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FEELING AND THINKING ABOUT THE FUTURE: OFFLINE METACOGNITION IN DECISION-MAKING

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ABSTRACT

In the article, I will argue that metacognition plays an important role in decision-making not only as direct *online monitoring and control* of decision-making processes but also by enabling us to influence our decisions and actions – and mental states and processes, related to them – in an offline manner. That is, *offline metacognition* allows us to observe, refer to and, to a certain degree, exert influence on mental states and processes related to our decisions and actions in the way of being removed, decoupled from the task/decision at hand and present time demands. As such, it enables us to observe, form thoughts and have feelings about mental states and processes *directly related* to our future decisions, to plan our future decisions, to reflect on our past choices, and to think and have feelings about our broader goals, desires, and personal values that are *indirectly related* to our decisions.

To illustrate the importance of offline metacognition in decision-making, I will firstly review and discuss some experimental findings on implementation intentions ("decisions about the future") and anticipated emotions (beliefs about future emotional states related to outcomes of our decisions). Secondly, I will argue that our ability to reflect (think and feel) on our broader goals, desires and personal values – that represent a kind of structure into which our specific decisions are embedded – reveals how offline metacognition can exert influence on our decisions also in an indirect way. All in all, I will try to show that our ability to refer to our own minds in an offline way – be it to mental states and processes directly or indirectly related to specific decisions – is essential for us to decide, as we decide, and act, as we act.

KEY WORDS

anticipated emotions, decision-making, goals, implementation intentions, offline metacognition

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INTRODUCTION: WHAT IS METACOGNITION AND WHAT ROLE IT PLAYS IN DECISION-MAKING?

One of the essential characteristics of human beings is their ability to consciously evaluate, have feelings, form beliefs and gain knowledge about their own minds. This is the domain of metacognition. Be it in the form of a more explicit, deliberate reflection or less explicit feelings of one's own thoughts, beliefs, desires and feelings, it is, in my opinion, one of the essential characteristics of what it means to be a human being with a mind. Our ability to consciously observe and assess our own mind allows us, for instance, to know to a certain degree what we know and what we do not know, to understand how we think and feel – even though we can, of course, also be wrong in our assessment – to be able to report on our own mind to others, etc. Metcalfe and Shimamura succinctly express this point: "The ability to reflect upon our thoughts and behaviors is taken, by some, to be at the core of what makes us distinctively human. […] Indeed, self reflection and personal knowledge form the basis of human consciousness. Of course, even without conscious awareness, humans can learn, change, and adapt as a function of the events and contingencies in the social and physical environment. Such plasticity, though, can be ascribed to a variety of other living organisms, from plants, to invertebrates, to mammals, and even to non-living machinery. What appears unique to humans and what has fascinated the minds of countless philosophers and scientists is the self-reflective nature of human thought. Humans are able to monitor what is perceived, to judge what is learned or what requires learning, and to predict the consequences of future actions. Moreover, we can distinguish reality from imagination, evaluate the quality of our own responses, and make plans for the future" [1; p.xi].

Before I delve into explaining various roles of metacognition in decision-making, let me first briefly explain how I understand the notion of metacognition. In my conceptualisation, metacognition is any kind of self-referential activity of the mind, be it having knowledge, beliefs, thoughts or feelings about one's own past, present or future cognitive[1] states and processes. In this regard, feelings (metacognitive feelings[2]), judgments (metacognitive judgments), beliefs, and knowledge (metaknowledge) about one's own feelings, judgments, beliefs, and knowledge all represent instances of metacognition.

Some hold the view that such a conception is too broad and argue, for example, that metacognitive feelings do not belong to the domain of metacognition [2], since they are not metarepresentational (at least not in the "correct" way). In my understanding, metarepresentations – at least in the stronger, propositional sense of being representations of representations as representations [3] – do not represent a necessary condition for a process or state to count as metacognitive [see also 4]. This is a rather complex discussion [2, 4-6] into which I shall not delve any further in this article. Others [7], on the other hand, understands metacognition in an even broader sense as "knowledge and cognition about cognitive phenomena" [7; p.906] and thus subsume general knowledge of the mind and even cognition of other's minds under the notion of metacognition. Conception of metacognition that is, in my view, too broad. Last but not least, although some researchers conceive of metacognition also as an unconscious activity [8-10] and/or speak about animal metacognition [6], I will limit my discussion to the role of conscious metacognition in human decision-making.

