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MIND YOUR REPUTATION

Master thesis

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‘You are the average of the five people you spend the most time with.'

Jim Rohn

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In ..... on ..... Signature .....

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Introduction

When reading any book on quantum theory, one's first thought is probably: "Wow, that's a really different world from the one I live in." The same thought may well arise when reading about our minds. Literally thousands of studies show how our minds, the non-conscious, reason, morality and so on, work. But most of them speak about processes that are very different to the ones we consciously experience. Research into how our minds really work has produced similar surprises to those thrown up by quantum research. Every one of us knows the feeling of being unable to make a choice, of consciously considering a range of options and using our reason, weighing up the pros and cons, or being rational, even altruistic. But do these feelings truly represent the reality of how our minds work?

Probably not. Our decisions are most likely made before they reach consciousness and before reason comes into play. Yes, we would like to say that our decisions are made on the basis of feelings. Moreover, our decision-making is strongly influenced by our environment more than we think or are willing to admit. Slight changes in our situation, or the presence of subtle cues and elicited non-conscious feelings, can lead us to behave differently, even oppositely. Moral behaviour is no exception: it can also be influenced by environment. Our morality does not conform to a set list of rules; rather, it is an active process, just like reason. It justifies our behaviour as socially acceptable. Morality enables us to live in groups and forms a basis for our ability to cooperate. Without being seen as trustworthy, we would not be able to cooperate or live with one another. Therefore, it is essential that we care about our reputation and that we are perceived accordingly. Consequently, moral behaviour is influenced by respecting one's reputation and behaving in a caring way. Stimuli can vary from being in the presence of other people to the subtle cue of simply being watched. Studies have shown that behaviour may be successfully influenced using a mirror or a picture of a pair of eyes. What else can induce moral behaviour? We tested other visual stimuli under experimental conditions to assess whether some of them would be more effective than others. Our second aim was to test whether there would be a difference in impact between stimuli. And if so, why? We believe that answers to these questions may enhance the store of knowledge on this phenomenon,

while also lending more weight to the argument in favour of withstanding the discrepancy between two theoretical hypotheses that relate to reputation and self-awareness.

THEORETICAL BACKGROUND

1. Being a conscious witness of oneself

Every day we make many choices. In the majority of cases, we convince ourselves that these choices originate from a conscious consideration from which we select the best option. However, is that true? Do we even have the opportunity to make a choice? Moreover, are we able to influence our choices or behaviour?

Firstly, in this chapter we would like to draw attention to something that is essential for people, that some (but not only) scientists and philosophers still fight for. This essential component is the difference between us and animals: free will. The answer to why free will is important to our study is simple. If the reader is not acquainted with the problems that free will is confronted with, it is impossible to realise the far-reaching consequences and complexity of our results. If we do not contextualise the results, they become simple, basic experiments, even though they highlight the consistency of many neurological, philosophical and evolutionary studies, unlike some long-standing general and social psychological theories. Therefore, in order to speculate upon this topic, the parameters of this thesis need to be scrutinised in depth.

Is the concept of free will still viable? When free will is mentioned, innumerable definitions, concepts, mental representations and expectations are evoked. This indefiniteness can create difficulties for anyone attempting to research the topic. Thus, for the purposes of this thesis, let us define free will as the freedom of choice; which is to say that people may decide and consciously alter their choices after a process of rational re-evaluation (a definition used by Miles (2013)). Are we able to make choices on our own, without direct influence? And, crucially, is it important that we possess free will?

The thought that we possess free will is essential for most people. We experience it every day. We also experience moments when we do not know what to choose. We may consider a number of possibilities before finally opting for one. Or not. Is it possible to have such an experience without having free will?

Determinism, one of the opponents of free will, is based on physical principles. The state of the universe (basically us and everything around us) is wholly determined by the prior state of the universe and the physical laws of nature (Kane, 2011). Determinism does not expect or require people to be unique or special, but rather that they are wholly

determined. In a broader view, people can also be determined by genetics (Damasio, 2010), the environment, culture and so on (Clarke, 2010). Therefore, when a person is fully determined by outside events, his/her previous state, culture, genetics and many other influences, there is no place for free will. However, if we are fully determined, does that mean that we are also fully predictable? It makes sense, because in a deterministic system only one state can result from the previous state. So only one thing can happen next. Except it is not that simple. As Henri Poincaré (1914, p.68) writes: "*If we knew exactly the laws of nature and the situation of the universe at the initial moment, we could predict exactly the situation of that same universe at a succeeding moment. But even if it were the case that the natural laws had no longer any secret for us, we could still only know the initial situation approximately. If that enabled us to predict the succeeding situation with the same approximation, that is all we require, and we should say that the phenomenon had been predicted, that it is governed by laws. But it is not always so; it may happen that small differences in the initial conditions produce very great ones in the final phenomena. A small error in the former will produce an enormous error in the latter. Prediction becomes impossible, and we have the fortuitous phenomenon.*"

Lorenz produced the same result in his weather forecast experiment, in which even the smallest inaccuracy would cause an enormous change in results. In his paper, he writes that in the real system inaccuracies and small errors are inevitable and, as a result, precise long-range predictions seem non-existent (Lorenz, 1963).

What does that mean? Well, even if we are fully determined, it is not possible to predict one's behaviour and probably never be.

The opposite of determinism is indeterminism. Indeterminism assumes that events have no cause and happen by chance. The existence of some state is an outcome of probability. This concept originates from quantum physics, where a 'random event' is a regular term. However, when a person does something out of randomness in the sub-atomic world, is it free will? As Miles (2013) points out, indeterminism offers no more freedom of choice than determinism. Carrying out an action as the result of a quantum event would not be a free action. Therefore, if randomness evokes action, it is consequently causational (by the quantum event), but most certainly not chosen. So when we wish to find a place for free

will, it need not even be located in the deterministic or indeterministic world. To be free to choose, there can be no strict causation or randomness in choosing.

The third concept we would like to mention is libertarianism, of which the main idea is that people are not fully determined and that there is a place for truly free choice. It assumes that one can truly be the original cause of one's action. The problem with libertarianism is in its explanation of how this is made possible. As Miles (2013) summarises, if a person is a cause of oneself, one will be one's author. The previous state of self would be the cause of the actual state. Finally, after infinite regress of previous selves (Strawson, 1994), the initial self, or creator, is needed, which is not possible because of its initial existence (Miles, 2013). Also, Peter van Inwagen (in Miles, 2013) has a problem with the circular reasoning surrounding free will and moral responsibility. In 2000, John Searle wrote a paper where he was not able to prove free will even though he intended to.

Another approach, philosophical compatibilism, tries to find a place for free will in the deterministic world. It is based on the belied that free will is compatible with the deterministic universe (Mele, 2008). For example, Meyer (2011) assumes that choice remains with an acting person who can react freely. How is that possible? As Miles (2013) points out, free will needs to be redefined to be compatible with the deterministic view of the universe. That is why Kant deemed compatibilism to be "wretched subterfuge . . . petty word-jugglery" (Kant, 1788/1956, p. 189–190 in Miles, 2013, p. 4). The general problem with compatibilism lies in its attempts to redefine free will, variously recalibrated as freedom of action (Schlick, 1939), sanity (Wolf, 2013) or regulative control (Fischer & Ravizza, 2000). An even more interesting compatibilist idea is constructed by Dennett (1984), who argues that the important virtue is to understand, predict and interact with the world. As McKenna (2009) writes, according to Dennett, free will is possessed by a thermostat. Miles sees it being owned by plastic toys or fungal infections (Miles, 2013). But if free will were to succumb to such broad definitions, it would become an even more opaque and unresearchable term. Some philosophers even openly admit that they do not understand it (Shariff, Schooler, & Vohs, 2008). More importantly, if we are to correlate the definition of free will with freedom of choice, we must put aside the concept of compatibilism.

Thus, in compatibilism, the main focus is not on freedom of choice, while libertarianism has a serious problem with inner logic and both determinism and indeterminism leave no space for free will. But if there is no place for free will in these theoretical approaches, do we have at least some scientific indications of free will's existence?

Numerous scientists express the opinion that free will is not a viable concept. Roskies (2006) says in an article of his that "salvaging freedom is not as easy as it might seem" (p. 1). Minsky (1986) believes that the physical world does not provide any place for free will and, what is more, that we know the concept of free will to be false. John Horgan (2000, in Miles, 2013) writes that, at least for him, scientific evidence clearly suggests that the concept of free will is an illusion. A specific example of this is given in a study by Soon, Brass, Heinze, & Haynes (2008), which demonstrates through brain activity that a person can arrive at an outcome to a decision up to 10 seconds before he/she becomes aware of it. Indeed, scientific evidence, of which we will give some specific examples later in this chapter, shows us that behaviour is driven by the biological mechanism instead of the soul (Roskies, 2006).

If we do not have free will, why do we experience the act of making a decision? Even if our process of making a choice is not free, the processes of the mind produce the experience of will. We also experience the agency of action at moments when it is not possible. So if we take an approach to will as an experience of the person who acts, free will no longer becomes a problematic concept (Wegner, 2002). The only distinction left to draw is if the action or change in action is experienced (conscious) or not (non-conscious).

Consciousness, as the neuroscientist Antonio Damasio sees it, is a particular state of mind. The mind is a requirement for being conscious because consciousness consists of the mind along with a sense of oneself and knowledge of the existence of one's surroundings (Damasio, 2010). This means that if one has a functional mind and a self-process, then, and only then, can one be conscious. This statement implies that the mind, which is the continuous flow of current and recalled mental images, works first. Damasio (2010) proposes that the source of the mind is not only found in the cerebral cortex but also in the brain stem (the non-conscious part).

Consciousness provides an improvement of adaptability. Nevertheless, consciousness is an advantage in that it is not the only process involved in reasoning and decision-making. Homeostasis is secured long before consciousness occurs, starting with unicellular organisms. If a threat occurs, a unicellular organism can respond, e.g. by moving, even though it is quite certain that it does not have a mind, self or consciousness. The amygdala process information and can activate responses (Le Doux, 1996) and trigger emotions in the absence of consciousness (Damasio, 2010).

As for the brain stem, it processes information before it occurs in the conscious mind. The right anterior insula, part of the brain stem, plays a part in proccessing gathered information from the body (Craig, 2003). Along with other parts (the basal forebrain, basal ganglia, thalamus and hypothalamus), it participates in holding the knowledge base and reconstructing that knowledge during recall. Knowledge (content) is always implicit, just as it is always non-conscious. In other words, we do not have direct access to it. Even if it were non-conscious, it would be able to generate actions, from muscle contraction to influencing the degree of attention we pay to a given task. The well-known "cocktail party" phenomenon is also a good example of non-conscious processing. We are able to recognise interesting topics or words even when we are not paying attention or in a noisy environment. Try saying the word "sex" in a crowd and watch how many strangers turn. Why is that the case? People hear much more than they consciously process and only when something "attracts" the self will it occur in one's consciousness (Damasio, 2010). Therefore, consciousness can work only with pieces of encoded information recalled from non-conscious parts, which can induce activity without conscious oversight. A peculiar example of a non-conscious change in behaviour is provided in a study by Coyle & Kaschak (2012). Their results show that men use different syntactic structures when interacting with women throughout their menstrual cycle. Men are probably not consciously aware of when a woman is fertile and most certainly are not aware of any changes in their syntactic structures. However, still there is a change in behaviour. Another study suggests that men speak more about self-promoting topics especially when women are present (Dunbar, Marriott, & Duncan, 1997). Rosenberg & Tunney (2008) assume that women primed by young male models use a greater share of higher frequency words (smaller linguistic ability). Men primed by young female models in contrast used a greater number of lower

frequency words. And in one study, participants responded differently when answering in their mother language than in a foreign language (Keysar, Hayakawa, & An, 2012). It is apparent then that only part of our actions is conscious, and that there is a large body of evidence that attests to complete, induced changes in behaviour without conscious realisation.

