ARCADA

Visual Communication and Digital Media

Exploring the Science behind Visual Communication
in Digital Age

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This thesis research intends to explain the effects of visual communication and visual media on individuals, both on conscious and subconscious levels. We live in a highly visual world surrounded and triggered by visual signs, images and movement every single moment. It is claimed that visual media has become central to living a contemporary life. Due to technological development visual communication products are used more than ever in today's consumption society. At the same time, individuals are especially selective in terms of objects of their attention. Moreover, as a result of evolutionary development of our perceptional system, we continue to learn from mediated experience and from actual experience alike. Qualitative research method such as literature review and interviews were applied for gathering data for this thesis. This study confirms that digital media and technology have a tremendous influence on our life affecting the way we live, work and interact with each other. The role of visual communication in today's digitized world is significant to the extent that we have become dependent on digital technology. Nonetheless, criticism towards media, news outlets, businesses and advertising has grown due to overload of information. Positively, according to this study, this has led to increase visual literacy and critical thinking.

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Tämän opinnäytetyön tarkoituksena on selittää visuaalisen viestinnän ja visuaalisen median vaikutuksia yksilöihin sekä tietoisella että alitajuisella tasolla. Maailma, jossa elämme tällä hetkellä on hyvin visuaalinen, ja meitä jatkuvasti ympäröivät ja triggeröivät erilaiset visuaaliset merkit, kuvat ja liike. On väitetty, että visuaalisesta mediasta on tullut keskeinen osa nykyajan elämää. Teknologisen kehityksen ansiosta visuaalisen viestinnän tuotteita käytetään nykypäivän kulutusyhteiskunnassa enemmän kuin koskaan. Samalla yksilöt ovat erityisen valikoivia huomionsa kohteiden suhteen. Lisäksi havaintojärjestelmämme evolutionaarisen kehityksen seurauksena jatkamme oppimista median kautta välitetyistä kokemuksista ja todellisista kokemuksista samalla tavalla. Tämän opinnäytetyön aineiston keräämiseen käytettiin kvalitatiivista tutkimusmenetelmää, kuten kirjallisuuskatsausta ja haastatteluja. Tämä tutkimus vahvistaa, että digitaalisella medialla ja teknologialla on valtava vaikutus elämäämme, mikä vaikuttaa tapaamme elää, työskennellä ja olla vuorovaikutuksessa toistensa kanssa. Visuaalisen viestinnän rooli nykypäivän digitalisoituneessa maailmassa on merkittävä siinä mielessä, että olemme tulleet riippuvaisiksi digitaalisesta teknologiasta. Siitä huolimatta kritiikki mediaa, uutistoimistoja, yrityksiä ja mainontaa kohtaan on lisääntynyt tiedon ylikuormituksen vuoksi. Kuitenkin positiivisesti tämän tutkimuksen mukaan tämä on johtanut visuaalisen lukutaidon ja kriittisen ajattelun lisääntymiseen.

Avainsanat:	Visuaalinen viestintä, visuaalinen media, digitaalinen media, havaitseminen, liikegrafiikka, visuaalinen lukutaito, visuaalinen etiikka
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1 INTRODUCTION

"There can be no words without images."
- Aristotle

We live in a highly visual world surrounded and triggered by visual signs, images and movement every single moment. We live within networks of messages, signs, information, and knowledge which produce our experience of ourselves, society, and all that we consider real (Plant in Noble & Bestley 2005). The visual media around us is created with typography, photographs, videos, illustrations, infographics and other graphical elements. Visual communication can be considered also in terms of clothes, architecture, classrooms; even a haircut can communicate some sort of message.

Verbal language is limited to alphabet and vocabulary, but there is no universally acceptable language of visual description (Günay 2021; Lester 2006; Avgerinou & Pettersson 2020). And what is an alphabet or the language we read? Essentially, it is just line drawings, for example, for a child, who doesn't know how to read yet. Turns out our written language is just as visual as it is verbal. Let's take as an example, Chinese or Japanese hieroglyphs, to most Latin alphabet readers these hieroglyphs are just beautiful lines and symbols, which have some sort of meaning. Imagery is expansive by nature, but verbal language is systematically constraining meaning through syntactic rules and definitions (Barry 2020).

Visuals are processed 60,000 times faster than text (Gillett 2014). In today's digital world, social media's visual content is 40 times more likely to get shared, and articles that feature an image every 75-100 words receive double the social media shares than those with text alone (PwC 2018), while tweets with images are 94% more likely to be retweeted than tweets without (Gillet 2014).

It has been noted that visual communication products are significantly influenced by the development of technology, dissemination of means of communication and rapid advancement of consumption society (Günay 2021; Herman; 2016; Valade-Amland *et al.* 2022). Vision, ultimately, is a dynamic process in which the brain, largely automatically, filters, discards, and selects information, and compares it to an individual's stored record

(Stafford 2009). Visual messages are processed mostly by unconscious regions of the brain that do not understand that everything visual is not necessarily real, thus, visual power of these messages has enormous impact, intended or not. As a result, our attitudes, ideas, and actions are all constructed by templates formed through vision (Barry 2020).

1.1 The Purpose, Objective and Methodology of the Study

This thesis is focusing on two main topics: visual communication and digital media (including visual media). The purpose of visual communication is to inform, educate, guide, entertain and even warn. Today, we are exposed to visual communication practically everywhere and the main sources are visual and digital media.

In order to understand visual communication and how it works, one needs primarily understand how a human brain works, i.e. understand our perception. I believe that there is more to design and visual communication than just "good design". What's more, not every communication is always a good communication. Thus, this thesis research intends to explain the effects of visual communication and visual media on individuals.

In order to do so, this research aims to answer the following research questions:

1. What is the role of visual communication in today's digital media?
2. How does visual media impact our everyday life?
3. How does motion graphics add value to digital media?

Qualitative research methods were applied in this thesis. The research method for collecting data for this thesis was made with literature review and interviews. Qualitative research relies on observations to understand concepts, opinions, or experiences. Qualitative research is valuable because it can be used to gather in-depth insights into a problem or generate new ideas for research. A profound description of the research method used in this study is explained in Chapter 4.

This thesis involves some limitations. The topic of visual communication is very extensive. In fact, same goes for visual and digital media. This study also covers a number

of related topics, such as visual literacy, visual ethics, aesthetics, and critical media studies. This thesis is based on general theories and practices of visual communication and media and approaches the subject from a user's perspective. The intention of this thesis is to provide an outlook also into some scientific background of visual communication and media. Therefore, the nature of this study leaves a lot of opportunities for further research (see Conclusions).

1.2 Structure of the Study

This thesis is structured in six main chapters. The first chapter is Introduction, which presents the relevance of this thesis, defines the purpose, objectives, research questions and limitations of the study. Second chapter familiarizes the reader with the first key topic and builds up a theoretical framework that discusses fundamental aspects of visual communication, such as neurological perspective to visual communication, perception, visual aesthetics, memory and visual literacy. The third chapter discusses the significant concepts of digital media, motion graphics and points out the challenges of digital media and visual media. The third chapter also reviews visual ethics in relation to visual communication and media. Chapter 4 briefly introduces research methodology used in this thesis work. Chapter 5 includes discussion and analysis on the research results. The last chapter highlights the important key messages and findings and concludes the thesis.

2   VISUAL COMMUNICATION

The world is increasingly dominated by visual communication. Visual communication is the use of visual elements to convey ideas and information which include but are not limited to, signs, typography, drawing, graphic design, illustration, industrial design, advertising, animation, and electronic resources (Wikipedia 2021).

Visual communication evolved long before verbal language (Günay 2021; Edwards 2012; Herman 2016; Barry 2020; PwC 2017). In prehistoric times, wild animal paintings and hunting scenes were drawn in caves when there was no literacy at all. These are the earliest examples and expressions of visual communication, and their primary purpose was to communicate and to inform. Until today these pictures transmit their messages and can be understood.
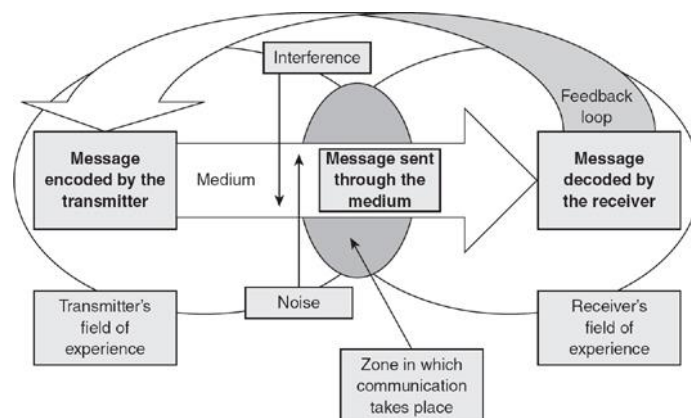
Figure 1. The Schramm Model of Communication. (Blythe 2009).

Before going into more details in visual communication, let's review meaning of communication in general. Communication is defined by Schramm as "a process that takes place between a sender (transmitter) and a receiver: there will be also a message, and a medium through which the message can be transmitted" (Schramm, 1948 in Blythe 2009) (Figure 1). Later to an updated communication model the fields of experience of the sender and the receiver were included. Encoding the message involves translating the original idea into symbols that are suitable for transmission. The symbols can be verbal (words either spoken or written) and in other cases the symbols can be visual (pictures, logos etc.) while in some cases sounds (music, Morse code, animal sounds) that are not

themselves words might be used to convey meaning. To avoid misunderstandings or misinterpretations by the receiver, feedback loop can be used so that the receiver repeats the message back to the transmitter, is a way of ensuring that the message has been correctly understood. (Blythe 2009)

Schramm Model of communication can be also applied to visual communication; however the main difference is that in visual communication the message is displayed to the receiver because the encoder is not present, and feedback loop (at least instant) is not offered. This, however, is not an obstacle because, there are several significant advantages to visual communication. First, we can learn and memorize faster if the content has been using images. While words generate only one verbal code, 'picture stimuli' embeds into memory twice, as both verbal code and as an image (PwC 2018). Second, when data is presented visually, it is easier to interpret. Third, visual information processing requires almost no literacy, and it develops at birth. The ability to recognize and understand information that is conveyed in the form of visual images is called visual literacy. Visual literacy can be considered as the foundation of learning as it allows the individual learners to effectively interpret the art and/or visual media whenever they come in contact with them. (Bawazir 2019)

Strong visuals can connect with an audience faster, and with more emotion, than words alone (PwC 2017). As Burnett (Broadbent 1984, cited in Barry 2020) once said: "The most powerful advertising ideas are non-verbal and take the form of statements with visual qualities made by archetypes. Their true meanings lie too deep for words". When what we read, what we hear, and what we see reach the level of ideas, they all appear in the different format of neural imagery (Barry 2020).

Moreover, images have clear advantages for certain kinds of information, and a combination of images and words give the best results. However, it is argued that text is better than graphics for conveying abstract concepts (Najjar, 1998, cited in Ware 2012), while procedural information is best provided using text or spoken language, or sometimes text integrated with images (Chandler & Sweller, 1991, cited in Ware 2012). Studies have shown that images and words in combination are often more effective than

either in isolation (Wadill & McDaniel, 1992; Faraday & Sutcliffe, 1997 cited in Ware 2012).
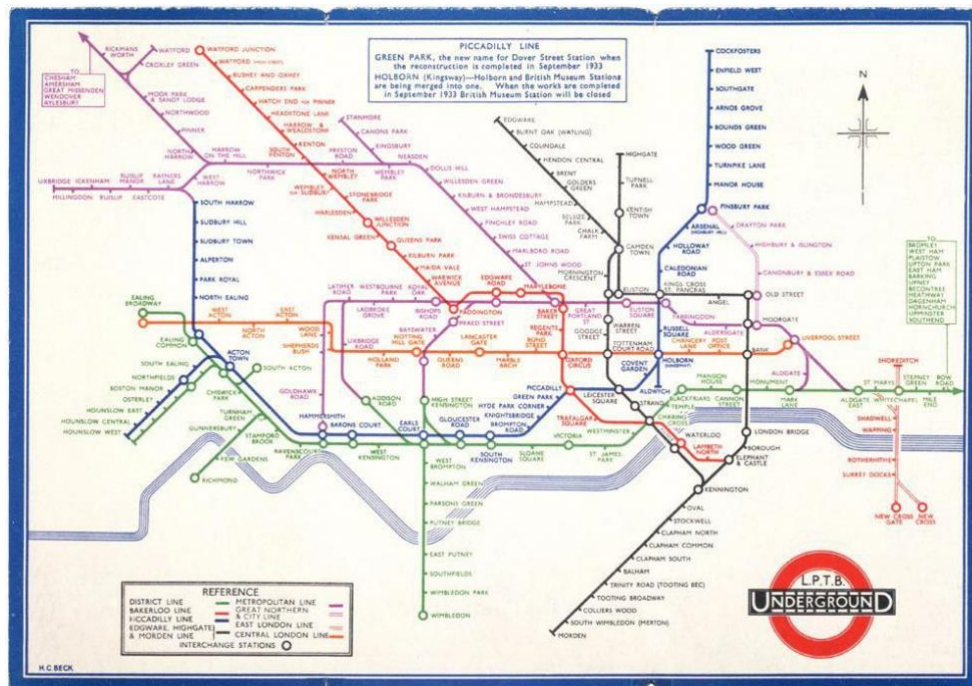
Figure 2. London underground map by Henry Beck, 1932. (London Transport 2022)

Visual communication creates the same feeling and emotion without it being necessary to speak a certain language among all the people (Günay 2021). One of the best examples of visual communication is the London Metro map. It was designed in 1932 by Henry Beck, who both created a universal visual expression and managed to look into the future from the eyes of the user from the time he lived. Rather than drawing geographically accurate distances, like maps usually, Beck based his creation on the circuit diagrams he drew for his day job; stripping the sprawling Tube network down to a neat diagram of colored, crisscrossing lines (Figure 2). Until this day, the London Metro Map stands as global standard for many transportation networks we use today. (Günay 2021; London Transport 2022)

2.1 Neuropsychological Aspects

We are born with the inherent ability to see, and in fact, our body does it involuntarily, if only our eyes are open (Herman 2016). But there is much more to it. The key to understanding all visual communication lies in the neurological perspective of workings

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of the brain. It's a lot more than just seeing. Ware (2012) states that "human visual system is a pattern seeker of enormous power and subtlety. The eye and the visual cortex of the brain form a massively parallel processor that provides the highest bandwidth channel into human cognitive centers". Thus, an understanding of perceptual process is essential to realizing the power of visual images to move us emotionally and to prepare and influence our conscious thoughts (Barry 2002).

This section begins with perception theory, which is metatheory that defined by Barry (2020) "encompasses that all visual communication theory must be consistent with neuroscientific principals of perception". Perception includes discussion about structure of the brain, holistic perception or, commonly known, *Gestalt*, mirror neurons and perceptual filters. Next, we move on to memory, which is important to visual perception because we use our past experience to understand the present. After perception, visual aesthetics and visual literacy is discussed.

2.1.1 Perception

"All our knowledge has its origins in our perceptions"
- Leonardo da Vinci

93% of all communication is nonverbal as a study conducted by the Armenian psychologist Mahrabian claims, but few negate the statement (Lapakko 2007; PGi.com 2020). It is known that most of the information we receive comes from our eyes, our sight. However, the important thing to notice is that we see with our brain, and not our eyes, because the eyes are just a direct extension of the brain into the environment (Herman 2016; Barry 2002; Barry 2020).

