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Intuitions and Ecological Rationality

Intuiciones y racionalidad ecológica

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Abstract

Through an ecological approach, it can be said that a person tries to identify the optimal action for him- or herself by a set of different possible actions through intuition. The debate about the 'dual process theories' takes up this idea and postulates two different ways to evaluate decision possibilities: A logical-analytical path and an intuitive (Magrabi and Bach, 2013). Predominantly, it is assumed that the logical-analytical path is related to rationality and therefore the path to strive for in rational decision-making. However, in science it has been shown that bounded rationality is to be assumed. Therefore, the question of the extent to which emotions or feelings, and in this context also intuitions, are rational has come to the fore (De Sousa, 1987; Evans and Cruse, 2004).

In this paper, intuitions are considered as a feeling with intentionality: Intuitions always refer to an appropriate environment and are directed toward a decision that results in an action. With Damásio (1994, 2013) it can be shown that an intuition is a feeling that excels in acting as a cue or signal. With the assumption of an ecological rationality (Gigerenzer, Todd and ABC Research Group, 1999; Todd and Gigerenzer, 2012; Todd and Brighton, 2016), it can be shown that intuitive decisions are based on experiential knowledge and implicit structure recognition (Magrabi and Bach, 2013). Accordingly, with the approach of an ecological rationality it can be shown that an intuitive decision is rational in the sense that a person interacts quickly and energy-efficiently successfully adapted with his or her environment and thereby identifies the individual optimal action for him- or herself. This may then be recognized as a 'gut feeling' or 'intuition'. Two challenges will be outlined explained in this paper: The influence of a negative environment on intuitive decisions, and the confusion of an intuition with an emotion or other feeling.

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Keywords: intuition, intuitive decision-making, ecological rationality, experiential knowledge, structure recognition.

Resumen

Desde un enfoque ecológico, puede decirse que una persona trata de identificar la acción óptima para ella mediante un conjunto de diferentes acciones posibles a través de la intuición. El debate sobre las 'teorías del proceso dual' recoge esta idea y postula dos vías diferentes para evaluar las posibilidades de decisión: una vía lógico-analítica y otra intuitiva (Magrabi y Bach, 2013). Predominantemente, se asume que la vía lógico-analítica está relacionada con la racionalidad y, por tanto, es la vía a la que hay que aspirar en la toma de decisiones racionales. Sin embargo, la ciencia ha demostrado que hay que asumir una racionalidad limitada. Por lo tanto, la cuestión de hasta qué punto las emociones o los sentimientos, y en este contexto también las intuiciones, son racionales ha pasado a primer plano (De Sousa, 1987; Evans y Cruse, 2004).

En este trabajo, las intuiciones se consideran como un sentimiento con intencionalidad. Las intuiciones siempre se refieren a un entorno apropiado y se dirigen a una decisión que da lugar a una acción. Damásio (1994; 2013) demuestra que una intuición es un sentimiento que se distingue por actuar como un indicio o señal. Asumiendo el supuesto de racionalidad ecológica (Gigerenzer, Todd and ABC Research Group, 1999; Todd and Gigerenzer, 2012; Todd and Brighton, 2016), se puede demostrar que las decisiones intuitivas se basan en el conocimiento experiencial y el reconocimiento implícito de estructuras (Magrabi y Bach, 2013). En consecuencia, con el enfoque de racionalidad ecológica se puede demostrar que una decisión intuitiva es racional en el sentido de que una persona interactúa con éxito con su entorno de forma rápida y energéticamente adaptada y, por lo tanto, identifica la acción óptima para sí misma. Esto puede reconocerse como una 'corazonada' o 'intuición'. En este artículo se explican dos retos: la influencia de un entorno negativo en las decisiones intuitivas y la confusión de una intuición con una emoción u otro sentimiento.

Palabras clave: toma de decisiones intuitiva, racionalidad ecológica, conocimiento experiencial, reconocimiento de estructuras.

1. Introduction

Every day, a human being makes countless decisions. Often, he or she is not aware of these decisions, because he or she is either guided by habituated or automated mechanisms or it seems mundane to him or her: Do we take the stairs or the elevator? Which chair do we sit down on? Which unread e-mail do we open first? Other more complex decisions are often consciously perceived by humans: the decision whether to have children, which profession to choose, whether to move, whether to give money or food to a homeless person. People think about some decisions for hours, days, weeks, or months, and vacillate between

the possibilities until they decide either with certainty or uncertainty. In addition, there are decisions that come very easily to him or her. They happen quickly and uncomplicatedly, seemingly automatically. Without thinking much about it, we simply do what feels right based on a 'gut feeling'. At this point, a person calls a decision intuitive: he or she has listened to his or her intuition and aligned his or her action according to it.