Summary: The future is not set, but you cannot avoid it

To sum up, philosophical approaches to free will (freedom of choice), determinism and indeterminism do not provide any space for free will. Determinism does not allow for it because the strict laws of physics, in which the specific state of the universe together with its previous state merge, can only ever result in one outcome. Indeterminism precludes it since randomness is not equal to freedom; indeed, even if randomness at the quantum level were capable of resulting in a change in the macroscopic world, further actions would still be deterministic. Yet, even if we live in a deterministic (and possibly a partly indeterministic) world, we are not, and never will, be able to confidently predict something as complex as the workings of the human mind. Why? Because of the butterfly effect. With other philosophical approaches like compatibilism and libertarianism, freedom of choice is sidelined and the concept of inner logic raises serious objections.

Even if we experience free will, there are, indisputably, actions and processes that are non-conscious. This is all the more important for us, because even if we could act freely, on principle we would not be able to act under the direct control of our consciousness. The non-conscious parts of our brain act without our awareness of them. In effect, we are only witnesses to our non-conscious processing.

2. The unreliable mind

In the previous chapter, we claimed that many of our decisions or actions are non-conscious and beyond our conscious reach. Our daily experience somehow gives us a different picture of ourselves. We experience thinking about options, sometimes the feeling of indecision, picking one and almost always knowing the reason why. We can also explain why we decide in such a way. But how is it possible to have such an experience?

First of all, as conscious witnesses of our actions, we employ reason, which is not just a tool for making decisions, but as Saletan (2012) writes in one review, more like a lawyer or press secretary who justifies our acts. This means that our reasoning does not precede decision-making, but instead tries to find an explanation after the event. From this point of view, the reason is not the cause of the choice; it only accounts for the choice once the decision has been made. Moreover, it can be far removed from the original non-conscious motive because it serves another purpose. What kind of purpose can reason serve? Let us take a closer look.

In her book 'The Ego and the Mechanisms of Defence' from 1936, Anna Freud (1936/1992) wrote about unconscious mechanisms that are targeted at avoiding menacing representations arising from the superego or id. Defense mechanisms are "*employed by the ego*" (p. 52) to decrease anxiety from these impulses. One such defense mechanism is rationalisation. Freud demonstrates rationalisation as justifying one's behaviours or motivations by unoriginal but acceptable reasons. Rationalisation is ego-syntonic and can "*easily shut the eyes to the discrepancies between cause and effect*" (p. 21).

Therefore, rationalisation was described a relatively long time ago. Along with non-conscious character, it is important that reasons be given independently of original causes and generated after the behaviour (or opinion, motives, etc.) manifests itself. A goal of reason is to justify one's behaviour as acceptable, just like the press secretary. Let us borrow an example from daily life. Tom is a student and used to be successful. One day he fails to score an A in his exam. He starts to think that perhaps missing out on his morning coffee could have had an effect on his performance, as well as the fact that he had felt little sick that morning too. It is more acceptable for Tom to obtain a worse grade because of external factors than to adjudge himself to be insufficient.

A more interesting example involves an experiment describing post-hypnotic suggestion. Participants were hypnotised to feel a pang of disgust whenever they read a certain word. After the hypnosis, they filled out a questionnaire on moral transgressions. They were asked to judge short stories and conclude whether the story was morally wrong and why. When participants felt hypnotic disgust (half of the participants did for each story), they assessed the stories as more morally wrong. Later in this thesis we will return to this experiment. For now, the most important fact to understand is that even though the participants' negativity was artificial, they were able to explain why they though the stories were morally wrong. Moreover, they were also able to explain their opinions in the case of one story that did not contain anything morally dubious in and of itself. Participants invented explanations on the basis of a gut feeling – the feeling of disgust implanted by hypnosis (Haidt, 2013).

However, the mind can go further by touching upon our past and our memories. We believe and experience that which has happened; it becomes imprinted in our minds, like a film. This conception is far from the truth, however, since, as is often the case, memories become slightly altered. One study of twins showed that both twins had some particular memories but that each twin claimed to be the sole protagonist (Sheen, Kemp, & Rubin, 2001). Also, substantial memories can become distorted. In a study on memories of the Challenger explosion, participants exhibited inconsistent memories when reviewing reactions given 24 hours after the event compared to memories recorded 2.5 years after the disaster (Neisser & Harsch, 1992). A number of studies show that memories may be influenced by what we have experienced earlier (proactive interference) or later (retroactive interference). In the case of retroactive interference, some pieces of new information can cause changes to previous memories. For example, one study documented participants who had witnessed a complex situation. Afterwards, half of them received new misleading information about a critical point in the situation, while the other half received none. Finally, all participants attempted to recall and describe the situation. Participants from the first half were much more inaccurate, with the difference in performance reaching up to 40% (Loftus & Pickrell, 1995). Moreover, there was obviously no reason to provide misinformation, where differences in recalling events were often caused by different questions. Participants in another study answered differently when asked the following:

"*About how fast were the cars going when they smashed into each other?*" using the terms "*collided, bumped, contacted, or hit*" instead of smashed (Loftus & Palmer, 1974). People even remembered broken glass, opposite details in appearance, and even details as conspicuous as a building in a scene that contained no buildings at all (Loftus & Pickrell, 1995). Another study showed similar results with regard to how different wording in questions influences the memories of participants (Loftus, 1975). One interesting study showed that participants even reported more or less headaches per week depending on how the following corresponding questions were phrased: "*Do you get headaches frequently, and, if so, how often?*" or "*Do you get headaches occasionally, and, if so, how often?*" (Loftus, 1975, p. 2). Even more subtle differences appeared in the questions, also influencing participants (Loftus, 1975).

Not only objects, but wholly false memories can be induced. One particular example relates to a famous story described by Jean Piaget, a memory of his own, as a child:

"I was sitting in my pram, which my nurse was pushing in the Champs Élysées, when a man tried to kidnap me. I was held in by the strap fastened round me while my nurse bravely tried to stand between me and the thief. She received various scratches, and I can still see vaguely those on her face. Then a crowd gathered, a policeman with a short cloak and a white baton came up and the man took to his heels. I can still see the whole scene, and can even place it near the tube station. When I was about fifteen my parents received a letter from my former nurse saying that she had been converted to the Salvation Army. She wanted to confess past faults, and in particular to return the watch she had been given on this occasion. She had made up the whole story, faking the scratches. I, therefore, must have heard, as a child, the account of the story, which my parents believed, and projected it into the past in the form of a visual memory" (in Loftus, 1996, p. 39).

It is highly probable that everyone has some false memories. Not only can they manifest as fragments of opinion or distorted pictures of a situation from long ago, but they can also take the form of entirely false memories, much like Piaget's. One study deliberately created false memories in some participants who were interviewed about their childhood events and one fictional event (Hyman & Billings, 1998). Using the same design, Loftus (1995) presented four stories from his childhood to a participant. One of them was false. The falsely presented memory was about getting lost in a shopping mall. The participant was

instructed to write about all of them for 5 days, every day. He was told to record the details and any facts he remembered. After 5 days, the participant could remember a number of details about the false memory. He even remembered his thoughts, the appearance of the figure in the story, and so forth. On a memory scale of 1 to 10, he scored a high 8 (very clear). He even had trouble believing that the memory was false.

This mechanism is “one step from disaster”. False memories can be about important events that contain even more solid consequences. Pynoos and Nader (1989) described eyewitness stories about a sniper attack on an elementary school collected from children with memories of the attack. However, even though they had vivid memories, they had not been present during the attack. Some memories were just false. Moreover, false memories can be seen as repressed, because they may emerge during life. Numerous psychologists have described cases in which patients have harboured long-standing, repressed memories about sexual assaults, crimes and so forth (Rieker & Carmen, 1986; Williams, 1987). And as we have already mentioned, patients may score highly in the vividness of their recollections. In the US, there have been a number of accusations of sexual abuse after sudden remembering (Loftus, 1993). Every study we have referenced is associated with negative memories. It has been shown that negative emotions can affect levels of false memories. Positive emotions are protective of distorting memory compared to neutral or negative ones (Brainerd, Stein, Silveira, Rohenkohl, & Reyna, 2008). It is also possible to predict whether true or false information will be reported. Using fMRI, one study showed that activity during encoding of a memory in the left hippocampal tail and left perirhinal cortex was a successful predictor of whether a true or false memory would be reported. Participants first observed a true situation, after which they received pieces of misinformation. When encoding activity was greater during the true situation, true memories were subsequently recollected. When encoding activity was greater during the receipt of misinformation, false memories were reported. Finally, the whole-brain result showed a hemispheric trend. Greater activity was recorded in the right hemisphere for the true situation in the false memory outcome (Okado & Stark, 2005). Another difference was found in one study by Schacter & Slotnick (2004), where neuroimaging and electrophysiological research suggested that sensory activity is greater during true recognition compared to false. The study also indicated that the hippocampus and several

cortical regions contribute to false recognition. These findings corresponded with slight verbal differences between false and true memories. Reported false memories were longer and contained fewer sensory details (Loftus, 2005). However, how is it possible that our memory is so unreliable? Why does our memory play tricks on us?

As Damasio (2010) notes in his book, perfectly faithful memory is a myth. Our memory is prejudiced by our history, past knowledge and beliefs. Moreover, we do not have "a memory of something", disconnected from others. Our memory works dispositionally, only storing cues needed for reconstructing it in the best possible way. We do not have conscious access to our memories because the whole basis for it is encrypted and implicit; so we are aware only of the results of this reconstruction. This basis contains not only pictures of situations we have experienced but also inherited relations, feelings, along with learned skills, movements and so on. In short, it comprises everything we have inherited from our ancestors through evolution and have acquired throughout our lives.

A special category is autobiographical memories, which are essential to us and our being conscious. Even if we do not use them, autobiographical memories form our background, and although ready to be reconstructed lie in our inaccessible consciousness (Conway & Pleydell-Pearce, 2000). In that place, memory reworks itself; sometimes slightly, sometimes greatly. This process is probably needed for self-maturation. Modifying is inevitable during this process as new experiences are acquired. Past events are re-evaluated, possibly gaining different degrees of emotional weight. After every experience in our life, our history is subtly rewritten (Damasio, 2010). That is why we should not rely absolutely on our memory. That is why we should acknowledge that with every fact we consider, our mind compares it with our own set of beliefs and opinions. We can dismiss even the strongest argument because of our store of knowledge and indeed rationalise why it is not valid.

Summary: Let me rationalise

Often our actions originate from non-conscious processes. How is it possible that we are not aware of this? Firstly, reasoning serves another goal, as people traditionally believe. As our PR department, reasoning justifies one's behaviour, but possibly independently of the original cause. The primary goal of reasoning is to offer an acceptable explanation, for oneself or for other people. On the other hand, our memory does not work as a repository.

Memories are stored in encoded, dispositional formulas. Autobiographical memories in particular are alive and re-evaluated with new experiences through a process of self-maturation. Modifying our memories on a small or even large scale is inevitable.