Scholars of metacognition also emphasise – in theory and research – different functions of metacognition. Dunolsky and Metcalfe [11], Koriat [8], and Thompson [10], for instance, primarily see metacognition as *online* monitoring and control of one's own behaviour and cognitive processes. Dunolsky and Metcalfe [11] conceive of metacognitive monitoring as

"assessing or evaluating the on-going progress or current state of a particular cognitive activity" [11; p.3], and metacognitive control as "regulating an on-going cognitive activity, such as stopping the activity, deciding to continue it, or changing it in the midstream" [11; p.3]. On the other hand, Proust [4], for instance, places greater emphasis on metacognition's *offline* functional role. In her view, metacognition is "exemplified in all cognitive activities in which one is trying to appreciate, in retrospect, a cognitive achievement (did I do this task right?, haven't I forgotten something?), to remember the source of the information one is using, or to predict whether one will be able to attain some cognitive goal (learn new material, retrieve a proper name within seconds, or make efficient plans in a new context)" [4; p.271].

There is ample empirical evidence supporting the claim that metacognition, as online monitoring and control of cognition and behaviour, is essential to judgment and decision-making [12-22]. While I agree with the claim that metacognition as online monitoring and control is crucial to our decision-making, I will attempt to show that our ability to refer to our own mind in an offline manner is at least as important to our decision-making as the former. In the article, I will thus focus on the role *offline metacognition* plays in decision-making[3].

By *offline metacognition* I roughly mean our ability to refer to our own mind in a "removed way", decoupled from the task/decision at hand and present time demands – the importance of which is nicely expressed by Wilson: "Lift the demands of time pressure, though, and some of the true power of human cognition becomes evident. Given the opportunity, we often behave in a decidedly off-line way: stepping back, observing, assessing, planning, and only then taking action. It is far from clear, then, that the human cognitive system has evolved an effective engineering solution for the real-time constraints of the representational bottleneck" [23; p.628]. And regardless of the fact that laboratory settings and tasks utilised to study decision-making do not represent "the best of circumstances" in which offline metacognition would show its full potential, even in such contexts one can make a strong point for the importance of offline metacognition in decision-making. Studies on implementation intentions and anticipated emotions, some of which I will present and reflect upon in the following two parts of the article, reveal that offline metacognition enables us to think about, plan and reflect upon future[4] decisions, and mental states and processes, related to them.

Having the limitations of laboratory settings in mind, I will, in the last part of the article, present some hypothetical everyday decision-making situations that show the importance of *offline metacognition's indirect influence*[5] on decision-making. I will argue that our ability to reflect (think and feel) about our more general/global goals, values, desires, etc. – that are not directly[6] tied to specific past or future decisions, but represent a more general structure into which our decisions are embedded – represents another, perhaps the most important aspect of metacognition in decision-making.

Lastly, I wish to stress that by claiming that conscious metacognition plays an essential role in decision-making, I do not wish to state that decision-making necessarily unfolds as a conscious (meta)cognitive activity, nor that conscious metacognition incontrovertibly leads to better choices. On the contrary, I would agree with the claim that probably most of decision-making unfolds unconsciously and that the "meddling" of conscious metacognition can, at least in certain circumstances, lead to worse decisions. Nonetheless, we would be unable to decide, as we decide, and act, as we act, without our ability to consciously refer to our own mind in offline manner. This is an important point since the discussion about the role metacognition plays in decision-making is usually framed in terms of whether metacognition leads to more or less "rational" decisions – a question that does not interest me here.

IMPLEMENTATION INTENTIONS

Gollwitzer characterises implementation intentions as "if-than" plans "in the form of implementation intentions that link anticipated critical situations to goal-directed responses ('Whenever situation x arises, I will initiate the goal-directed response y!')" [24; p.493]. In this regard, implementation intentions can be considered "future-oriented decisions" or "decisions about the future" [25]. Let me provide some examples of research that show how implementation intentions lead to a more successful decision realisation, self-regulation, etc. in comparison to mere goal intentions or intentions about one's goals (such as "I will initiate the goal-directed response x!").