When we ask about the nature of intuition, we need to understand not only when and in what context it appears, but also how it can be best explained. In this paper it is argued that intuitions are related to actions and always appear when a decision is to be made. Accordingly, a person tries to identify *the optimal action for him- or herself* from a set of different possibilities for action. It is suggested that an intuition is best explained as a feeling that excels in acting as a cue or signal that allows a person to respond appropriately adapted in a situation. With the assumption of an ecological rationality (Gigerenzer, Todd and ABC Research Group, 1999; Todd and Gigerenzer, 2012; Todd and Brighton, 2016), it can be shown that intuitive decisions are based on experiential knowledge and therefore on implicit structure recognition. An intuition, primarily based on experiential knowledge through structure recognition, is then a result of a complex process that an organism carries out between itself and its environment.

In this paper it is assumed that it belongs to the human being to be a rational *and* emotional being. In everything that a human does, he or she can *never* act only rationally or only emotionally. Rather, he or she only acts *more* rationally (and thus less emotionally) or *more* emotionally (and thus less rationally). How this relates to intuitive decisions and to what extent intuitive decisions are rational is the subject of this paper. The question is pursued what it means that a person identifies *the optimal action for him- or herself* from a set of different possible actions by intuitions.

In Section 2, it is explained what intuitions are, how they differ from emotions (such as fear, sadness, or pleasure), and how intuitions have intentionality as a feeling. Intuitions always refer to a corresponding environment and are directed towards a decision that leads (or should lead) to an action. The approach of Damásio (1994; 2013) emphasizes the difference between an evolutionary emotion and feelings as a mental experience of bodily states. With this approach, it can be shown that an intuition is a feeling that is characterized by acting as a cue or signal that allows a person to react appropriately in a situation. In Section 3, it is discussed the extent to which an intuitive decision is rational. The assumption of an ecological rationality is examined, focusing on the fact that intuitive decisions are based on experiential knowledge and therefore on implicit structural recognition. With the approach of an ecological rationality (Gigerenzer, Todd and ABC Research Group, 1999; Todd and Gigerenzer, 2012; Todd and Brighton, 2016) it can be shown that an intuitive decision is rational in the sense that a person interacts with his or her environment in a fast and energy-efficient way and thereby identifies the optimal action for him- or herself based on implicit structural recognition (Magrabi and Bach, 2013). In Section 4, it is outlined explained two

challenges: The influence of a negative environment on intuitive decisions and the confusion of an intuition with an emotion or other feeling. Section 5 summarizes the considerations.

2. Intuition is a feeling

In this section the term 'intuition' will be examined. It will be shown what is meant by an intuition considered as a feeling and how it is be distinguished from an emotion. With the approach of Damásio (1994; 2013), it can be shown that an intuition is best explained as a feeling that excels in acting as a cue or signal that allows a person to respond appropriately in a situation.

2.1 Emotion vs. feeling

In psychological approaches we generally speak of an emotion when further complex emotions can be derived from so-called basic emotions. For this purpose, the number of basic emotions varies depending on the theory: pleasure, fear, anger, sadness (Zinck and Newen, 2008); pleasure, anger, disgust, fear, contempt, sadness, surprise (Ekman, 1988). These basic emotions are associated with primal instincts, which have their justification from an evolutionary perspective. They are innate, cannot be suppressed, and emerge in an effect-like, intense, and powerful manner. Moreover, they are independent of explicit thinking and automatically lead to corresponding behavioral reactions and bodily states (for example, fear leads to flight; the body trembles, sweats, has an increased heartbeat).

Damásio (1994; 2013) appeals for the necessity of distinguishing between emotions and feelings. Emotions and feelings are closely connected, but they are not the same.[1] He emphasizes the different physical and neural processes. Here, feelings are *mental experiences of bodily states*, whereby the evolutionary emotion, for example fear, automatically triggers certain bodily states, which are then recognized and perceived in a feeling of fear. Different steps that occur in time order in different parts of the body and brain are: The perceived event that starts it all; the brain regions whose job it is to generate emotion (such as the amygdala); the body that changes as a result of the emotional action program; the brain regions that map these physical changes. While this program is going on and the brain is mapping the actions that are going on in the now rapidly changing body, the mental experience of what is going on in the body occurs (Damásio, 2013).