3. Gut feeling first, morality second

In the previous chapter, we focused on a general view of our minds. Our non-conscious is a powerful player in our lives. It is the director of what will occur in our conscious minds. In comparison to non-consciousness, consciousness is the icing on the cake. As many simpler animals show, although the organism can survive without being conscious, it does provide us with better adaptive skills. However, as we have hopefully shown, believing that we act only consciously (and freely) is not a viable option. We clearly commit numerous actions without conscious control. Moreover, we are influenced to a degree by these non-conscious processes on a daily basis. We act on behalf of our feelings, which are the keys to detecting the discrepancy between the ideal and actual state of the organism. We experience complicated emotions, but feelings are simpler, more essential pieces of information gathered from the body. Feelings, such as pain, disgust or pleasure helped us to stay alive long before people became conscious. Not only is human homeostasis dependent on the brain stem, but so are our actions, beliefs, emotions, opinions and so on. Primordial feelings, the primary cause of all that happens in our minds, are generated there (Damasio, 2010). Our feelings are an *éminence grise* rooted deep in our non-conscious, influencing every thought, every opinion that we have.

Where there is a reason, there is also a feeling lying behind it. Reason is like a PR manager who produces acceptable reasons for our behaviour. The post hoc process makes for justification, but is not the primary cause. Of course, moral judgments are the same. Or are they? Is it true that when it comes to the morally disputable situation, we consider it using our list of "what is moral and what is not" using reasoning and reflection? It does not seem all that plausible.

Rationalist models of moral judgment claim that moral reasoning is, or at least ought to be, the cause of moral judgment. This view was maintained for a long time, mainly in philosophy, by Plato, the Stoics, Christian philosophers, Descartes, Leibniz, Kant and Rawls among others (Haidt, 2001). According to Haidt, the psychologist had never operated with reason or as a master until Kohlberg's Piaget-inspired work. Kohlberg was convinced that moral judgments are formed through conscious, even verbal consideration (Haidt, 2001). Turiel thought that harm is the key to recognising whether an action is morally wrong or not and the key that people use to unlock their judgment. One of his studies shows that

participants who talk about harmful consequences judge abortion, homosexuality, pornography and incest as more morally wrong than participants who are not so attuned to harmful consequences (Turiel, Hildebrandt, and Wainryb 1991, in Haidt, 2001). However, there is a problem on a neurological level, for if we know that feelings always lie in wait, how can morality produce such a difference?

Studies that take the opposite approach seem to amass more convincing evidence. Haidt, Koller and Dias (1993) compiled a study on judging morally disputable stories. Participants were told to distinguish which stories are morally wrong and why. The stories were constructed harmlessly, but in such a way as to evoke disgust (such as eating a dead pet dog, eating a piece of chicken that had been used for masturbation, cleaning a toilet with a national flag). Even if the stories were harmless, most participants deemed such behaviour to be morally wrong. The important point is that the affective reactions of the participants were useful in predicting their judgments. As Turiel would contend, disgust, but not harm, was the powerful tool in invoking moral denial of questionable behaviour.

Let us return to Haidt's study (2013) mentioned in the previous chapter, where post-hypnotic suggestion evoked momentary disgust. Participants who felt disgust judged the stories to be morally wrong even in the story that contained no morally disputable content. In other words, non-conscious feeling overplayed cognition. Their answers as to why the action in the neutral story was morally wrong were sometimes absurd, given only to defuse their gut feelings of disgust. What are the consequences of such findings? How far-reaching is this feeling of disgust?

A study conducted by Helzer and Pizzaro (in Liberman & Pizarro, 2010) showed that simply the presence of a hand-sanitising dispenser was capable of influencing participants to be more conservative in their political, moral and social opinions. Or another example of the power of disgust is seen in a study by the same authors, in which a foul smell released during an experiment generated more negative responses towards gay men in comparison to responses recorded in a non-smelling environment (Liberman & Pizarro, 2010). The study suggests that being conservative is a complex trait and connected to the ease with which one feels disgust. Moreover, the study showed that conservatives tended to be more easily disgusted than liberals (Liberman & Pizarro, 2010).

Being influenced by disgust is nothing new in terms of political tactics. It is common practice in propaganda, for instance, to picture an enemy like rats, snakes, spiders or child-eating monsters. As a particular example from history, Jews were usually pictured on posters as snakes, devious caricatures, or accompanied by insects. Presently in Europe, there are numerous websites which present stories showing out-group members (e.g. Muslims) in a disgusting way, variously described as "*rapists*", "*dirty livestock*" or "*invaders*" through the use of invented stories or pictures (Houdek, Valůch, Bittalová, Podhola, & Škardová, 2015). Christians in several countries use disgust-invoking pictures for anti-abortion campaigns.

Why disgust? When we view the stimuli that evoke disgust, such as vomit, pus, wounds, faeces, it is certainly in our best interests to avoid them. When disgust is invoked, an adaptive response from our non-conscious emerges: avoidance. This becomes advantageous when a person is confronted with something unknown or foreign. In another of their studies, Liberman and Pizarro (2010) found that college student participants who felt vulnerable to disease responded with more xenophobic opinions. Disgust as a primordial feeling lies behind our morality and can influence our judgment. It seems that morality is primed with the same case as reason – designed for justification.

There are other ways of influencing one's morality. In his book, Ariely (2008) writes about finding more moral behaviour in participants tempted with the opportunity to cheat after writing the Ten Commandments than before. Although it was not important whether participants were believers or not, even subtle cues reminding them of their morality improved the cheating ratio. We provide another example in our study using a mirror. Something as simple as the presence of a mirror decreased the frequency of transgressions among university students (Žihlavníková, 2013). Again, even the subtlest cue of being watched (watching oneself) decreased cheating.

Ultimately, when it comes to rational morality, gut feelings and subtle cues are more important for us than universal rules. We feel what is wrong and use moral reasoning after the event.

Gut feelings also cast a shadow over moral consistency. There are numerous philosophical or psychological hypotheses that attempt to find some consistent patterns lying behind our moral behaviour, some of which are more plausible than others. Let us take an example of

the famous trolley problem. Even slight changes in administration changed the moral approval of participants (Greene, 2013; Nichols & Mallon, 2006). Differences were dependent on cause of death (as a side-effect or means), a mechanism (indirectly or directly) or their combination. Participants judged the very same effect of a hypothetical occurrence, the death of five people, differently. We are more vulnerable to slight changes in our environment than we think. It means that relying on one's moral principles regardless of the context is imprudent. And even if morality is useful and provides us with an evolutionary advantage, it is not enough for every situation.

Summary: Feeling "wrongness"

Feelings gathered from the body are the basis for everything we experience throughout our lives. Morality is neither an exception nor a consistent list of rules. It does, however, justify the feeling of what is wrong or good to an acceptable extent. But if gut feeling is so important, then one can never be morally consistent. A slight change in initial conditions can lead to a different outcome, as evinced by the trolley problem. So why did morality evolve? Firstly, it provided us with a variety of advantages. But one of the reasons could be that the emotion of feeling "wrongness" based on disgust, and the consequential avoidance of that which is disgusting, foreign or unknown, helped us to prevent infection and illness. It also served as a necessary requirement for cooperation.

4. Purposeful morality

In which situations does morality provide an advantage? We previously mentioned the health-related advantages of avoidance upon invoking disgust. Also, out-group (foreign and unknown) avoidance seems to be broadly accepted. However, morality is necessary for cooperation. As Greene (2013) observes, morality evolved in order to promote cooperation within groups. We need to trust our friends not to murder us in our sleep just because we have a few valuable possessions. In situations when cooperation provides an advantage (to outcompete another group), we are able to share, be altruistic and help others within the group. Morality can think of "us" ahead of "me", but also of "us" ahead of "them" (Greene, 2013). We experience situations when we think only about our good because no advantage is to be gained through cooperation (cheating in an exam). But we are also able to cooperate because of advantage (collective cheating through the division of study topics among group members) and widen a group that recognises the potential of advantage (cooperation in inter-faculty competitions) and so forth (interuniversity rivalry, national rivalry, etc.). As seen in the following example, we quickly and intuitively form groups, even though these groups are not rigid. In an experiment about recognising groups, Kurzban and colleagues (Greene, 2013) found that some markers are more important (gender) than others (team membership or race) and, moreover, that we favour our own group, regardless of whether it may be randomly assigned. This means that we are designed to recognise groups, even if they are only temporal. But importantly, it does not imply anything about group selection; cooperation offers advantages for every party concerned.

One of the primary units of cooperation is family. Generally speaking, we favour family members. One study that examined last wills in Canada showed that more property was bequeathed to close family members than wider family or friends (Smith et al., 1987; in Barrett, Dunbar, & John, 2002). In accordance with the previous statement, investing in family and cooperation within family presents not only advantages for individuals but also enhances the chances of genes present on both (every) sides. It is one of the bases that cooperation is rooted in. Hamilton (1963) adds an important idea about family – a gene causing cooperation will be selected and altruism will be preferred among family only when a gain for the receiver(s) outweighs a loss to the provider. If we are to exaggerate, the life of the altruistic person provides for the lives of two siblings, not less. It means of course

ultimately that because it is a complex system, many aspects must be balanced – reputation, emotion, previous history and upbringing among others.

We usually feel little sympathy for out-group individuals. The current European immigration crisis shows us that in Central Europe the foreign, unknown, out-group (unfamiliar non-Christian cultures) threat is such a strong stimulus within our non-conscious that xenophobic moods are now being awakened among the population. Other oft-cited examples include historical anti-semitism in Europe and racism in the US.

However, when cooperation provides benefits, we can even cooperate with the enemy. Ridley (1998) describes an example from the Western front during the First World War. Soldiers from two sides grew acquainted with each other and started cooperating. Why? Cooperation provided mutual benefit; relative peace.

In conclusion, we can flexibly divide people into groups and we favour the people in our group, the strongest of which is family. Sympathy and cooperation between groups occur only when they provide some advantage.

From a biological point of view, in-group behaviour is associated with oxytocin, a neuropeptide produced in the hypothalamus and released into both the brain and the bloodstream (De Dreu et al., 2010; Greene, 2013; Kosfeld, Heinrichs, Zak, Fischbacher, & Fehr, 2005; Zak, 2011). Experiments with intranasal administration of oxytocin show that participants are influenced by in-group behaviour but not by out-group behaviour. Oxytocin increases cooperation (Greene, 2013), trust (Kosfeld et al., 2005), “tend and defend” responses in favour of in-group members and defensive reactions towards out-groups (De Dreu et al., 2010). In another case, participants who did not naturally release oxytocin during an experiment proved unresponsive to cooperation. Oxytocin also influences the amygdala in lowering activation of emotional stimuli (Rodrigues, Saslow, Garcia, John, & Keltner, 2009). Moreover, participants with a larger number of receptors for oxytocin (OXTR) exhibit more empathy skills and lower cardiovascular reactivity to immediate stress (Rodrigues et al., 2009). Therefore, oxytocin plays a role in empathy as well as stress reduction. Moreover, testosterone inhibits oxytocin. In a study using testosterone, male participants became more selfish and were also more likely to use their money to punish others for being selfish (Zak, 2011). Therefore, testosterone makes us

more prone to think less of others, less prone to trust other people, and increases the probability of our cheating and consequently punishing others.

Everything is inside of us. From birth, we carry basic moral principles based on our genes. Studies show that adults, children and also monkeys share negative associations towards out-group members. Even six- and ten-month-old infants prefer individuals that help one another to individuals that hinder one another. They also prefer helping each other than not at all (Hamlin, Wynn, & Bloom, 2007).

