientational metaphors do. Besides these shared characteristics between orientational metaphors and common spatializations of culturally-determined categorizational systems in ideaesthesia, interestingly, understanding of time in terms of space, as in TIME IS SPACE metaphor, is shared between CM and ideaesthesia. This way, TIME IS SPACE is one of the few CM that can directly accommodate an ideaesthesia type, such as time unit→ spatial location, serving as an example once more of the tendency of humans to reason about time in spatial terms (e.g. Boroditsky 2000: 4). Moreover, spatializations in ideaesthesia tend to involve the sense of self (or "ego" of the affected person) more than other types of concurrents, as concurrents are perceived, in a way, in relation to the person's body. For example, person with time unit→ colour/ spatial location ideaesthesia could describe December as dark brown, in front of the person on the right, and closer to his/her body than November, reminding of the ego-moving and time-moving CM which also directly involve the sense and positioning of the self. Such spatializations are known to have functional impact on person's cognition, such as in cases when mental calendars serve to schedule tasks and help in further recall of appointments (Smilek *et al* 2007: 508).

Secondly, as introduced in the previous chapter, *ontological metaphors*, such as TIME IS A CONTAINER, give abstract concepts physical characteristics of objects, substances and entities, allowing for a rational ground for referring, quantifying, identifying and understanding abstract human experiences by **attribution of physical properties or personifications** based on correlation in experience. Arguably, most ideaesthesia types can be quite comfortably accommodated under the cognitive functions performed by ontological metaphors, inasmuch the basic mechanism and most probable cause of emergence of ideaesthesia is precisely the attribution of concrete physical properties to abstract and elusive concepts. This way, learned categorizational elements such as different musical pitches, weekdays, different kinds of pain or taste might acquire additional sensory attribute of colour, taste or smell that help precisely in identifying, understanding and facilitating other mental operations involving said inducers. This applies also to time unit→colour ideaesthesia, which, arguably, attributes physical properties to abstract concepts of weekdays and months in order to facilitate their identifying and understanding in early learning processes.

Moreover, personality and personification, while rather rare, appear both as a documented synaesthetic inducer as well as concurrent (Day 2005), allowing to suggest that

also this functional aspect of ontological metaphors is present in a part of people with synaesthesia and ideaesthesia.

Thirdly, *structural metaphors*, as introduced previously, "use one highly structured and clearly delineated concept to structure another" (Lakoff, Johnson 1980: 61), allowing us to "**understand target A by means of the structure of source B**" (Kövecses 2010: 37), performing orientational and ontological functions simultaneously. Here, the previously introduced cases of spatialized time units come to mind, where clearly delineated concepts of spatial location and/or colour might help to structure the other concept, such as the weekdays or calendar months. Similarly, there exist cases where the concurrent system and inducer system have influence on each other, such as when the frequency and positioning of discrete elements in the inducer system affects the qualities of the concurrent that are a response to said inducers, such as frequently used letters triggering brighter colours than less common ones (Watson *et al* 2014). Furthermore, the attribution of a concurrent to a concrete inducer in ideaesthesia, given the underlying theories about its origins, arguably, arises as the need to structure, discriminate and identify the ideaesthetic "target domain" or inducer system, which usually has very scarce sensory attributes, and the clearly delineated and specific ideaesthetic sensory concurrent serves this exact purpose. However, despite these similarities, there is still a lot of room for further research into how exactly the *structure* of the concurrent system allows to understand or gives structure to inducer system besides the attribution of the idiosyncratic and automatic ideaesthetic association.

Moreover, ideaesthetic experience closely complies with the cognitive functions of CM as pointed out by Zheng (2017: 8). To paraphrase these functions regarding ideaesthesia, we can say that ideaesthesia helps to structure (name, discriminate, identify and manipulate) the conceptual system by attributing concrete sensory characteristics to the discrete units of the inducer system. Moreover, via this process, ideaesthesia explicitly helps to conceptualize the abstract concepts that suppose semantic vacuum (e.g. the concepts of different musical pitches, pains, tastes or weekdays) with the help of the concrete additional sensory attribute. Thirdly, by doing so, ideaesthetic processes allow to obtain and improve understanding of our experience by facilitating mental tasks involving the ideaesthetic inducers.

Taken together, the analysis of functional convergences of CM and ideaesthesia confirm the notion that both phenomena provide an insight into how human perceptual and conceptual systems work. While both metaphor and synaesthesia have initially been seen as

merely artistic devices, both are integral part of affected person's thinking and cognition, and inform us about the ways meaning is built and encoded. There are, of course, differences in functionality of ideaesthesia and CM, some of which will be pointed out in the next subchapter. However, in very broad terms, **ideaesthesia can be seen as functionally similar to CM, being a process of meaning forming idiosyncratic semantic systems.** This way, as I said previously, the known or the concrete concept (such as "redness") is used to reason about and form the abstract, unknown concept (such as "number 5"), reminding of what Vico called creative process on the basis of the known, or *poetic logic* (Danesi 2013: 399).

Interestingly, both ideaesthesia and CM being processes of meaning, their functioning unveil how human concepts exert influence on perception, emphasizing the role of interpretation. As stated by Lakoff and Johnson, "Our concepts structure what we perceive" (2003:4). This way it can be suggested that the perceptual and conceptual aspects in both CM and ideaesthesia have a mutual influence on each other. In this regard, the physical concepts of source domains are formed on the basis of embodied experience, which later is used to structure abstract concepts, which in turn determine our worldview, emphasizing certain aspects and hiding others. Similarly, **ideaesthesia can be seen as a process whereby the concurrent helps in structuring and encoding the abstract concept, and at the same time is a great example of how interpretation of stimuli, and the extracted meaning directly determine person's phenomenological experiences** (e.g. Leeuwen *et al* 2015). This manifests especially in the previously mentioned cases of ambiguous stimuli in ideaesthesia, and metaphorical ambiguity in CM, showing how the extraction of meaning and interpretation of the stimulus determines the experience, and providing an insight into how human perceptual and conceptual systems work.

3.2. Conceptual metaphor and ideaesthesia: differing structural and functional traits

Despite the shared array of characteristics, ideaesthesia and CM have several differences, which will be discussed in detail in this subchapter. One of the most obvious points of divergence of the two phenomena is their **prevalence**. As already stated in chapter 1, the estimated prevalence of population having one or several types of synaesthesia (as understood by the dualism view: strictly distinguished from widespread perception of cross-modal

similarities) is around 1:25, or 4,4% (Simner *et al.* 2006: 1028), making it quite a rarity. Meanwhile, CM is unconsciously and inevitably present in everyday thought, reasoning and language almost universally.