Some feelings arise from emotions, others from even more elementary bodily states. Therefore, humans are able to feel not only the particular bodily states known as emotions, but also the many other states of the body that are an integral part of ongoing life processes and development/organization of an organism'. Consequently, the term 'feeling' emphasizes 'how' bodily states are consciously felt and perceived. If they refer to emotions, the feeling

[1] See also: Prinz (2005). He also discusses and emphasizes a difference between emotions and feelings.

is temporally subordinated.[2] Examples of feelings include hunger, thirst, and pleasure. These elementary feelings, as well as more complex feelings, are experiences of bodily states that indicate something: A problem, deficiency, compensation, or a good condition. Feelings in this sense, according to Damásio (2013), represent a kind of guardian, a conscious observer of life as humans move, act, and interact with the environment. While an evolutionary emotion automatically generates corresponding bodily states, feelings functions as a signal or cue, which, as mentioned earlier, is based on either an emotion or a more elemental bodily state. The person can then react to the particular feeling (in the case of thirst, a person would seek out water based on their knowledge). Damásio (2013, p. 19) illustrates the difference as follows:

> When I react to a frightening situation with fear, for example, my body undergoes a series of changes, the fullness of which constitutes the emotion fear. Emotions are about reactions that occur in the body, such as an accelerated heartbeat, increased blood pressure, altered breathing patterns, pale skin, the release of cortisol into the bloodstream, the contraction of the bowels - but they are not the only ones. On the other hand, the feeling of fear consists largely of my mental experience of these changes. This difference must be very clear. The emotion fear is a concert of processes in the body, all of which can be observed and measured - sometimes even with the naked eye (even by other people). The feeling of fear is a mental experience similar to the experience of hunger, thirst or pain, only more complex. We can describe a mental experience and estimate its intensity, but we cannot measure it exactly.

Accordingly, feelings contribute to the fact that people are able to understand better that a certain situation is dangerous (or advantageous). The experience resulting from this optimized learning can be used to anticipate and plan the future accordingly, which is made more efficient through feelings.

2.2 Intuition as a feeling

The following terms are commonly used in the context of intuitions: unconscious or conscious assessment, hunch, inner voice, flash of inspiration, insight, research intuition, judgment (Engelen, 2010, p. 129). Intuitions are characterized by the following features: According to Berne (2005, p. 36), an intuition is knowledge that is based on experience and acquired through direct contact with what is perceived, without the intuitive perceiver being able to explain to himself or others exactly how he came to the conclusion. In doing so, intuitive insight feels 'good' or 'right' in a very specific way. Engelen (2010, pp. 131-135) also emphasizes an organism's implicit learning and that there is an essential difference between emotional and intuitive appraisal. The sensation associated with intuitive appraisals

[2] In neuroscience, a differentiation between emotions and feelings is being pursued. To this end, the role of the prefrontal cortex (PFC) in particular is being studied. See in more detail: Osterath (2018).

is nonspecific, whereas emotional experience or sensation is very specific. Fear is felt as fear, joy as joy, and shame as shame. When a person wants to indicate what the intuition was that he or she had, they begin to describe what was going on. Therefore, there would not be prototypical intuitions in the same way as prototypical emotions. Gigerenzer (2007, p. 20) identifies three criteria for what a person experiences to be a signal of intuition: Quickness, unawareness of the origin, and the fact that the person aligns his or her actions with this intuitive certainty. He assumes that human intuition very quickly produces a judgment or even a feeling, which then allows a person to direct his or her action according to the feeling. This shows in particular how an intuition works and that it has an intentional content. An intuition, like other intentional mental states (beliefs, desires), is directed toward something.

Moreover, intuition is associated with decisions, actions, and recognitions. Magrabi and Bach (2013, pp. 277-281) emphasize with regard to an intuition the experiential knowledge that includes sensory perceptions such as seeing, hearing, smelling, feeling, and tasting and enables a holistic perception. Thereby the intuition shows up merely in a positive or negative feeling, which is directed on decision possibilities (and also generally on thoughts). This experiential knowledge serves as structural recognition: Through intuition, a person reacts to non-conscious structures (perceptual structures in the environment or cognitive structures of thought processes) that have already been processed unconsciously in the past. In this context, intuition is described as a feeling that can be seen as 'unconsciously processed evaluations based on recognized structures' (Magrabi and Bach, 2013, p. 279). The difference to emotion is that due to impulsive/strong emotions the person is able to lose control and make unreflective decisions that are later regretted. The corresponding feeling of intuition would be perceived weaker and does not lead to a loss of control.

When intuition is associated with decisions, it refers to a different way of *evaluating* decision options. Here, the intuitive path is considered 'parallel, unconscious, autonomous, relatively fast and energy-efficient [and] ha[s] an apparently unlimited capacity' (Magrabi and Bach, 2013, p. 278). The only thing a person becomes conscious of is the result: an intuition, a positive or negative feeling about a decision *possibility*. This feeling then represents a signal of how a person should decide (Magrabi and Bach, 2013, pp. 277-280). The reference to decisions will be taken up and discussed more in detail in Section 3.