The study of Orbell et al. (1997, as presented in [24]) compared the realisation of breast self-examination (BSE) in women who showed strong goal intention and women who, besides having a strong goal intention of BSE, formed implementation intentions in the form of when and where they would perform BSE in the following month. Results showed that all women who formed implementation intentions reached their goal of BSE. On the other hand, only a little more than half (53 %) of the women who merely expressed a strong goal intention of BSE reached the desired goal. Research by Milne et al. (1999, as presented in [24]) reveals a similar correlation between implementation intentions and the realisation of a decision. Milne et al. were interested in whether they could increase students' participation in vigorous exercise (20 minutes a day for one week) if students were asked to form implementation intentions about where and when to perform the exercise. Results, similarly to the BSE study, showed that only 39 % of students who were motivated by being told about the beneficial effects of physical exercise, health risks linked to the lack of exercise, etc. managed to do the 20-minute daily exercise for one week. On the other hand, 91 % of students who formed implementation intentions about when and where they will exercise, were successful in their realisation of the intended goals.

The above presented studies do not involve metacognition, the following, on the other hand, require it; I will explain this shortly. In Schaal's [1993; from 26] experiment participants had to solve arithmetic problems that demand high concentration under condition of being exposed to distracting stimuli, such as attractive videos that included music, pictures, various texts, etc. Participants who formed the implementation intention "As soon as I see moving pictures or hear some sound, I will increase my efforts on the arithmetic task" (task-facilitating implementation intention group) or "As soon as I see moving pictures or hear some sound, I will ignore them" (temptation-inhibiting implementation intention group) solved the arithmetic problems significantly faster than the group of students who only intended to reach the goal of not being distracted by interfering stimuli. An experiment by Schweiger Gallo et al. [27] showed that implementation intentions, such as "if I see a spider, then I will ignore it!", "if I see a spider, then I will remain calm and relaxed!" or "if I see blood, then I will stay calm and relaxed!" enabled better regulation of future emotions than merely goal intentions, such as "I will not get frightened!" or "I will not get disgusted!".

Furthermore, Gollwitzer and Oettingen [28] review numerous studies that show that the use of implementation intentions enables better regulation of future emotional and cognitive states. Achtziger et al. (2008, as presented in [28]), for example, researched the influence of implementation intentions in natural environments: dieting and tennis competitions. They showed that implementation intentions facilitate regulation of future inner disruptive states, such as longing, obtrusive thoughts, feelings, and physiological states. Moreover, in their review article Gollwitzer and Sheeran [29] show that implementation intentions facilitate self-regulation in the context of consumer decision-making. They, for instance, report that implementation intentions improve consumer decisions by promoting control of attention and

by overcoming various disruptive influences and factors on decisions (such as emotions, ego depletion, etc.). Such studies on implementation intentions clearly indicate how such conscious intentions about our future mental states and processes – of increasing our effort, ignoring stimuli, remaining calm and relaxed, and other feelings that accompany our decisions and actions – exert an influence on our actions and realisation of decisions in offline, future-oriented manner.

Gollowitzer and Schaal [26] conceptualise implementation intentions in terms of metacognitive monitoring and control and regulation of our first-order behaviour. Similarly, Gollwitzer and Oettingen [28] conceive of implementation intentions as metacognitive strategies for regulation of behaviour, emotions and thinking. However, in my conception of metacognition we cannot so easily ascribe metacognitive character to implementation intentions. For, cognitively referring to one's behaviour – if it does not entail referring to one's mind – does not yet constitute metacognition. With this in mind, the implementation intention to carry out physical exercise every day at a specified time and location does not involve (at least not necessarily) metacognitive activity. The same holds for the breast self-examination example of implementation intentions. On the other hand, all other presented implementation intentions necessarily involve metacognitive activity, for they involve thoughts, plans or feelings about future mental states or processes. Moreover, it is not only the formation of implementation intentions that necessitates metacognitive abilities, but also their realisation, as one needs, for example, to become aware of past intentions to be able to realise them – both of which require a certain mental effort directed towards the regulation of one's own mental states and processes.

One could nonetheless argue, however, that implementation intentions would be as effective even if formed and realised unconsciously. Of course, if one presupposes that conscious states and processes are mere epiphenomena (that is, that they play no causal role), then this should, indeed, hold. But let me briefly comment on this "danger".