In the 21st century we have become more, not less, dependent upon visual media for information, education, entertainment, and socialization. Therefore, an understanding of the brain's perceptual process is essential if we are to make intelligent decisions about the visual media which have come to dominate our lives. (Barry 2002, 104)

Perception is the process of organizing and interpreting sensory information, enabling us to recognize meaningful objects and events. Perception theory can be defined as the application of cognitive neuroscience principles to understanding visual communication: how the brain derives meaning from what it sees, the impact that visual images have on us personally and as a culture, and how visual images can be manipulated to achieve desired outcomes. (Barry 2020)

Perception is how we interpret the information we gather during observation. (Herman 2016). Unconscious emotional memories of all kinds are stored in the amygdala where they become maps for interpreting reality. Pattern formation and repetition are the way in which the brain forms attitudes and ideas neurologically, and these repeated patterns create the templates that we use to map reality and anticipate the future. (Barry 2020)

Our brain is an open system, that is genetically based yet responsive to environment and experience. A large part of our cerebral cortex is devoted to seeing, and we as humans have substantial visual skills. Seeing begins when light falls on the eyes, initiating the process of transduction (Figure 3). Once this visual information reaches the visual cortex, it is processed by a variety of neurons that detect colors, shapes, and motion, and that create meaningful perceptions out of the incoming stimuli. (Walinga)
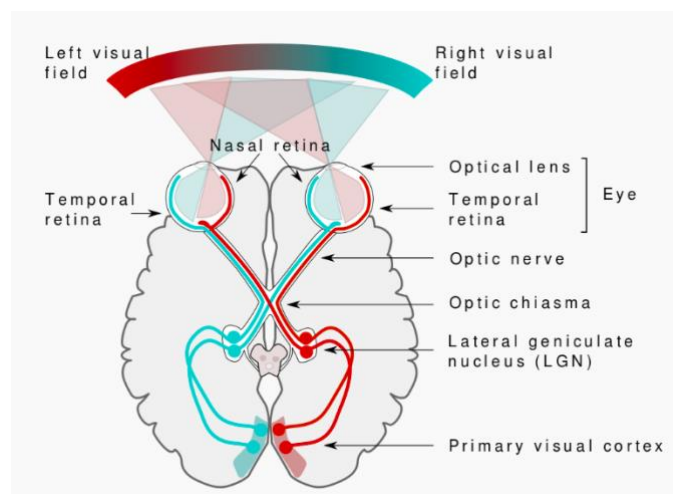
Figure 3. A simplified schema of the human visual pathway. (Source: visualliteracytoday.com)

There can be distinguished three stages in perception of visuals. First, there is mere perception of material qualities like colors, sounds, gestures, and many more complex and undefined physical reactions. Second, the arrangement of such perceptions into pleasing shapes and patterns, and the third stage of perception is made to correspond with previously existing emotions and feelings, it is given as an expression. (Bah 2002, cited in Read 1951) A designer's or artist's core purpose is to awaken emotions, stimulate intellectual activities and trigger certain kinds of action (Bah 2002, 24).

The process of visual perception involves several basic parts, including the sensing of information; the use of past experience (both real and genetically acquired); and the processing of information along dual pathways. The process of perception, particularly the sense of the present moment unfolding before us, begins not in the "now" but in the past, in the crude emotional response which prepares conscious seeing (Barry 2002, 93-94). A perceptual approach to visual communication employs an understanding of the mechanisms underlying the process of vision and understanding and asks how these processes consciously and unconsciously impose themselves on the formation of attitudes and ideas. (Barry 2002, 95)

2.1.1.1 Split Brain

"The intuitive mind is a sacred gift, and the rational mind is a faithful servant. We have created society that honors the servant and has forgotten the gift."
-Albert Einstein

In order to understand better how our perception works, we need to understand the brain's basic hemispheric structure. Human brain has two brain hemispheres – right and left. Each half look identical, but they perform different functions. Each hemisphere also directs the movements of the opposite side of the body, and coordination between the two hemispheres is made possible through the bridge of the corpus callosum, which connects them. (Barry 2002; Barry 2020; Edwards 2012; McGilchrist 2019)

Naturally, we use both sides of the brain mixing and matching each of the side's traits. However, two hemispheres are quite different from each other, and one is sometimes

more dominant than the other. This is how McGilchrist (cited in Barry 2020) describes the two hemispheres:

> "The left hemisphere has a map of the world; and the right hemisphere sees the terrain that is mapped. So, [in the right hemisphere] one is seeing an immensely complex, very hard-to-summarize, nonlinear, deeply embedded, changing, flowing, never-constant, ramifying world. And in the other [the left hemisphere], things are clear, sharp, distinct, dead, decontextualized, abstract, disembodied. In simple terms, the left brain is very good at detailed work, at categorizing and ordering and at understanding mechanisms, of taking things out of context. Importantly, it sees itself as being detached from the world it observes, separated from it, so that it can manipulate it. The right brain, on the other hand, sees itself as being connected with the world around it; it understands things in their totality, sees them in their context, and grasps the meanings of metaphors and paradoxes.--"

What this means is that our two brain hemispheres interact differently with external environment. Simply put, our left-hemisphere is logical and rational, detail-oriented and highly verbal, and our right-hemisphere is creative and intuitive, oriented on the big picture and is highly visual (Figure 4). What is interesting to note, that right hemisphere is a risktaker while the left brain tends to stay on the safe grounds. This can refer to the right brain's ability to question and engage in learning without knowing the correct answer. This pattern can be observed in our society, government system, business and management and it explains, for instance, the disciplines such as risk management, and other management fields, because the left hemisphere seeks order creating rules and strategies. McGilchrist (2019) claims in his book *Master and His Emissary* that "the left hemisphere is competitive, and its concern, its prime motivation, is *power*".

Figure 4. The function of left and right hemispheres. McGilchrist 2019.

Visual design elements purposely target the pattern-seeking right brain, and consistently literally draw the eye away from the words. In other words, visual images have right-brain appeal, while verbal arguments are grabbed by the left brain for isolated processing (Barry 2020). Subsequently, visual images are usually stored in both the left and right sides of the brain, whereas verbal messages tend be stored in only the left side of the brain (Clow & Baack 2012). The right hemisphere sees the whole, before whatever it is gets broken up into parts in our attempt to understand it. The right hemisphere, with its greater integrative power, is constantly searching for patterns in things. (McGilchrist 2019)

Knowing how to activate the right hemisphere of our brain can be valuable for our perception and other skills. In her book *Drawing on the Right Side of the Brain* Edwards (2012) teaches how to access the right side of the brain using five basic perceptual skills (edges, spaces, relationships, lights and shadows, Gestalt) that can assist in understanding better our perception of the surrounded world, while the same knowledge can be applied to verbal, analytical as well as creative problem solving.

2.1.1.2 The Mirror Neuron System

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Every bit of information, whether we sense it or not, is passed along our neural pathways, pathways that can be strengthened or rewired (Herman 2016). The Mirror Neuron System (MSN) consists of mirror neurons that are cellular level mechanisms that allow us both to emphasize with others and imitate what we see as our understanding of cultural adaptation. Through mirror neurons we absorb culture and customs unconsciously without being taught it. In other words, we are becoming what we see. We have a fundamental inborn tendency for imitation of what we see that is very crucial to acknowledge (Barry 2020; McGilchrist 2019).

Mirror neurons are vital to our survival and our social and cultural development. At the very core of the concept of culture lies the necessity of registering what others are doing and subsequently imitating it without quite understanding why. In addition, the nature of community formation lies in unconscious mirroring of others and in our tendency to pull together as a group in order to survive. (Barry 2020)

Mirror neurons form connections, communities and cultures, while super mirrors take us to the next level - empathy. The "I" is always seeking to become "we," not to lose identity but to gain power through replication, but also because being a part of the group we feel secure and powerful. This phenomena of "super mirrors" can be traced back to the 19th century's psychology, when it was referred as "group theory" or "group psychology". (Barry 2020)

Barry (2020) explains working of the mirror neurons as following:

> "As we meld into one community after another, we enjoy the feeling of safety and comfort from being a part of something larger than ourselves. To fit in, we unconsciously absorb the characteristics of the community, and through the repetition of consistent exposure, we come to feel that, whatever the existing norm is, it is not only right but also natural. It feels correct: as if this is the way the world does work and should work. Opposing thoughts and values often appear threatening and wrong, and we cling to community values for safety, comfort, and stability."

However, even such a remarkable neurological feature of a human being can have a dramatic reverse effect.

> "Our notion of free will is fundamental to our worldview, yet the more we learn about mirror neurons, the more we realize that we are not rational, free-acting agents in the world. Mirror neurons in our brains produce automatic imitative influences of which we are often unaware and that limit our autonomy by means of powerful social influences. We humans are social animals, yet our sociality makes us social agents with limited autonomy." (Iacaboni 2008, p.209, cited in Barry 2020)

Another reversed aspect of super mirrors is that they function by "inhibition".

> "Although we do tend to automatically identify with others on a personal level, if a clear differentiation is introduced into the process, it can cause us to not feel akin to them, to see them more as objects than as people like ourselves. By recognizing dissimilarity, mirror neurons stop empathy, shutting out other beings who are different from us. -- If people can become cognitively and emotionally convinced that other people are less than human because they have a difference which the group considers important, then negative emotions such as intolerance, disdain, and even hatred can be aroused." (Barry 2020).

McGilchrist (2019, 250-251) wrote that also mental representation, lacking direct visual or other stimulus – in other words, imagining – engages the same neurones that are involved in direct perception. Imagination is not just a neutral projection of images on a screen (or mind), that's why we need to be careful of our imagination, since what we imagine is in a sense what we are and who we become. Imitation is extremely infectious: thinking about something, or even just hearing (or seeing) words connected with it, can alter the way we behave. (McGilchrist 2019)

As we have discussed earlier the difference between right and left brain hemispheres, there is seemingly a connection between mirror neurons and imitation and the right brain hemisphere. According to McGilchrist (2019, 248-249), there is significantly increased right-sided activity in the limbic system specifically during imitation, compared with mere observation, of emotional facial expressions. The process of mimesis is one of intention, aspiration, attraction and empathy, drawing heavily on the right hemisphere, whereas copying is the following of disembodied procedures and algorithms, and is left-hemisphere-based.

The brain is constantly searching for meaning, patterns and repetition. Unconscious emotional processing seems to be the foundation for all the brain's workings. However, these unconscious regions of the brain that do the processing cannot tell whether it is real or not, so their visual power has enormous impact, intended or not. Our attitudes, ideas, and actions are all arranged by templates formed through vision. Particularly in relation with visual media. (Barry 2020)

2.1.1.3 Perceptual filters

As humans we are all different and unique. We experience the world differently, and therefore, our perceptive filter is shaped by our own exclusive experiences. Perception is also shaped by a person's values, upbringing, and culture. In practice, this means that we have opinions that are different from other people and things we like that other might not like. Herman (2016) highlights that we are subjective beings, and our subjectivity can color the "truth" of what we see.

In general, these very common perceptual filters go by many different names, such as cognitive bias, confirmation bias, myside bias, wishful seeing, and tunnel vision. Confirmation bias is especially dominant with data that give us a sense of self-verification or self-enhancement. These perceptual filters can color or cloud what we see, and we know that others have their own filters, but what we want to cull are facts. By bringing perceptual filters into our consciousness, we can avoid subconscious pitfalls, and that can only happen when we pay attention to them. (Herman 2016)

In addition to perceptual filters, our brains are built to automatically fill in gaps for us. In the course of our everyday lives we routinely perceive only what is critical to our current situation, and we do it so expeditiously that we hardly notice the process of instant organization of data, even with what we now know is incomplete information. That we cna stlil reda wrods wtih jumbeld lettres and whn vwls r mssng without missing a beat proves this. (Herman 2016)

Next, we will look into more perceptional filters, namely visual holistic perception, and how our brain functions to perceive patterns.

2.1.1.4 Gestalt principles

"If I can't picture it, I can't understand it,"
-Albert Einstein

Gestalt is a German word which stands for "shape", "form". Principles of Gestalt help to understand pattern perception, which is important for human mind to interpret

information quickly and efficiently. Moreover, Gestalt communicates the idea that the whole is more important to our understanding than details. McGilchrist (2019, 46-47) calls Gestalt also holistic perception, because this visual processing is happening in the right hemisphere of the brain, and it sees the whole, before breaking down into parts to "know" it. Edwards (2012, 205) describes that "*Gestalt* simply emerges from as comprehension of *the thing itself* or *the thingness of the thing*, resulting from intense focus on the parts that make the whole, and the whole, which is greater than the sum of its parts".

There are eight basic Gestalt laws which are namely: proximity, similarity, connectedness, continuity (continuation), symmetry, closure, relative size, and common fate (Figure 5). These principals are universal. Ware (2012) has stressed that "the laws themselves have proved to be of enduring value". Indeed, we can see patterns in our environment, nature and cities (Figure 7) as well as in art, design and visual communication (Figure 6).
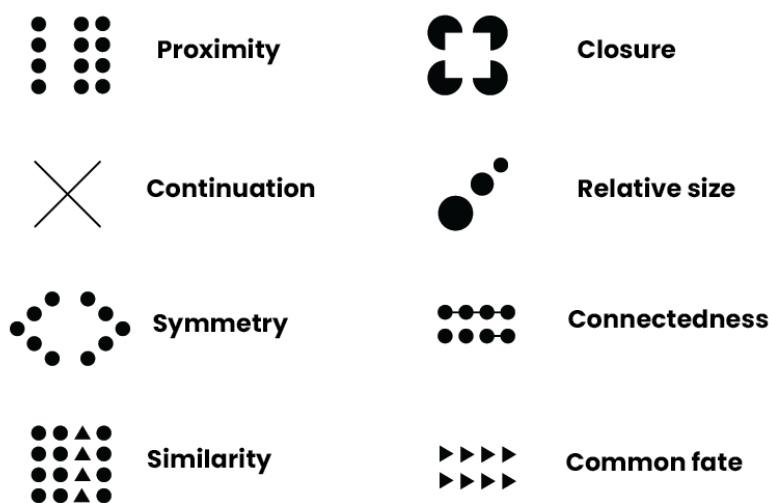
Figure 5. The 8 Principles of Gestalt.

Proximity is the most used principle in design. Proximity is perceiving elements as belonging to the same group if they are close to each other (Figure 5) (Figure 6). *Similarity* means that individuals tend to perceive and collect elements that have similar characteristics, e.g. size, shape, color, within the same group. In Figure 3 we see

that we tend to incorporate the triangles within the same group and circles within the other. *Connectedness* is perceiving elements as being united if they are connected by other elements. Flowcharts and infographics are good examples of connectedness. *Continuation* (or continuity) is the tendency to perceive each object as a single uninterrupted object. In Figure 5 we tend to see two lines crossing each other, instead of two open triangles (or arrows) facing each other. In *symmetry*, symmetrical elements are perceived as part of the same group. In fact, Ramachandran & Hirstein (1999) state that we have a built-in aesthetic preference for symmetry. *Closure* is when individuals perceive elements as belonging to the same group if they are part of a closed figure. In Figure 5 we see a square in the middle of circles, although there is only an illusion of a square. This is also called negative space, and it's commonly used in logo design. *Relative size* refers to the notion that the more distant an object, the smaller its size will be on the retina. Therefore, if there are two identical objects, the one that is further away is the one that is smaller on the retina (Figure 7). *Common fate* states that any objects that coordinate movement similarly are perceived to be related (Figure 6). (Ware 2012)

Figure 6. On the left: Poster for International Day of Happiness. Coca-Cola Company. (Proximity). On the right: The Matrix movie poster. (Common fate). Source: Pinterest

Figure 7. On the left: Example of Relative size in the city. On the right: Example of Symmery in the forest.

There have been several studies that support the idea that we first comprehend the shape and overall structure of an object (Gestalt), and then we comprehend the details (Price & Humphreys, 1989; Venturino & Gagnon, 1992 cited in Ware 2012). Ramachandran & Hirstein (1999) explain why outline drawing or sketch is more effective than a full color photograph is because isolating a single area (such as *form* or *depth*) allows one to direct attention more effectively to a source of information. This is also why written language, namely alphabet, is simple line drawings, because they are most effective for quick reaction and responses. We can also observe proximity principle in written language because we have words, which is a group of letters, and sentences, which is a group of conveying an idea.

2.1.2 Memory

In order to understand how we perceive visuals, we also have to understanding the basics of the our memory and its limitations. There is no knowledge without memory, and by adding emotion something can be made more memorable (Kwik 2020). This can be explained that virtually every image, actually perceived or recalled is accompanied by some reaction from the apparatus of emotion (Damasio 1999 cited in Barry 2020). The brain stores visual images as both pictures and words, therefore, this dual processing makes it easier for people to recall the message (Clow & Baack 2012).

Memory can be conceptualized in terms of *types*, in terms of *stages*, and in terms of *processes*. There are two types of memory, *explicit memory* and *implicit memory*, the three major memory stages: *sensory, short-term, and long-term*; and three processes that are central to long-term memory: *encoding*, *storage*, and *retrieval*. (Figure 8)

Explicit memory refers to knowledge or experiences that can be consciously remembered. *Implicit memory* refers to the influence of experience on behavior, even if the individual is not aware of those influences. Implicit memory is more important to us because it has the knowledge that we cannot consciously access, and it can directly affect our behavior. (Walinga)

Following, there are three stages of memory: *iconic* (one of the sensory memories), *working (or short-term)*, and *long-term*. Fourth can be called an intermediate store that determines which information from working memory finds its way into long-term memory.
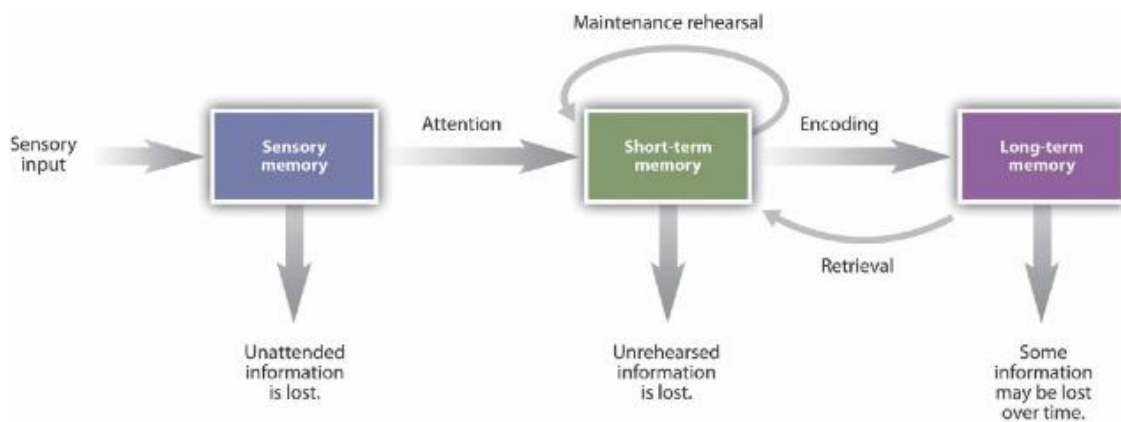
Figure 8. Three types of Memory. Adapted from Atkinson & Shiffrin (1968) by Walinga.