In the philosophical tradition, intuitions are generally epistemically scrutinized as a genuine human capacity that stands as intuitive recognition (also called intellectual intuition) versus discursive cognition. While discursive cognition is based on sensory perceptions and successive conclusions (emphasized are language, understanding, rationality), intuitive recognition is to be regarded as a purely mental view, a transcendent function of human (emphasized are feelings, emotions and without reference to language) (Kobusch, 1976, p. 524). Here, the term 'intuition' is discussed as a possible reliable source of knowledge (Langkau, 2019; Pust, 2017). It is questioned whether and how humans can arrive at (philosophical) knowledge through intuitions. Intuitions are generally understood here as mental attitudes with a certain propositional content. Langkau (2019, p. 152) cites two approaches to this: On the one hand,

the approach following in the rationalist tradition according to which intuitions as a source of a priori knowledge are a separate kind of mental states and therefore play a significant methodological role in philosophy. Opposed to this approach is the view that intuitions are a kind of beliefs or judgments. Thus, from a methodological point of view, they would do not have a special epistemic role.

From an interdisciplinary point of view, it can be said that a characteristic feature of intuitions is that intuitions trigger a sense of well-being or discomfort - in addition - in a particular emotional state, such as fear (basic emotion) or threat (complex emotion). Based on Damásio (1994; 2013), a distinction can be made between evolutionary based emotions and feelings. In this context, an intuition could represent a feeling that refers to bodily states. Thus, intuition as a feeling is a mental experience of bodily states that may be preceded by an emotion and acts as a signal or cue. This is compatible with the assumption of experiential knowledge through structure recognition. Because in that case intuitions can be attributed a propositional intentional content, which is determined by the situational circumstances and the cognitive evaluation and not in which emotion state a person is.

An experiential knowledge through structure recognition means, that every experience[3] a living organism (a human) does is stored in the form of experiential knowledge. The content is an information. The interaction of an actor with his or her environment includes not only the mere acquisition and storage of information via senses, but also the cognitive evaluation of this information. Information via senses means, in physical terms, that the same wavelength of the perceived information is mapped in the sensory perception.[4] Thus, experiential knowledge includes all individual experiences through the senses and the cognitive evaluation. These both are stored in form of information, that has a specific combined structure. The structure depends on two components: the quality of the sense, a corresponding information is created: a visual perception in the quality of the visual operator; an auditory perception maps in the quality of the auditory operator; an olfactory perception maps in the quality of the olfactory operator; and so on. The second component concerns the cognitive evaluation. The cognitive evaluation depends on how relevant something is for a living organism (the situational circumstances, adaptation). In this context, structure recognition means: In a situation that is focused on a decision-making the same stored information will be recognized. This recognition, regarding to an intuition, occurs implicit and is perceived as a feeling. In this context, intuition is described as a feeling that can be seen as 'unconsciously processed evaluations based on recognized structures' (Magrabi and Bach, 2013, p. 279).

An intuition, primarily based on experiential knowledge through structure recognition, is then a result of a complex process that an organism carries out between itself and its

[3] For the meaning of 'experience', see Section 3.3.

[4] Studies are already working on the technical conversion (reconstruction) of sensory information, primarily visual information (neuroimaging studies), in such a way that the perceived information can be represented pictorially (see e.g. Huth et al., 2016; Nishimoto, et al. 2011).

environment. With intuition an organism receives a signal or cue. By being directed to the environment, intuitions emerge primarily in situations in which decisions have to be made. Here the decisions can seem so inconspicuous and irrelevant (a person can be convinced to change the side of the street now).

3. Ecological rationality

This section demonstrates the role of experience with respect to intuitive decisions and how, in this context, a rationality of intuitive decisions can be assumed on the basis of an ecological rationality approach.

3.1 Decision-making

Human beings as actors make decisions on the basis of reasons - whether they can name these reasons or not. To decide means to commit oneself to a certain course of action or a certain omission in view of alternative possibilities. In this context, a distinction can be made between the decision to act and the execution of the action. The former concerns the mental choice *whether* to perform or refrain an action.