Other obvious difference between ideaesthesia and CM is the fact that ideaesthetic experiences are **idiosyncratic**, or highly specific for each affected individual, while CM, at least on the level of a particular culture or language, are commonly **shared**. A special case here would be the so-called primary metaphors, which, arguably, are the most universally shared since they have their rooting in basic experience and constraints of human body and physiology which is shared across the globe. Such primary metaphors could be possibly compared to the physiognomic character of several synaesthetic tendencies, as introduced in chapter 1. However, when it comes to vivid synaesthesia and ideaesthesia, idiosyncracy and heterogeneity, both regarding the qualitative and quantitative aspects of the condition (such as the number and kind of types of synaesthesia) is one of its defining aspects.

The idiosyncratic aspect of ideaesthesia, arguably, is linked with another difference between this condition and CM: that of **arbitrariness or motivation**. This is, nevertheless, a discutable aspect. As stated previously, both ideaesthesia and CM share the aspect of being determined or at least to some extent affected by bodily, cultural and linguistic aspects, which serve, even though very slightly, as some kind of a constrictive framework even for the idiosyncratic synaesthetic experience, and is the very basis for CM. While the rooting and motivation of the almost universally shared CM in cultural, bodily and linguistic experience is taken as a fact, the same might not be true for the apparently arbitrary synaesthetic links. However, while it is true that ideaesthetic experiences, as stated earlier, are highly different even among twins, the very emergence of ideaesthesia can be deemed as a **cognitive response to culturally-predetermined learning requirements**, such as the child's need to attribute meaning to categorizational sequences such as alphabets, digits, musical pitches, different kinds of pain, weekdays, months, etc., which are at the heart of the ideaesthetic experience. Thus it can be suggested that the apparently arbitrary and **person-specific ideaesthetic links are a sensory bodily response to culturally-predetermined meaning-attribution requirements, which would liken the workings of ideaesthesia to the above explained cognitive functions of CM**, while exercising them in a person-specific way in so predisposed individuals.

Given the above mentioned factors, the **kind of inference** on which the inducer-

concurrent or source-target domain link is established is another disputable aspect of difference between ideaesthesia and CM. As has been introduced previously, in CM source-target domain relationships are based on **correlation in experience, or perceived/ generic similarity**, while the same cannot be said about inducer-concurrent mappings in ideaesthesia, as there is nothing, for example, in the experience of green colour that would correlate with the concept of Thursday or letter G. However, the evidence of scarce tendencies to link, for example, brighter colours to more frequently used letters (such as A being red, or E being blue) allow to talk, at least in some cases, about possible correlation between the intensity (frequency) of experience and the intensity of colour. This yields some interesting insights about possible interaction between the structure of the inducer system, and the concurrent system which encodes the separate inducers, allowing to suggest that, **at least in some cases, not only the concurrent encodes the inducer forming a system of thought, but also the structure of inducer system exerts some influence on the concurrent**.

Regarding the functional aspects of both ideaesthesia and CM, as suggested in the previous subchapter, the functional traits of CM can, to an extent, accommodate for the ways ideaesthesia works regarding the orientational, ontological and structural aspects of CM. However, the reverse application poses several challenges. As concluded in chapter 1, ideaesthesia can be seen as a facilitator of meaning-attribution processes in so predisposed individuals, and emerge as a response to the requirements of learning processes, aiding in acquisition of novel systems of meaning that pose a semantic vacuum for the learner. Similarly, CM aids in structuring and facilitates the understanding of abstract concepts via mapping of characteristics of concrete, physical source domains. Thus **both phenomena can, arguably, seen as arising naturally due to meaning-attribution demands of culturally-defined abstract concepts.** However, in CM, these cognitive structures are transferred culturally and linguistically, while the propensity to ideaesthesia seems to be transmitted genetically and remain open to very **idiosyncratic development** on the level of the concrete individual: while most people within a linguistic community would agree the on use and meaning of a certain CM, the same would never be true for two people with ideaesthesia.

While, as suggested previously, ideaesthesia can, in a way, structurally be seen as linking two concepts, what sets ideaesthesia's function as "felt meanings" apart from CM is their sensory nature. The ideaesthetic concurrent is always a sensory, or percept-like experience, while the same is not true for CM's source domains, despite the fact that they are

physical, embodied concepts.

Moreover, it is interesting to observe the way ideaesthesia and CM account for creation of new knowledge and new meaning, as both can be seen as deeply ingrained systems of meaning. It is quite obvious that ideaesthetic concurrents carry information, or knowledge about the inducer, helping in mental tasks such as recall and memory or identification. However, the ability of ideaesthetic concurrent to carry *new* information about the inducer has been questioned, even though concurrent can act as a kind of a tool for the person (e.g. Ward 2019) and can be linked to semantic knowledge. Similarly, as stated previously, ideaesthesia can, arguably, serve as a tool for mapping existing systems of meaning onto new ones, such as in cases when pre-existing ideaesthetic associations are transferred to novel inducers, such as between equivalent graphemes of different alphabets (e.g. Jürgens, Nikolić 2012).

Whether or not the noetic aspects of ideaesthesia are different from the earlier introduced productivity of metaphor (transfer of knowledge from source domain to the target domain, and lexical expression of certain aspects of a conceptual metaphor) can be debated. While metaphor can be seen as "main motivation of the emergence of new meanings" (Zheng 2017: 2), the emergence of *new* meaning in synaesthesia and ideaesthesia could be said to be restricted to cases of novel stimuli which activate the need of meaning-attribution, such as acquiring new concepts of particular sounds, novel tastes or learning unknown alphabet or numeration systems. Even then, as explained previously, mapping of semantics-related ideaesthetic associations from known to unknown systems tends to occur. This way, new synaesthetic links can be created, as long as the new stimulus falls within a particular person's synaesthesia types. In other words, **the productivity of synaesthesia (in terms of creating new associations) is restricted to the concrete person's idiosyncratic quantitative aspects of the condition**: the more synaesthesia types co-occur in a person, the wider the possibilities for new synaesthetic meanings.

3.3. CMT's *source* and *target domains* in describing time unit→colour synaesthesia

If synaesthesia types (e.g. time unit→colour) are equated to conceptual metaphors or metaforms (e.g. TIME UNITS ARE COLOUR), both can be said to have "used" and

"unused" parts. Just as not every single aspect of the source domain is transferred to the target domain in conceptual metaphors, and this scope is varying, also not every single possible aspect, for example, of colour is transferred to time units. This aspect of "used" and "unused" part of source domain, as well as the analysis of the quantitative and qualitative aspects of concrete individual's ideaesthesia types relate to the aspect of completeness of metaphoric sets or synaesthetic association networks. As stated by Kövecses, "No doubt, completeness (i.e., to have exhaustive sets of metaphors for particular concepts) is a good thing in itself, but I believe this is not the most important reason for the pursuit of metaphor in cognitive linguistics." (Kövecses in Handl and Schmid 2011: 33)).