Firstly, numerous psychological and neuroscientific studies show that people decide and act differently in "unconscious" compared to "conscious" experimental conditions [30-32], especially when participants carry out more complex tasks. And even though such research is mainly about correlations between unconscious/conscious activity and behaviour (including decisions) and thus not about "true" causality, most proponents of epiphenomenalism "from the empirical circles", such as psychology or cognitive neuroscience, should accept the mentioned research as valid. For, they accept the basic presuppositions and ways of researching the mind of the mentioned research [30-32].

Secondly, it is hard to imagine how one could unconsciously understand the instructions to form an implementation intention, unconsciously know whether the implementation intention refers to mind or behaviour, to a thought process or an emotional state, and how one could later unconsciously realise the implementation intention in question[7]. In this regard, I utterly agree with Mele's[8] [25] ridicule of a person who, after reading his book "Effective Intentions: The Power of Conscious Will", learned that implementation intentions can be effective and, since she at the same time believed that fully(!) unconscious implementation intentions are as effective as the ones involving conscious activity, would simply (unconsciously?) wait for an implementation intention to occur and get realised. It is, indeed, hard to imagine how one could form and realise implementation intentions in a completely unconscious manner.

According to Gollowitzer and Schaal [26], implementation intentions and metacognitive processes, necessary for their formation and realisation, have another useful function. That is, they can facilitate automatic behaviour. As such, (meta)cognitive implementation intentions can be used for the purpose of easing the burden of every-time deliberation, reflection and

control of our cognitive and behavioural endeavours. This seems especially valuable if we consider the rather ubiquitous limitations of our cognitive apparatus: the limitation of working memory, attention, information processing, self-observation, etc. Furthermore, being able to offload the burden of every-time online monitoring and control necessary for many decisions into a more automatic behaviour may further support thinking and reflecting upon matters, not tied directly to the present moment.

Let me now turn to presenting some studies of anticipated emotions that further exemplify the role of offline metacognition in decision-making.

ANTICIPATED EMOTIONS AND INDECISION

Pfister and Böhm [33] divide emotions pertaining to the process of decision-making into two broad categories: immediate and anticipated emotions. In their view, "*Anticipated* emotions are beliefs about one's future emotional states that might ensue when the outcomes are obtained. *Immediate* emotions, in contrast, are actually experienced when making a decision, thereby exerting an effect on the mental processes involved in making a choice […] Immediate emotions come in two variants, either as *incidental* emotions caused by factors which are not related to the decision problem at hand, and as *anticipatory* or integral emotions, which are caused by the decision problem itself" [33; p.6].

An example of *immediate* and *anticipatory* emotions is, for instance, a negative feeling, related to choosing of a card from the deck that brings losses [e.g., 34] or the felt fear when one considers turning into a dark alley. Anticipatory emotions are, according to the stated definition, experienced during decision-making and should, as such, be functionally understood mainly in terms of online monitoring and control of decision-making. On the other hand, anticipated emotions as beliefs about future emotional states related to decision outcomes – such as a belief about how much satisfaction a certain outcome will bring or a belief about future regret one might experience if not achieving her goals – are supposedly "less tied" to current decision-making processes than anticipatory emotions. But even though anticipatory emotions are related to more or less immediate decision-making processes and experienced when making a decision, one could still claim they are, in fact, related to near-future decisions and potential outcomes of decisions. This holds especially if we consider decisions that are comprised of many steps, considerations, possible future outcomes and subjective consequences, and spread across longer time-scales. Furthermore, the strict division of experienced emotions (feelings) and (experienced?) beliefs – that is espoused by Pfister and Böhm [33] – is, at least phenomenologically, not that clear (see also my first comment in the "Remarks" section; for an opposing view see, for instance, Colombetti [35]). Nonetheless, anticipated emotions, as a more "reflective type" of "emotions", represent a clearer case of offline metacognition in decision-making. I will thus focus on anticipated emotions, such as anticipated regret, in the following paragraphs.