The roots of morality, empathy, sympathy and cooperation are also contained among children and specifically non-human mammals. Children have been shown to reject economic games when inequity presents itself (Blake & McAuliffe, 2011) and numerous primatologists note that, surprisingly, humans share common caring behaviour with primates (in Greene, 2013). There is an interesting video by Frans de Waal (2011) that shows primates and monkeys reacting to unfair behaviour. De Waal (2011) claims that we share a simple morality with other species. Of course, our morality is more complex, but it springs from this essence. We need morality if we are to uphold cooperation. It seems the tenet *homo homini lupus* is not what science observes; certainly not in situations when cooperation provides an advantage.

Summary: Born to cooperate

Morality is a necessary predisposition for cooperation. The person who cooperates and creates groups holds an advantage over the out-group individual. The closest group is family, especially because cooperation improves the chances of reproducing genes more than through cooperation within a non-familiar group. The ability to cooperate and, consequently, our morality are innate traits that we share with, at least, non-human mammals.

5. Let me impress you

Ever since groups first formed long ago, cooperation has shaped us and our minds. There is no progress without cooperation; without the division of labour. There are examples of tribes which, because they were not large enough to divide labour, started to regress (Greene, 2013). If one must do all one can to survive, no time is left to develop new tools, make jewellery or practise science. But if cooperation is necessary for progression, what is the necessary requirement for cooperation?

Dunbar states (2004) that we share advanced forms of social cognition and deep sociality with our subgroups: mates, primates and monkeys. Firstly, to live in a group, we need to know what others know and feel. This ability enables us to understand why others behave in a particular way and helps us to predict their reactions. Without the theory of the mind, we are not able to connect with each other, much less cooperate. The second requirement is trust. We need to trust that the other side will not deceive us, that our mate will do his/her job. Since the earliest groups, individuals have needed to trust that other group members would not be killed in their sleep or that they would be warned of danger. In the event of danger, it is in our interests not to be alone. But despite the advantages to group life, there are also some disadvantages. In primates, too large a group can lead to higher risk of exposure, higher demands on coordination, and so forth (Dunbar, 2004). Briefly, social life requires balancing one's shot-term gains against the long-term payoffs reached through cooperation. Short-term discomfort, e.g. paying taxes, later brings advantages in the form of emergency medical services. Primates balance sociality through the formation of matrilineal alliances which work on the basis of strong trust and commitment (Dunbar, 2004). For Dunbar, this commitment is also created through social grooming. Grooming releases endogenous opiates (Keverne, Martensz, & Tuite, 1989); even when hugging and kissing, oxytocin is released (Kosfeld et al., 2005). Oxytocin enhances trust and generous behaviour. When we groom, we feel good, trust our mates more and care more for each other; thus closing the full circle of cooperation. Interestingly, physical contact in our culture is more likely among females.

Trustworthiness is a vital trait for group living; the smaller the group, the more vital it becomes. Smaller groups have just enough faces for us to remember who has deceived us in the past. Being perceived as trustworthy has held, and still holds, advantages in the form

of cooperative partners, opportunities and payoffs gained through cooperation. However, people do not go around with a "cooperation rating" imprinted on their foreheads. Therefore, we need to assess whether a given person is worth our trust or not before entering into cooperation. One way this is achieved is through appearance. We are equipped with a set of skills that enables us to recognise the cheater or the free-rider on appearance (Frank, Gilovich, & Regan, 1993). But there is a more effective way of coming to know a potentially cooperative individual: language. Approximately two thirds of conversation time is spent on social topics, otherwise known as gossip (Dunbar, 2004). Laughter has a similar effect to grooming (for apes, this not only pertains to hygiene, but also to the strengthening of social bonds, such as scratching your partner's back), as it releases endogenous opiates (Dunbar et al., 2011) and thus plays a similar role in bonding and commitment.

Language (or the amount of time we spend gossiping) brings about another plus side, which is that we receive useful information about others and thereby gain access to more information than we would ever experience first-hand on our own. We are given the opportunity to share others' experiences of a particular individual by becoming acquainted with how he or she has behaved in the past. We are not able to see into someone and gain experience of "his/her true self". Therefore, priming ourselves with the available information is the only possible way of doing so. Moreover, through language we can advertise ourselves, too. Most of the time, when discussing social topics, we devote ourselves to advertising our own advantages as friends (Dunbar, 2004). Through sharing good deeds we can increase our reputation, and the reputation of being trustworthy is essential. As Milinski (2016) notes, reputation is the universal currency that can be used in any type of social interaction. Moreover, the amount of gossip shared helps motion us in direct cooperation towards other cooperative individuals (Sommerfeld, Krambeck, & Milinski, 2008).

Take the everyday example of shopping on the internet. We have no guarantee that another party will behave morally. However, what we can verify when paying on eBay or any other e-shop is through accessing history in the form of ratings from previous customers. Ratings tell us how a person or shop has behaved, and this reputation is what gives us more probability about the result of our cooperation. Interestingly, we use our

knowledge of reputation in particular environments more generally (Botsman & Rogers, 2010).

Keeping up a solid reputation is nothing new. In medieval Europe, having a good reputation was crucial in maintaining one's social standing; and conversely, losing one's good reputation would result in the imposition of legal and social disabilities. Even during this time, how others thought about you was extremely important (Fenster & Smail, 2003; in Jones, 2006). As Fenster and Smail note: *"On some level, the importance of talk as a device for social regulation in Western societies has never been lost. It remains a social constant, even if its social role is commonly disparaged in modern societies*…" (p. 221). To date, managing one's reputation remains a major objective of gossip (Dunbar, 2004).

It is clear that caring about our reputation is highly important for our social life. Indeed, studies support this idea across research fields. Game theory demonstrates that players who interact with each other are more generous and more moral. Moreover, open-ended games support cooperative behaviour because the prisoner's dilemma is ruled out (Binmore, 2007). Life in a group, friendship and so forth are open-ended interactions dependent on our previous behaviour. We can earn more if we cooperate; but we stand to lose more than we might gain if we fail to cooperate. If we refuse to cooperate and instead act selfishly, we may lose our cooperative partner and potentially additional partners owing to our bad reputation.

Moreover, reputation goes hand in hand with many kinds of altruistic behaviour. People tend to help others who are more than likely unable to help in return, even though these acts are investments in establishing a good reputation. It can help to convince potential partners to start cooperating with an altruistic individual, since there is a strong relationship between reciprocity, trust and reputation (Sommerfeld et al., 2008). Reputation scores from Stack Overflow are used in CVs to convince future employers that a potential employee is trustworthy and skilled. One study has shown that when accompanied by a woman, a man tends to give more money to a beggar (Barrett et al., 2002). Charity lists and pro-social advertising projects are all indirect investments. However, the payoffs will occur later on through reputation. People are more willing to cooperate when their behaviour is observed by others and will use reputation when choosing their partners (Oda, Niwa, Honma, & Hiraishi, 2011). Therefore, one sure-fire way

of influencing behaviour is through reputation. But making your act public will result in even more moral, cooperative behaviour. Alternatively, you can at least give a cue that your act is public.

There are numerous studies showing how cues can play a role in influencing one's behaviour, even in situations where nobody is there to observe. An audience, recording your own voice or someone else's, a mirror, a picture of a pair of eyes, a video of people, etc. all have the cue of being observed in common (Bateson, Nettle, & Roberts, 2006; Beaman, Klentz, & Diener, 1979; Duval & Wicklund, 1972). These stimuli are known as implicit reputation cues (Cai, Huang, Wu, & Kou, 2015). However, in some experiments stimuli are not effective in enhancing moral behaviour. How is that possible?

Let us look at how the brain works. Neurological research has been carried out in order to determine whether we are hard-wired to automatically detect eye-gazing. Over the posterior temporal scalp, responses were stronger for isolated eyes than whole faces (Bentin, Allison, Puce, Perez, & McCarthy, 1996). Moreover, researchers have found that faces elicit greatest activity in regions within the anterior and posterior fusiform gyri (Haxby, Hoffman, & Gobbini, 2000). Activation can be elicited by unfamiliar faces (Clark, et al., 1994; in Bentin et al., 1996) or even through pareidolia (Liu et al., 2014). This may mean that "*face recognition uses a specialized neural subsystem for processing physiognomic information*" (Bentin et al., 1996, p. 2).

Finally, the most important finding reveals that naturalistic stimuli generate stronger responses than schematic or line drawings. Also, moving objects provoke stronger responses than motionless, visual stimuli and the size of a stimulus produces no differences in responses (Bruce, Desimone, & Gross, 1981).

We may safely assume that our brains are hard-wired to care about our neighbour's gaze, which is a necessary prerequisite for managing reputation. Because if we do not sensitively recognise that somebody is watching us, we have no reason to act representatively. The strongest stimulus is probably motion, eyes are stronger than the whole face and our response is not size-dependent. Finally, even pareidolia prompts the brain to respond: "Somebody is here".

We now understand that we are influenced by numerous factors and that we act non-consciously. But there is yet another complicated component to the brain. In spite of not being aware of it, we also work under two systems: System 1 and System 2 (Kahneman, 2011). System 1 is automatic, effective and programmed to be adaptive so that it provides a quick response to events unfolding around us. It is faster than System 2, always on and lies behind the majority of our decisions. System 2 requires more effort and mental capacity but operates more methodically. Reading simple words written in our native language is under the control of System 1, which is to say that we are not able to *not* read it. System 1 is always in the background, making decisions, forming responses, opinions and predictions, while realising automatised activities across our lives. Although it is energetically efficient, it is nonetheless simplified and biased. System 1 uses clues that appear upon first glance, but it does not factor in other, more complex or difficult explanations. Facial expression of disgust upon seeing something disgusting, or even the very thought of it, is induced by System 1. That flash of disgust can make a difference to our behaviour, as we have learned in previous chapters. System 1 is the cause of our actions and involves more than we can experience. It is non-conscious, heuristic; a secret agent, if you will. It is always alert to the eyes in the room. When somebody is watching us, we will behave representatively.

On the other hand, System 2, which is not as fast or as efficient, can focus attention and take control when activated. Normally, System 2 has the last word, but it works on System 1's first conclusions (Kahneman, 2011). The gap between the automatic response of System 1 and the slower consideration of System 2 is the place where the subtle cues of being watched work. Being watched adds more money to the honesty box (Kahneman, 2011) and reduces bicycle thefts on campus (Bateson et al., 2006), etc. System 1 sees these eyes and activates behaviour "when observed by others". After some time, slower System 2 evaluates the stimulus as the "only picture" and the influence-by-stimulus stops. A meta-analysis performed by Sparks & Barclay (2013) confirmed that prolonged exposure to stimuli put a stop to its effect, meaning that visual stimuli have limited influence, but give us enough time to remain moral.