It is known that different CMs have different scopes of possible linguistic expressions, from countless to only one, and the list cannot be exhaustive. In some cases the scope of used part in ideaesthesia is predetermined, such as in cases of inducers that pertain to closed systems (e.g. there are seven days of the week, so, arguably, only seven colours from the whole spectrum of colour will be used in specific instantiations of the type). In other cases, when the inducers pertain to an open system, the "used part" of synaesthetic source domain can be wider, or possibly infinite. However, while the particular trends of, for example, more frequently "used" kinds of colours in a particular synaesthete's perceptions are interesting to observe, there is no basis to claim that the relation between the "used" and "unused" part would equate to what CM's highlighting/ hiding allows to do: to suggest what particular values or preferences a particular culture (or, in this case, particular synaesthete) favours. Still, it can be suggested that the particular colour trends of synaesthete's most common concurrent colours allow to point out which colours would have the deepest impact on person's cognition. Similarly, it has been stated that the quantitative aspects of ideaesthesia, such as the amount of types of the condition a person has, or the possible number of concurrents for the same inducer, would account for a more or less "extreme cognitive profile" (Ward 2019: 34), and, arguably, have the highest "synaesthetic value" and yield implications when it comes to aspects such as implicit bidirectionality, forming associations between inducers based on shared concurrents, or the extent and existence of particular synaesthetic *meta-metaforms* or *cultural models*.

However, as explained previously, some scarce tendencies among synaesthetes exist for particular inducer-concurrent couplings, but the evidence of them is too unsystematic to suggest some *universal* tendency, or preference. It remains to be investigated if, how and to

what extent the structure of the inducer system is reflected in the choice of concurrents that encode it, or how the structure of concurrent system (e.g. colour spectrum) influences the understanding of the inducer system (e.g. an alphabet).

3.4. MST's three levels of connective modelling in describing time unit→colour synaesthesia

In the framework of MST, ideaesthesia types can be seen as connective forms, since they result from a linkage of different types of referents (or referential domains), namely, an abstract concept, such as musical pitch class, with a concrete referent, such as colour, from which the referent of the former cannot be observed directly, while the concrete referent can (Sebeok, Danesi 2000: 5-6). Such form can be both *mental* as *externalized*, corresponding to cases where the individual has associative and projectile type of condition, respectively. In this regard, for example, physically seeing blue colour in response of the concept of "Wednesday" would be an *externalized form*, while perceiving blue colour in the mind's eye would correspond to what Sebeok and Danesi call *mental form*. The representation of abstract concepts by linking them with concrete referents, such as colour, could, arguably, be deemed as a process initially based on abduction, whereby "[...] a new concept is derived on the basis of an existing concept [...]" (ibid, 7), as the situation of supposed "semantic vacuum" presented by the novel abstract concept, such as a weekday, is solved by attribution of a characteristic of an existing concept, such as colour, while, however, the sharedness of traits between the two concepts can be questioned, as will be elaborated upon later in this subchapter.

According to what Sebeok and Danesi call *representational principle,* "Knowledge is indistinguishable from how it is represented" (2000: 11), thus ideaesthesia as representation of abstract concepts with a physically perceived sensory attribute can be deemed a form of knowledge, and mode of knowing. In what follows, the three levels of connective modelling will be analysed in terms of their applicability of describing and conveying the structuring and function of time unit→colour ideaesthesia: internal or external experience of colour in response to activation of concepts of weekdays and calendar months.

3.4.1. Metaform

As already introduced previously in subchapter 3.1., metaform and ideaesthetic perception share the following structural and functional similarities: both are formed by two domains, resulting in a linkage of abstract notion with a concrete referent, whereby the concrete source domain (or ideaesthetic concurrent, in this example – colour) serves as a facilitator of understanding of the abstract target domain (or ideaesthetic inducer, in this example – concept of time unit). Just as metaform encompasses concrete instantiations – metaphors, time unit→colour ideaesthesia type provides for concrete instantiations of the type in form of separate inducer-concurrent links: the different colour qualia the person experiences in response to the concepts of individual weekdays and months. In both cases, an iconic element is added to the abstract concept.

Still, it remains to investigate to what extent time unit→colour ideaesthesia can be seen as based on abduction, and to what extent it encodes connotata, like metaforms do. Metaforms have been described by Sebeok and Danesi as based on "conscious inferences" about the abstract domain that is encoded (Sebeok; Danesi 2000: 73). However, in the case of time unit→colour ideaesthesia, the conscious aspect of forming the concrete inducer-concurrent links can be questioned, as, first of all, as discussed earlier in this thesis, the links seem to be formed, largely, arbitrarily, and, secondly, the synaesthetic person cannot consciously choose or alter the concurrent that is experienced. In this sense, **metaphor formation allows for bigger freedom, subtlety and agency than the ideaesthetic experience, which seems to encode the denotative, or even annotative (subjective meaning of a form) instead of connotative meaning of colour.** For example, by saying "Wednesday is blue", the ideaesthetic person means that this day of the week is literally experienced as blue colour, not the culturally assigned meaning of "blue" as "sad or melancholic".

The following is an attempt to convey the ideaesthetic experience of time unit→colour type, systematized in the form of metaform and metaphor:

	Target domain (abstract)	**Source domain (concrete)**
Time unit→ colour ideaesthesia type as metaform	[time units]=	[colours]

Ideaesthetic perception as metaphor: weekdays	Monday	(is) white
	Tuesday	(is) light brown
	Wednesday	(is) blue
	Thursday	(is) forest green
	Friday	(is) red
	Saturday	(is) silver grey
	Sunday	(is) golden
Ideaesthetic perception as metaphor: months	January	(is) white
	February	(is) light grey
	March	(is) bright green
	April	(is) sky blue
	May	(is) red
	June	(is) light grey
	July	(is) blue
	August	(is) dark blue
	September	(is) golden brown
	October	(is) dark violet
	November	(is) brown
	December	(is) dark brown

Table 2. Conceptualization of time unit→colour ideaesthesia as metaform and metaphor

As can be observed, the time unit→colour ideaesthesia type can be conceptualized in form of metaform: [time units] = [colour], while the specific instantiations of the type, the separate concepts of weekdays and months, can be seen as instantiations of metaform, or concrete metaphors. Since the inducers of time unit→colour ideaesthesia pertain to closed systems, the amount of possible instantiations of metaform is strictly pre-defined and limited. The specific properties of the source domain of [colour] here are shown to deliver the meaning of the target domain of [time units].