Classical psychological studies indicate that anticipated regret and other anticipated emotions can lead to various decision avoidances, such as accepting the status quo (status quo bias), indecision, etc., that in certain contexts lead to less advantageous choices [36]. The study of Fishbach and Zhang (2005, as presented in [30]), for instance, shows that sellers, endowed with an object, anticipate negative emotion of loss when thinking about selling the object they were endowed with and hence, demand a higher price for the product they own to compensate for the potential regret. This finding is consistent with the study of Kahneman, Knetsch and Thaler [37], who showed that participants were unwilling to sell various products (such as cups or pens) if they were not offered approximately twice as much as they were willing to pay for them when they did not own the objects yet. In another study,

Bar-Hillel and Neter (1996, as presented in [30]) offered participants to exchange the lottery ticket they were endowed with, with a new ticket, having the same probability of winning money. To cancel out the endowment effect, researchers also offered them a small money incentive. The exchange of a lottery ticket for the same value lottery ticket plus some money is, at least from the perspective of normatively "correct" choices, a choice participants should have made. Nonetheless, more than half of participants did not accept the offer. Bar-Hillel and Neter interpreted the result as a consequence of anticipated regret that purportedly ensued from participants' thinking about exchanging a potentially winning lottery ticket they owned. Conversely, in Bar-Hillel and Neter's study, 90 % of participants were willing to exchange the pen they were endowed with, for an identical pen plus a small money incentive – a result that indirectly indicates that their interpretation might not be ungrounded.

Some researchers claim [36, 38] such results show that anticipated emotions lead to irrational decision-making, various biases "of indecision", etc. I believe, the results can also be interpreted rather differently. Baumeister et al. [30] state that anticipated emotions are, in fact, adaptive: "Adjusting behavior on the basis of anticipated emotion appears to be quite adaptive: It produces safe, healthy, and justifiable choices. It also tends to foster preserving the status quo when the status quo is good" [30; p.196]. They also point out that anticipated emotions encourage counterfactual thinking and thus facilitate learning. In this regard, anticipated emotions can be understood as "tools" that encourage us to reflect on future possibilities of making choices that lead to more advantageous/desired outcomes and consequences and maybe nudge us to reflect on our past choices and mistakes that could inform our future choices. Furthermore, our beliefs and feelings regarding an imagined potential outcome and the negative emotions we think will ensue, can motivate us to think about other, non-obvious possible options, and thus enable us not to follow the first possible course of action that seems appropriate in a given moment.

On the other hand, indecision should not pervade all decision-making, as is succinctly put by William James in his essay on habit: "The more of the details of our daily life we can hand over to the effortless custody of automatism, the more our higher powers of mind will be set free for their own proper work. There is no more miserable human being than one in whom nothing is habitual but indecision, and for whom the lighting of every cigar, the drinking of every cup, the time of rising and going to bed every day, and the beginning of every bit of work, are subjects of express volitional deliberation. Full half the time of such a man goes to the deciding, or regretting, of matters which ought to be so ingrained in him as practically not to exist for his consciousness at all" [39; p.122]. Nevertheless, if indecision does not become a habit, it can open up space for a more thorough reflection upon our past and future decision-making. One could say that we should strive towards a balance between "action out of habit" (automaticity) and "reflection out of indecision".

And even though anticipated emotions can, in specific situations and contexts, lead to "errors of indecision" and possibly other biases, they nonetheless represent a good example of the importance of referring to one's own future states of the mind in decision-making and thus provide further support for the claim that offline metacognition is essential to decision-making.

GLOBAL GOALS, DESIRES AND PERSONAL VALUES

Implementation intentions and anticipated emotions that exemplify the importance of offline metacognition in decision-making, are "directed" towards specific actions and decisions. However, our decisions are importantly determined also by our global/broader goals, desires and personal values that represent a kind of broader structure into which our specific decisions and processes of decision-making are embedded. Baron nicely expresses such

embeddedness of our decisions into other decisions and personal goals: “When we decide on a personal goal, we make a decision that affects future decisions. If a person decides to pursue a certain career, the pursuit of that career becomes a goal that many future decisions will seek to achieve. When we choose personal goals by thinking, we also try to bind our future behavior. Personal goals of this sort require self-control” [40; p.6]. Although I have “broader” goals as well as other factors such as personal values in mind, Baron’s thought nicely illustrates how decisions cannot be understood as a kind of points in time and space but should be conceived of as embedded into broader goals, desires, values, and other decisions. In this last part of the article, I will thus argue that our ability to reflect upon our broader goals, desires and personal values reveals how offline metacognition can impact our decisions also in an indirect way – one of the most neglected aspects of decision-making, metacognition and their relation.