A person can behave cognitively according to a situation or thoughts: *whether* he or she *wants* to act. With the execution of the action, the (consciously or unconsciously) made decision is put into action (physically executed). Alternative possibilities are then considered along with it. (Hardy, 2008, p. 139). In this context, the existence of a decision does not imply the future existence of a corresponding action. Rather, a decision is directed toward an action or doing. There are no decisions that do not aim at an action. While action occurs physically through the body, decision-making is a mental phenomenon.[5] (Budnik, 2016, pp. 169-172). For conscious decisions, reasons can be given, while for unconscious decisions one lacks reasons or possible reasons are asked for after the fact. Unconscious decisions include, in particular, automated, habituated actions and affect actions.

A decision is always preceded by a process of decision making (decision process) (Budnik, 2016, p. 173). The purpose of this process is for a person to identify the action that is optimal for him or her from various possible actions (Magrabi and Bach, 2013, p. 274). But what does 'action optimal for oneself' mean? In the literature, a distinction is often made between logical-analytical and intuitive decision-making (Magrabi and Bach, 2013). The point here is that humans can arrive at evaluations of decision options in different ways. Logical-analytical decision-making is characterized by an emphasis on the application of rationality. The process

[5] At this point, it should be noted that it can also be assumed that actions are not only events in the world that act through a person through his body, but also that mental events are actions. This would make every decision always an action - a mental action (Budnik, 2016, pp. 170-172). For this thesis, mental actions are not assumed. Decisions themselves do not constitute mental actions.

is sequential, controlled, relatively slow and energy-consuming, has a limited capacity and the person is aware of the processes taking place. A person can then give well-considered consciously made reasons. Intuitive decision making, on the other hand, is characterized by feeling. The process is parallel, autonomous, relatively fast and energy efficient, has an apparently unlimited capacity and the running processes of the person are unconscious. The person becomes conscious only of the result: the intuition, a positive or negative feeling. Here, a person cannot give explicit reasons (Magrabi and Bach, 2013, pp. 277-278). Thus, a differentiation is made between rationality and emotionality. However, this differentiation represents only a switch: It shows that a living organism (such as humans) has two ways of *evaluating possibilities* for action. As assumed at the beginning, the human being is to be regarded as a being which *necessarily* has rationality and emotionality. Together with this assumption, the two ways merely represent a *preferred focus* of the human being in a given situation. The human being thus evaluates possible actions either *primarily* rationally (logical-analytical) or *primarily* emotionally (affective, intuitive), but never only on the basis of one of the two components. In the following section, this assumption will be further explored through an ecological approach to rationality.

At this point it is important that, after it was shown in the previous section what intuition consists of, it can be said that an intuitive decision is to be understood as follows: An intuition is first of all a mental phenomenon. Decisions that are made implicitly on the basis of experiential knowledge and structural recognition aim at an evaluation of possible actions. A living organism (like a human being) thereby makes a mental experience of bodily states (through feeling). Due to changes and interaction with the environment, a change/experience is felt through the body. This feeling then represents a signal or indication, whereby the living organism compares the current situation with the already stored experiential knowledge and has the possibility to react accordingly. A living organism can thus react relatively quickly and energy-efficiently without being aware of the processes or reasons that are taking place - nor do they have to be, because the experiential knowledge and structures have already been anchored. Similar to a habituated action, the experiential knowledge and structures are unconsciously manifested and then come into play as a signal when the organism interacts with its environment in a situation.

An 'optimal action for itself' is to be considered ecologically with the background assumption that a human being is a rational and emotional being, which stands as a living organism in a constant interaction with its environment. Both ways - the logical-analytical way as well as the intuitive way - are then two parts of a whole. One could say, two sides of the same coin, which can complement each other and come into their own depending on development/experience and situation.

3.2 The ecological rationality approach by Gigerenzer, Todd and The ABC research group

Generally, an ecological view focuses on the relationship between living things and their environment. When applied to human decision-making, this term concerns the behavior of a human being in relation to its environment. Here, the term 'ecologically rational' is only etymologically similar to the biological science of ecology. Rather, an ecological approach to rationality emphasizes that the rationality of a decision depends on the circumstances in which it takes place in order to achieve one's goals in that particular context. This is not a matter of classical utility maximization[6] but of how successfully a living organism (such as humans) interacts with its environment. The ecological rationality approach was developed by Gigerenzer, Todd and ABC Research Group (1999) as a response to the problem of understanding how biologically *constrained* organisms' function under the *uncertainty* of the natural world. This uncertainty typically precludes knowledge of all relevant states, actions, and consequences, as well as probabilistic quantification of the various uncertainties to which the organism is exposed. Ecological rationality is used to examine how, when, and why organisms can function so effectively despite environmental constraints that make optimal responses indeterminable and internal cognitive and biological constraints that limit information processing (Todd and Brighton, 2016, p. 13). Emphasis is placed on the fact that humans make decisions within their individual limits and apply a set of simple mechanisms. In doing so, he or she generates adaptive, effective decision-making behavior to achieve his or her desired goals in the world. This means drawing on an 'adaptive toolbox' (Todd and Gigerenzer, 2012, p. 11) of decision-making mechanisms that includes quick and frugal heuristics[7] quick shortcuts, and crude rules of thumb. Some of these tools are pre-embedded through evolution and some are learned through individual experience and through cultural heritage. Depending on decision tasks and situations, humans apply their adaptive toolbox. In the process, biases can occur as simple heuristics are applied from certain environmental contexts to other environmental contexts. And this, in turn, means that they often require little information and little processing of that information to achieve ecologically rationality-adaptive behavior adapted to different situations (Todd and Brighton, 2016, pp. 12-13; Todd and Gigerenzer, 2012, pp. 11-12).