3.4.2. Meta-metaform and cultural model

As stated previously, meta-metaform is an unconscious layering of existing metaforms,

resulting in a culture-specific understanding of a concept, whereby the culture-specificity increases with the intensity of layering. Here it is possible to compare the formation of meta-metaform with the complex and involuntary processes of layering of synaesthesia types, whereby the individual experiences several different concurrents triggered by the same inducer, for example, such as in cases where the concept of "Monday" triggers the experience of colour, taste and spatial location simultaneously. Here, the culture-specificity of meta-metaform can be likened to person-specificity of ideaesthetic perception, whereby the uniqueness of the experience increases with the number of synaesthesia types that are layered in cognition. The ideaesthetic experience can be analysed and deconstructed mentally (e.g. pointing out the different types of condition that are taking part in the experience), however, as the experience is involuntary, the layering of the different types in experience is an unconscious process, such as in the case of meta-metaform.

The following table offers an example of conceptualization of layering of ideaesthesia types as meta-metaform, and its concrete instantiations.

	Target domain (abstract)	**Source domain (concrete)**
Layering of time unit→ colour ideaesthesia with other types as meta-metaform	[time units]=	[colours]; + e.g. [spatial locations]; [tastes]; [personalities]; [smells]
Ideaesthetic perception as instantiation of meta-metaform: weekdays	Monday Tuesday Wednesday Thursday Friday Saturday Sunday	(is) white, salty and at the level of eyes (is) light brown and kind (is) blue and at the level of the eyes (is) forest green and sweet (is) red and tastes like apple (is) silver grey and grumpy (is) golden and at the reach of the left hand
Ideaesthetic perception as instantiation of meta-metaform: months	January February March April	(is) white, tastes like peach and is benevolent (is) light grey and sour (is) bright green and smells like forest (is) sky blue and larger than May

	May	(is) red and on the top of April
	June	(is) light grey and sad
	July	(is) blue and on the right of June
	August	(is) dark blue, bitter and extensive
	September	(is) golden brown and on the right of August
	October	(is) dark violet and smells like coffee
	November	(is) brown and smells like vanilla
	December	(is) dark brown and tastes like cherry

Table 3. Conceptualization of time unit→ colour ideaesthesia as meta-metaform

As can be seen in the table, there is, theoretically, no limit to the amount of different synaesthesia types that can be linked in perception, and the quantitative and qualitative content of ideaesthetic perception as meta-metaform is highly idiosyncratic and person-specific. In other words, while the number of ideaesthetic target domains (inducers), as they pertain to closed systems, is strictly limited, potentially no such limits apply to the variety of ideaesthetic source domains that are layered and converge in perception.

In turn, cultural models are culture-specific models of certain concepts, showing which source domains are used to deliver the target domain. When applied to describing synaesthesia, cultural model can refer, on the level of type, to all the possible concurrents that are triggered by the same inducer, as conceptualized in the table below:

	Target domain (abstract)	**Source domain (concrete)**
Time unit→ colour ideaesthesia as cultural model	[time units]=	[colours]; [spatial locations]; [tastes]; [personalities]; [smells]; [sound]

Table 4. Conceptualization of time unit→ colour ideaesthesia as cultural model

This results in an overall model of the concept, showing how many different concrete modalities (to which concurrents pertain) are used in encoding the abstract target domain (the inducer).

In similar vein, it can be suggested that a reverse cultural model can be used to consciously and analytically come up with a schema of all target domains that are encoded by the same source domain, or, in the case of synaesthesia, to show how many different inducers trigger the same concurrent. This way, it could be possible to elaborate a scheme assessing what I have previously (in subchapter 3.3.) called "synaesthetic value" of the concurrent, showing, for example, how many different inducers trigger the experience of blue colour. However, such model, while having an interesting schematic value and implications regarding processes of implicit bidirectionality introduced previously in this thesis, would inevitably be reductions and simplifications, since, first of all, one could not possibly indicate *all* inducers that could potentially trigger the same qualia, and, secondly, the highly specific qualities of concurrents allow to suggest that no two inducers can possibly trigger the exact same *shade* of, for example, blue colour.

3.4.3. Meta-symbol

Meta-symbols are symbolic forms that come about from the conceptualization of an abstract concept using source domains that are descriptive of a physical object, and are extracted from specific linkages of metaforms.

This kind of connective modelling reminds of how a synaesthete might describe his or her experience to a non-synaesthete, or how some complex synaesthesias with several concurrents for the same concept (synaesthetic synthesis) might result in a symbolic form. For example, the abstract notion of [hope] might trigger in a synaesthete the concurrents of [blue colour]; [vast surface]; [salty smell], therefore inducing the image of [sea] and resulting in a synaesthetic meta-symbol [hope = sea]. This way, paraphrasing Sebeok's and Danesi's description of meta-symbols, [hope] is associated with source domains that describe a physical sea (Sebeok; Danesi 2000: 150-151).

Evidently, the formation of ideaesthetic meta-symbols is accidental and dependent on the qualitative and quantitative aspects of concrete individual's synaesthesia types. Therefore ideaesthetic meta-symbols are, arguably, extracted from concrete instantiations of layering of ideaesthesia types, which by chance for the conceptualizing the abstract concept use source domains (concurrents) that can be descriptive of a physical object. Emergence of such meta-

symbols is highly person-specific, and even then, on the level of individual perception, not all layerings of ideaesthesia types could result in a symbolic form. A hypothetical case of formation of ideaesthetic meta-symbol in case of time unit→colour synaesthesia is given in the table below:

	Target domain (abstract)	**Source domain (concrete)**
Time unit→ colour ideaesthesia as forming meta-symbol	[time units]=	[colours]; [smells]; [sound]
Instantiation of time unit→colour ideaesthesia as meta-symbol	Wednesday Wednesday	(is) blue, salty, loud → (is) sea

Table 5. Conceptualization of time unit→ colour ideaesthesia as forming meta-symbol

Alternatively, in case of ideaesthetic reasoning processes, it can be suggested that meta-symbol can come about from the affected individual's intentions of describing the "undescribable" qualities of the synaesthetic colour concurrents (for peculiarities of synaesthetically induced colour, see subchapter 1.2.2.). As synaesthetically induced colour differs from perception of real colour, it can have multimodal characteristics, including, for example, texture, volume, shape, and can have tonalities that are not encountered in real colour perception. Thus, description of such colour experiences can prove challenging, and require descriptions or comparisons in terms of "real-life", physical objects, e.g. ¨Friday looks like a burning flame¨, or ¨January is like white fog¨.

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Conclusions

On the level of definition, CM can easily accommodate the ideaesthetic experience, but not vice versa, as both suppose understanding one thing in terms of another.