Iconic memory or visual sensory memory, which is one of the sensory memories, is a very short-term *image store*, holding what is on the retina until it is replaced by something else or until several hundred milliseconds have passed. *Short-term memory* (STM) is the place where small amounts of information can be temporarily kept for more than a few seconds but usually for less than one minute (Baddeley, Vallar, & Shallice, 1990 cited in Walinga). Short-term memory holds the visual objects of immediate attention. If

information makes it past short term-memory it may enter *long-term memory* (LTM), memory storage that can hold information for days, months, and years. (Walinga)

Knowledge and experience are stored in the form of long-term memory patterns, while sensory experience is processed in the form of patterns held in short-term temporary storage "buffers" (Barry 2002, 93). In between lies a general workspace which allows for conscious, working memory (LeDoux, 1996 cited in Barry 2002), yet only a small part of the total process is conscious or rational. Unconscious emotional memories of all kinds are stored in the amygdala where they become maps for interpreting reality (Barry 2020). Barry (2002, 93) notes that, although both cognitive and emotional systems work in parallel, they both store separate memories of the experience. In verbal and visual languages prior experience and context are important to the perception of content. Stafford (2009) suggests that even when our brain adapts to changing surroundings, its set of self-sustaining and self-reflexive functions still performs largely unconsciously and autonomously.

Working memory is the most critical component of human cognitive architecture during information processing for three reasons: (1) it acts as an intermediary between the initial acquisition (sensory memory) and ultimate storage of information (long-term memory); (2) it is where the majority of information processing activities take place (i.e. encoding and retrieval); and (3) it is resource-based (Wickens and Holland, 2000 cited in Barnes 2017).

Our memory for pictures is superior to memory to words (Branch & Bloom 1995; Paivio 1983 cited in Avgerinou and Pettersson 2020) and memory for a picture word combination is superior to memory for words alone or pictures alone (Haber & Myers 1982 cited in Avgerinou and Pettersson 2020).

Finally, we come to three types of processing that we do of the information we want to remember. *Encoding* is the process by which we place the things that we experience into memory. Unless information is encoded, it cannot be remembered. However, not everything we experience can or even should be encoded. Even when information has been adequately encoded and *stored*, it does not do us any good if we cannot retrieve

it. *Retrieval* refers to the process of reactivating information that has been stored in memory. We are more likely to be able to retrieve items from memory when conditions at retrieval are similar to the conditions under which we encoded them. (Walinga)

2.1.3 Visual attention

As discussed earlier whatever one sees builds a pattern for future responses. When we look around us, the right hemisphere of the brain scans the environment and the left hemisphere jumps in when attention is needed (Barry 2002, 93). Barry (2020) mentions that according to some studies some of visuals might not even pass-through consciousness. Feelings, unconsciously developed and processed, prepare us to cognitively understand what we see (LeDoux, 1996, cited in Barry 2002). Herman (2016) explains that "the brain scans (unconsciously) information received from our environment until something captures its attention; only then is it uploaded into our consciousness." The activity between sensory memory and short-term memory is called attention (Figure 8).

Consciousness is a state that occurs when we become aware of activity in an unconscious processing system. Conscious perception involves both top-down processing, whereby memory influences perception, and bottom-up processing as perception is built up from sensory input. (Barry 2002, 93)

However, there is a distinction between attention and consciousness. Attention selects first and only after we have selected something we can be conscious of it. Thus, attention implies selecting one event over another, while conscious events are those, we are now aware of and we can report verbally. Therefore, consciousness can be considered as the end result of some selection processes, but we are not aware of the actual selection process. (Friedenberg 2012)

2.2 Visual Aesthetics

We usually identify aesthetics with beauty, art and visually pleasing objects. The etymological meaning of the word *aesthetics* is derived from the Greek word

"*aisthētikos*" – "perception of feeling", the root of which is the original Greek word "*aisthesthai*", which means "perceive" (Costelloe, 2013 cited in Mooney 2020). Aesthetics is a sub-discipline of philosophy, that incorporates theories of perception, sensorial experience and emotions. Aesthetics is the science of sensual perception (Hardt 2005, 2).

There is triadic continuous relationship between the artist, viewer, and art object (Figure 9). Already Aristotle tried to explain the relation between the artist, the artwork and the art consumer, and called them *poiesis* (input of an artist), *mimesis* (expression of artwork) and *katharsis* (effect on the viewer) (Hardt 2005, 4). For centuries this has been a fundamental factor in the consideration of the value and meaning of the art experience. It is more accurate to visualize this relationship not as static points but as a flow of information and exchange. Old cave paintings like *Cueva de las Manos* in Argentina, *El Castilo Cave* in Spain, and Lubang Jeriji Saléh cave paintings in Indonesian Borneo, are considered to have aesthetic values, although their primary purpose supposedly was to communicate vital information. (Mooney 2020).

Figure 9. An illustration of artist/viewer/art object relationship. Mooney 2020.

The engagement with an art object involves all faculties that we associate with what makes us human – our senses, cognition, and feeling. The individual is "changed and developed" through interaction with the environment (Mooney 2020).

Barry (2002) reminds that even our most personalized and individualistic response to aesthetic art forms has a common ground with other humanity. She quotes Semir Zeki, a pioneer in the modern study of the visual brain, who has said the following famous statement:

> "All visual art is expressed through the brain and must therefore obey the laws of the brain, whether in conception, execution or appreciation, and no theory of aesthetics that is not substantially based on the activity of the brain is ever likely to be complete, let alone profound". (1998, p.l cited in Barry 2002)

Perfect art is perfect imitation of nature and gets its effect in the way that aesthetic of art is perceived as aesthetic of nature (Hardt 2005, 4). After all, human is made and evolved from nature.

According to Mukarovsky aesthetics has three aspects: *aesthetic function, aesthetic value and aesthetic norm. Aesthetic function* describes the aim (often non-aesthetical) to reach aesthetic pleasing through any object or any activity, whether natural or human. *The aesthetic value* describes the capability of an object to serve in reaching the aim. *The aesthetic norm* represents the expectations of the receiver. Knowledge of the aesthetic norm can shape the aesthetic function to increase the aesthetic value. (Hardt 2005, 10-11; Murakovsky 1970)

The original field of aesthetics is not art alone but reality (Buck-Morss 1992). Therefore, aesthetics can be observed in our everyday activities. Watching movies, reading, listening to music, and selecting fashion are all potentially aesthetic experiences (Mooney 2020). Balinese and Inuit culture embrace the aesthetic concerns in everything they do and make, while traditional Japanese culture aestheticizes everyday objects, phenomena, and activities (Saito 2020). We can experience the same artist, viewer, and art object relationship while listening to a song, reading a book or just holding a cup of coffee. Saito (2020) also describes that "Japanese tea ceremony is an aesthetic experience, which both encourages and challenges the participant to create an aesthetic experience out of many disparate elements, such as tea hut, utensils, flower arrangement, and snack, but other features are beyond anyone's control, such as the weather, the sound of birds or of rain hitting the roof, and the spontaneous conversation between the host and guests". This

notion suggests that aesthetic experience can be perceived by many objects at the same time and external factors can increase (or decrease) the effect of the experience.

What's also significant to understand in aesthetics is the difference between beauty and sublime. Plato (Grube, 1927 cited in Mooney 2020) presented in his writings that "pure beauty – i.e., pleasure – that in its absence does not cause pain". While beauty can to be associated with feelings of pleasure, reward, and satisfaction, the sublime is associated with awe, fear and even terror, as Burke (1757) expressed "whatever therefore is terrible, with regard to sight, is sublime too" (cited in Ishizu and Zeki 2014). Burke (cited in Mooney 2020) also argues that "experiences that evoke fear, while not pleasurable when too close or too intense, have the potential to be delightful". Previously Kant (cited in Mooney 2020) expressed a similar impression:

> "An intense aesthetic experience, as in the sublime, does not need to be a sense of actual danger but rather an experience that highlights or creates a sense of vulnerability in the viewer. The sublime terror, or unease, can be brought about by the experience that changes ones bodily relationship with the world, even if just for a moment".

A brain scan experimental study conducted by Ishizu and Zeki (2014) found that the neural activity that correlates with experience of beauty is very different from that which correlates with experience of the sublime. In their study certain areas of the brain were deactivated with sublimity, that earlier studies have implicated with negative experiences. Ishizu and Zeki (2014) conclude their paper with Burke's quote (1757): "on a review of all that has been said of the effects, as well as the causes of both; it will appear, that the sublime and beautiful are built on principles very different, and that their affections are as different: the great has terror as its basis -- the beautiful is founded on mere positive pleasure".

Recently, applied media aesthetics has been introduced as a new field of aesthetics. The primary purpose of applied media aesthetics is to produce maximally effective communication of static and moving screen images and sounds. There are three main differences between traditional and applied media aesthetics. Firstly, it is not limited to traditional philosophical concept of beauty but considers art and life interconnected. Secondly, media is not anymore neutral means of communication but an essential element

in the aesthetics communication system. And thirdly, applied media aesthetics examines various forms of media production but also their creation. (Zettl and Kelly 2020)

Applied media aesthetics give the tools to make aesthetic analysis consistent and reliable, and aesthetic synthesis—production—maximally effective and efficient. (Zettl & Kelly)

To conclude, aesthetics is a multileveled experience not limited to art alone. It starts with an artist who produces a piece of art or object. But the viewer is the one who chooses to see the aesthetics value of that piece of art or object, senses it and undergoes an aesthetic experience. After all, beauty is a subjective opinion (Herman 2016).

2.3 Visual Literacy

"Discovery consists of seeing what everybody has seen and thinking what nobody has thought." - Albert Szent-Györgyi

To understand and "read" universal visual language we do not need specific visual literacy skills. However, images and visuals can be ambiguous, and if we want to really make sense and use of images (and protect ourselves), we need certain visual literacy skills, especially in a current world abundant with visuals.

Most people believe that pictures tell the truth (Lefferts 1982), but few realize that what they think they see in pictures depends on what they expect to see in them (Berthoz 2010) and are expected to learn from them (Singer 2010) (cited in Avgerinou & Pettersson 2020). Dondis (1973) states that "what you see is a major part of what you know, and visual literacy can help us to see what and to know what we know" (cited in Avgerinou & Pettersson 2020).

Generally, visual literacy is regarded as a cognitive ability that involves cognitive functions. In fact, visual literacy is complex, multidimensional and embedded within a range of visual, cognitive, aesthetic, and nonvisual (emotional, ethical) dimensions (Dallow 2009). A study conducted by Avgerinou in 2001 distinguished 11 visual literacy abilities: visualization, critical viewing, visual reasoning, visual discrimination, visual thinking, visual association, visual reconstruction, constructing meaning, re-constructing

meaning, knowledge of visual vocabulary and definitions, and knowledge of visual conventions (cited in Avgerinou & Pettersson 2020). Additional functions to the previous list are communicating, and evoking feelings and attitudes (Avgerinou 2001 cited in Avgerinou & Pettersson 2020). A more recent work by Kedra and Zakeviciute (2019) suggest three key visual skills: visual reading (image interpretation, analysis, evaluation, visual grammar and syntax), visual writing (refers to creating visuals, image production and use) and other visual literacy skills (visual thinking, visual learning, ethical use of images) (cited in Avgerinou & Pettersson 2020).

Visual literacy is a complex by nature. Visual literacists have borrowed theoretical and practical components of such disciplines as aesthetics, anatomy of the eye, Gestalt psychology, communication theory, cultural anthropology, educational technology, instructional design, linguistics, mental imagery, neurophysiology, philosophy, research on hemisphere processes, screen studies, semiotics, sociology, and visual perception and perceptual development. (Avgerinou & Pettersson 2020)

The aim of visual literacy is to develop critical viewing, meaning critical thinking skills if viewers that imply visual messages, regardless of whether they are well intended, are always under scrutiny. Messaris and Moriarty (2005, cited in Avgerinou & Pettersson 2020) have concluded two core benefits of visual literacy: "first, proactively, as a gateway to cognitive enrichment; second, reactively as critical viewing, which is a defensive necessity in a world of potentially manipulative or harmful media."

Visual semiotics can be helpful in becoming more visually literate as it helps to comprehend the role visual messages play in our everyday life. As Deloache (1995, cited in Dunleavy 2020) expressed: "There is nothing that so clearly distinguishes us from other creatures as our creative and flexible use of symbols". Also called as the "science of signs" (Chandler, 2007 cited in Dunleavy 2020), according to Curtis (2009, cited in Dunleavy 2020) "semiotics is concerned with meaning; how representation, in the broad sense (language, images, objects), generates meanings and processes by which we comprehend or attribute meaning". From social media memes to hyper-sexualized depictions of men and women in popular video games, visual semiotics provide a unique

method to explore the underlying structure of visual phenomena, and explicate what these images mean in relation to our societal and cultural norms (Dunleavy 2020).

Visual thinking is crucial for creative expression. The ability to be creative, to analyze, interpret, and present visual information, and to communicate ideas in visual forms is a part of visual-spatial intelligence. With proper practice, visual thinking can be the most effective means for carrying out problem-solving processes. (Avgerinou & Pettersson 2020)

3 DIGITAL MEDIA

Media is the general name given to channels that transmit the message (Günay 2021). Digital media is defined as "digitized content that can be transmitted over the internet or computer networks" (R, 2016 cited by Moreno & D'Angelo 2020). Digital media became possible with the evolution of Web 1.0 to Web 2.0, and now it is a great part of our everyday life. Mostly all major forms of advertising and marketing communications are targeting both our visual and verbal systems. In today's multimedia environment, visuals are essential and expected parts of storytelling.

The "visual phenomenon" can be seen across social media platforms. The sharing of images is becoming a fundamental part of the social media experience today and given that social media platforms are the prime focus for sociability – especially among young people in the West (Russmann & Svensson, 2017). It is not surprising that the most popular social media platforms primarily focus on visuals such as pictures and videos. When Facebook was once a dominant social platform, it was superseded by Instagram, Youtube, Snapchat and TikTok, which all focus on visual content. Even Twitter beginning as a text-based platform, shifted to incorporate visual content, and yet remains one of the popular social media platforms for over a decade (R, 2016 cited by Moreno & D'Angelo 2020).

According to Digital 2022 Global Overview Report (Kemp 2022), more than 67% of the world's population uses a mobile device, with unique users reaching 5.31 billion by the start of 2022. Global internet users reached 4.95 billion at the beginning of 2022, with internet penetration now standing at 62.5% of the world's total population. There are 4.62 billion social media users around the world in January 2022. Over the past 12 months global social media users have grown by more than 10 percent. (Kemp 2022)

3.1 Motion Graphics

The term *motion graphics* refers to a combination of graphic elements, such as images, typography, and shapes, that have been animated and can be accompanied with sound.

Just as visuals can add new layers of meaning to text, motion brings new depth to visuals (PwC 2017).

It is said that moving elements considerably can increase the number of engagement and interaction. When something starts moving, it immediately grabs attention and becomes immersive (Durez 2021). Not surprisingly, movement is a principal characteristic of human life, and the magic of motion has always been attractive for humans and helped them to have a better communication with their environment (Shir & Asadollahi 2014). Human nature is to move constantly forward, and art and design, in digital or traditional forms, is simply trying to imitate those qualities. Before the rise of technology, artists and designers were in a great attempt to focus on motion elements within their artwork (Alamarat & AlFakrah 2020).

Motion graphics is defined by Schlittler (2014) as "the art of combining animation and graphic design in order to convey information and communicate ideas". Principally, motion graphics is a form of animation where several sets of shapes are choreographed together using a wide range of effects to produce compelling footage (Song 2021).