On the other hand, there is a second approach to the "watching-eyes" results. Psychological theories claim that the effect of implicit reputation cues attributes of self-

awareness (more in Žihlavníková, 2013). Moreover, non-conscious self-awareness can endanger one's self-esteem. In social psychology, the theory of objective self-awareness (Duval & Wicklund, 1972) assumes that a stimulus such as a mirror can lead to a person experiencing his/her own consciousness. Consequently, this process automatically initiates self-evaluation, i.e. comparing the self to the standard. If discrepancies are detected, negative feelings arise, and these negative feelings have been shown to motivate us to correct ourselves. Silvia & Duval (2001) assume that self-evaluation can occur without conscious self-awareness. When attention is directed to the self, the comparison between the self and the standard automatically leads to aversion or correction. Self-awareness theory is comprehended as friendly and illustrative. It is simpler to imagine that a person, when looking into a mirror, feels self-aware and evaluate his actions within a frame of self-esteem, or else non-consciously. Cai et al. (2014) add that the "*image of watching eyes in this study may lack an effect on moral identity, while the mirror can activate one's inner moral identity through self-awareness and therefore decrease dishonesty*". If these psychological theories are true, how quickly does self-awareness have to kick in and, consequently, self-evaluation? Moreover, how does prolonged exposure erase the effect of these stimuli?

In conclusion there is extensive documentation of at least two different approaches, but there are still plenty of questions left unanswered. This thesis intends to resolve at least some of these aspects.

Summary: You need a face or you need a name

Where there is cooperation, there is also trust. We trust other people based on the information available to us. Information is gathered from impressions, gossip, history and other sources. It is apparent that reputation is essential for living in a group, and to be surrounded by information in forming an opinion about how trustworthy a person is. There are copious ways through which we spread signals that we are trustworthy, e.g. altruism, charity, cooperation with strangers, etc. However, in situations when no one is around, it is advantageous to be immoral. Therefore, many (if not all) of us conform to at least two types of behaviour. It is interesting that our brain does not need a whole "living" person to switch behaviour to the representative mode, since subtle cues are enough. A mirror, a picture of a pair of eyes or any other implicit reputation cue, leads to a change in behaviour,

making us more compliant with rules. This is perhaps caused by System 1 and System 2 processes. System 1, a fast, non-conscious process, evaluates signals from the brain, which perceives eyes as if somebody is looking and automatically changes our behaviour to be compliant and, consequently, representative. This idea is more congruent than the psychological theory of self-awareness.

EXPERIMENTAL PART

6. Introduction and aims of the study

By making an act public we behave more representatively. Alternatively, we may make an act at least feel as if it is public. As the previous studies described show, a picture of a pair of eyes or a mirror can cause a change in behaviour, making us more compliant, moral or generous (Bateson et al., 2006; Kahneman, 2011; Žihlavníková, 2013). How is that possible? We assume that our brain is hard-wired to care about the other's gaze. Through visual perception, we register the following quick and strong impulse: "Somebody is watching me. I must behave properly." However, not all brain areas respond equally to visual stimuli. The eyes in isolation elicit a stronger response than the whole face (Bentin et al., 1996), and naturalistic stimuli lead to stronger responses that schematic or line drawings. Also, moving objects effect stronger responses than motionless visual stimuli (Bruce et al., 1981). In light of that knowledge, it is reasonable to ask whether every stimulus is equally effective. Moreover, are there other possible stimuli that have not yet been examined? The hypothesis (Cai et al., 2014) that written rules work better than implicit reputation cues is worth testing. We wanted to examine whether or not written rules (so common in our daily lives) would somehow bring about compliance. **Consequently, this study was aimed at testing the influence of visual stimuli on compliant behaviour. The first aim of the study was to test different visual stimuli to determine whether they would produce compliant behaviour**.

Let us assume that neuronal findings can manifest themselves in reputation research. In other words, all stimuli are not equally effective. The strongest stimulus is probably motion (mirror) and the eyes are more effective than the whole face. A non-facial stimulus is even less effective. This assumption feeds into our **second aim, which was to compare the effectiveness of selected stimuli on compliant behaviour**.

There is a theoretical discrepancy between the social-psychological and evolutionary approaches. Self-awareness theory claims that a stimulus such as a mirror leads a person to experience his/her own consciousness. Consequently, this process automatically instigates a process of self-evaluation, i.e. comparing the self to the standard. If some discrepancies are detected, negative feelings are engendered. These negative feelings give us motivation to correct ourselves. This theory is well established, but we have alluded to the basic problems with the consistency of these experimental findings. If self-awareness theory is right, then each stimulus is as effective as the next. If not, then the strength of a cue such as a mirror helps to reveal one's 'inner moral identity' (Cai et al., 2014). **Our third aim was to formulate new arguments based on research results as a way of shedding more light on this problem.**

To fulfill our aims, we selected five visual stimuli and a control group: a **written rule** reading "take only one reward", an image of the **silhouette** of a person with no facial details, a schematic image of a **face**, a detailed image of a pair of **staring eyes** and a **mirror**. The images are documented in the appendix.

Hypotheses

The first proposed hypothesis is that there will be differences among stimuli in their chances of transgressing the stated rule. This hypothesis has two parts: the first contends that stimuli will vary in their effect on the odds of transgression compared to the control group; the second states that stimuli will vary in their effectiveness when compared to each other.

7. Materials and methods

To accomplish our aims, we chose an experimental design. Participants (N=232) were drawn from a population of Czech university students residing at university dormitories in Prague (Strahov, Hvězda, Větrník and Kajetánka) and Olomouc (17. listopadu, Šmeralova, Bedřicha Václavka and J. L. Fischera). The population was chosen for the purposes of developing previous research (both ours and external). Convenience sampling was used.

The experiment was divided into two parts. The first part took place in a room in which participants were requested to fill in a trail-making test. This test was chosen because of the relatively short time it would take to complete and because no personal data were required. The test was used only to make participants feel that they deserved a reward. We did not score the test in any way, as we were not able to maintain standardised conditions for the test.

After the test, the examiner told participants to go to a second room, where they were allowed to take **one** reward away with them. In the second empty room, there was a table with plenty of rewards. We ensured there were a high and varied number of rewards. One of the reasons was to attract not only "sweet tooths", but all types of students. In the selection of rewards, we were inspired by Ariely (2008). Chocolates, cookies, pens and cigarettes were offered. The reason for the high number of rewards was to assure participants that no one would discover how much someone had taken. In five of the six groups, a stimulus was placed behind the rewards to act as a "watch-person" while taking the reward. The last object was hidden behind a camera and positioned at an angle so that only the rewards and hands were recorded to ensure participants were fully anonymised. Thereafter, there was no further interaction with the participant, ensuring once more that the participant could be certain that the examiner would have no chance of finding out if he/she had transgressed.

Ethical aspects

No stressful situations were induced in any part of the experiment; participants were tested with their consent, and no personal data were recorded. Although video recording was used, the camera was placed at an angle so as to record the hands, a small part of the lower body and the rewards only, making it impossible to identify the participant in any way. After the experiment, we used dormitory public notice boards to provide complete information about the procedure with attached contact details. We were contacted by one individual, who expressed interest in the results.

Binary logistic regression

Since transgression of a rule is a binary variable (which can be either one of two values, where 1 means "transgression" and 0 means "compliance"), we used logistic regression to verify the impact of various stimuli. In common linear regression, we assumed a linear relationship between the dependent and independent variables and operated according to the following model:

$$Y = A + B_1x_1 + B_2x_2 + B_3x_3 + ... + B_nX_n$$

Our task was, using the collected data, to estimate the values of the coefficients A, B_1 and B_n as to which fitted the data sets the best. In the simplest case, we used only one predictor X, with the equation being formed as follows:

$$Y = A + Bx$$

Unfortunately, this model can only be used under rather strict assumptions. One of them is that the dependent variable Y is measured on an (at least) interval scale and is, therefore, continuous, with all of its differences between units having the same value. Using the binary dependent variable, this model is not suitable. In fact, we were interested in whether a change to the independent variable would affect the value of the dependent variable in a predictable way in terms of the different **probability** of that value, i.e. preferably a linear relationship.

Although the probability is a continuous value, its disadvantage lies in the likelihood of it being "trapped" in the interval between 0 and 1. Were we to seek a linear relationship between an independent variable X and a probability of the certain value of the dependent variable p(Y =1) for many values of X, this relationship would lack reason. However, if we express the probability as the odds, we simplify the equation. The odds are calculated as a ratio of the probability of a certain phenomenon and its complement. In our case:

$$odds(Y = 1) = p(Y = 1)/p(Y = 0)$$

The chances can possess values from 0 to infinity. However, they cannot be negative. That is why they need to undergo one more mathematical operation: transformation into their natural logarithms. Instead of the original independent variable, we have a derived independent variable as a model input: the logarithm of odds (log odds). This transformation is entirely suitable, because from the logarithm of odds (log odds) we can conclusively calculate the probability of the phenomenon we are interested in. However, when we transform the probability into a variable that can, in theory, be any arbitrary value from the area of real numbers, we can create our linear model as the following formula:

$$\text{Log odds}(Y = 1) = A + Bx$$

Alternatively, if we have more independent variables:

$$\text{Log odds}(Y = 1) = A + B_1x_1 + B_2x_2 + B_3x_3 + ... + B_nX_n$$

Naturally, we could rewrite these equations directly for the chances:

$$odds(Y = 1) = \exp(A + Bx)$$

hence

$$odds(Y = 1) = \exp(A + B_1x_1 + B_2x_2 + B_3x_3 + ... + B_nX_n)$$

If we wanted to express the probability that Y = 1 directly, we would have to use the definition of chances:

$$odds(Y = 1) = p(Y = 1)/(1 – p(Y = 1))$$

From this formula, we can easily arrive at:

$$p(Y = 1) = odds(Y = 1)/(1 + odds(Y = 1))$$

When we fill in the previous equation with the formulas for chances odds(Y=1) with use of predictors, we would arrive at the known expression for the "logistic function":

$$p(Y = 1) = \frac{e^{A+BX}}{1 + e^{A+BX}}$$

Because of the logistic function, which expresses the relationship between the values of the predictor (or more predictors) and the probability of a certain value of the dependent variable, this modeling method is called logistic regression.

Let us now attend to the practical problem of whether the presence of a certain visual stimulus affects the probability that a participant exposed to this stimulus will break the current rule. First, we calculated the **null model**, where the only predictor of the behaviour of the subject was a random variable (an average chance of breaking the rule). If we have a model:

$$Log\ odds(Y = 1) = A + Bx$$

or

$$odds(Y = 1) = exp(A + Bx)$$

then when using the "zero" model, we do not take into account the values of the predictor X, and we thus estimate only the parameter A:

$$m0: odds(Y = 1) = exp(A)$$

Naturally, this model is not interesting from a theoretical point of view; it only shows the probability that participants transgress the rule regardless of any stimuli having affected them. The null model is used only for the sake of comparison, with the most elaborated models taking the predictors into account. However, these more elaborated models differ according to the supposed character of the independent variable (or variables): First, the simple, categorical (e.g. nominal) variable is supposed. Second, we suppose that there is a certain ordering among the categories implied by the theory, and this ordering is at the interval scale. The model comparison is based on the Chi-squared distribution of the -2 log likelihood (-2LL) difference between the models, as well as the difference in the Akaike Information Criterion (AIC).

If, for example, the total number of subjects is N=232 and 46 of them transgress the rule, we can easily calculate the chance of transgressing the rule:

$$odds(Y = 1) = 46/(232 – 46) = 46/186 = 0{,}247$$

Coefficient A is the logarithm of this number, A = -1.397.

This model has no theoretical value just by itself; we used it only as a reference for other models, in which we took the value of the predictor into account. One of the criteria we used to evaluate the predictor influence is the Akaike Information Criterion (AIC).

The other model takes into account the influence of the predictor, which acquires categorised, but not ordered values. The question is whether this model explains the observed data better than the null model without the independent variables. A simple comparison of the models with the Chi-squared test applied to the residual deviations shows that $\chi^2(5) = 16,556$ a $p(>Chi) = 0,0054$. Similar information can be obtained from the decreased AIC.