Structurally, given the abstract or concrete nature, CM's target domain can be likened to ideaesthetic inducer, while source domain can be likened to the ideaesthetic concurrent. Moreover, the mapping direction from concrete onto abstract is shared in both phenomena. In a similar vein, just like the same inducer can have several concurrents in ideaesthesia, several

different source domains can structure the same target domain, and vice versa. Structurally, both phenomena share the systematic, durable, involuntary, unidirectional and noetic character.

Functionally, both ideaesthesia and CM are deeply ingrained modes of thought and systems of meaning that arise largely unconsciously during childhood due to the normal exposure to culture and learning requirements.

Interestingly, some evidence suggest that ideaesthetic concurrent could be deemed a physical *concept*, and not only percept-like experience, as supported by theories of disinhibited embodiment being at the core of ideaesthesia's cognitive-perceptual links. Moreover, the nature of induced colour qualia is not the same as normally perceived colour, as it is not constrained by processing at the retina, and has been shown to be more akin to knowledge about colour. In a similar vein, majority of people with ideaesthesia perceive the concurrent in the mind's eye, and the inducer can be triggered via endogenous representations.

The cognitive functions of CM overlap with those of ideaesthesia to a great extent. In this regard, orientational metaphors give the concepts tangible characteristics, such as spatial orientation and coherence. The same process can be observed in time unit→colour ideaesthesia, whereby the system of concepts is given tangible character and coherence (e.g. "mental calendar"). In turn, ontological metaphors attribute physical properties or personifications to concepts, just like time unit→colour ideaesthesia does. Moreover, structural metaphors exercise the cognitive function of understanding target by means of the structure of the source domain. In a similar vein, the ideaesthetic concurrent and inducer systems can have influence on each other, and, in light of theories about the emergence of ideaesthesia, the concurrents serve exactly the function of delineating concepts that pertain to a certain system (such as weekdays or months). Both ideaesthesia and CM are processes of meaning forming idiosyncratic semantic systems, and highlight the role of interpretation in determining phenomenological experiences.

In turn, ideaesthesia and CM differ in prevalence, idiosyncratic vs shared character, and arbitrariness vs motivation. Moreover, ideaesthetic concurrent is always a percept-like experience, while CM's source domains are conceptual.

Equating ideaesthesia to CM, both have "used" and "unused" parts with a varying scope which depends on the open or closed character of the inducer system.

In terms of MST, time unit→colour ideaesthesia can be seen as a connective form,

linking an abstract concept with a concrete referent, which can be either externalized or mental. This process can be seen as based on abduction. According to the representational principle, time unit→colour ideaesthesia can be seen as a mode of knowing.

Time unit→colour ideaesthesia can be likened to metaform, with its concrete instantiations being comparable to metaphors. However, the aspect of conscious inference in formation of ideaesthetic links can be questioned, since they appear to be rather arbitrary.

The notion of meta-metaform can be used to refer to layering of ideaesthesia types whereby the same inducer has different concurrents. Here, the uniqueness of experience intensifies as the layering increases. Arguably, there is no limit to potential number of concurrents, while the number of inducers in time unit→colour ideaesthesia is clearly delineated. In a similar vein, cultural models can be used to convey all the possible concurrents triggered by a certain inducer.

The notion of meta-symbol can be applied to conveying the ideaesthetic experience as taking a symbolic form due to the layering of ideaesthesia types. Such formations are accidental, person-specific and dependent on the qualitative and quantitative aspects of the condition.

CONCLUSION

Time unit→colour ideaesthesia is an involuntary, automatic, durable, memorable and noetic experience in which the trigger (inducer: concept or meaning of weekdays and months) produces an idiosyncratic, unidirectional additional experience (concurrent: colour), resulting in an integral linkage between an abstract concept and a percept-like colour experience.

In turn, conceptual metaphor is an unconscious cognitive structure that establishes unidirectional, motivated and partial mappings between two conceptual domains of human experience based on correlation in experience or perceived similarity, allowing to structure and understand abstract concepts with the help of more concrete source concepts. Conceptual metaphor is universally or culturally shared.

Conceptual metaphor and time unit→colour ideaesthesia structurally share the following points of convergence:

Both are systematic correspondences between two domains of experience which involve mental activation of concepts and associated activity in other cognitive stream, and suppose understanding and experiencing something abstract in terms, or with the aid of, something concrete.

Both involve two structural elements with a mapping direction from the concrete onto the abstract, allowing to compare the colour concurrent of time unit→colour ideaesthesia with CM's source domain, and the inducer with CM's target domain, both on the level of type and on the level of concrete instantiation.

In both CM and ideaesthesia, the abstract (CM's target domain and ideaesthetic inducer) can be structured with the help of several concrete domains (source domains or concurrents, accordingly). In a similar vein, the same concrete domain can structure several different abstract domains.

In both CM and ideaesthesia, the link, or mapping from concrete onto abstract, which is the general tendency in both phenomena, is systematic (consistent), durable (persistent), involuntary (automatic or unconscious), unidirectional and noetic. Novel mappings are possible in case of creative purposes (in CM) or learning processes and exposure to novel stimuli (in ideaesthesia). Mappings of both ideaesthesia and CM can be layered, resulting in synaesthetic synthesis or meta-metaforms/ meta-symbols, accordingly.

Functionally, CM and ideaesthesia share the character of being deeply ingrained

modes of thought and systems of meaning arising naturally during normal interaction with environment, culture and language acquisition, and share a developmental aspect. Both are, essentially, figures of thought.

It can be argued that ideaesthesia, just like CM, links two concepts since, firstly, the inducer-concurrent links can arise from disinhibited embodiment; secondly, concurrent qualia can be compared to semantic knowledge; and thirdly, in most cases concurrents are experienced internally and can be triggered by endogenous representations of the inducer.

The cognitive functions of **orientational metaphors** overlap with functions of time unit→colour ideaesthesia: both give tangible spatial orientation and coherence to systems of concepts (e.g. mental calendars involving time units). Both CM and time unit→colour ideaesthesia reason about time in terms of space, and involve sense of self, such as in ego-moving and time-moving metaphors (Boroditsky 2000:5). In turn, **ontological metaphors**, just like ideaesthetic links, attribute physical properties or personifications to abstract concepts, facilitating processes of referring, quantifying, identifying and understanding. Lastly, **structural metaphors**, just like several cases of ideaesthesia, use the structure of the source domain (concurrent) to understand and structure the target domain (inducer). In this regard, ideaesthesia serves to discriminate the structure of the inducer system, conceptualize the abstract concepts and helps in obtaining and improving understanding of experience.

Both CM and ideaesthesia are processes of meaning that form semantic systems, and show the role of interpretation of stimuli in determining phenomenal experiences.

If CM's **source domains are equated to ideaesthesia's concurrents, and target domains – to inducers**, both can be said to have "used" and "unused" parts, and the scope of this part in case of ideaesthesia is determined by the closed or open character of the inducer system.