Motion graphics is created by video or animation technology and by making an illusion of movement or changing the appearance of visual factors. Commonly, in motion graphics, visual elements like line, dot, surface, and mass are integrated with visual ideas such as rhythm, emphasis, and contrast, then combined with sound and motion, and ultimately, by passing through the creative mind of the designer, they are be presented to the audience and create an influential performance. (Shir & Asadollahi 2014)

The terms motion graphics and animation are usually used as synonyms. However, the main difference between animation and motion graphics is their purpose. The purpose of animation is to engage and entertain, while the purpose of motion graphics is the same but most of all to be informative. In addition, animation has emerged from the discipline of illustration, when motion graphics comes from the discipline of graphic design. (Crook & Beare 2015)

Motion Graphics	Animation
Functional	Narrative
Informational	Entertaining
Key-frame based	Frame by frame
Typography	Characters
Experimental	Caricature
Rational	Emotional
Short form	Longer form
Filmic effects	Theatrical effects
Captured	Generated
Composited	Composition
Spatial	Theatrical

Figure 10. Comparative attributes of Motion Graphics and Animation. (Schlittler 2014)

Despite the differences in characteristics of motion graphics and animation, these two fields are developing rapidly and the line between them is becoming more and more transparent. During recent years, a new term of *motion design* has been commonly used. Motion design is defined by Joey Korenman (2021), a motion designer and founder of *School of Motion*, as:

> " (Motion design is) a collection of overlapping skills. A tool set that can include graphic design, animation, visual effects, editing, (photography), 2D and 3D illustrations, interactive design and even augmented and virtual reality. These tools allow you to communicate a message through the magical combination of design and motion."

Motion tends to heighten our emotional responses to images. We have a primitive ability to recognize motion. Adding movement to content enables the controlled timing of information. Due to *predictive coding*, our brains actively predict what inputs are ahead, rather than passively processing information as it arrives. Controlling the sequence and tempo of visual information consequently heightens curiosity and engagement (PwC 2017). Motion graphics bring users more intuitive feelings, provide multidimensional experience, enhance visual interest, and increase emotional communication (Song 2021).

Some research suggest that static representations are likely to be as good as or better than animations (Ware 2012). However, animation works well when making boring or difficult content accessible, interesting, and memorable (Durez 2021). Motion graphics focuses on eliminating unnecessary content and communicating with basic elements such as color, space, and typography (Flynn 2016). Thus, when it comes down to motion graphics, often less is more.

An experiment by media agency Kinetic compared the effectiveness of three different posters from the same advertiser at London Bridge train station: fully static, lightly animated, and richly animated. The results show that a digital poster is twice as likely to be viewed as a static poster, up to three times more likely at its highest. The moving image also affects the viewing time: the animated poster collects an average of 60% longer viewing time than a traditional poster (digital 7.4 seconds, static 4.7 seconds). Usually, more than one ad rolls over in outdoor advertising media. However, research has shown that adding advertisers to a loop increases the likelihood of viewing and increases the duration of viewing. (Dagmar 2010)

Digital outdoor and indoor advertising provides simultaneously entertainment and information. Digital screens in the shopping malls, public transport and at the stations can serve as entertainment. These are examples of advertising when a consumer may not want to (or can) ignore. At best, these ads can cheer up the consumer when they have nothing to do and leave a positive impression. (Dagmar 2010)

There is also an advantage in teaching movements using animation, as opposed to a series of static stills. Ware (2012) suggests that it is also likely that mirror neurons can be the medium for motivating learners, or if our brain mirrors an enthusiastic person, this may make us more enthusiastic.

With the development of media technology, motion graphics are focused as an emerging communication method (Cho & Yamanaka cited in Song 2021). Motion graphics has the potential of movement and narrative, which results in better communication of the audience and coveys more complex concepts and meanings in a simpler format (Shir & Asadollahi 2014). The designers are challenged to create designs that are aesthetically appropriate and visually engaging for the target audience, but which are also functionally - legible and support the encoding of communication messages so that these are effectively decoded as intended (O'Connor cited in Song 2021).

3.1.1 Visual storytelling

Motion graphics is found to be engaging because it involves storytelling. Storytelling is important in human cognition and human interaction (Martinez-Conde *et al*, 2019). People love stories. Stories can be found anywhere, in graphic images, photographs, art, paintings, sculptures, and more. But no other medium can tell a story better than motion graphics and animation (and film, naturally). Visuals tend to be more easily remembered than verbals (Clow & Baack 2012). It is also claimed that we can learn and memorize better and faster with storytelling and visualization (Kwik 2021). Animation continues where the words fall (Durez 2021), thus motion graphics brings graphics closer to words in expressive capacity (Ware 2012). In addition, movement is a simple and elegant way to convey character (PwC 2017) and different moods just in a few seconds.

According to Durez (2021), animation (and motion graphics) allows to create a unique and creative storytelling that is not bound by the limitations of the filming production. She also explains this is the reason why animation industry rose to a new level during COVID-19 pandemic, when filming on physical locations had to be cancelled or postponed, it was time to find new creative ways and generate content that contained more computer-generated components.

Meditation app Headspace is good example of instructional informative story-based motion design. The strategy of Headspace was to illustrate people's "uniqueness, weirdness, and individuality": "(Headspace) created visuals relating to the inside of the mind – the place where our innermost thoughts and feelings are produced" (Bilham 2021). Although the characters aren't essentially human, they are ambiguous and have different shapes and sizes, Bilham (2021) implies that we can almost see a bit of ourselves in them through colors and emotion (Figure 11). Yet, another strong tactic of Headspace was communicating abstract ideas though metaphors, which in turn allows to connect to honest emotions.
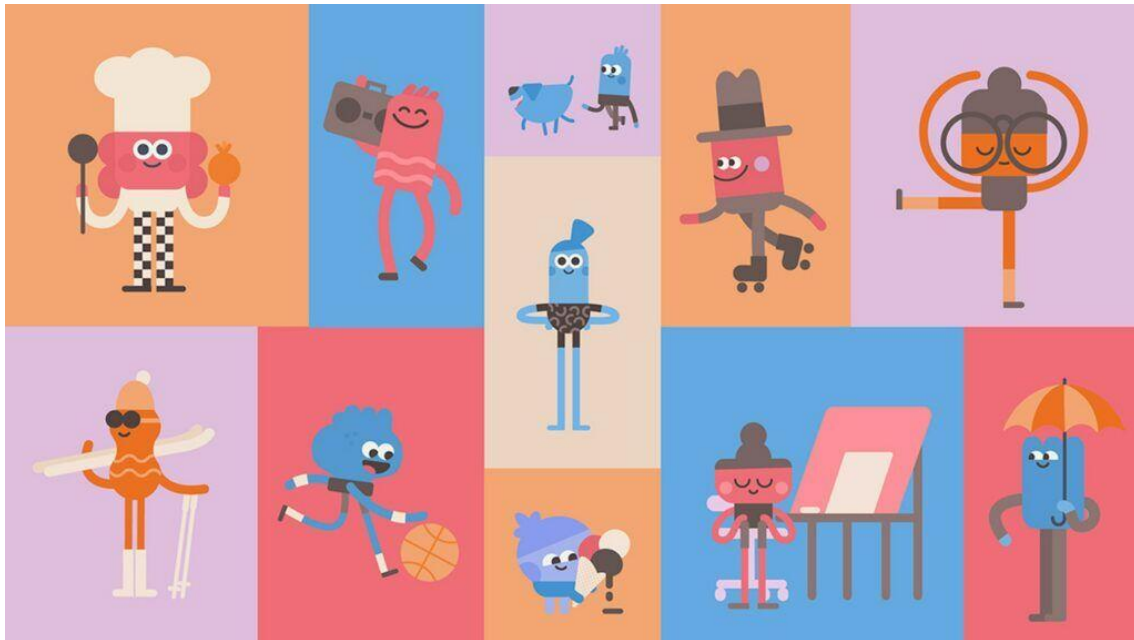
Figure 11. Character Design of Headspace meditation app. Source: Raw.studio.com

3.2 Perceptual approach to media

A perceptual approach to media suggests that media is both a major social influence and a contributor to individual attitudes through its ability to mimic reality in the basic, unconscious systems of the brain. The fact that visual perception is a complex system evolved over long period of time is especially significant in terms of visual and digital media, which is on the other hand, comparatively new. When we watch TV, a film or our social media feed, the phylogenetically primitive unconscious part of our brains perceives what is happening as reality and continues to learn from and to respond to what it sees (Barry 2002). Pinker in *How the Mind Works* (1997, cited in Barry 2020) explains:

> "When we watch TV, we stare at a shimmering piece of glass, but our surface-perception module tells the rest of the brain that we are seeing real people and places. … Even in a life-long couch potato, the visual system never 'learns' that television is a pane of glowing phosphor dots, and the person never loses the illusion that there is a world behind the pane."

This explains why humans also have an automatic response to threatening mediated messages as if they represent *bona fide danger*, a scenario that media producers eagerly take advantage of (Grabe 2020). It can be exemplified that when we watch violent or horror movie or see a car chase on TV, our perceptual system still unconsciously initiates

the adrenaline rush and fight-or-flight response, functions regardless of the actual reality, activating the amygdala, hippocampus, and hypothalamus (Barry 2002, 96). Barry (2020) then reminds that "no amount of conscious control can erase the emotional experience being recorded in the unconscious memory of our survival mechanisms".

Social Learning Theory by Albert Bandura suggests that most human behavior is learned through observation, imitation, and modeling. Barry (2002, 98) argues that with regard to this theory, people learn aggressive behavior, and that they do learn it through imitation, especially as children, if it seems to be socially acceptable and useful in getting what they want. Therefore, media plays a significant role in legitimizing violence, in promoting attitudes that result in violence, and in glamorizing violence as a pleasurable activity. The following example evidently confirms the Barry's view:

> "When CNN media mogul Ted Turner stated of media executives before a Congressional subcommittee in 1993, "They're guilty of murder. We all are - me, too," he was both acknowledging the responsibility of media for promoting actual and ultimate violence within the society and provoking the awareness that media is not merely mindless entertainment apart from life, but rather the very fabric of life itself, teaching values, attitudes, and lifestyles." (Barry 2002, 98)

Grabhorn (2004, 45) illustrates the power and effects of visual media in her book *Excuse Me, Your Life is Waiting* as following:

> "We hear all the time from our media: another bombing, another arson, another rash of some awful bug. So everybody focuses on the awfulness that is happening. Did they have guns in school, and gang rapes and buildings blown up, and serial arsonists in 1865? No, because they didn't have the media that create the focus to cause vibrations to bring it about en masse. Instead, they had newspapers and posters about their train robbers and bank robbers, so what they go more of was train and bank robberies. – Focus with repeaded intense emotion on something we don't want (or do want), and sooner or later that something is going to be in our lap."

The word "fear" was used in newspaper reports and in headlines in 1996 one third more often than in 1987 (Altheide & Michalowski, 1999; see also: Romer, Hall Jamieson, & Aday, 2003, cited in Wirth & Schramm 2005).

The significance of this in terms of perceptual process is, of course, that visual experience is always real to the emotional system even when we are consciously aware. The brain's amygdala remembers the emotional shape of the viewed experience and stores it for future survival. (Barry 2002, 99)

Due to technological developments and information overload, individuals are nowadays especially selective in terms of objects of their attention. Due to the evolutionary development of our perceptual system, we continue to learn from mediated experience and from actual experience *alike* and use them to construct the maps by which we can understand future experience (Barry 2002). Therefore, it is very important to acknowledge possible consequences, and in the next section we investigate challenges that digital media brings in.

3.3 Critical Perspective of Digital Media

Habit, boredom, laziness, overstimulation – there are many reasons we tune out. When we walk through the world on autopilot, our eyes might seem to take everything in, but in reality, we are seeing less than we could if we were paying closer attention. (Herman 2016)

Our perpetual, byte-size interactions are not only a detriment to our concentration, focus, productivity, and personal safety, but they're also hurting our intelligence (Herman 2016). Portable technology is not just a sensory distraction; we allow it to be a sensory substitution. However, human brain is more powerful than any digital gadget (Herman 2016; Kwik 2020).

When we take in too much information or make it switch focus too quickly, our brain simply slows down. The Journal of Experimental Psychology reported that students who were distracted while working on complicated math problems took 40 percent longer to solve them. Fortunately, there is a natural and easy buffer against letting the stress of speed and the steady stream of distraction overwhelm us: that is, simply slowing down. (Herman 2016)

In his book *Limitless* Jim Kwik (2020) points out four types of digital setbacks: *digital deluge, digital distraction, digital dementia,* and *digital deduction*. Technology is vital for our progress, but too much consumption can have negative consequences. Digital deluge means that if we don't give our brain a break and let it wonder or get bored for a while – we pay a price – poor memory, mental fog and fatigue. Digital distraction literally

means that we distract ourselves with digital devices while multitasking to get everything done, and that doesn't serve us at all, instead, it compromises our health and mental and physical performance. Digital dementia refers to "outsourcing our brain to our smart devices", looking up everything and relying on technology compromising our memory and not recalling simple things like phone numbers and basic math. And the last obstacle, which is critical in today's digital media, is digital deduction. "In digital-first world, where millennials obtain their answers to problems at the click of a mouse or swipe finger, the reliance on technology to solve every question confuses people's perception of their own knowledge and intelligence" (Zarom cited in Kwik 2020, 28). The result – deduction, which is a mixture of critical thinking, problem-solving and creativity, is becoming automated.

Children are often involuntarily exposed to certain types of media. Barry (2002, 104) writes about vulnerability of children to media:

> "When children select out particular kinds of negative media experience and expose themselves to its patterns over and over again, they in effect not only store up an increasingly automatic and limited number of perceptual maps from which to interpret the world and make appropriate behavioral choices, they also render themselves more vulnerable to media influence because of underdevelopment of rational defenses. However, because of the plasticity of the brain, which continues to assimilate experience, much of the damage caused by overexposure to media influence may be reversible."

Delfanti and Arvidsson (2018) stress that technologies are not neutral, but have complex histories that weave together social, cultural and political factors with technical and material possibilities. Therefore, it is essential to evaluate the social, political, and economic contexts within which digital media have emerged. Umberto Eco (1994, cited in Delfanti & Arvidsson 2018) divided the critics of the media into two categories: *apocalyptic* and *integrated*. These types can be also applied to contemporary critiques of digital media. From the apocalyptic view, new technologies tend to subvert traditional values, strengthen corporate power, alienate people from one another, and generate loneliness and stupidity. The integrated, on the other hand, see digital technologies as a step toward a new modernity that holds the promise of solving humanity's problems, opening markets, fostering economic growth, and democratizing culture and communications. (Delfanti & Arvidsson 2018)

McGilchrist leans towards the apocalyptic view, and in his book *The Master and His Emissary*, he described a world where the left brain has become dangerously overbearing, creating a

> "– digital world built on a series of zeros and ones, on over-bureaucratization, over-specialization, an over-reliance on technology and an unwarranted optimism about its potential, and a degradation of common sense and more holistic thinking. In a world dominated by left-brained thinking we become blind to the larger picture, unaware even that it exists or has any importance… While the left hemisphere is an either-or style… the right hemisphere sees more. So it knows what it is it doesn't know. But the left hemisphere, seeing less, thinks it knows everything and doesn't know what it is it doesn't know." (McGilchrist 2009 cited in Barry 2020)

According to McGilchrist (2019), since the beginning of Industrial Revolution, we have created a world around us which, in contrast to the natural world, reflects the left hemisphere's priorities and its vision. Today all the available sources of intuitive life – the natural world, cultural tradition, the body, religion and art – have been so conceptualized, devitalized and 'deconstructed' (ironized) by self-consciousness, explicitness and the systems and theories used to analyze them, that their power to help us see intuitively beyond the hermetic world that the left hemisphere has set up has been largely drained from them. (McGilchrist 2019)

The fact is, digital media is to stay in our lives, and it is constantly changing the way we live, work and interact with each other. We need to adapt and evolve. Therefore, it's important to recognize that in current digital age, looking at things from all angles before we act is imperative for our own protection (Herman 2016).

3.4 Visual Ethics

The power of visuals always comes with a responsibility. Power manifests itself visually, and visual artefacts, such as images, videos, even buildings, clothes, and classrooms, are rhetorical. The ethical precedes morality and is its necessary foundation, and unlike morality, ethics is not concerned with judgment but rather with awareness and sensitivity to the possibilities available within a situation (Buwert 2020). In this section I will address some of the topics of that visual ethics is concerned of in relation to visual communication and visual media.