Comparison of the stimuli

As a measure of the influence of a particular stimulus on the chances of transgression, we used the log odds, odds ratio and subsequent significance testing. In the case of a binary outcome, the natural logarithm of the odds of transgression (i.e. log odds) is a better measure than probability because log odds is measured on the real number scale. The odds of transgression are estimated from the observed frequencies. If, for example, N = 100 and 40 of the participants transgress the rule (the rest 160 were compliant), their odds of transgression will be estimated as

$$Odds(transgression) = 40/160 = 0,25$$

We compared the stimuli using the odds ratio (i.e. the ratio of odds of transgression between the target and baseline stimuli). In the first step of the analysis, we took the control group as the baseline. The odds ratio is thus a measure of the effect size of the particular stimulus compared with the control group.

In the second step, we compared each two conditions resulting in 15 comparisons (i.e. odds ratios). In each case, we test the null hypothesis H_0: OR = 1 against the alternative H_1: OR > 1 (it is thus a one-tailed test). Because we tested 15 hypotheses (one-tailed tests) simultaneously, the alpha-level correction for multiple comparisons was required to be performed. We used the Sidak correction of the alpha-level -

$$\alpha SID = 1 - (1 - \alpha)^{(1/15)}$$

$$\alpha SID = 0,003414$$

8. Results

After the experiment, we collected data from the hidden camera placed in the room with the rewards. We tested the frequency of transgression among participants (university dorm students). After the exam, participants were instructed to move to the second room and take one reward. Where the participant took one reward only, it was recorded as compliant behaviour. But where two or more rewards were taken, it was collectively recorded as a transgression. Because we wanted to test whether stimuli could affect behaviour, data were grouped according to the stimulus presented at the exact moment when taking the reward.

Altogether, we tested 232 students in six groups (Tab. 1). The number of students in each particular group varied between 34 and 46. Almost 20% of the students transgressed the rule, with the highest probability of transgression measured in the control group (38%) followed by the group exposed to the written rule (28%). The lowest probability of transgression was recorded in the group exposed to the staring eyes and mirror (9% and 10% of transgressing students, respectively).

	Behaviour			% of
Stimulus	**Compliant**	**Transgressing**	**Total**	**transgression**
Mirror	36	4	40	10.0%
Staring eyes	42	4	46	8.7%
Face	27	7	34	20.6%
Silhouette	29	5	34	14.7%
Written rule	26	10	36	27.8%
Control group	26	16	42	38.1%
Total	186	46	232	19.8%

Table 1: Observed numbers of compliant and transgressing participants grouped according to stimulus and the probability of transgression in such groups.

Effectiveness of visual stimuli

As we can see from the above, the number of participants who transgressed differed from stimulus to stimulus. To find out whether stimuli were effective in influencing more compliant behaviour, we used odds ratios and logistic regression. Firstly, we wanted to compare stimuli with the control group; therefore, in the first step of analysis, we took the control group as the baseline. The odds ratio is thus a measure of the effect of the size of a particular stimulus compared with the control group (Table 1).

It is evident that when the written rule lowers the chances of transgression by just over a third compared to the control group, the presence of the eyes and mirror lowers the chances of transgression to less than a fifth of the original probability.

The results of logistic regression show that the null model has an AIC value of 233.07. The other model takes into account the influence of the predictor, which acquires discrete values resulting in an AIC value of 226.52. The coefficient estimates (Estimate column in Tab.2) express the difference between the chance of transgressing under the set conditions between one group and the control group. Although it is expressed in logarithmic form, it is clear from the Estimate column that the chance of transgression lowers from the written rule to the eyes and mirror in that order. In other words, not all of the stimuli have the same effect on participants.

	Estimate	Std. Error	z value	Pr(>|z|)		OR (exp/controlc)
(Intercept)	-0.486	0.318	-1.528	0.127		
Written rule	-0.470	0.489	-0.961	0.337		0.625
Silhouette	-1.272	0.579	-2.197	0.028	*	0.280
Face	-0.864	0.530	-1.631	0.103		0.421
Eyes	-1.866	0.612	-3.049	0.002	**	0.155
Mirror	-1.712	0.615	-2.782	0.005	**	0.181

Table 2: The results of logistic regression and odds ratios for each stimulus show which stimuli were effective in reducing transgression.

In order to be more visible and user-friendly, we here illustrate the results (Fig. 1). The odds ratios, which lowers from the control in the direction of left to right, show which stimuli were most effective. It is evident that only the "blue" stimuli scored significantly. The silhouette, mirror and eyes significantly influenced more compliant behaviour in comparison to the written rule. The other red stimuli scored insignificantly.

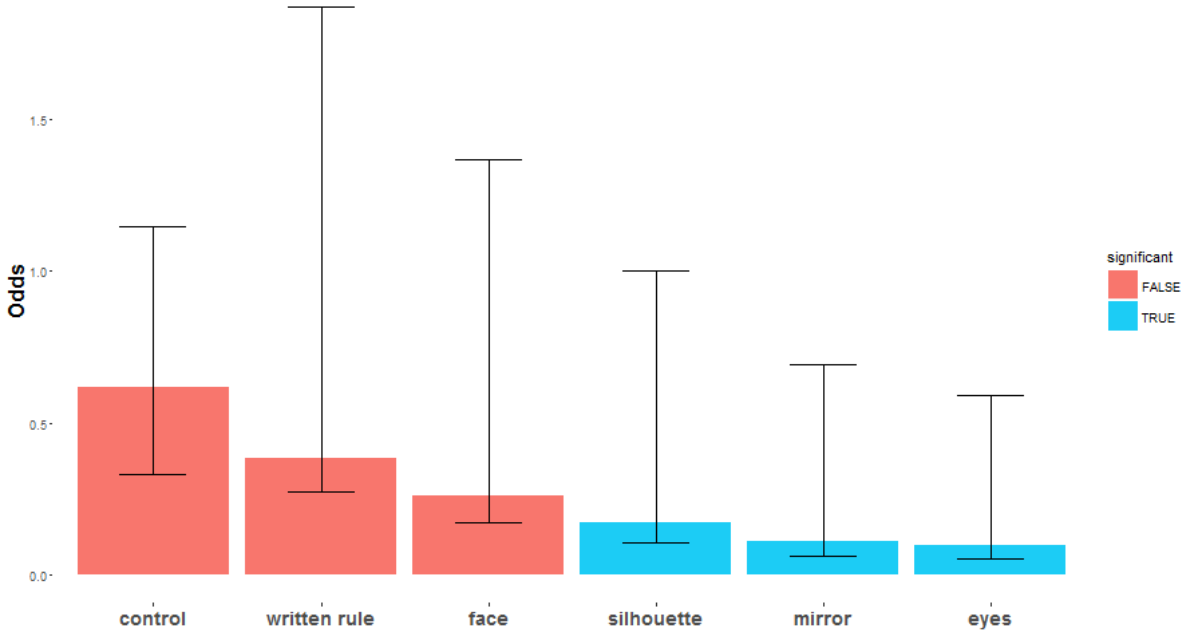

Figure 1: The odds ratio results for each stimulus show the stimuli that were significantly effective in reducing transgression.

Comparison of stimuli

We were subsequently able to fulfil our second aim of comparing stimuli with each other. By measuring the effect of size, we were able to determine how strong an influence a given stimulus would have on participants in comparison to the other. We compared the stimuli using the odds ratio (i.e. the ratio of odds of transgression between the target and baseline stimuli).

The odds ratio for transgression falls below the OR = 1.000 diagonal (Tab. 3), while the odds ratio for compliant behaviour lies above. The lowest OR, i.e. the strongest influence, was for the eyes and mirror compared to the control group. The highest OR, i.e. the weakest influence, was for the written rule compared to the control group. This means that the written rule had almost no influence on behaviour.

	Control group	Written rule	Silhouette	Face	Eyes	Mirror
Control group	**1.000**	0.625	0.280	0.421	0.155	0.181
Written rule	1.600	**1.000**	0.448	0.674	0.248	0.289
Silhouette	3.569	2.230	**1.000**	1.504	0.552	0.644
Face	2.374	1.484	0.665	**1.000**	0.367	0.429
Eyes	6.462	4.038	1.810	2.722	**1.000**	1.167
Mirror	5.538	3.462	1.552	2.333	0.857	**1.000**

Table 3: Odds ratios related to each combination of stimuli. The odds ratios compare the effect of the size of respective stimuli on correcting behaviour, with stimuli tabulated in rows and columns.

In terms of significance (Tab. 4), only the eyes and mirror significantly influenced the behaviour of participants in comparison to the control group (using $\alpha SID = 0.003414$). The differences between both stimuli (mirror and eyes) and the written rule is obvious, but this does not provide enough evidence for rejecting the null hypothesis. One-tailed testing was chosen because the alternative hypothesis states that $OR \neq 1$ but that $OR > 1$ in order for the rule to be compliant.

Post hoc multiple comparison testing shows that some stimuli had a weak effect on the behaviour of participants. Out of all tested stimuli, only the eyes and mirror were able to significantly affect respondent behaviour. The written rule, face and silhouette were not nearly as effective as the eyes and mirror.

	Control group	Written rule	Silhouette	Face	Eyes	Mirror
Control group		0.168	0.014	0.051	**0.001**	**0.003**
Written rule			0.094	0.242	0.015	0.027
Silhouette				0.263	0.203	0.270
Face					0.069	0.105
Eyes						0.418
Mirror						

Table 4: Post hoc multiple comparison testing (p-values of one-tailed test) shows the significance of stimuli in affecting behaviour (critical $\alpha SID = 0.003414$).

9. Discussion

Our aim was to analyse the influence of visual stimuli on compliant behaviour and our results produced similar results to the majority of international research. The mirror and the image of a pair of eyes had more of an influence on engendering compliant behaviour of participants than the written rule.

One study claims that visual stimuli do not influence behaviour. It carried out four experiments, from which three sets of results were non-significant for eye-like stimuli (Cai et al., 2014). Looking closely at their methods, it is worth mentioning that in one of the experiments a background stimulus was visible for 30 seconds during a break between tests, which is quite a long time to be exposed. In contrast, in a previous experiment of ours, participants were exposed to a stimulus lasting less than 10 seconds at a minimum and usually under 7 seconds; moreover, we ensured exposure to the stimulus was not as obvious (Žihlavníková, 2013). Another limitation can pertain to the nature of the stimulus. One group of researchers chose an Egyptian-like eye line drawing for theirs, which is not the strongest stimulus for stimulation as made clear by another study (Bruce et al., 1981). In their discussion, the researchers suggest that "*explicit reputation cues (e.g., verbal messages, cameras) and increasing individuals' moral identities may be a better way of preventing dishonesty.*" (Cai et al., 2014). On the basis of these findings, we decided to test more than two of the most common stimuli under the same experimental conditions. We tried to find out whether explicit cues would be stronger than implicit ones.

Even for comparative analysis between stimuli, the eyes and the mirror were the only stimuli that significantly influenced compliant behaviour. The written rule lowers the chances of transgression insignificantly compared to the control group, while the presence of the eyes and mirror lowers the chances of transgression to less than a fifth of the original chance. From the detailed results, it is clear that the effect of the written rule is negligible. Indeed this result contradicts the assumption put forward by Cai et al. (2014), who used what we revealed to be the weakest of the tested stimuli. We deduce that an explicit verbal written statement is not stronger than an implicit reputation cue. This naturally leads to the question whether there is a way of enhancing its influence by adding, for example, a pair of staring eyes or other effective stimuli, as demonstrated in a study by Bateson et al.