Conceptual metaphor and time unit→colour ideaesthesia **structurally and functionally differ** in prevalence, sharedness and motivation. In this regard, ideaesthesia is a rare phenomenon with person-specific and, to large extent, arbitrary quantitative and qualitative characteristics which can be considered as an idiosyncratic response to culturally-predetermined meaning-attribution requirements. In turn, CM is generally shared and transferred on cultural and linguistic level, constrained by bodily, cultural and linguistic aspects, and based in correlation in experience or perceived similarity. Moreover, ideaesthetic concurrent is always a percept-like experience, while CM's source domains stay conceptual.

Additionally, the *kind* of noetic aspects and productivity of the two phenomena differ: new meanings in case of CM emerge for creative purposes, while new meanings in case of ideaesthesia emerge mainly by reacting to new stimuli and mapping known onto unknown systems, and is restricted by person's quantitative aspects of the condition.

In the framework of MST, time unit→colour ideaesthesia can be seen as a connective form, or linkage of abstract concept (weekday or month) with a concrete referent (colour) based on abduction. This form can be either externalized (in case of projectile ideaesthesia), or internalized (in associative ideaesthesia), and can be deemed as a mode of knowing, according to the representational principle.

In terms of primary connective modelling, time unit→colour ideaesthesia can be seen as a **metaform,** and, in turn, its concrete instantiations can be seen as metaphors, whereby there is a linkage between an abstract target and concrete source domain, and the number of possible instances is pre-defined. However, such ideaesthetic metaphors do not encode connotata and are not based on conscious inference.

In terms of secondary connective modelling, layering of time unit→colour ideaesthesia with other types with the same inducers (synaesthetic synthesis) can be compared to the unconscious processes of **meta-metaform** formation. Here, quantitative and qualitative aspects of ideaesthetic meta-metaforms are highly person-specific. In a similar vein, the notion of **cultural model** here can be applied to convey the variety of all possible concurrents triggered by a specific inducer. A reverse cultural model, arguably, can be used to analyze which and how many different inducers trigger relatively the same concurrent (e.g. different shades of blue).

In terms of tertiary connective modelling, the notion of **meta-symbol** can be applied to convey how synaesthetic synthesis, or, in the case of time unit→colour ideaesthesia, its layering with other types of the condition, can result in a symbolic form. Such formations are incidental and highly person-specific. Similarly, meta-symbol can also result from the intentions of describing often multi-modal and "undescribable" qualities of synaesthetically induced colour, whose description can require a search and comparison with a "real-life" object.

In light of the above, it can be concluded that time unit→colour ideaesthesia and CM share an array of characteristics, whereby the ideaesthetic experience not only shares several important structural and functional characteristics, but also appears to serve similar purposes

as CM. While certain differences between the two phenomena prevail, both provide an insight on how meaning is created and how novel stimuli are encoded, as well as highlight the role of the concrete in conceptualizing and making sense of abstract concepts. This way, ideaesthesia can be likened to a physically perceived CM, whereby the source domain, or the ideaesthetic concurrent, is a percept-like experience. This way, ideaesthesia appears to unveil in perception the same kind of tendencies as abstract concept formation, and, given the conceptual nature of ideaesthetic inducers, serves as an insight into the encoding of meaning of abstract concepts. In this regard, CMT's formal notions, such as those of source and target domains, as well as three levels of connective modelling appear, to an extent, applicable in conveying the structure of ideaesthetic experience, while orientational, structural and ontological metaphors seem to be applicable as sharing the functional characteristics of ideaesthetic experience.

This way, **the role of meaning** in synaesthesia, and especially ideaesthesia, is evidently multifold: not only the sensory synaesthetic experience is triggered by, and determined by the meaning and interpretation of the inducer stimulus, but also the reason of development of this condition in genetically predisposed minority of the population is, arguably, a result of the requirements of meaning-attribution, discrimination and naming processes pertinent to predominantly childhood learning processes and the acquisition of culturally-defined categorizational sequences, such as alphabet, musical pitch or calendar months.

Future research on the topic could include elaboration upon the notion, suggested within this thesis, that ideaesthesia structurally links two concepts (see subchapter 3.1.), just like CM does, with the physical percept-like concurrent experience being a result of a disinhibited embodiment of a physical colour concept. This notion would contravene the traditional notions of synaesthesia as a cross-sensory phenomenon and redefine, within ideaesthesia research, the nature of the ideaesthetic concurrent. This approach would also suggest double conceptual mediation in ideaesthesia, as the externally or internally perceived inducer would trigger the corresponding concept (e.g. semantics of "Sunday"), which would, in turn, trigger the concept to which the additional sensory attribute belongs, and become physically experienced as corresponding colour (e.g. golden brown).

REFERENCES

Anaki, David; Henik, Avishai 2017. Bidirectionality in synesthesia and metaphor. *Poetics Today* 38: 141–16.

Auvray, Malika; Deroy, Ophelia 2015. How do synaesthetes experience the world? In: Mohan Matthen (ed.), *The Oxford Handbook of Philosophy of Perception* DOI: 10.1093/oxfordhb/9780199600472.013.027 Berlin, Boston: De Gruyter Mouton, 63-84.

Barnett, Kylie J.; Newell, Fiona N. 2007. Synaesthesia is associated with enhanced, self-rated visual imagery. *Consciousness and Cognition* 17: 1032–1039.

Boroditsky, Lera 2000. Metaphoric structuring: understanding time through spatial metaphors. *Cognition* 75, 1-28.

Brang, David; Ramachandran, V.S. 2011. Survival of the synaesthesia gene: Why do people hear colors and taste words? *PlOS Biology* 9 (11): 1–6.

Cohen Cadosh, Roi; Henik, Avishai 2007. Can synaesthesia research inform cognitive science? *Trends in Cognitive Sciences* 11 (4): 177–184.

Curwen, Caroline 2018. Music-colour synaesthesia: Concept, context and qualia. *Consciousness and Cognition* 61: 94–106.

Cytowic, Richard 1995. Synesthesia: Phenomenology and neuropsychology. A review of current knowledge. *Psyche* January.

Danesi, Marcel 2013. A note on the notion of metaform and its implications for semiotics. *Signata* 4.

Day, Sean A. 1996. Synaesthesia and synaesthetic metaphors. *PSYCHE*, 2(32), July.

Day, Sean A. 1999. What synaesthesia is (and is not). In: Kevitt, Paul MC; Ó Nualláin, Seán; Mulvihill, Conn (eds.). *Language, Vision and Music*. Amsterdam/Philadelphia: John Benjamins Publishing Company, 171-180.