First, let's see what visual ethics is. There are several definitions of visual ethics. Visual ethics is the appropriate use of visual power in regard to self and others. Visual ethics is using images for good. Visual ethics is "all the ways images and imaging affect the ways people think, feel, behave, and create, use, and interpret meaning, for good or for bad". We can also define that "visual ethics means using imaging power in ways that do not harm or that rectify harm". (Newton 2020)

One controversial concept and discussion in visual ethics is aesthetics. Plato said "if it is good and honest, it is aesthetic", and later Hegel stated "As the idea is equal to truth, the beauty has to be seen equal to truth". Seeing truth and aesthetics in relation to each other is a dangerous combination (Hardt 2005). Hardt (2005) has expressed in his essay *Aesthetics, semiotics & design* the following thoughts:

> "Kant had stated: "An object, which pleases the senses, is perceived as delightful and provokes interest in the existence of the object." -- This aspect attracted modern marketing to make a consumer buy without thinking. -- Dictators have also used it as a tool to make people believe in their ideas. A deterrent example is the 3rd Reich in Germany between 1933 and 1945 where aesthetics was used as a tool to brainwash people. The discussion is still on: "Was Leni Riefenstahl just an innocent artist?" I think she was. She had a naive aesthetic dream and she was an outstanding artist. -- Seeing aesthetics as a symbol of the pure, good and honest made blind to see the non-aesthetic aims and objectives behind it. Artists and designers need fundamental knowledge about ethical issues to avoid unwanted misuse.—"(Hardt 2005, 11)

Nazi propaganda in Germany in the era preceding World War II began not with control of the spoken word but with a state art, architecture, and film initiative that captured people emotionally and intentionally bypassed reason (Barry 2020). However, there's more than aesthetics; Nazism appeared and raised as a social movement due to visual social and mass media with its frequently reccuring patterns that are crutial in emotional learning (Barry 2020).

Another ethical concern from the user's point of view, is how to avoid emotional manipulation. Manipulation can also relate to aesthetics especially in female consumer culture. Narrow portrayals of female beauty in advertising have come under increasing critique for its apparent negative effects on young girls and women (Plaisance 2018).

The most obvious manipulation is being used in advertising, although media and businesses are continually (intentionally and/or intentionally) misusing human responses

by appealing to their needs, emotions and even fears. From a neurological point of view, if one judges something is good, he or she judges something as beautiful ending up having similar neural activity. Comparably, if a product is found beautiful along with that for the ride might come the notion that it is also good, and most probably, it is also regarded as true (Chatterjee 2015). In addition, meta-messages are used for perceptual agenda for the viewers. If used irresponsibly and unethically, these meta-messages can potentially make harm. Bill Nichols, a film critic and theoretician, warns in his book *Ideology and the Image*, that visual "codes" can be "manipulated to our detriment – (K)nowing how to structure meta-information to achieve a desired effect is a powerful skill" (Dallow 2009). Applied media aesthetics attempts to detect meta-messages and their effect on the viewer (Zettl and Kelly 2020).

Another concern of visual ethics is lack of social value. As a result of fast consumption, there is a huge number of graphic products, which cause, so called, visual pollution. Some of the graphics do not serve their purpose at all. Back in the 60's, Guy Debord said that modern society can be defined as a "the society of spectacle". According to Debord, people passively consume images and objects of spectacle that are disconnected from real life and real needs (Günay 2021). The proliferation of images and desires alienates us, not only from ourselves, but from each other, Debord refers to this as "lonely crowds" (Morgan & Purje 2016).

Figure 12. Representation of visual pollution. "The Society of the Spectacle". (Morgan & Purje 2016)

Sensitive graphic images and violence raise many ethical questions. Sensitive content images are claimed to be offensive, harmful, or unnecessary, but at the same time there is a suggestion that avoiding such images risks sanitizing or propagandizing the news (Plaisance 2018). A utilitarian approach is taken here by focused on minimizing harmful *consequences* of a decision versus a *deontological* (duty) ethos that calls for depicting the news with courage and relying on audiences to make their own decisions about the value of such images. (Plaisance 2018)

By its very nature communication is relational, regardless of its various forms – mass, mediated, digital, interpersonal. Communicating ethically is to communicate with thought and care, ever mindful of the relational web through which we move and of our potential effects, positive and negative, on others. (Plaisance 2018)

Ultimately, the key to increasing ethical visual behavior lies in personal, visual and ethical literacy through education – in school, in homes, and most importantly, in media (Newton 2020). Zettl (2017, cited in Zettl and Kelly 2020) sums up the ethical responsibility and primary aim of visual communication:

> "Irrespective of the scope of your communication a brief news story, an advertisement, a documentary, or a major dramatic production your overriding aim should be to help people attain a higher degree of emotional literacy, the ability to see the world with heightened awareness and joy. All of your aesthetic decisions must ultimately be made within an ethical context a moral framework that holds supreme the dignity and the well-being of humankind."

4 METHODOLOGY

This chapter describes methodology carried out by the author. It discusses the methods used for conducting the research, how the data was collected and explains the design of the interviews. The chapter also provides a brief description of the interviewees' background.

This research starts with a literature review study about visual communication and digital media. The theoretical part is constructed for investigation and data collection. After collecting and analyzing all the data from the interviews, the conclusion is attempted to answer the research questions and, in this way, to reach the research goal (see Figure 13). In other words, the method is the way to the goal.
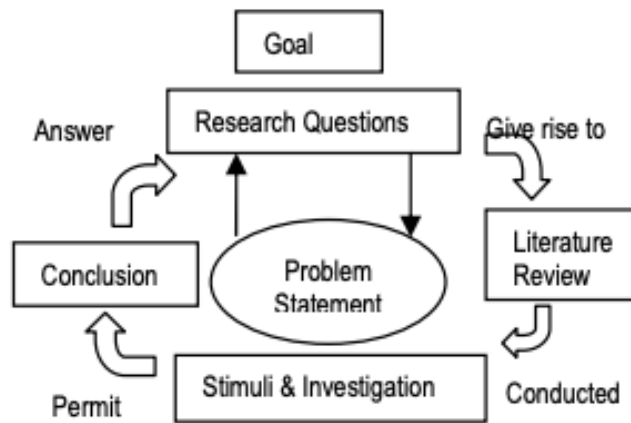
Figure 13. Conceptual map of research.

In this thesis some principles of a user study have been also applied. Fundamental goal of conducting user studies is to seek insight into why a particular technique is effective. The use for studies in visualization is to show that an abstract theory applies under certain practical conditions (Kosara *et. al* 2004). This thesis aims to examine why specific visual communication theories and practices are the most effective.

4.1 Data Collection

Data collection for this study was performed in two ways. Firstly, an extensive literature review was conducted to build a theoretical framework around visual communication and digital media and their subtopics.

Literature review is a compilation of the most significant previously published research on the research topic. Literature review outlines, evaluates, and synthesizes relevant research and relates those sources to one's own research question/s (Mauldin; Rowley & Slack 2004). A good literature review lays the foundation for the importance of the problem of one's research project addresses defines the main ideas in research question and their interrelationships (Mauldin).

The theoretical part of this thesis is a combination of digital and printed literature. The literature covers academic sources, such as books, e-books, journals, articles, studies, and presentations, as well as various non-academic articles, blogs, videos, and posts published by professionals in the field.

Creating a literature review usually involves several stages as proposed by Rowley and Slack (2004): searching and locating information resources, evaluating information sources, scanning, making notes, developing conceptual framework and mind mapping, structuring the literature review, writing the literature review, and building a bibliography.

The search for the literature started with a few keywords: *visual communication, digital media, visual media, motion graphics*. As the research moved further, new concepts and keywords were incorporated in the research for a more comprehensive perspective.

Secondly, interviews were conducted to gather more specific data to answer the research questions. The interview method is discussed more closely in the next section.

4.1.1 Interviews

Another data collection method of this thesis research was interviews. The theoretical part of the study served as the foundation for the interview design. The questions were based on five main themes: perception, digital media, visual literacy, visual ethics, and motion graphics (Appendix 1). The objective of the interviews was to discover answers to the research questions stated in the introductory part of the study.

Interviews are one of qualitative research methods. Qualitative research gathers data about experiences, emotions or behaviors, and the meanings individuals attach to them. It assists in enabling researchers to gain a better understanding of complex concepts, social interactions, or cultural phenomena. In addition, qualitative research is useful in the exploration of how or why things have occurred, interpreting events, and describing actions. (University of Newcastle Library 2022).

Conversation is a basic mode of human interaction; we talk, ask questions and answer questions, we get to know people and learn about their experiences, feelings and hopes. Similarly, research interview is a "inter-view" where knowledge is constructed in the "inter-action" between the interviewer and the interviewee. Research interviews have a professional nature, where careful questioning and active listening is used with the purpose of obtaining systematically tested knowledge. Thus, qualitative interview is a construction site for knowledge. Moreover, interviews may reveal information that is not related to the topic, but it is still valuable to capture the subject view to the research. (Brinkmann & Kvale 2018).

Kvale (1980) has identified seven stages of interview process: *thematizing, designing, interviewing, transcribing, analyzing, verifying*, and *reporting* (Brinkmann & Kvale 2018). This thesis research has formulated a framework about the role and effects of visual communication and digital media based on previous theories and studies. The design of 7 interviews in total was planned. Interviews were conducted with the participants lasting about 60-70 minutes and were recorded. The interviews were later transcribed into written form, categorized, and analyzed in regards to the research purpose

(Chapter 5). Reliability and validity checks were attempted throughout the thesis work. Finally, the conclusive results are reported in the last chapter of this paper (Chapter 6).

4.1.1.1 Interview design

The interviewees were approached via message through personal and professional networks. The aim was to have a diverse group in order to get more comprehensive outlook. The interviewees are aged between 20-40 years old. 3 males and 4 females from four different nationalities have participated in the interview. Participants' educational background varies from professional studies to Bachelor and/or Master's degree. The participants do not have any design or visual communication background; therefore, their answers are based primarily on their personal opinion and personal experience.

The interviews were scheduled during the weeks 16-18, and were organized both face-to-face and online. The interviews were recorded, and a transcription was done right after the completion of each interview. Also, notes were taken during each interview for better recalling.

A total of 19 interview questions were based on the main themes of the literature review. There interview consisted on six topics, namely: *perception, aesthetics, digital media, visual literacy, visual ethics, and motion graphics*. (Appendix 1)

To add, there are no right or wrong answers to the interview questions, and they do not test someone's mental ability nor intellectual abilities. The main purpose of the interview questions is to collect data to answer the research questions.

5 DATA ANALYSIS AND DISCUSSION

This chapter analyses the results of the interviews. The data is presented with the intention of providing answers to the investigative research questions.

The analysis for first question *"What is the role of visual communication in today's digital age?"* and the third question *"How does motion graphics add value to digital media?"* are based on both on the literature review and data collected from the interviews. The second question *"How does visual media impact our everyday life?"* is analyzed considering the results gathered mainly from the interviews.

5.1 Visual communication in Digital Age

5.1.1 The science of perception and aesthetics

"The greatest scientists are artists as well" – Albert Einstein

The perception exercise reveled that the same picture could give so many different opinions (Appendix 1, Q1-2). The participants were shown two black and white images that look like jumble of splotches. There is one main intention of the artists (a cow and a face), but individuals who look at it, can perceive many different things. In the first picture, which intends to show a cow, the participants saw things like "something peculiar", ghostly, conifer branches, a nose, rock, landscape, "lamb with crossed eyes", "planet Earth from the satellite", snow, war, a map, elephants, pig. The second image, which intends to be a face, was interpreted as an African person, flamenco dress, a flower headband, "a face with a helmet", cute dogs, "dogs hanging", plant, horse.

Some of the participants were unable to see the intended subjects. There are two reasons to explain this. First and the main reason is that none of the participants had assumably prior experience of the visual pattern of the presented images, therefore they had difficulty to recognize it at first. Secondly, they all focused on the details at the very beginning of observing the picture, which means their analytical detail-oriented left hemisphere stepped into game. When focusing on details, it is difficult to interpret the whole picture.

When participants discovered for themselves or were guided to "see" the intended subjects in the picture, they were instantly surprised and pleased. One of the interviewees even said he sees "another man" after seeing the face picture.

However, once the right hemisphere of their brains made sense of the pattern, that leads to experiencing a pleasing "aha"-moment. Edwards (2012) suggests that "aha"-moment is when both right and left hemisphere celebrate the solution. Once the connections are made, they are stored in the brain's pattern recognition system. Once it is seen, it cannot be unseen. This is when the pattern has been recognized and encoded to the long-term memory. Thus, it is difficult to revert back seeing merely splotches once the "cow" and the "face" is seen as a whole – "that particular percept is powerfully reinforced" (Ramachandran and Blakeslee, 1998, cited in Ramachandran and Hirstein, 1999, 46).

According to Ramachandran and Hirstein (1999, 46), the equivalent for black and white grouping in color space is wearing a blue scarf with red flowers and a red skirt; the perceptual grouping (proximity) of the red flowers and the red skirt is aesthetically pleasing. Ramachandran and Hirstein (1999, 46) hypothesize that these examples suggest that there could be a direct links in the brain between the processes that discovers such correlations and the limbic areas which give rise to the pleasurable "rewarding" sensations associated with "featuring binding". In fact, "aha"-moments are linked to mood-enhancing hormone dopamine produced by the brain (Wilton 2018). Edwards (2012, 247) describes "aha"- moment when perhaps "the whole human brain is suffused with joy". Furthermore, Bhattacharya (Wilton 2018) articulates that

> "-- the solution with an accompanying Aha! experience is more salient, facilitates long-term memory storage and reinforcement, -- Aha! moment is more than just a sensation of pleasure or relief, instead it is a special form of fast retrieval, combination, and encoding process".

One significant remark in the perception exercise was that mostly participants were concentrating to see and interpret the black areas. One interviewee analyzed the first image as following: "The black spot in the left corner looks like a sea animal – a turtle". Another interviewee noted: "The black is strong – it is dominating the picture". The

conclusion is that they were unable to interpret white space as "something", but as if it didn't mean anything, being an empty space.

Another interesting observation was done when the images were made smaller, the interviewees were able to see the intended content. That means their brain were able concentrate not on the details but on the bigger picture – the Gestalt. As Freeman (1999) writes, the evolutionary value of such grouping of stimuli to pick out objects is obvious: it makes the detection of both prey and predators much easier. Ramachandran and his associates (1998, cited in Ramachandran & Hirstein, 1999, 47) explain:

> "Given the limited attentional resources in the brain and limited neural space for competing representations, at *every* stage in processing there is generated a 'Look here, there is a clue to something potentially object-like' signal that produces limbic activation and draws your attention to that region (or feature) , thereby facilitating the processing of those regions or features at earlier stages. Furthermore, partial 'solutions' or conjectures to perceptual problems are fed back from every level in the hierarchy to every earlier module to impose a small bias in processing and the final percept emerges from such progressive 'bootstrapping'."

This could be illustrated that when we walk in the city, we are surrounded by thousands of different stimuli. We do not observe these stimuli in detail, but see, read, interpret, something may get our attention, and we encode or forget. During the interview participants were given time to observe the images, having time for long-term response, as such time may not be given in different circumstances. Thus, their focus on details can be also explained by *availability* of time.

Aesthetics is engaging in many ways. Aesthetic experience involves emotions and rewarding. Numerous studies (Ramachandran & Hirstein, 1999; Chatterjee, 2015; Kirsch et al, 2015; Skov & Nadal, 2020) have been written about the science of aesthetics and its strong connection to psychology and neuroscience.

Ramachandran and Hirstein (1999) talk about *shift peak effect*, which is a well-known principle in animal discrimination. In the context of art and design, the artist tries to (consciously or unconsciously) to not only capture the essence of something but also to *amplify* it in order to more powerfully activate the same neural mechanisms that would be activated by the original object (Ramachandran & Hirstein, 1999). Ramachandran and Hirstein (1999) propose that the purpose of art is not merely to depict or represent reality,

but to enhance, transcend, or even *distort* reality, or in other words, amplifies the differences to produce a caricature. In this regard, it is also interesting that prehistoric art and the earliest forms of art, such as cave paintings of animals, famous Venus figures, Indian Chola bronzes, have been often caricatures of one sort or another (Ramachandran & Hirstein, 1999).

Something worth mentioning is that, if we look at the human body development (Figure 14), ages 0, 2, and 6 have proportions of a "cartoon" like body. Essentially, there is some fascinating appeal to those figures. Typically, small children are perceived as cute and adorable, and there is some kind of natural interest in human babies (as well as in animal babies). Perhaps, it is the "exaggeration" factor of a child human body that differs from an adult human body. Lorenz (1943, cited in Endendijk *et al.* 2020) clarifies this is because infants possess certain facial characteristics called *baby schema*, such as a large forehead, big eyes, chubby cheeks, and a small nose and mouth. There is plenty of data that indicates that baby schema is associated with positive emotions, increased ratings of cuteness, and caretaking behaviors in parents, adult non-parents, and also children (Endendijk *et al.* 2020). In a way, caricatures are a method to distort reality, but on the other hand, we can see "real-life caricatures" in children. This takes us to the main point, why caricatures are perceived effective and attention-grabbing.
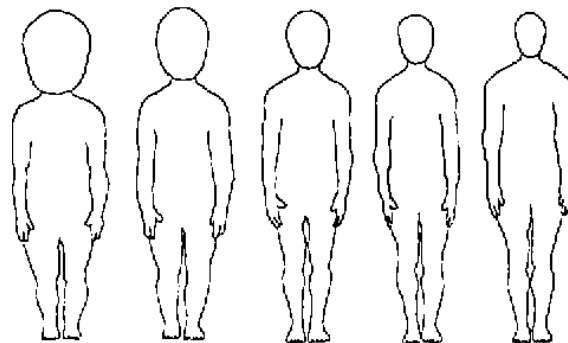

Figure 14. The Body Proportions Series, depicting the typical body proportions of a male at birth, 2, 6, 12, and 25 yr. of age. (Alley, 1983, Fig. 1. Copyright 1983 by the Society for Research In Child Development, Inc.