(2006). Even carrying out an experiment in a natural setting would deliver more interesting results.

Another aim of our study was to analyse different visual stimuli that have not been used yet to see whether they would evoke compliant behaviour. Along with the mirror, the pair of eyes and the written rule, we examined the effect of a silhouette and the image of a face. We expected that the written rule and silhouette would not be successful in lowering transgression but that the face, mirror and eyes would. Our analysis, however, shows that not only the mirror and eyes, but also the silhouette significantly lowered transgression compared to the control group.

Looking at these results, the first discrepancy between the expected and the actual results is the higher effectiveness of the silhouette over the face, although one could argue that the difference in our sample was observed in two participants only. From these results, the question arises whether the face would score as significantly in a larger sample. Nevertheless, our results may have arisen from the characteristics of our chosen stimuli. A detailed neutral face (see appendix) is probably not as threatening as the silhouette of a person standing "in shadow". Also, our image of the face may have been not entirely suitable given that the vector line drawing ends around the collarbone, creating a rather unrealistic stimulus. On the other hand, the detailed and complete silhouette seemed to make a much more realistic impression on all participants. Neurological results are another factor that may have an effect. Since the face is not as strong a stimulus as the eyes, similarly it may also be less effective than the whole body. The EBA, a region in the right lateral occipitotemporal cortex (Downing, Jiang, Shuman, & Kanwisher, 2001) which responds selectively to visual images of human bodies and body parts (except faces), may produce a stronger response to the silhouette than "facial area(s)" when confronted with an entire face. These ideas would be worth testing in a larger sample.

There is an assumption that neuronal findings can manifest themselves in reputation research. In one study, event-related potentials associated with facial perception were recorded with scalp electrodes. Participants were exposed to stimuli, such as unfamiliar human faces (photos), isolated face components, inverted faces, distorted faces, animal faces and other non-facial stimuli. A negative potential (N170) was larger over the right hemisphere and largest over the posterior temporal scalp. It is worth pointing out that eyes

presented in isolation elicited significantly more neural activation than entire faces. Distorted human faces elicited a similar response to normal faces, whereas other non-facial stimuli failed to elicit N170 (Bentin et al., 1996). These important findings show that naturalistic stimuli cause stronger responses than schematic or line drawings and that moving objects cause stronger responses than motionless visual stimuli. Finally, one study also showed that the size of a stimulus has no bearing on differences in response to it (Bruce et al., 1981).

This means that not all stimuli have an equal effect. Our results support such an assumption by showing differences between stimuli. We consider these results especially interesting given that we have not found any research that connects brain studies with behavioural correlatives. In accordance with the studies mentioned above, we observed that the effect of the eyes were much stronger that the whole face (which scored insignificantly) and that the eyes and mirror were the strongest stimuli.

One difference observed in our neurological studies is that no differences occurred when comparing the effect of the eyes and the mirror. Why were they both equally strong? The use of a larger sample may have helped tp shed more light on this point and we hope to conduct further investigations on that score. In any case, a pair of staring eyes or a moving object is a naturally potent stimulus that can attract the attention of most participants. A mirror reflecting additional movement also serves as a very attractive stimulus, not only for us, but even for animals. In one experiment, magpies spent up to 19 minutes observing themselves in a mirror (Prior, Schwarz, & Güntürkün, 2008) and the many reactions of wild animals to mirrors have been documented (Caters, n.d.). It is obvious that the mirror somehow attracts our gaze and that we share this characteristic with other animals. System 1 tells us that when we look at another member of our species, when it moves or when it nears us, the stimulus becomes so strong that we are unable to ignore it. Also, a stimulus (the eyes or the mirror) that looks directly at us is always an eye-catching moment and alerts us more than the subtle presence of the person who does not pay attention to us. Indeed the face attracts us from the very first hours after birth, with the eyes attracting us the most, especially the direct gaze (Gliga & Csibra, 2007). In fact it is hypothesised that infants are principally attracted to the human face because of the eyes, which also play a major role in communication and are the strongest facial stimuli for others (Neumann,

Spezio, Piven, & Adolphs, 2006). It seems that for our non-conscious at least, the mirror and the eyes could be equally important stimuli.

Galvanised by previous experiments (e.g. Cai et al., 2014), we chose a detailed drawing of a pair of staring eyes, similar to Bateson et al (2006). According to neurological research (Bruce et al., 1981) and our results, we assume that more realistic drawings are more likely to improve the probability of bringing about compliant behaviour.

However, we assume these results are also an argument against self-awareness theory. From what we can gather it seems that our results correspond with the belief that hard-wired reputation management acts as an *éminence grise*, exerting influence by watching. How could the theory otherwise explain that not all stimuli are equal? Irrespective of whether there is a silhouette or a pair of staring eyes in front of us, they are not the same. Even if a visual stimulus only serves the purpose of a self-evaluating starter, we still do not know why some stimuli work better than others. Cai et al. (2014) write that the "*image of watching eyes in this study may lack an effect on the moral identity while the mirror can activate one's inner moral identity through self-awareness and, therefore, decrease dishonesty.*" The mirror did not affect people more than other stimuli, even if it should have. The mirror, after all, should lead one toward a process of self-evaluation and better reflect the discrepancy between actual and prescribed behaviour. However, the staring eyes lowered transgression similarly. In light of these unanswered questions, we assume that the reputational approach together with System 1 and System 2 are sufficient. System 1, as a quick, heuristic, non-conscious process based on brain perception and evolutionary patterns, corrects behaviour to be representative before morality comes into play. Interesting arguments can be formulated in favour of experimenting with prolonged mirror exposure. We already know that the image of the eyes lost its influence during longer exposure (in line with the logical and precise process of System 2), but we did not find any similar experiment using a mirror. If the mirror were to succeed through long-term exposure, it would mean that some inner morality would have to come into play during the System 2 process. On the other hand, if we were to conduct an experiment in which participants are divided according to how strongly System 2 affects them and how influenced they are by stimuli, it would provide some new information about the link between implicit reputation cues and systems. A study that experiments with the use of

costumes could also bring interesting results. Deindividuation, described by Zimbardo (2007), shows that people dressed in costumes change their behaviour. Would there be a difference in the mirror's influence on behaviour if the participants were dressed in costume? If so, it could undermine reputation theory. Finally, studies have found that stress leads to higher cortisol levels (McEwen & Sapolsky, 1995), which in turn affect our cognitive functions (Vedhara, Hyde, Gilchrist, Tytherleigh, & Plummer, 2000). In stressful situations we are not good at logical thinking, because System 2 does not work as well as in calm situations. An experiment that suppresses System 2 through stress could also lead to higher or longer-term influence using visual stimuli.

One limitation of our study could arise from the convenience sampling used and the absence of strict distribution between places and stimuli. That said, in defence of convenience sampling, only three people from a total of the enrolled 235 refused to be part of the experiment. Although we tried to distribute stimuli in order to be equally presented in each building, not every person tested came for the reward, so it could not be strictly enforced. There is a slight possibility for confounding, and we recognise that there is room for improvement. Moreover, there is a slight possibility that some of the participants had heard about the experiment during our presence in the dormitories from participants who had already been tested. Fortunately, we were present in each dormitory for only about two hours and nobody wanted to talk about the stimuli, so we do not assume confounding to a large degree. Also, from our previous camera experiments, we saw that stimuli drew almost no attention from participants. Finally, participants may have been able to find out the true purpose of our experiment, which is a notable objection. Give that each stimulus hung on a wall suspicion may have been aroused. However, this objection still does not answer the question of differences between stimuli in accordance with neurological research and numerous international studies (Sparks & Barclay, 2013). Also, our previous experiments with children, for whom we were given parental consent to record (Žihlavníková, 2013), show that a mirror when placed in an even more suspicious way draws almost no attention. Even so, if one of the participants were to have found out our true purpose, behaviour would have been directed either toward compliance or transgression anyway. In this case, we do not see any way of filtering this possibility.

Our results show that some stimuli significantly engender more compliant behaviour than the written rule. How is this possible? We believe that images invoke the perception of being watched. Consequently, this perception leads to the likelihood of cooperative behaviour more so than would arise spontaneously in the same environment. To understand the mechanics, we need to focus on how our brain works. The brain regions respond in the same way; whether observed by a real face, a picture, or even in the case of face pareidolia (Liu et al., 2014). In the first moments, the quick automatic response from the older non-conscious and heuristic System 1 adjusts behaviour so as to be representative of the given surroundings. After a while, the brain finally recognises that the picture is different to a real person and at that moment visual stimuli stop being effective. This assumption corresponds with one meta-analysis that studied the relation between the effect of stimuli and length of exposure (Sparks & Barclay, 2013). We suppose this process could probably also be applied to the mirror. All these findings support the hypothesis that we are hard-wired to care about our reputation – the key to our social life. We are very sensitive to cues that indicate our behaviour is being observed because it brings with it the advantage of being perceived as a cooperative individual. Cooperative individuals have better opportunities in future interactions (Sommerfeld et al., 2008). We are built to cooperate because it is the most convenient way to progress. We are not motivated by higher good or ultimate morality, but the simple care for our reputation. Even an image of a pair of eyes can influence us without us being aware that it does (Cai et al., 2014). How much are we influenced in our daily lives by our surroundings without realising it? Probably much more than we could imagine. So just as an image of a pair of eyes can influence behaviour, simply the presence of an experimenter could also play a role in cooperative experiments: a valuable effect to consider when designing future studies dealing with cooperation.

Looking forward, we believe that prospective experiments should be directed at testing connections between biological findings and behavioural correlates. It would be interesting to test longer-term exposure to mirrors and the increasing perceptual salience of stimuli aligned with neurological findings under natural settings. Finally, the relation between stress-related hormonal changes and compliant behaviour would also be worth testing.

10. Conclusions

Our experiment shows that more than two stimuli are capable of invoking compliant behaviour, of which each has a stronger influence than the standard written rule. The most effective stimuli were the image of a pair of staring eyes and the mirror, each exerting a similar effect. With the mirror and eyes (when present in the room), chances of transgression were **less than a fifth of the original chances.**

These findings provide an interesting perspective on implicit reputation cues. It is possible that compliant behaviour in this situation is rooted in the brain's response to being watched. Consequently, it means that all stimuli are not as equally effective. Our results support such an assumption by showing differences between stimuli. In accordance with neurological studies, the effect of the eyes was much stronger than the whole face (which scored insignificantly), with the eyes and mirror featuring as the strongest stimuli.

11. Summary

Freedom of choice. Everyday experience suggests us that we are free to choose. However, science is not so sure. There are couple of approaches to the free will. Determinism is based on physical laws, when our state is fully determined by the history and physical laws. There is no special place for people, because we live in physical world, so we are fully determined by it. In this approach, history such as genetics, the environment, previous experiences, culture and so forth along with physical laws how we work are like precise clockwork, fully determined with no place fo freedom. Indeterminism has an opposite stand. Because of quantum random event, there are states originated from pure probabilty. However, if something is caused by a pure randomness, it still is not free. The third concept, libertarianism, states that people have pure free choice. Unfortunately, they have problem with logical explanation how is it possible. The last mentioned approach, philosophical compatibilism, tries to find a place for free will in the deterministic world. They try to find a place for free will in deterministic world, but the result is defining free will otherwise, not as freedom od choice. Free or not, we still consciously experience decision making process. How is that possible? For answering it, we can abandon free will for more perspective approach.