Day, Sean A. 2005. Synesthesia: demographic aspects of synesthesia. Robertson & Sagiv, eds.; *Synesthesia: Perspectives from Cognitive Neuroscience* Oxford: UP: 11–33.

Deroy, Ophelia; Spence, Charles 2013. Why we are not all synesthetes (not even weakly so). *Psychon Bull Rev* 20: 643–664.

Dixon, Mike J.; Smilek, Daniel; Merikle, Philip M. 2004. Not all synaesthetes are created equal: Projector versus associator synaesthetes. *Cognitive, Affective, & Behavioral Neuroscience* 4 (3): 335–343.

Eco, Umberto 1986. *Semiotics and the philosophy of language.* Bloomington: Indiana University Press.

Glaznieks, Aivars 2011. Why focus on target domains? The importance of domain knowledge in children's understanding of metaphors. In: Handl, Sandra; Schmid, Hans-Jörg (eds.). *Windows to the mind. Metaphor, metonymy, and conceptual blending*.

Grady, Joseph 1997. Foundations of meaning: Primary metaphors and primary scenes. Berkeley: University of California.

Grady, Joseph 2005. Primary metaphors as inputs to conceptual integration. *Journal of Pragmatics* 37, 1595–1614.

Gray, Brian F.; Simner, Julia 2015. Synesthesia and release phenomena in sensory and motor

grounding. Cases of disinhibited embodiment? *Frontiers in Psychology*. January (6), article 54.

Grossenbacher, Peter G.; Lovelace, Christopher T. 2001. Mechanisms of synesthesia: Cognitive and physiological constraints. *Trends in Cognitive Sciences*, 5(1): 36–41.

Hampe, Beate 2005. Image schemas in cognitive linguistics: introduction. In: Hampe, Beate (ed.). *From perception to meaning: Image schemas in cognitive linguistics*. Berlin, New York: Mouton de Gruyter, 1-12.

Hunt, Harry T. 2011.Synesthesias, synesthetic imagination and metaphor in the context of individual cognitive development and social collective consciousness. *Intellectica*, 2011/1 (55): 95–138.

Hupé, Jean-Michel; Dojat, Michel 2015. A critical review of the neuroimaging literature on synesthesia. *Frontiers in Human Neuroscience.* 31 March 2015. doi: 10.3389/fnhum.2015.00103

Jewanski, Jörg; Day, Sean A.; Ward, Jamie 2009. A colorful albino: The first documented case of synaesthesia, by Georg Tobias Ludwig Sachs in 1812. *Journal of the History of the Neurosciences* 18: 293–303.

Jürgens, Uta. Maria, Nikolić, Danko 2012. Synaesthesia as an ideasthesia – cognitive implications. In Söffing, C; Sinha J. R. (eds.). Synesthesia and Children - Learning and Creativity. Kassel: Kassel University Press, 1-18.

Knowles, Murray; Moon, Rosamund 2006. *Introducing metaphor*. London: Routledge.

Kövecses, Zoltán 2010. *Metaphor: A practical introduction*. Oxford University Press.

Kövecses, Zoltán 2011. Methodological issues in conceptual metaphor theory. In: Handl, Sandra; Schmid, Hans-Jörg (eds.). *Windows to the mind. Metaphor, metonymy, and*

conceptual blending. Berlin, Boston: De Gruyter Mouton, 23-40.

Kövecses, Zoltán 2014. Context-induced variation in metaphor. *Argumentum* 10, 392-402.

Kövecses, Zoltán 2017. Conceptual metaphor theory. In: Semino, Elena; Demjén, Zsófia (eds.) *Routledge Handbook of Metaphor*. London& New York: Routledge.

Lakoff, George 1990 [1987]. *Women, fire and dangerous things. What categories reveal about the mind.* Chicago and London: The University of Chicago Press.

Lakoff, George 2009 [2008]. The neural theory of metaphor. In: Gibbs, Raymond (ed.). *The metaphor handbook*, Cambridge University Press.

Lakoff, George; Johnson, Mark 2003 [1980]. *Metaphors we live by.* London: The university of Chicago press.

Letalleur-Sommer, Séverine 2015. More than a condition*:* An examination of synaesthesia as a key cognitive factor in the processing of reality and in its literary and pictorial renditions. *Interfaces* 36: 29–55.

Ludwig, Vera U; Adachi Ikuma; Matsuzawa, Tetsuro 2011. Visuoauditory mappings between high luminance and high pitch are shared by chimpanzees (Pantroglodytes) and humans. *Proceedings of the National Academy of Sciences of the United States of America* 108 (51): 20661-20665.

Marks, Lawrence E. 2011. Synesthesia, then and now. *Intelectica* 55: 47–80.

Martino, Gail; Marks, Lawrence E. 2001. Synesthesia: strong and weak. *Current Directions in Psychological Science* 10: 61–65.

Mischler, James J., III 2013. *Metaphor across time and conceptual space*. *The interplay of*

embodiment and cultural models. Amsterdam / Philadelphia, John Benjamins Publishing Company.

Mroczko-Wąsowicz, Aleksandra; Nikolić, Danko 2014. Semantic mechanisms may be responsible for developing synesthesia. *Frontiers in Human Neuroscience* August (8), Article 509.

Nikolić, Danko 2009. Is synaesthesia actually ideaesthesia? An inquiry into the nature of the phenomenon. Proceedings of the Third International Congress on Synaesthesia, Science & Art, Granada, Spain, April 26–29.

Pierce, April Elisabeth; Garrison, Seth Taylor 2011. The metaphorical horizon: Between facts and fiction. *The International Journal of Interdisciplinary Social Sciences* 5 (9), 95-106.

Ramachandran, Vilayanur S.; Hubbard, Edward M. 2001b. Psychophysical investigations into the neural basis of synaesthesia. *Proceedings of the Royal Society B: Biological Sciences*, 268 (1470): 979–983.

Ramachandran, Vilayanur S.; Edward M.. 2003. The phenomenology of synaesthesia. *Journal of Consciousness Studies* 10 (8): 49–57.

Ramachandran, Vilayanur S.; Hubbard, Edward M. 2001a. Synaesthesia: A window into perception, thought and language. *Journal of Consciousness Studies* 8 (12): 3–34.

Ravignania, Andrea; Sonnweberb, Ruth 2017. Chimpanzees process structural isomorphisms across sensory modalities. *Cognition* Vol. 161: 74-79.

Rogowska, Aleksandra 2011. Categorization of synaesthesia. *Review of General Psychology.* Vol. 15, No. 3, 213–227.

Rothen, Nicolas; Meier, Beat; Ward, Jamie. Enhanced memory ability: Insights from synaesthesia. *Neuroscience and Biobehavioral Reviews* 36: 1952–1963.

Rouw, Romke; Schölte, H. Steven; Colizoli, Olympia 2011. Brain areas involved in synaesthesia: A review. *Journal of Neuropsychology* 5: 214–242.