When the participants were shown two images picturing anger, one being a photograph and the other being an illustration (Appendix 1, Q12), and asked which image they can relate to more, surprisingly (or not), most of the interviewees answered they relate more to the illustrated image. There were answers such as:

"When I look at the lady she looks anxious, her eyes are closed. She's scared. The other (illustration) has eyes wide open, looks more angry, aggressive. I can relate to the cartoon 100%."

"The illustration. I'm like that myself. – It's an explosion."

"(The photograph) doesn't seem to be angry. I do not feel anger the same way, physically."

Two of the interviewees responded that they relate more to the photograph, explaining:

"(This is) a real person – and a woman. So I relate to this more (to the photograph), because I'm naturally not an angry person."

"I can relate to this (the photograph) naturally. There is no need to interpret, and here (the illustation) I need some brainpower to analyze."

Similar to *peak shift effect*, Chatterjee (2015) mentions about the notion of *averaging* which means taking a number of faces and combining them digitally; the result almost always is an average face that more attractive than any of the individual faces that contributed to this. So, is beauty universal or variable? Based on the previous assumption, Chatterjee (2015) responses:

"If you take these kinds of experimental observations and say how does that apply to our lives. What it means that the faces which we are exposed to are the source by which we form our own prototypes, and while the individual faces that we might tend to think as attractive might vary a bit from person to person, the process by which we arrive at those prototypes is universal. It's just a matter of who you're exposed to."

Individuals can express emotions and anger very differently. One can become more aggressive; another might just keep the anger inside. Critical key takeaway from the photo/illustration exercise is that experience and personality matters. If a person is "naturally not an angry person", he/she relates to the photograph which depictures a person with more neutral expression. There can be assumingly two reasons behind that. First is being that an individual experiences anger in a mild manner. Second, or the

opposite to the first reason, an individual has never experienced anger in a very strong way.

Furthermore, an illustration can indeed produce an "anger prototype" better than a photograph. This is when both *shift peak effect* and *averaging* principles are applied. In an illustration anger can be amplified, exaggerated, distorted, and what's more, it can be illustrated in that one collective style, that most people can relate to more often.

In addition, the use of visual metaphors like "anger like an explosion" is very common. Metaphors have been used in art, literature, and poetry for ages. Ramachandran and Hirstein (1999) raise a question: "Why visual puns or allegories should be aesthetically pleasing or rewarding?". Metaphor is a mental tunnel between two concepts or percepts that appear greatly dissimilar on the surface. One suggestion is that the use of simple concrete examples (or the one that is easily to visualize, like an explosion) allows us to ignore irrelevant, potentially distracting aspects of an idea or percept (such as the whole complex nature of emotion such as anger). Ramachandran and Hirstein (1999) imply that this is a basic principle for achieving economy of coding rather than a rhetorical device. This is where companies like Headspace got it right. Even though Headspace uses illustrations that are not human, their visual elements almost seem more relatable than the image of a person. Headspace uses the symbolism of steam, stars and lightning bolts to emphasize the feeling of explosiveness and blinded confusion that can come in bouts of anger (Bilham 2021).

In aesthetics context matters. Our values, cultural, educational and personal experiences and knowledge have an impact on how we perceive beauty. In an experiment non-architects and architect experts were shown faces and buildings. The reaction to faces was similar for architects and non-architects. However, the brain activity for building images clearly showed there was more activity for the architects than non-architects, suggesting that people's own education had an influence on pleasure response, giving them more pleasure in the response to the buildings. (Chatterjee 2015)

A similar experiment was made in Denmark (Kirk, Skov, Hulme et al 2009 cited in Chatterjee 2015), when abstract images were shown to people in a scanner. Participants

were asked to judge the images whether they like them or not, and they were told two conditions: that these images were generated by the computer and that these images are cutting-edge art and hanging in a gallery. What they were looking at in both conditions was the same having no difference in sensory information. The study found that people rated the gallery context higher, and it enhanced their pleasure experience even what they were looking at was exactly the same. The difference was only in the context. This implication can be linked to marketing and branding. The reputation of company may have some analogous reaction when people's actual enjoyment of the object may be improved based on contextual piece of information. (Chatterjee 2015)

Controversially to the previous study, based on the interviews, not many of the participants viewed the Mona Lisa painting as fully pleasant or beautiful knowing the context that it is an old painting by Leonardo Da Vinci that is considered to be one of the masterpieces of art of all time.

Being asked if the Mona Lisa painting was pleasant to look at, one participant said ironically: "If it wasn't pleasant, it wouldn't be so expensive. And have 15 layers of glass in front of it". One interviewee said not very convincingly that "the painting is okay – yeah – it's beautiful". Another participant admitted that "it's not beautiful, it's just too familiar". One of the interviewees specified:

 "--The painting is very nice, but do I think this person is attractive – no. – The painting is obviously the most famous painting in the world, and do I think it's beautiful – yes, I do".

Another female interviewee mentioned:

"What I see is lady smiling. – I have neutral feeling, I do not have impression. I never spent the time to observe. I watched some content about people repainting this and some memes – people making fun about this artwork. But yeah – there is no real impression about this. – I do not have the feeling this is beautiful, like if it's beautiful in the context, I would like to see it many times. So I wouldn't want to have it in my house to see it all the time. – But technically I understand how sophisticated the process of making it is."

The woman figure in the painting was described as innocent, mysterious, calm, relaxed, "with serious eyes, but lips are smiling", "a classy woman", she's not serious, not sad", she has "neutral facial expression, but still a tiny smile, not serious, but calm face". On the other hand, it was mentioned, she has "tough facial features" and she is "quite

masculine, not very feminine". When asked if the woman in the painting is smiling one interviewee answered:

> "It's not a smile, the way it is shaped, it gives a calm feeling, like the lady is in charge - in that situation – authority – also very kind".

Interestingly enough, all participants were analyzing mostly Mona Lisa's face, and none of the interviewees mentioned anything about her hands, body, hair, clothes, or any other aspects of the painting – at least they didn't verbally refer to them.

One female interviewee mentioned that Mona Lisa has a "pretentious smile". Indeed, Mona Lisa's "uncatchable smile" may be an illusion indented by the painter. Ramachandran & Hirstein (1999) propose that "a puzzle picture (or one in which meaning is implied rather than explicit) may paradoxically be more alluring than one in which the message is obvious". In other words, the visual system "struggles" for the solution not giving up too easily, and when it is discovered, the object is regarded as more pleasing (Ramachandran & Hirstein, 1999).

The opinions of the interviewees about the nature image were a bit different than views about the Mona Lisa painting. It was described as "super-beautiful", "very beautiful", "beautiful but mystical".

The following are some comments from a few interviewees:

> "Nature is powerful. There are a lot of things that nature could do. – This part is relaxing and the other part – okay – the waterfall is falling down, but at the same time the clouds are gathering – the dark ones – and I can tell you lots of faces and people I can see there, because when I was a kid I was doing that."

> "It gives me instant impression how marvelous, magnificent nature is. And also feeling of peace. I always like the combination of sky, trees, water and mountains. There is a way that this photo is structured, it just grabs a very big landscape into one photo – which is kind of impressive. We can see this is very vast and big place, by looking a one point at the picture. – It is dark, but since there is lighting here it makes it less depressing in a way. Like there is still hope and positive energy – and the animals give a nice little twist, even though – I don't have a feeling they play a big role in this picture--."

Not intentionally planned by the author, there were many religious and spiritual associations, like God, heaven, paradise depictured in the Bible and memories of biblical books for children. One interviewee said it is "an ad for paradise, saying this is where you

will end up ("tänne pääset")". There were also descriptions that is it mystical, ghostly, even scary, having "dark spots", but still have the "light (and darkness)". "It is calm and scary at the same time. The green parts are relaxing, the animals, and clouds, the waterfall", said one male interviewee. Another participant reviewed:

"The first things that comes to my mind is heaven. But if you look at the mountains on the top, it's scary. It gives me a good feeling, but also a bit scary at the same time. You look at the clouds and mountains -- the water, the animals, they give you peaceful feeling. I don't know if this is good, a happy picture or a sad picture. I'm stuck in between. – I guess it depends on the person's perspective. – Like on a good day, I could see this as a good picture, and on a bad day, it could be a miserable picture. – Not long ago I climbed a mountain that looked something similar, and it was scary. So maybe if you have asked me this question, before I climbed that mountain, I would have said magnificent, calm, relaxing. But because of my experience climbing a mountain something similar in picture, part of my brain says "oh oh, danger". – The way it's been painted, it's very beautiful, but like -- The person who painted this picture has done it so cleverly. It gives you mixed feelings."

In this regard, Kant's quote (cited in Mooney 2020) about "an intense aesthetic experience, as in the sublime, that does not have a sense of actual danger but rather an experience that highlights or creates a sense of vulnerability in the viewer" can be confirmed. However, considering the last comment, a person who have experienced the actual danger (of climbing the mountains), does not momentarily regard the object or event as beautiful. Capre (2015) envisions that the process of embodying feelings and ideas is always more real when one has lived a similar personal experience. Considering the last statement, an individual feels the emotion (e.g. danger) associated with an image *more intensively.*

5.1.2 Motion

Animation gives us the first "impression", when something needs to be "told" quickly. When we need more details, we need to stop and look at the picture more properly.

The intention of perception and motion exercise (Appendix 1, Q3) was to examine how effortlessly simple movement can increase our interpretation of content. When participants were shown a still image of dots, their first notions were letter H, letter K, galaxy, constellation, chromosomes, candles, Christmas lights. The most objective answers were "dots" and "lights".

The primitive brain has over two dozen visual areas each of which is concerned with different visual attributes such has motion, color, depth, form; moreover, these areas are probably concerned with extracting correlations if higher dimensions spaces, such as "color space" and "motion "space". Isolating a single area (e.g. color, form or depth) allows one to direct attention more effectively to this one source of information. When color or noise are not critical for defining the identity of an object in question, the extra redundant information can actually distract person's limited attentional resources away from the defining attributes of that object. Hence the famous aphorism in art and design – "more is less". (Ramachandran & Hirstein, 1999).

The results from the motion exercise imply that a still image cannot be always clear, but combined with motion, we can tell it's a human, we can tell or at least predict or assume the sex of that person, we can tell they are shaking hands, even when there is only a few luminous dots on a person's joints and he or she is filmed in a complete darkness. Even when there are only three dots moving, one can tell what is happening: "This is a man is walking, this is his hand. A man because of his walking style. He is very confident.". In other words, motion is most of the times involved with storytelling.

In a series of exercises using randomly selected animated content (Appendix 1, Q19), the participants were asked which image they prefer more, a still or animated. In the question 19a, three of four answered they prefer the still image. One interviewee answered that she prefers the still image, even though when she saw the still image first, she did not like it, "but it is less "scary" compared to the animated one" and the still image is more pleasant to look at, however, she thought that the animated image is more interesting because of the moving elements. Another said she prefers the still image because it doesn't "jump around", and that she rather observes the image with her eyes. The third commented as the following:

> "(I prefer) the still picture. It is the final result. This human body is full of potential, like perfect. The motion shows, like, how things start and how things end. As an individual maybe because I lack patience; I just want to see the final result. I don't want to see the whole process. In this motion thing it's too much going on. There is too much going up and down. – On motion version I can't focus on one thing. But on the picture, I can focus on different things. Observe properly and move on."

The four people who preferred the animated image to still image, described it as lively, fascinating, more interesting, mentioning to it as "an image full of life" and "living life" ("elävää elämää"). One described that the animation "grabs more attention and you anticipate what comes next", while another had similar opinion saying, "the animation is moving, and you just wait something to happen". Also, a third similar observation was made by a female interviewee:

> " --You look what is happening there, and what happens there. Everywhere something different happens. When you look at the still image, and think -- here it is, but we you look at the animated, it engages you in many ways."

It was mentioned that it is enough to look at the still image for 5 seconds, after which one loses its interest in it, because the image becomes boring. Also, when looking at the still image, one can "see everything at once and then forget everything", while the animated image was perceived as more memorable.

Correspondingly, there were two opinions about the animated logo of Swedish National Museum Historiska. The interviewees were asked if they liked the animated version of the logo. Four out of seven responded they disliked the animated version.

Those participants who disliked the animated logo called it disturbing, restless, too motley, and unpleasant. It was mentioned that it's too fast, there is too much going on (images and colors changing), getting feelings of nausea and anxiety because of the lack of smoothness, it has bad quality, and it is technically poorly produced. Suggestions to improve the animated logo was to make it a bit slower, animate just parts of it, only the objects or colors. In addition, colors could be different, because current ones were regarded as "mismatching" and "too bright".

Three interviewees who liked the animated version appreciated its informative and diverse nature.

> "The animation is very smart. They use different objects to show historic stuff. Even if the writing Historiska wasn't there, you would know this is something related to history because of the stuff they are showing. I think it looks very smart. What I would do differently, I would get rid of the right figure (part of H), though."

"Immediately, I feel a flow of time. Then I feel a sense of diversity and richness (culture-wise). -- It is interesting, informative, and pleasant to look at. -- When looking at the first logo (the still version), I thought "What does historiska mean in Swedish. Is it history". But with the second one (animated version), I did not have questions or confusion, I just observe the different images and my curiosity was triggered."

Positively reacted participants also valued the storytelling type of the animated version like the previous human body animation. Why is storytelling so significant? Storytelling engages not just people's intellect, but also their feelings. Narrative improves information processing, increasing recall of, and interest in, the information. Jim Kwik (2020), a world-renowned memory and brain coach, teaches how to improve memory with a learning method that involves making up stories of the content being learnt. Part of the pleasure that we derive from engaging with narratives lies in their potential to evoke mental images. Storytelling does not only create emotional connections to draw in the viewer (or in the listener), but, like the narratives that often accompany magic performances, can help ease an audience's discomfort or frustration with the information presented. (Martinez-Conde *et al*, 2019)

But why storytelling is so compelling? Zak (2015) discovered that compelling narratives cause a chemical called oxytocin, which is also linked to empathy, release and have the power to affect our attitudes, beliefs, and behaviors. In addition, emotionally engaging narratives inspire post-narrative actions, because oxytocin is synthesized in the human brain when one is trusted, and that the molecule motivates reciprocation (Zak 2015).

An intriguing point to note is the overlap of the regions activated during narrative comprehension and the so-called *default mode network* (which is often linked to creativity). This overlap may be meaningful in the sense that the "resting state" invites narrative construction. The type or content of the mind wandering that takes place during the resting state is unconstrained (and unknown), but it is likely that it has narrative structure. (Martinez-Conde *et al*, 2019)

With the next exercise (Q19c), the animated logo Helsinki University of Arts, three out of seven interviewees replied to prefer more the animated version.

" Love it. Still love it, even after seeing the still version. It is super interesting and pleasant to look at. -- The animation brings a dynamic vibe. Giving me the impression that there is innovation, even rebellions and all sorts of events going in this university."

"It's a good one. -- I think it's tricking brain in a way. Like right now that I have read the text, I'm having a hard time take my eyes of it, I'm want to see what shape come next. "

Negative impressions were disturbing, too fast, too edgy, prickly. One mentioned that the logo is "dancing, but it doesn't give anything". One interviewee commented:

"I have a feeling that someone is trying to escape, like the students there are prisoned, and they are trying to escape. – it goes from corner to corner like someone is pulling it, but it can't escape. – So it's like University of Arts, like the students are trying to tell something. It's their subconscious message."

	Interviewee 1	Interviewee 2	Interviewee 3	Interviewee 4	Interviewee 5	Interviewee 6	Interviewee 7
Q19a	-	+	+	+	+	-	-
Q19b	-	-	+	-	-	+	+
Q19c	-	+	-	-	-	+	+

Table 1. Interview replies for question 19. +/- (like, dislike).

The study reveals that 47 percent of the interviewees enjoyed animations, while a slightly bigger part, 53 percent disliked animated content. These results (Table 1) point out individual differences. None of the interviewees liked all animations, but four liked at least two of them. Two interviewees liked one animation.