Moreover, existing empirical research provides evidence that metacognition importantly impacts our decision-making in an offline way, but such research does not represent the most appropriate grounds for making claims about the indirect role of metacognition in decision-making. For, it mostly focuses on studying relatively simple, one-shot, short in duration decision problems with few and unimportant consequences for decision-makers and, as such, cannot account for more “complex” every-day decisions and contexts [41, 42]. With this in mind, I will here focus on hypothetical decision situations and show that the indirect influence of offline metacognition on decision-making is crucial, as it enables us to reflect (think and feel) on our more general/global goals, values, and desires that significantly determine our specific decisions.

Let me provide some hypothetical examples of everyday decision-making situations that show the essentiality of the indirect influence of offline metacognition on decision-making.

Mary’s goal is, after finishing her bachelor degree, to pursue her studies. Since the deadline is far in the future, she does not think about the choice but rather concentrates on her study and other activities. However, she knows/feels that she is not very interested in her undergraduate studies of computer science. She also knows that she wants to try something more exciting in the future. When the deadline approaches, she starts to gather information about various study programmes, discusses her options with friends, reflects upon what she wants to do with her future, what she feels as exciting and motivating, what she is good at, etc. Finally, just before the deadline, she identifies psychology and cognitive science as the two – for her – relevant options. She decides to study psychology. Note, that her final decision is not strongly dependent solely on her knowing her study interests or her feelings about wanting to study something exciting, but is strongly dependent also on her knowledge, beliefs and feelings about her more global goals and personal values, that are indirectly and importantly related to her choice. Namely, for her to even consider to continue to study, she needs to have the goal of wanting to be well educated, to be able to do an interesting job after studying, etc. Her identification of psychology and cognitive science as the final relevant alternatives is partly the consequence of various desires, goals, and personal values she holds. She, for instance, has always wanted to understand the human and her own mind, and has always held the value of helping others in high regards. Hence, she decides to study psychology, for which she thinks will give her more opportunity to live in accordance with such desires and values. If, on the other hand, Mary’s goal was to build houses or earn as much money as possible, she would presumably not choose to study psychology. Her choice is thus strongly dependent on her reflection on what she expects from life, what values she holds, and her broader, more global goals. And although we can imagine Mary to be a more practical person, and thus not be particularly happy to delve on such “reflective” matters too much, she

cannot but have at least a slight awareness, knowledge, and feelings about what she wants to do with her life, about her goals and values, if she is to decide as she decided.

Let us provide another example. John is about to finish his studies of economy and is deliberating his future career path. He suspects he is quite talented in business matters, would want to earn more money than a regular job affords, but knows he is rather inexperienced with real-life business endeavours. He is also a little fearful of uncertainties brought by independent entrepreneurship. Should he rather take on a regular job or risk and start his own company that would test his abilities to compete on the ruthless market? Should he decide to start up a company, what kind of company should he start up? What is the most optimal choice for his future? (Note that Mary did not ask the question of the best or optimal choice. This is quite telling, since her values, outlook on life, and herself are rather different to John's.) Even though John is a competitive and self-confident person, he has his doubts: should he really choose the option for which he believes it will, in the long run, bring him most "fame and money" or should he choose the option, for which he believes it will bring the optimal proportion of success and satisfaction? But how does he actually understand success and satisfaction in the context of his goals and life aspirations? Does he really want to risk bringing upon himself the stresses entrepreneurship is known to entail? Is it not, that a part of him also desires tranquillity? How is he to reconcile his contradicting goals and desires?

These hypothetical decision-making situations illustrate that decision-makers have to, at least in certain decision-making situations, reflect upon their broader desires, goals, and personal values if they are to decide, as they decide, and act, as they act. There is no other way for them but to reflect on these matters, if they should have the willingness and desire to choose according to their goals and life aspirations. And even though – especially if we do not deem a decision situation as important for us – we, most of the time, are probably not reflecting too much on our goals, aspirations, and values. And even though our broader desires, goals, and personal values are determined by many external factors, such as our socio-cultural environment, our ability to reflect upon such matters represents an essential, constitutive element of decision-making. In this regard, offline metacognition plays a crucial role in decision-making also in an indirect way.