The focus is on how minds fit environment (Todd and Brighton, 2016, p. 14). This occurs through evolution and experience (learning, development). The three components of minds, environment, and fit are as follows: The mind directs the behavior of the actor to achieve certain goals in certain situations. In this context, minds are understood to process

[6] For more on this idea, see Wöhler (1972, pp. 544-547).

[7] Heuristics are to be understood as follows: A heuristic is an information-processing mechanism that ignores information. It ignores most of the available information and instead focuses on a few key pieces of data to make decisions. An example of ignoring information is estimating the value of a product using only one clue (possibly determined to be the most important factor), e.g., size, and ignoring all other clues. (Todd et al. 2012, pp. 7-8).

information about setting values (e.g., stimuli or input from the current situation) together with information about past experiences and current goals to make decisions about how to proceed. Moreover, the natural world is uncertain. Therefore, organisms must make inductive inferences. Based on this subjective knowledge (which may or may not have been gained from observations), decision making should be understood as a process of categorizing, estimating, or predicting events (Todd and Brighton, 2016, p. 14). An environment is how an actor acts in and on an environment and can be understood as a set of structural and statistical properties. The environment influences the actor's actions in the way that it can determine the potential goals to be achieved and shapes the appropriate adaptive tools in the actor to achieve them. Here, it is essential that the relevant conception of the environment for a particular decision-making task is not something independent outside the mind, but rather defined by what the actor can perceive or be influenced by (Todd and Brighton, 2016, p. 15). This emphasizes the embeddedness of an individual organism in its environment. The organism is in constant interaction with its environment, whereby it evolves and the environment and the organism adapt to each other. Evolution, according to Todd and Brighton (2016, p. 15), builds sensory systems that reflect the subjective perception of the environment on which an actor bases his decisions, the objective structures in the environment sufficiently for the actor to achieve his goals. Moreover, the environment is not a fixed and stable pattern of information, but a dynamic system that the actor can actively influence and change his perception of cognition and environment, mix and co-evolve. The relevant environment can be composed of patterns between physical objects such as landscapes, but also between other organisms such as predators and prey, and other conspecifics such as social partners, family members, and cultural institutions. The fit between a decision mechanism and a particular environment is a measure of how well that mechanism performs given the specific environment information structures present in the environment is suited to perform the tasks (Todd and Brighton, 2016, p. 15). There is a 'co-adaptation' (Todd and Brighton 2016, p. 16) between the mind and the environment: On the one hand, the inner limits of the mind (sensory abilities, memory limits, cognitive power) can be shaped through evolution, learning, and development (experience) to exploit the structure of the external environment. Similarly, the external boundaries of the environment, which result from the structure of available information, can be shaped by the effects of the understood (mind) making decisions in the world, including, most notably in humans, the process of cultural evolution (Todd and Brighton, 2016, p. 16).

Rationality is characterized by how well adapted a (living) organism is to its environment and vis versa, to the situations that arise. The focus here is on the fit between the mind and the structures of the environment and how the mind can achieve its goals, as well as in terms of adapting to the environment by learning the appropriate heuristics, traits, and patterns to use in current environmental situations (through these processes of development, individual learning, social copying, or cultural inheritance) (Todd and Brighton, 2016, p. 17). With an ecological rationality, a person's ability to function under uncertainties and

make optimal decisions for themselves is emphasized. This is done through interaction with the environment and through mutual adaptation. In addition, flexibility in dealing with information and solving problems is emphasized. This is because decision-making situations in everyday life are often characterized by incomplete information. In many cases, people have to make decisions based on their estimation (under incomplete information) of how likely certain things are. At this point, acting on the basis of empirical knowledge and structure recognition can be highlighted, which, as has already been shown, are crucial for intuitive decisions.