If we distinct actions to conscious or nonconscious, there is no need for free will. And still we will be facing interesting problem. Consciousness provides an improvement of adaptability, but majority of homeostatic needs are secured nonconsciously. Not only homeostasis, though, but majority of processes. Consciousness, like icing on a cake, lies on nonconsious knowledge basis, processes that root mostly from feelings gathered from body, memories and so forth. Majority of processes are nonconscious. There are numerous studies that support this idea and also another number of studies show how much external factor can influence one's behavior without conscious realization.

It is possible thanks to reason. Reason is, though, not an instrument for decision making, but process for justifing what nonconsciousness decided. It makes reasonable explanations afterwards. It works for all aspects of our functioning. Morality is not an exception. Studies show that it is not set list of rules, but active process, just like reason. We feel what is wrong and use moral reasoning post hoc. Morality can be also be influenced by slight changes in the environment. Even not perfect, morality is neccesary. It enable us to live in groups and

makes a base for cooperation. Morality evolved to promote cooperation within groups. We need to trust our mates to not being murdered in sleep, because we have some valuable possessions. In situations when cooperation provides an advantage, we are able to share, be altruistic and help others within the group. Cooperation and consequentially morality are an innate trait that we share with, at least, non-human mammals. However, without being seen as trustworthy, we would not be able to cooperate or live next to each other.

The reputation of trustworthiness is essential to have. Game theory showed that players that interact with each other are more generous and more moral. We can earn more when we cooperate and can lose more than one gain when we are not cooperating. If one refuse to cooperate and start acting selfishly, he possibly lose his cooperating partner and additionally possibly another partner because of reputation. Reliable way how influence one's behavior is through reputation. Make one's act public and the result will be more moral, more cooperative behavior. Alternatively, give a cue that act is public. We mentioned studies that show which cues can play a role in influencing one's behavior even in situations where people are alone. These stimuli are known as implicit reputation cues. These cues use how our brain is hard-wired for reputation management. A gap between automatic nonconscious processes of System 1 (elicited signal that there are eyes watching, so I need to mind my reputation) and slower precise reasoning of System 2 (it is only picture, so I can behave as alone).

System 1, automatic, effective, and biased to be adaptive, provides a quick response to what is happening. It lies behind the majority of our decisions. Energetically efficient, heuristic, but simplified and biased. System 2 requires more effort and mental capacity but operates more methodically. Not so fast and not so efficient, it can focus attention and take control when activated. It is System 1 that switch behavior to be representative because of a picture of eyes or a mirror. After some time, slower system 2 evaluate stimulus to be "not real person" and the influence by stimulus stops. As we mentioned, meta-analysis confirmed that prolonged exposure to the stimuli stopped its effect. How it is possible from neurogical level? Brain regions response in similar way when observed by real face, just a picture, or even a pareidolia. This response is very quick and equivalent to System 1. So before advanced analysys arise that one see only a picture, automatic response to being observed is already in progress.

On the other hand, social psychologists have another theory about visual cues. The theory of objective self-awareness assume that e.g. visual cue lead person to experience of own consciousness. Consequentially, this process automatically start self-evaluation process - comparing self to standard. If some discrepancy was detected, negative feeling arise and can endanger self-esteem. In this state, the comparison between self and standard will automatically lead to aversion or correction to be in compliance with the standard. However, this theory has no explanation why prolonged exposure erase the effect of stimuli. Moreover, if it is true, participants should respond equally to different visual stimuli, because every one of them should start self-evaluation process. Alternatively, mirror should score much more than other stimuli because of appeal on inner moral principles seen in it.

To find out, we chosed two aims of this study. Firstly, to test different types of visual stimuli that could work and we did not find being used in other studies. Five visual stimuli were chosen along with control group. Our second aim was connected to neurological research and also self-awareness theory. We wanted to find out if there is an increase in effectivity of the stimulus along with increasing salience of the stimulus. Following neurological studies, stimuli were were chosen: the **writen rule** „take only one reward“, picture of a **silhouette** of a person without face details, schematic picture of a **face**, detailed picture of **staring eyes**, and **mirror**. We expected that there would be difference in effectivity. We set up an experiment. Participants (N=232) came from a population of Czech university students.

Experiment had two parts. The first part was proceeded in a first room. Participants were requested to fill in Trail making test. This test was chosen for short filling time and anonymity. Test was used only to make participants feel that they deserve a reward. We did not score the test in any way, conditions for testing was not able to keep standardized. After the test, examiner told to participant to go to the second room, where they could take **one** reward. In the second empty room, there was a table with plenty of rewards, in number and variety. Chocolates, cookies, pens, and cigarettes were offered. One of the reason is to attract not only “sweet likers”, but all students. High number of rewards was used to assure participant that no one would discover how much one had taken. In five of six groups there was stimulus placed behind rewards in height to “watch person” during

taking the reward. The last object present in the second room was hidden camera. It was placed in angle that only rewards and hand were recorded, so participants were fully anonymized. After that there was no further interaction with participant, so again, participant could be sure that examiner would have no chance to find out if one transgressed. From results we can see that the mirror, picture of eyes and silhouette caused significant change in behavior. The presence of eyes and mirror lowers the chances of transgression to the **less than a fifth of the original chances**. In the second analysys we assumed that it is not the same if there is silhouette in front of us or staring eyes. These results are in accordance to neurological findings. Our system 1 is much more sensitive for look than just neutral cue. We assume these results to be arguments against self-awareness theory. A limitation could arose from convenience sampling and not strict distribution between places and stimuli. There is slight possibility for confounding and we recognize room for improvement.

Our results show that it is not negligible which stimulus is chosen and for practical usage we can recommend mirror and picture of staring eyes. Future investigation in naturalistic conditions could bring even more information in this field.

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APPENDICES

Appendix 1: Abstract

Appendix 2: Abstrakt

Appendix 3: Stimuli

Appendix 4: Document for registration diploma thesis

Appendix 1: Abstract

Title: MIND YOUR REPUTATION
Author: Romana Žihlavníková
Supervisor: Ivan H. Tuf
Number of pages and characters: 66, 123 142
Number of appendices: 4
Number of references: 89

Every day, we experience making a choice. However, is this experience equivalent to what really happens in our minds? Probably not. It is highly likely that our decisions are made before they reach consciousness and before reason comes into play. Our decisions are made on the basis of feelings. Moreover, we are strongly influenced in decision-making by our environment, more than we think or are willing to admit. Slight changes in situation, the presence of subtle cues or elicited non-conscious feelings can generate different, even opposite behaviour. Moral behaviour is no exception; it can be influenced by environment, too. Our morality does not conform to a set list of rules; rather, it is an active process, just like reason. It justifies our behaviour as socially acceptable. Morality enables us to live in groups and forms the foundation for our mutual cooperation. Without being seen as trustworthy, we are not able to cooperate or live with each other. It is essential to care about our reputation in order to be seen as trustworthy; consequently, moral behaviour is influenced when we manage our reputations. Stimuli can vary from the presence of another person to the simplest, subtlest cue of being watched. Studies show that behaviour can be successfully influenced by a mirror or an image of a pair of eyes. But what else can induce moral behaviour? We tested other visual stimuli under experimental conditions and discovered that the image of a pair of eyes, a mirror and the image of a silhouette significantly reduce transgression. We first wanted to determine whether some would be more effective than others and, if so, why? Our second aim was to determine whether the influence would be dependent on the salience of the stimulus. We conclude that the responses of participants were dependent on the salience of the stimulus: the more salient, the more compliant the participant.

Key-words: morality, reputation, evolution, transgression

Appendix 2: Abstrakt

Název práce: Mysli na reputáciu
Autor práce: Romana Žihlavníková
Vedoucí práce: Ivan H. Tuf
Počet stran a znaků: 66, 123 142
Počet příloh: 4
Počet titulů použité literatury: 89

Rozhodnutia robíme každý deň. Je však naše prežívanie rozhodovania totožné s tým, čo sa naozaj deje v našej mysli? Možno nie. Množstvo vecí nasvedčuje tomu, že naše rozhodnutia sú vykonané ešte predtým, než sa nám voľba dostane do vedomia . Skôr, než sa k slovu dostane rozum. Rozhodujeme sa na základe pocitov. Na naše rozhodovanie navyše výrazne vplýva okolie, a to viac, než sme ochotní pripustiť. Aj malé zmeny okolností, prítomnosť nepatrných podnetov či vyvolanie nevedomých pocitov môže viesť k inému až opačnému správaniu. Morálne správanie nie je výnimkou a tiež naň vplýva okolie. Našu morálku netvorí iba zoznam pravidiel. Je to aktívny proces, podobný mysleniu. Ospravedlňuje naše správanie tak, aby bolo sociálne prijateľné. Morálka nám umožňuje žiť v skupinách a vytvára potrebný priestor pre spoluprácu. Ak by sme sa nepovažovali za dôveryhodné bytosti, nemohli by sme spolupracovať ani žiť vedľa seba. Dbať na svoju reputáciu je pre nás kľúčové. Preto môžeme morálne správanie ovplyvniť vytvorením situácie, ktorá v nás spustí potrebu dbať na svoju reputáciu. Podnety môžu byť rôzne – od prítomnosti iných ľudí až po nenápadné stimuly navodzujúce pocit, že nás niekto pozoruje. Štúdie ukázali, že správanie možno úspešne ovplyvniť prítomnosťou zrkadla alebo obrázka očí. Aké ďalšie podnety môžu ovplyvniť morálne správanie? V experimentálnych podmienkach sme testovali iné vizuálne stimuly a zistili sme, že porušovanie pravidiel výrazne znižuje obrázok očí, zrkadlo a obrázok ľudskej siluety. Sú niektoré z nich účinnejšie než ostatné? Ak áno, prečo? Našou druhou úlohou bolo zistiť, či je vplyv podnetov závislý od jeho výraznosti. Ukázalo sa, že čím výraznejší stimul bol, tým výraznejšie kleslo porušovanie pravidiel účastníkmi.

Kľúčové slová: morálka, reputácia, evolúcia, porušovanie pravidiel

Appendix 3: Stimuli

Appendix 4: Document for registration diploma thesis

Univerzita Palackého v Olomouci
Faculty of Arts
Akademický rok: 2013/2014

Studijní program: Psychology
Forma: Full-time
Obor/komb.: Psychologie (PS)

Podklad pro zadání DIPLOMOVÉ práce studenta

PŘEDKLÁDÁ:	ADRESA	OSOBNÍ ČÍSLO
ŽIHLAVNÍKOVÁ Romana	Bernolákova 1, Košice	F100039

TÉMA ČESKY:

Mysli na reputáciu

TÉMA ANGLICKY:

Mind your reputation

VEDOUCÍ PRÁCE:

RNDr. Mgr. Ivan Hadrián Tuf, Ph.D. - EKO

ZÁSADY PRO VYPRACOVÁNÍ:

1. Studium literatury zabývající se problematikou reputace
2. Analýza zdrojů věnovaných problematice morálky, teorii mysli, reputace, self-awareness
3. Vytvoření výzkumného designu
4. Realizace experimentu s nejméně 30 participanty v jednotlivých kategoriích
5. Analýza získaných dat kvantitativně
6. Kritická diskuze teoretických východisek, výzkumných metod a výsledků výzkumu

List of recommended literature:

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