CONCLUSION

In conclusion, I want to emphasise two further issues which are essential to our understanding of the role metacognition plays in decision-making.

Firstly, even though empirical research provides evidence that metacognition plays an important role in decision-making – as an online monitoring and control "function" and as an offline activity – laboratory settings do not, in fact, represent the most fruitful environments for researching metacognition, decision-making, or their relation. For, they primarily afford research on relatively simple, one-shot, short in duration decision problems with few and unimportant consequences for decision-makers. As such, they exclude many every-day life decision-making situations and contexts that are more complex, intricate and messier than one is willing to avow. With this in mind, one has to admit that we, in fact, know relatively little about the role of metacognition in decision-making and should thus put more effort into studying the role of metacognition in everyday decision-making environments [43].

Secondly, questions regarding the degree to which we actually avail ourselves of our metacognitive abilities in decision-making, which goals and life aspirations we perceive as "worthy" of our attention, and when we deem decision situations to be "important enough" to prompt us to reflect on our past and think about our future, are very much dependent on what sense and meaning our lives, world, and minds have for us, from our first-person and

individual perspective(s) [35, 42, 44-46]. I this regard, it is essential that we – as researchers and individual human beings – attempt to understand decision-making, metacognition, and their relation also in and from this perspective.

Lastly, despite the fact that our understanding of metacognition in decision-making is undoubtedly limited, and despite the fact that our ability to form feelings, thoughts and gain understanding of our own minds is, in a way, severely restricted, it seems that our decision-making would not be what it is, if we lacked the ability of conscious metacognition. Our ability to consciously refer to and influence our own mind might, in the end, turn out to be just a convenient illusion, but it might as well be at the core of what intrinsically defines us and possibly other living beings.

REMARKS

[1]I understand cognition in the broader sense in which cognition is "composed" of the so-called "higher-level" cognitive processes (such as reasoning, thinking, etc.) as well "lower-level" cognitive processes (such as emotions, feelings, volition, etc.). I should emphasise, however, that I do not espouse the "duality" or separation of cognition and emotion, thinking and feeling, etc. (see, for instance, Pessoa [47] for arguments that at the level of brain organisation, emotion and cognition are inseparable; Colombetti [35] for a similar claim from the perspective of the enactivist notion of cognition).

[2]Termed also epistemic or noetic feelings [48].

[3]Although I am aware that embeddedness of decision-making into socio-cultural contexts and environment is a significant aspect of all decision-making, I will, for the simplicity's sake, limit my discussion to individual, personal decision-making.

[4]I shall here not discuss another important aspect of offline metacognition, namely, our ability to reflect on past decisions. I should stress that planning and referring to future decisions, and thoughts, beliefs and feelings, related to them, are strongly based on our past experience, beliefs and knowledge regarding our past decisions. However, experience and knowledge we gain from past decisions are at the same time influenced by our expectations and plans for our future. In this regard, the past and the future of decision-making are strongly interconnected and mutually defining.

[5]See also the review of Baumeister, Masicampo and Vohs [31] for a similar claim in the context of the influence of conscious thought on behaviour.

[6]In this, indirect metacognition is mostly an offline activity, whereas offline metacognition can be either directly or indirectly tied to specific decisions/tasks/activities.

[7]I would agree with the claim that the realisation of an implementation can, in time, potentially become fully unconscious. Also, note that the case of realising an implementation intention in a fully automatic manner does not necessarily entail the process to be fully unconscious.

[8]See Mele [25; Ch.7] for a more detailed critique of such views.