Sebeok, Thomas A.; Danesi, Marcel 2000. The Forms of Meaning. Modeling Systems Theory and Semiotic Analysis. Mouton de Gruyter.

Shen, Yeshayahu; Aisenman, Ravid 2008. "Heard melodies are sweet, but those unheard are sweeter": synaesthetic metaphors and cognition. *Language and Literature,* Vol 17 (2) 107–121.

Sidoroff-Dorso, Anton V. Lev Vygotksy and Solomon Shereshevsky. Synaesthesia and sociocultural influence: history and perspectives in consciousness study. 2018. In: *Actas del VI congreso internacional de sinestesia, ciencia y arte + actividades paralelas.*

Simner, Julia; Mulvenna, Catherine; Sagiv, Noam; Tsakanikos, Elias; Witherby, Sarah A.; Fraser, Christine; Scott, Kirsten; Ward, Jamie 2006. Synaesthesia: The prevalence of atypical cross-modal experiences. *Perception* 35: 1024–1033.

Van Campen, Cretier 2009. The hidden sense: On becoming aware of synesthesia. *Revista Digital de Tecnologias Cognitivas* 1: 1–13.

Van Leeuwen, Tessa M; Singer, Wolf; Nikolic, Danko 2015. The merit of synesthesia for consciousness research. *Frontiers in Psychology* December (6), article 1850.

Slepian, Michael L.; Ambady, Nalini 2014. Simulating sensorimotor metaphors: Novel metaphors influence sensory judgments. Cognition 130, 309–314.

Smilek, Daniel; Callejas, Alicia; Dixon, Mike J.; Merikle, Philip M. 2007. Ovals of time: Time-space associations in synaesthesia. *Consciousness and Cognition* 16, 507-519.

Ward, Jamie 2019. Synaesthesia: a distinct entity that is an emergent feature of adaptive neurocognitive differences. Philosophical Transactions of the Royal Society 374 (1787). Retrieved from http://doi.org/10.1098/rstb.2018.0351

Ward, Jamie; Thompson-Lake, Daisy; Ely, Roxanne; Kaminski, Flora 2008. Synaesthesia, creativity and art: What is the link? *British Journal of Psychology* 99 (1): 127–141.

Watson, Marcus R.; Akins, Kathleen A.; Spiker, Chris; Crawford, Lyle; Enns, James T. 2014. Synesthesia and learning: a critical review and novel theory. *Frontiers in Human Neuroscience.* February (8), article 98.

Wheeler, Raymond Holder.; Cutsforth, Thomas D. 1922. The synaesthesia of a blind subject with comparative data from an asynaesthetic blind subject. *University of Oregon Publications,* 1 (10): 1–104.

Zheng, Meihua 2017. *A conceptual metaphor account of word composition. Potentiality of "light" in English and Chinese.* Cambridge Scholars Publishing.

KOKKUVÕTE

Käesolev magistritöö üritab kehtestada ajaühiku→värvi-ideesteesia ja kontseptuaalse metafoori (KM) strukturaalseid ja funktsionaalseid konvergentse ja divergentse. Lisaks püüab töö selgitada, mil määral kontseptuaalse metafoori teooria (KMT) arusaamu *allikast* ja *sihtdomeenist*, *suuna-*, *olemis-* ja *strukturaalsest metafoorist* ja modelleerimissüsteemiteooria (MST) kolme konnektiivse modelleerimise (*metavormid*, *meta-metavormid* ja *meta-sümbolid)* tasandeid saab rakendada sünesteetilise kogemuse analüüsimiseks, kontseptualiseerimiseks ja edasiandmiseks, ja mil määral need arusaamad aitavad kaasa sünesteesia uurimisele. Peamine uurimisküsimus üritab avada ilmselge sarnasuse implikatsioone KM-i struktureerimise ja sünesteetilise kogemuse vahel seoses KMT formaalsete mudelite rakendatavusega sünesteetiliste kogemuste analüüsimisel, kontseptualiseerimisel ja edasiandmisel.

Kontseptuaalne metafoor ja ajaühik→värvi-sünesteesia jagavad strukturaalset ja funktsionaalset süsteemsust, kaardistamise suunda, üheainsa sihtdomeeni mitme algdomeeni võimalikkust ja sama indutseerija mitmeid samaaegseid esinemisi, ning ka vastupidi. Veelgi enam: ideesteesia ja KM on kestvad, tahtmatud, ühesuunalised ja noeetilised kogemused, mis on oma põhiolemuselt mõtteviisid, mis tekivad indiviidi tavapärasel suhtlusel ümbritseva kultuuri ja keskkonnaga.

Võib väita, et ideesteesia nagu KM-gi ühendab kaht põhimõtet, sest: esiteks, indutseerija ja kaasnevate ilmingute seosed võivad tekkida pidurdamatute sisenduste tõttu; teiseks, samaaegselt esinevaid kvaale saab võrrelda semantilise teadmisega; kolmandaks, enamikel juhtudel kogetakse kaasnevaid ilminguid sisemiselt ja need võivad esile tuua indutseerija endogeensed representatsioonid.

Ajaühiku→värvi-ideesteesia kognitiivsed funktsioonid kattuvad osaliselt KM-i funktsioonidega: need annavad kontseptidele käegakatsutava ruumilise paigutuse (nagu suunametafoorid), need võimaldavad abstraktsetele kontseptidele füüsilisi omadusi (nagu olemismetafoorid) ja struktureerivad indutseerijaid kaasnevate ilmingute abiga (nagu strukturaalsed metafoorid). Sellest tulenevalt saab KM-i algdomeene pidada sarnaseks ideesteetilistele ilmingutele ja sihtdomeene sarnaseks indutseerijatele.

Mõned strukturaalsed ja funktsionaalsed erinevused ideesteesia ja KM-i vahel on nende esinemine, jagatavus ja motivatsioon.

MST seisukohalt võib ajaühiku→värvi-ideesteesiat näha kui konnektiivset

eksternaliseeritud või internaliseeritud vormi ja teadmise laadi. Esmane seostav modelleerimine lubab näha ajaühiku→värvi-sünesteesiat kui metavormi ja selle rakendumisi kui metafoore. Sekundaarset konnektiivset modellerimist saab kasutada selleks, et kontseptualiseerida sünesteetilist sünteesi meta-metavormina ja kasutada kultuurimudeli tõekspidamisi, et näidata indutseerija võimalike ilmingute mitmekesisust. Tertsiaarne konnektiivne modelleerimine võimaldab vaadelda sünesteetilist sünteesi nii, et ilmingute ulatus annab kogemata ja idiosünkraatiliselt tulemuseks sümboolse vormi.

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