Generally, motion graphics is perceived as more interesting and attention grabbing. It is difficult to say in more detail why individual opinions varied greatly, but the most probable proposition is that experience and personality played their role here too. One participant who perceived all three animated exercises disturbing and unpleasant, was the one who said to be "naturally not angry", and the one who mentioned about "students being prisoned" was also a student (and the only student out of all interviewees). Nonetheless, there were also variations in liking one animation, and disliking another, which shows that besides the experience and personality, the style or type of the animation contributes to its engagement and how it is perceived.

From a neurological point of view, when the brain is fed with constant stimuli, it cannot rest properly. As discussed, the brain has already automatic mechanisms that regulate information flow. However, the results indicate that motion graphics does add value to content. If it didn't, there wouldn't be any positive responses.

5.1.3 Visualization and learning

"The true sign of intelligence is not knowledge but imagination." – Albert Einstein

Visualization helps to enhance cognitive abilities for interpretation, evaluation and problem-solving. Visual learning has been linked to practicality and speed learning by the participants. One participant said she avoids long texts, research or studies. The text-based sources are said to be "more difficult to learn", "more time-consuming", and one expressed that "brain doesn't work as fast when reading something to learn it". Hence, the brain works better "looking at the visuals to learn faster". One of the interviewees explained:

> "I learn it when it will be visual, I memorize seeing a video - more practical way. Let's say if I read some theory – or someone gives me a lecture, I will not learn as much as watching a video that practically explains how something works. Because it depends on the people, and I am a person who is very much practical. "

In addition, all participants stated they use internet sources for learning or gathering information. However, the use of books is preferred if there is enough time and no urgency in attaining information. The use of multiple sources for learning is something that depends on whether the first source gave enough information and is reliable. Visual information such as videos, infographics, charts and diagrams are preferred more than plain text, as it was mentioned as the "worst option to learn something". One participant described:

> "If I learn something for the first time, I grasp as many information as possible, and when I consume the content – most of the time, I need to use mindmaps, so I try to put them into categories and link the connections between different ideas, that is how I can understand the concept - but if I have to read a long text, I break it down and create mindmaps".

Another interviewee articulated:

"Visual instructions help a lot, it makes it much easier. But then with text based stuff, it is helpful, but then you just have to create an image in your head. Sometimes it's good , sometimes it's not good, because you don't know enough about that subject, so you won't be able to create an image in your head."

Conclusively, the best way to learn something according to the interviews is to consume visual information. If visual information is not available in the first place, text-based sources are studied visually using highlights, mind maps and charts, or creating images in the mind by visualization. The latter is a very powerful tool because in order to understand something we need to understand it first in our minds by creating pictures. With our visual mind we can create a concept and context out of the visuals to be able understand it better, to explain or teach to others. As Barry (2020) explains brains, it seems, were built to process visual images with great speed and to respond to them with alacrity. They did not evolve to process written verbal symbols in the same way. "Brains were not built to read", as Gazzaniga (1998 cited in Barry 2020) states:

"Reading is a recent invention of human culture. That is why many people have trouble with the process and why modern brain imaging studies show that the brain areas involved with reading move around a bit. Our brains have no place dedicated to this new invention."

5.2 The impacts of digital media and technology

Digital media is almost inseparable part of our life. The discussion about digital media confirmed that digital media and digital technology has a tremendous influence on our life affecting the way we live, work and interact with each other.

The interviewees acknowledge their great reliance on digital media and digital technology. The daily use of digital media is both personal and work related. The average use of digital devices varies from 4 to 13 hours a day. All of the interviewees stated that their work is dependent on the Internet connection and digital platforms. Without Internet there is no possibility to work nor communicate accurately.

"On a daily basis, my screentime shows me 4h 23min per day on my phone. At work computer, um, 12h a day, no, I'm at work 8h a day. With other, like phone about 1-2h. Do I get tired – of course, I do."

"(I've been using digital media) my whole life, the only moment when I don't use it is probably when I'm sleeping. It's tiring, and my eyes are very tired."

> "The only time I don't use it is when I'm sleeping. But even when I'm sleeping, I use my Apple watch that monitors my heart rate. So, 24/7 I guess."

The study indicates that fatigue is a common side effect from a continues use of digital devices. Participants reported also having eye strain, headaches, and neck stiffness. Some fatigue mitigating actions included taking breaks, and resting, using eye drops, reading a book, limiting screen time in the evenings and in the mornings, and taking a complete one day off from social media (and phone). Two of the interviewees revealed that they do not experience any physical symptoms - yet - despite an intensive use of digital devices, but there is a possibility that it could manifest in the future. One of them commented:

> "Do I get tired? Not in general. I can get tired of my watch, I take it off and be distracted by my phone. When I put my phone away, I will be distracted by TV, PlayStation or the games. It's like a circle, you get tired of one thing, you go the next one, and so on. Keep going in the same circle. In general, do I get tired of this stuff, no, not yet. Digital is an essential of your life. Without that stuff it would be very difficult. Life would be boring without the stuff we have right now. -- This new world is designed so, it's almost impossible to let go out these stuff in our lives."

Mainly, all participants use social platforms and social media, e.g. Facebook, Instagram and Whatsapp as a communication tool. One interviewee expressed ironically that "we rely on them so greatly that without these communication tools, we feel a little paralyzed" adding that "the phone system has changed to digital platforms like Whatsapp, if it's off, no one calls you anymore". Many acknowledge the positive side of social media platforms because "people can reach out and spread the message and reach everyone in the world, and get connected in a way, but not really connected".

Few interviewees admitted of having or having had a dependency on their digital devices such as phone or smart watch, but they have recognized it and have taken limiting measures. One participant expressed that "we *have* to be there all the time; it's the only way to the outside world". For some interviewees, at the moment, the main concern is digital media usage of their family members, like spouses, younger siblings and their own small children. It was also mentioned that in general the limitless use of digital media is very common especially among youngsters and young adults, who have been born in this digital era. They do not perceive properly, many have anxiety, and do not stand a moment of boredom; they need constant neural stimuli, most probably unconsciously. Their soul is not "resting".

There are certain situations when scrolling of the feed was like a subconscious action, described by one of the interviewees:

> "I would say I check the Insta feed every day when I feel bored. And it can be maximum 5 minutes, or there would be certain occasions when I keep scrolling, if I'm stressed or avoiding some boring task. Then I would keep scrolling endlessly. I think its eveyone's issue."

Future development of digital media and technology was said to involve new "cool and fancy" gadgets, such as the smart rings, and growth in robots, like already seen AI robot Sofia and (Starship) food delivery robots. The dependency on digital devices will remain, and there won't be done anything about it. In fact, the reliance will increase because everything will be connected to phone and Internet, such as reading the news, socializing, paying bills, buying tickets etc. On the other hand, it was perceived to be easy and helpful and "time-saving". As the COVID-19 pandemic had accelerated digitalization, similar views were pointed out about the future with a very rapid pace development in digital media. However, this may lead that physical social lives may be at risk to diminish.

Social media algorithms were seen as a threat because "it shapes one's mindset in certain ways maybe not to your benefit, but for their benefit". It was mentioned it has vast influence and control over people. An example was made about the social media's influence on people's votes, meaning using *shadow blocking* to advertise more, make one party's content show less because they are competitors. Shadow blocking is a practice of blocking or partially blocking a user or their content from some areas of an online community in such a way that it will not be readily apparent to the user that they have been banned. These, such as algorithms and shadow blocking, may have great effects on the outcomes of the future. As one interviewee hypothesized: "Social media is literally controlling everything. In the wrong hands, this can be very dangerous."

The interviewees portrayed other future scenarios regarding digital media and technology, for example:

> "If the internet disappears from the world, a lot of information will also disappear, we have so much in cloud storage. Pictures, videos, - (Pros is that you don't have that all physically stored otherwise you need a storage room for it, but the cons is that what if it all cloud storage and internet suddenly disappears?) But of course, those materials that are in the cloud, electronically, they also take space, bit space, they consume energy. It is somewhere that it doesn't bother us, like would a box at home in front of us, that it doesn't spend our energy (i.e. thinking capacity)."

" The future is quite negative but I try to be positive. My concern is because I have younger sisters --, my youngest sister is 9, and her peers already use TikTok. And I feel this is not how it is suppose to be. When I was her age, I was just painting, playing, going outside. I think this something very harmful, in my own humble opinion. Um, because, even adults, there have been so many studies, that conclude the negative effects of social media to mental health, and maybe also social skills.-- That's what I see about the future, that the children might have some issues, because of use of social media from a very young age, if no one from the family help to monitor the use."

"Well, it's a personal opinion, its is mostly a bit dangerous. And I feel that this is going to be controlling the human brains and human mindset, that will directly have an impact to your day-to-day decisions. Now I can see this is happening by looking at the ads taking you for different kind of (like google ads, fb ads, notification based on your purchases) It will be very personalized. It will make direct impact on your daily decision making. It make have a direct impact of your decision having a dinner or lunch. That is very kind of important, that seeing one ad can make you change your mind where to eat. Simple, but it's very important."

"There is more good stuff, than the bad side, these are just conspiracies we are thinking about how they going to control the population etc. If we go back, when there was no digital stuff, they made the religion to control the people. Now instead of religion, books, they use technology to control people. We can only blame human evolution. Maybe in the next 100 years, they will find another way how to control the people."

Interestingly enough, there are suggestions by historians of writing and alphabetic literacy that written word's past use as an apparatus of religious propaganda, a tool that serves commerce, and a means for elites to exercise social control over the lower classes (Graff, 1987; Halverson, 1992 cited in Grabe 2020). As the history of literacy shows, written communication has effectively served as a means of social stratification, distinguishing between those who have and have not mastered its use. In terms of visual and digital media, the brain interprets media images as if they were real, preparing the body for an approach or avoidance response even when higher-order cognitive processes are at work discounting their realness (Grabe 2020).

The future always comes with the unknown. However, paradoxically, the use of digital devices is perceived to give us more time and ease our daily lives. At the same time, e.g. social media is taking a huge amount of our time if we keep scrolling the feeds pointlessly. Are we saving time to consume more time? The greatest benefit of social platforms is if they are used effectively and most importantly meaningfully. As one interviewee concluded:

"--But yeah, I think like anything else in life there is always -- there are two sides of the coins. If every individual knows how to make the most of the good side, it can be beneficial. I do not try to avoid social media or I'm against it 100%, I think it's a very good development in technology of our era, that I appreciate. I learn a lot from social media, so I appreciate it as a tool for communication and learning."

5.2.1 Visual ethics and visual literacy

This study reveals that in the recent years the criticism towards media, news outlets, businesses and advertising has grown. There are few reasons behind this increase of criticism. Firstly, the fast spread of fake news and fake ads especially in social media has raised more awareness and criticism. Secondly, there is a lot of information available that confirms cases of unethical practices of media corporations. Thirdly, which is related to the first factor, due to overload of information there is a lot of misinformation, it is sometimes difficult to tell who is right, and who is wrong. Therefore, individuals have more experience in being more careful towards visuals on the news and particularly on social media. One interviewee stressed that "people are shown what they want to see". This might be true, because people tend to choose information sources with which they share personal biases and beliefs (Higgins, 2016 cited in Martinez-Conde *et al*, 2019). Another interviewee noted about a similar matter:

> "When I look at the news, like BBC news, I know they will be biased towards the UK. The news they share with public, they make sure they cover UK in a good way. They tell us what we want to hear. But if you look at the news in another country, of course, every news outlets are quite biased towards their own people their own country. And they advertise the things that will benefit that country. Or like wording the stuff, the newspapers, how they write headlines. Especially in this country, England, this is very big subject, how the newspapers play with the words to brainwash people. Let's say you're rich, young famous footballer and you're black, they will headline in the newspaper like "This rich black footballer bought a house for 1 milloin for his mom". But they way use images and words is to make the person look bad in your brain. Another "This black guy and footballer, and very famous, giving free lunches at schools for kids." But the way the media covered it was like a bad thing. Everything depends on the information and how they make it look like."

One interviewee highlighted that verifying sources is critical:

> "Sometimes you question those pictures or media outlets, is this correct or it something that you might verify with a different source. I don't trust mass media news, it's a big NO. I don't trust media and politicians."

Many of the interviewees had a critical opinion about media in general, saying that most of the times media tries to benefit itself, "falsifies the real picture" and "tries to create empathy" with (sometimes false) information. An example was illustrated by showing poor kids on TV and making the general public feel certain way in order to make them

donate to charity. "But who really know where the money goes to?", questioned the interviewee. Zak (2015) found in his experiment that the narrative with a dramatic story caused an increase in cortisol and oxytocin. Tellingly, the change in oxytocin had a positive correlation with participants' feeling of heighten level of empathy, which in turn, motivated participants donate money. As has been mentioned earlier, emotionally engaging narratives inspire post-narrative actions (Zak 2015) – in this case, sending money to strangers.

Alvesson and Willmott (2003) state that the practices that compromise organizations are never politically neutral, because top management in any corporation is routinely privileged in decision-making and agenda-setting, and in defining and shaping human needs and social reality. Within certain corporations the management is mostly concerned to promote its own needs and beliefs for profit. Media concentration might be economically desirable but democratically undesirable by allowing dangerous accumulations of media power (Hardy 2014). Media was called as "unethical system that is driven by its profits no matter how much it will harm people along the way". There are though rare organizations that are neutral, but it comes with a price of being disapproved, like one interviewee marked:

> "Manipulation and dark psychology is everywhere, between families, friends. The higher we go the bigger it gets, governments, social media, news outlets, if anyone says something wrong about, so be against the majority, they will be called crazy. It's just the way things are, it's human nature."

There were also views that the nature of media is not to create harm because they have specific guidelines and there are some limits that cannot be crossed. In general, media shouldn't express anything unethically. However, there are sometimes "slips" ("lipsahduksia"), mistakes and errors. One interviewee commented that ethics is something that people do not think about in the first place:

> "I guess, the people who create the content try to be as ethical as possible. But maybe they don't know how or couldn't anticipate the impact of the content, or what they put in media, how it affects other people or the public interest towards a certain topic. There is always a goal behind a certain video, article, and their goal is to deliver message that is meaningful. A way of communication. Instead of communicating to one person, you want to communicate to bigger audience. Maybe, I don't think people think about ethical at first, when they are trying to communicate with a bigger audience. They just want to deliver a message, they believe in that moment. Mostly they have also emotional influence in that message. I don't think ethics is a concern when people do media. Just my opinion."

While another summed up the big question whether media is ethical or not:

> "It's a big question. I want to believe that it is ethical because you use it so much and often. It is so present in our lives, so I would like to say that it's ethical. It is ethical in a way that I see it, and how I perceive things. To another person it might be totally different. It all depends on the people's experiences, so it is difficult to say in general is it ethical or not. And there are also some many different media, news, and magazines, visual media and all. I think everyone wants to believe it's ethical."

Further, interviewees were asked to interpret image without its context (Appendix1, Q11) because some of the elements were removed from the picture. The purpose of this exercise was to examine how well the participants can interpret the image without its context. All of the participant were able to describe the main idea. General explanation, which did correspond to the original intention, was that external factors affected the woman's mental health. The image was part of a larger campaign which raised awareness about non-physical violence and its effects on individuals. However, participants did go into details, and there were a few noteworthy interpretations:

> "Something is being destroyed. Humanity is being destroyed, or elderly, -- why is there a beard? Femininity is being destroyed."

> "Something goes inside your brain, very small thing, and comes out with a very big effect. If you hear news or a word, just something small, the brain makes it more difficult and stronger."

> "-- I feel like this is campaign to raise awareness about something related to women. And what kind of woman? – definitely not wealthy. There is no harm physically done."

> "Woman is fading way slowly, breaking. The way she looks like, she's expecting this thing to happen for long time. Her eyes are just no hope. Like fighting for so long, she knew it was coming, and I just give up. Defeated. She looks defeated."

Visual literacy is understanding pictures without words, and the ability to question something. It is an extensive topic and very imporant in this digital age we live in. In the case of visual perception and subliminal messages or whether it's fake news, once we see them often enough, and we start to recognize them better, it increases our visual literacy and critical thinking. Hence, exposure is necessary because with experience and knowledge comes wisdom.

The interviewees reported that the ads nowadays do have great influence on them, which can be explained by their vast and repeated occurrence. Clow and Baack (2012) reasoned that advertisements must be perceived as honest by Generation X to be effective, because puffery is not typically an effective tactic. Apparently, that approach is applied also to later generations. One female participant in her early 20's commented:

> " --ads do not affect me that much, or much at all, because when I look at an ad I ask "for who is this done? And who has made it? Because in Instagram I have a lot of ads and I know why it is there for me. I just searched this in Google, and now it shows me this ad."