3.3 The role of experience

An intuition has been defined as being primarily based on experiential knowledge and structural recognition, whereby a person (living organism) experiences a signal or cue through a pleasant or unpleasant sensation. Together with the assumption of ecological rationality, it can be said that intuitive decisions are rational because of experiential knowledge and structural recognition. It is in the implicit experiential knowledge and structure recognition that the successful adaptation of the organism with its environment is revealed.

At this point, it is first necessary to ask what is meant by experience. Ecological rationality thereby emphasizes learning and developing. If by experience is understood that a life of an organism is meant, which only through its body (beginning with the development of the organism and ending with death) makes any experiences with its environment (through the senses), then the concept of experience is bound to the body and excludes the possibility beyond death - if an unembodied life form after death is assumed - to make experiences. All that a person accumulates in implicit or explicit knowledge in his or her life phase results in something like an inner map. Impressions and experiences then leave corresponding structures/patterns (Gallagher, 2013; Newen, Welpinghus and Juckel, 2015), memory traces (Engramm: Tonegawa et. al., 2015; Robins, 2017; Werning, 2020) or somatic markers (Damásio, 1994). These structures, patterns, memory traces, or markers influence the way a person thinks, what they believe is good and right, and what beliefs they hold. Intuition in the form of experiential knowledge then involves knowledge that draws on actual knowledge, a kind of inner wisdom. Furthermore, this knowledge represents a specialization for certain situations, whereby procedures or decisions can be accomplished faster and without large thinking or reflecting. For example, according to Magrabi and Bach (2013, p. 278), an experienced tennis player may have the intuitive feeling that his opponent will play the next ball to the left side. This feeling could, for instance, have been triggered by certain structures in the opponent's movement or facial expression, without the player being aware of these structures. This then leads to purely intuitive decisions, which are possible because he has acquired expert knowledge, a specialization, for this particular situation (playing tennis). Experiential knowledge is stored information. Every event, every experience, no matter if positive or negative, the human being has stored with a corresponding feeling (a mental

experience) and in every similar context the human being reacts by resorting to this already stored information.[8] An experiential knowledge then takes place as follows: The more often certain similar experiences are made the more habituated, automatic and intuitive a person can act in such contexts (similar because time does not stand still. It can never be done again the same experience in the same situation, merely similar experiences or situations). Humans then access already existing stored information when a decision has to be made in an upcoming situation.

Consequently, the role of experiences regarding an intuition and intuitive decisions primarily concerns an acquired expert knowledge about certain situations bound to the body, whereby a successful interaction with the environment takes place and thus a rationality, in the sense of an ecological rationality, is to be assumed for intuitive decisions. The pleasant or unpleasant feeling functions in a corresponding decision situation or decision possibility as a signal or cue that points the way for the individual optimal action for him- or herself.[9]

4. Two challenges

The assumption that intuitive decisions are based on experiential knowledge and implicit structure recognition is not without challenges. Two challenges will be outlined explained in this section: First, the influence of a negative environment on intuitive decisions, and second, the confusion of an intuition with an emotion or other feeling.

If an intuitive decision is based on implicit experiential knowledge and structure recognition, it should be noted that not everyone has the same experiences. The horizon of experience is shaped by the respective environment (fauna, culture, society) and an individual experience with the environment in which the person grows up from birth or has spent most of the time. Since these experiences also have an influence, someone who decides intuitively always acts and judges against the background of his or her individual development within this environment. In this context one can speak of prejudice or bias. Since this is done implicitly, the acting person is often not aware of the fact that his or her intuitive decisions can also be influenced by negative experiences. Mainly such biases are characterized by groups of persons and their characteristics. These include gender, race, age, circumstance, or other dimensions of diversity. Examples are that implicitly women are assigned more to family roles than to worker roles, or people of other ethnicities may be associated with negative personality traits. In addition, older people may be believed to offer less in the workplace (or

[8] In particular, the (neurological) scientific results on learning, memory, extinction underpin how experiences and contexts are related. See, among others: Brandes, Lang and Schmidt (2019).

[9] Note that systems and strategies are being established for an application of intuitive decision systems design and decision environments. See, among others: Gigerenzer (2018) 'Intuitive design'; Kuhnle (2011) 'Intuition in learning situations'; Fenkart (2018) 'Management'.

conversely, perhaps the same about younger people).[10] Consciously (explicitly), individuals know that the way of generalizations are without any reason, but unconsciously (implicitly), the brain has formed and stored associations of information weighed during previous live. By assuming ecological rationality as an evaluation of rationality, it can only be said that an intuitive decision is rational because the person successfully interacts (adapts) with his environment. Thus, an intuitive decision, which results in an action, is normatively tangible and naturalistically teleological. This results in a discrepancy on the moral side. The question whether an action based on intuitive decisions produces morally right or wrong action seems to be intangible here. If the environment is characterized by, for example, destruction, war, murder, famine or prejudice, a person can be very well adapted successfully in relation to this environment (and vis versa) and therefore make rational intuitive decisions according to ecological rationality. Nevertheless, actions that produce destruction, war, murder, famine, or prejudice are morally reprehensible and should be evaluated differently. The question of how people *should* make decisions nevertheless depends on how people *are able* to make decisions.