While textual information relies on argumentation, visual information relies on associations. An advertisement that is highly visual proceeds differently. Viewers pay more attention to visual cues and less to verbal or written arguments. When the participants were shown different advertisements including provoking and empathic ones, their responses were compelling. The first ad (Appendix 1, Q14) illustrated a wall with a window and bars with a shape of a bottle. It was said that there is a misleading subconscious message in this ad that can be probably best understood by the target group. One interviewee concluded: "-- this message has no influence on me. It's quite ironic, I don't need this kind of freedom". Another ad (Appendix 1, Q15) was and image of a pen in a certain angle complemented with text. Some participants thought it's offensive, stupid and unethical, and that it mostly would appeal to teenagers. Others said it's funny because it grabs attention and is, therefore, memorable. One interviewee observed that "it's very simple and very smart and creative; they used the psychology of words and visuals perfectly".

The next picture (Appendix 1, Q16), that illustrates stacked coins, was also perceived, and understood better with words, "the visual combined with text is powerful" as one interviewee commented. After all, images and words in combination are often more effective than either in isolation (Wadill & McDaniel, 1992; Faraday & Sutcliffe, 1997 cited in Ware 2012). "If it wasn't for the text and the logo, I would struggle to see what the picture is" was one of the responses. Many also associated the ad with the unwealthy. "It's funny, but not good. People who eat this might think it's smart", stated one interviewee.

Another ad (Appendix 1, Q18) was depicting a man with a face mask with a burnt hole. One interviewee described thoroughly:

"In the pandemic we think about masks. It's anti-smoking ad. How bad smoking is. When corona came how much you've been avoiding and were scared of dying. But then you have the biggest problem of humanity, which no one cares about. I think image is very powerful, because how they used the face mask. That the first thing you see, like the last two years have been that everytime I see a face mask, my brain tells me "corona". And then you look closer, oh there is hole, and then the next thing you see is the text. It really is powerful. How they use one pandemic to picture another problem. How they use one problem to solve another problem in a way, if that makes sense. Smart and powerful."

Indeed, most of the participants perceived this anti-smoking ad as powerful expressing that "to some people cigarettes are more important than life", although "smoking is a pandemic itself and we should treat it as the corona virus because it statistically kills more people". On the other hand, it was mentioned that smoking is a personal choice, and one knows the pros and cons and accepts the consequences.

Highly visual images utilize the right hemisphere's ability to discern patterns, to ignore detail, to respond emotionally, and to connect with an idealized world holistically. Because images appeal to the right side of the brain they are read in a different way from words that appeal to the left for processing. In advertising, Carter and Frith (1999, cited in Barry 2020) asserted, much of its art "is designed to exploit the gap between the impressionable right brain and the critical left. Those adverts that use visual images rather than words to convey messages are particularly likely to impinge on the right hemisphere without necessarily being registered by the left." (Barry 2020)

Next, the participants were asked to compare two ads both addressing to organ donation (Appendix 1, Q17) and to tell which one is more ethical. The results showed that three favored the first version (17a), while four preferred the second version (17b). The participants who chose the first image said is was more personal, more emotional, touching and more emphatic. The other group who chose the second one perceived the image as inspiring, encouraging new way of thinking, and challenging the traditions:

"I'm impressed by this one (17b), because the message is trying to convey innovative in a way, and its so practical. Okay, I don't use this anymore, so I just give it to someone else who needs it. I don't find anything unethical about this one, and this too (17a). I think the ethical level is the same. But I like this much, this is quite standard, but this is sparks a question "why can't I give away my organs just like my clothes?"

However, it was also mentioned that the first version is slightly inappropriate, and therefore unethical, because donating organs doesn't always mean that a person is dying. "You can donate one kidney and still live", marked one interviewee. Moreover, it was said that "owing live to someone" is an offensive statement. Arguments for the first version included "boring", "scary to hug a ghost", and the second one was described as "cold" to "give away organs like items".

To conclude this section, we are constantly exposed to visual images and advertisements, although not being the target group. Therefore, our perception of an advert could differ from perception of an individual from that target group. However, humans are instinctively drawn to images. Visual design elements deliberately target the pattern-seeking right brain, and invariably literally draw the eye away from the words (Barry 2020). As social creatures we are biased toward engaging with others, while expressive stories motivate us to help others (Zak 2015).

Famous quote of Leo Burnett (Broadbent 1984, cited in Barry 2020) states:

> "the most powerful advertising ideas are non-verbal and take the form of statements with visual qualities made by archetypes; their true meanings lie too deep for words. -- The richest source of these archetypes is to be found at the roots of our culture – in history, mythology and folklore. Somewhere in every product are the seeds of a drama which best expresses that product's value to the consumer. Finding and staging this inherent drama of the product is the creative person's most important task.".

6 CONCLUSION

Visual communication is defined as the use visual elements and symbols to convey information, messages, and ideas. It is no over-statement to claim that media images have become central to living a contemporary life. The sheer volume of mediated visual stimuli we encounter daily surpasses that of verbal stimuli. (Grabe 2020)

The reality is that because of how we have evolved to cope in a complex world, we don't see everything and we don't perceive everything (Herman 2016). Hence, the idea of this thesis was to introduce and examine how deeply visual communication, visual media and digital media affects us, our consciousness as well as sub-consciousness. All sensory information shapes humans on individual, societal, and national levels. Due to the evolutionary development of our perceptual system, we continue to learn from mediated experience and from actual experience *alike* and use them to construct the maps by which we can understand future experience (Barry 2002).

"Visual common sense" is the first degree of visual intelligence. In addition, visual intelligence implies an understanding of exactly how far can we trust perception to tell us the truth, and an appreciation of how perceptual process can be manipulated through various media to alter our attitudes and behavior (Barry 1997). Herman (2018) adds that visual intelligence is an ongoing learning process, the one that really is never mastered.

In terms of media and technology, it can be assumed that the world doesn't ever have enough. As users are used to one technology, very soon it gets outdated. There is a constant need for new experiences that connect with our emotion (Herman 2016). There is a continual stimulus for the users, which is sometimes even unnecessary. Lorenz-Spreen and his associates (2019) explain that content is increasing in volume, which exhausts our attention and our urge for *newness* causes us to collectively switch between topics more rapidly. When more content is produced in less time, it exhausts the collective attention faster. The shortened peak of public interest for one topic is directly followed by the next topic, because of the fierce competition for novelty.

The role of visual communication is today's digitalized world is tremendous and significant to the extent that we have become dependent on digital technology. In a way digital media and digital technology regulates how we live and work. Without Internet connection it is almost impossible to do one's job, because all work systems are digitalized.

We have learnt in this thesis work that our visual system is a result of millions of years of evolution. What about media? Television has been there for around 100 years, and digital media for about 20 years. The fact is that we perceive media as reality because visual system does not differentiate real from a screen. Therefore, our mental state and emotions play significant role here, too.

One of the main functions of primitive vision is to discover and delineate objects in the visual field and for doing these visual areas rely on extracting correlations (Ramachandran & Hirstein, 1999). However, abundance of information narrows our collective attention span, and these observed developments may have negative implications for an individual's ability to evaluate the information they consume (Lorenz-Spreen *et al* 2019).

Carpe suggests (2015) that animation can be an important media to be aware of our thoughts and feelings, to reflect upon them and find our way to express with respect, what sometimes words can't say. What's the most important about animation is that it reduces cognitive load (Bağlama *et al* 2018). Unlike static material makes the mind wonder through pieces of information, animation guides a viewer through the information. Animation, as a modern-day tool, can be utilized in storytelling and act as a metaphor (Carpe 2015).

There is still much to learn about the space between perceptual psychology and visual design (Kosara *et. al* 2004). Carpe (2015) explores that animation is an excellent medium to teach visual literacy and develop critical minds to avoid manipulation. Animation can be an important media to be aware of our thoughts and feelings, to reflect upon them and find our way to express with respect, what sometimes words can't say (Carpe 2015).

Augmented reality and motion graphics are two media that go hand in hand, and we may be seeing them both more in the near future.

We have to bear in mind both the positive and the negative effects of visual media. The negative consequences of the media have been acknowledged. There is greater need for more transparent discussion. Media is a major social influencer and contributor to individual behavior. To avoid digital "illnesses" we need to educate ourselves, become visually literate and promote visual intelligence.

The role of media management is crucial in promoting open discussion because it gives the direction to what content is being produced and published. As many examples provided in this thesis illustrate, "media is not merely mindless entertainment apart from life, but rather the very fabric of life itself, teaching values, attitudes, and lifestyles" (Barry 2002, 98). Therefore, media managers should take full responsibility of the visual content though which they promote these attitudes and values within the society. In addition, there are, most of the time, involved the interests of corporations. The ideal goal is transparent diverse multicultural and democratic media rather than centrally controlled corporate commercialized media. Unfortunately, what we see today is the latter version.

Therefore, more critical thinking in challenging the old and the new methods and traditions is needed, because even new is not necessarily always better. This change, like any other, starts from individual level. Changing people in organizations means using leadership skills to enable the change to be successful.

Perceptional skills are a significant skill for any effective leadership because perceptions of leaders, managers and also employees shape the climate and effectiveness of the working environment. What people often observe or assess as your ability to be a leader and your effectiveness becomes their perception, which in turn becomes reality. A leader can have the best intentions and honest concern for his or her employees but if he or she does not communicate it well enough, their perception may work contrary to the right intentions. This can also go the other way around when it can become dangerous. (Otara 2011)

Herman (2016) advices to deal only in objective manner and not let emotions take over:

> "Describe what you see without letting your emotions and assumptions block your perception. Don't divorce yourself from your experience, but be conscious of it and how it might affect you so it doesn't lead you toward faulty assumptions. When we choose to see the world differently, with a critical eye, we are choosing to be exceptional."

Lester (2006) stated that "something is happening. We are becoming a visually mediated society. For many, understanding of the world is being accomplished, not through words, but by reading images." However, we have always been directed by visuals, and now more than ever we use external devices to enhance our experience.

Moreover, a major takeaway during this research was that no matter how much of a development and technological change is trying to be pushed, we should never underestimate and, certainly, neglect our roots, our human nature and history. We should be developing and evolving from it and with it, not against it.

There are several suggestions for further research. This thesis consisted of several topics and theories around visual communication and digital media. The main was how deeply does the media and visual communication affect individuals. This study was mainly analytical based on theories and interviews, but further research could include experiments, such as eye-tracking or brain scans for deeper understanding and effects. The neuroscience of animation is also fascinating topic to explore more.

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APPENDIX 1. INTERVIEW QUESTIONS

Perception / Gestalt

1. What do you see in this picture?

2. What do you see in this picture?

3. *Motion / Perception*

(First showing an image with just dots.) -> a. What comes to your mind?

(Then showing [animated scene](#) (beginning at 5:28. Stop at 5:35.))

b. -> What do you think about this now?

c. (At 6.20): What can you tell me about this figure? (Can you tell me if this is a male or female?)

Aesthethics

4. Showing pictures of (a) [piece of art](#)

b. (2) [photo with sublime](#)

➔ Questions: What kind of feelings the picture awakes in you? Is it beautiful?

Learning/ Memory / Visualization

When you need to learn something, how do you find it and how do you learn it? (so you read it or do you watch a video or illustration)? (do you use multiple sources?)

Digital media

5. How often do you use digital media (digital images, digital video, video games, web pages and websites, social media, digital data and databases, digital audio such as MP3, electronic documents, and electronic books)?

6. Do you ever get tired of digital media?

7. Do you think that there is a dependency on digital media and digital devices? How do you see this is 5 years from now?

8. Do you agree with this picture?

(Author Unknown)

Visual literacy

9. When you see do you ever think critically when watching something on the news or seeing an ad campaign?
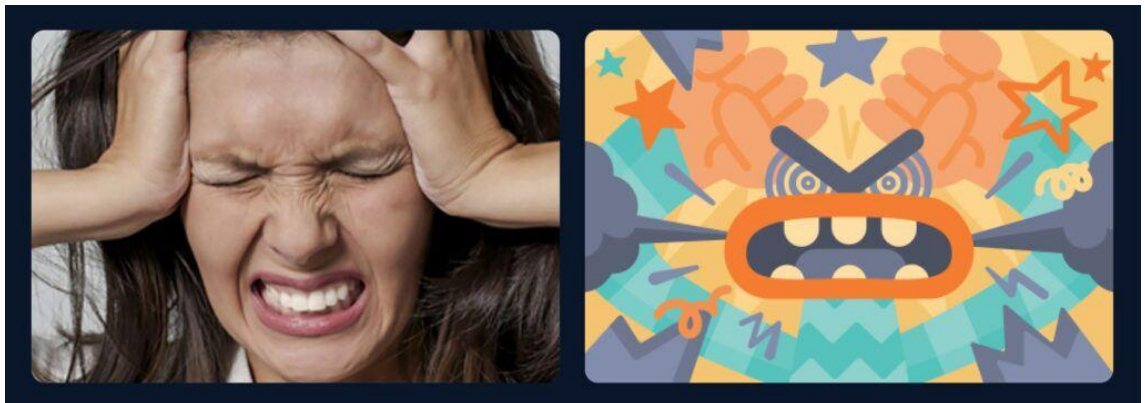
Here is an image.

10. How do you interpret this image?

Now look at this image: -> Does it make sense now?

11. To which image you can relate to
more?

Visual ethics

12. Do you think that nowadays media is ethical? Has it ever been ethical?

13. What do you think this image / ad is saying?
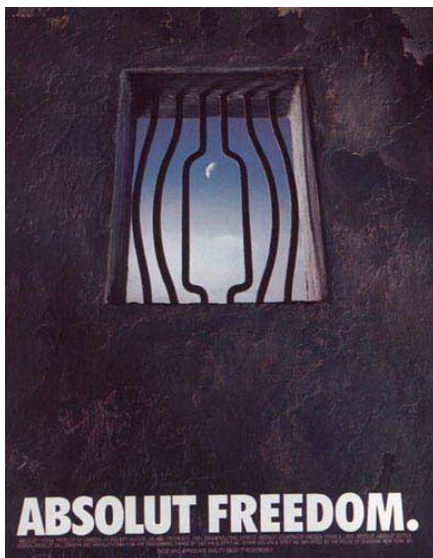
14. What do you think this image / ad is saying? Do you think this ad is appropriate?
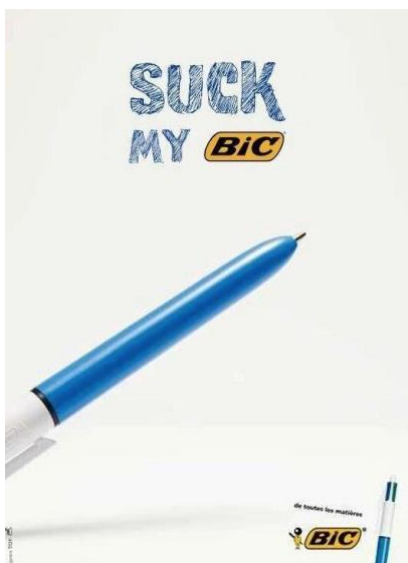
Source: Pinterest
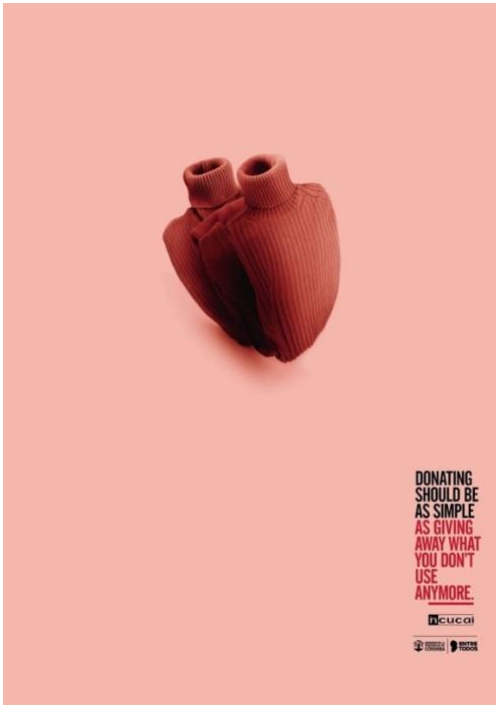
15. What do you think this is promoting?

16. Compare these two ads. Both promote organ donation. Which one, in your opinion, is more ethical?

a.

b.

Source: https://campaignsoftheworld.com/print/incucai-donating-should-be-simple/

17. What kind of feelings do you get, when looking at this image?

Source: https://campaignsoftheworld.com/print/cancer-society-of-finland-smoking-is-a-pandemic/

18. *Motion graphics*

a. Which image do you prefer: *still* :

   or *animated* (https://www.behance.net/gallery/128057689/Journey-to-Mindfulness?sdid=PLHRQ9YG&mv=social&mv2=ownsoc-org)?

b. What do you think about this animated logo?

https://bpando.org/2014/02/28/logo-historiska/

c. What do you think about this animated logo?

https://www.behance.net/gallery/11219015/University-of-the-Arts-Helsinki