Another challenge for the rationality of intuitive decisions is that the feeling of intuition can be confused with other feelings or emotions. If a person *has not learned* to deal with his or her feelings or emotions, it can be very difficult for him or her to distinguish between different feelings. Thus, a person may feel, for example, the emotion fear in a situation, but this feeling is so strong that he or she does not perceive the *additional* emerging feeling of intuition and then makes a fear-based decision, but misinterprets this as an intuitive decision. When a person turns little or no attention towards his or her feelings and their differentiation, he or she does not learn to distinguish between feelings that relate to an emotion, an elementary physical experience, or intuitions. This can result in misinterpretations that lead to unintended or wrong decisions. A person is not able to understand adequately an action or decision generally, whereby an intuition can be confused with other feelings. With regard to ecological rationality, it can be said that individuals who do not pay attention to their feelings cannot be appropriately adapted to their environment, since the interaction runs contrary to the naturalistic teleological orientation. With the assumption that a human being is a rational *and* emotional being, this contradiction shows that the emphasis on only one of the two components does not correspond to the nature of the human being. The challenge to unite both components seem to be the basic prerequisite to be able to understand at all which feeling indicates how a person feels in a certain situation or environment (i.e. how he or she perceives this situation: fearful, joyful, etc.) or *whether* he or she receives a signal or cue in a certain situation or environment how he or she should decide in this situation *despite* his or her subjective perception of this situation based on his or her experiential knowledge. To recognize this requires a high level of attention to one's own body and body states in order to be able to differentiate between different feelings. Further it can be said that if a person does not know his or her emotions and feelings, represses them or does not pay attention to

[10] To see more: Inzlicht and Kang (2010).

them, then he or she will also not have access to his intuition and thus will not be able to interact appropriately with his or her environment (and vis versa) in the sense of an ecological rationality.

5. Conclusion

With the approach of Damásio (1994; 2013), which differentiates between emotions as evolutionary and feelings as mental experiences of bodily states, intuition could be defined as a feeling. The term 'feeling' emphasizes 'how' bodily states are consciously felt and perceived. A feeling functions as a signal or cur: The experiences of bodily states that indicate something: A problem, deficiency, compensation, or a good condition. According to this, an intuition is a feeling that functions as a signal or cue and emerges through the interaction of humans with their environment in situations. By being directed to the environment, intuitions emerge primarily in situations in which decisions have to be made. Here the decisions can seem so inconspicuous and irrelevant (a person can be convinced to change the side of the street now). Furthermore, it has been shown that intuition is based on experiential knowledge and thus implicit structural recognition, whereby intuitions are directed towards decisions and the possibilities for action resulting from them. Intuitions can be attributed a propositional intentional content, which is determined by the situational circumstances and the cognitive evaluation and not in which emotion state a person is.

With the approach of an ecological rationality, it was shown that intuitive decisions are rational in the sense that a person interacts successfully adapted with his or her environment. Humans fall back on an acquired embodied expert knowledge for corresponding situations, whereby they need little explicit conscious information and are able to react quickly and energy-efficiently in situations. Here, the pleasant or unpleasant feeling in a corresponding decision situation or decision possibility functions as a signal or cue that points the way for the *optimal action for him- or herself*.

It should be noted that the basis of experiential knowledge through implicit structure recognition for intuitive decisions opens up the possibility to manifest and automate a consciously reflected decision made in the past. Since attention seems to play a very important role, humans are able to primarily link logical-analytical decisions with emotional and intuitive decisions. However, this is something that a living organism has to learn. Neuroscience suggests that the prefrontal cortex is related to decisions and intuitions. In the development of the brain this part of the brain forms later. The emotion-processing regions (limbic system) form ahead of time (Leyh, 2011; Brandes, Lang and Schmidt, 2019). With the knowledge of a synaptic plasticity, humans can consciously influence their information networks, whereby the logical-analytical and the intuitive way for decisions can be connected and lead to an automated energy-efficient decision. How and if this is possible needs further investigation and should be used here only as an impulse for a possible further object of

investigation. In addition, further research is needed regarding the understanding of the term 'information'.

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