REFERENCES

[1] Metcalfe, J. and Shimamura, A.P., eds.: *Metacognition: Knowing about Knowing*. The MIT Press, 1994,

[2] Carruthers, P.: *How we know our own minds: The relationship between mindreading and metacognition.* Behavioral and Brain Sciences **32**(2), 121-182 (with commentaries), 2009, http://dx.doi.org/10.1017/S0140525X09000545,

[3] Perner, J.: *MiniMeta: in search of minimal criteria for metacognition.* In: Beran, M.J.; Brandl, J.L.; Perner, J. and Proust, J., eds.: *Foundations of Metacognition*. Oxford University Press, Oxford, pp.94-118, 2012,

[4] Proust, J.: *Metacognition and metarepresentation: is a self-directed theory of mind a precondition for metacognition?*
Synthese **159**(2), 271-295, 2007,
http://dx.doi.org/10.1007/s11229-007-9208-3,

[5] Proust, J.: *The Representational Structure of Feelings.*
In: Metzinger, T. and Windt, J.M., eds.: Open MIND **31**(T). MIND Group, Frankfurt am Main, 2015,
http://dx.doi.org/10.15502/9783958570047,

[6] Beran, M.J.; Brandl, J.L.; Perner, J. and Proust, J., eds.: *Foundations of Metacognition*.
Oxford University Press, Oxford, 2012,

[7] Flavell, J.H.: *Metacognition and cognitive monitoring: A new area of cognitive–developmental inquiry.*
American Psychologist **34**(10), 906-911, 1979,
http://dx.doi.org/10.1037/0003-066X.34.10.906,

[8] Koriat, A.: *Metacognition and consciousness.*
In: Zelazo, P.D.; Moscovitch, M. and Thompson, E., eds.: *Cambridge Handbook of Consciousness*.
Cambridge University Press, Cambridge, pp.289-325, 2007,

[9] Shea, N.; Boldt, A.; Bang, D.; Yeung, N.; Heyes, C. and Frith, C.D.: *Supra-personal cognitive control and metacognition.*
Trends in Cognitive Sciences **18**(4), 186-193, 2014,
http://dx.doi.org/10.1016/j.tics.2014.01.006,

[10] Thompson, V.A.: *Dual-process theories: A metacognitive perspective.*
In: Evans, J.St.B.T. and Frankish, K., eds.: *In Two Minds: Dual Processes and Beyond*. Oxford University Press, New York, pp.171-195, 2009,

[11] Dunolsky, J. and Metcalfe, J.: *Metacognition*.
Sage Publications Inc., Los Angeles, 2009,

[12] Alter, A.L.; Oppenheimer, D.M. and Epley, N.: *Overcoming Intuition: Metacognitive Difficulty Activates Analytic Reasoning*.
Journal of Experimental Psychology **136**(4), 569-576, 2007,
http://dx.doi.org/10.1037/0096-3445.136.4.569,

[13] Davis, E.L.; Levine, L.J.; Lench, H.C. and Quas, J.A.: *Metacognitive Emotion Regulation: Children's Awareness that Changing Thoughts and Goals Can Alleviate Negative Emotions.*
Emotion **10**(4), 498-510, 2010,
http://dx.doi.org/10.1037/a0018428,

[14] Fleming, S.M.; Huijgen, J. and Dolan, R.J.: *Prefrontal contributions to metacognition in perceptual decision making.*
The Journal of Neuroscience **32**(18), 6117-6125, 2012,
http://dx.doi.org/10.1523/JNEUROSCI.6489-11.2012,

[15] Hart, J.T.: *Memory and the feeling-of-knowing experience.*
Journal of Educational Psychology **56**(4), 208-216, 1965,
http://dx.doi.org/10.1037/h0022263,

[16] Mischel, W.; Shoda, Y. and Rodriguez, M.L.: *Delay of Gratification in Children.*
Science **244**(4907), 933-938, 1989,
http://dx.doi.org/10.1126/science.2658056,

[17] Novemsky, N.; Dhar, R.; Schwarz, N. and Simonson, I.: *Preference Fluency in Choice.*
Journal of Marketing Research **44**(3), 347-356, 2007,
http://dx.doi.org/10.1509/jmkr.44.3.347,

[18] Oppenheimer, D. M.: *The secret life of fluency.*
Trends in Cognitive Sciences **12**(6), 237-241, 2008,
http://dx.doi.org/10.1016/j.tics.2008.02.014,

[19] Shynkaruk, J.M. and Thompson, V.A.: *Confidence and accuracy in deductive reasoning.*
Memory and Cognition **34**(3), 619-632, 2006,
http://dx.doi.org/10.3758/BF03193584,

[20] Schwarz, N.: *Metacognitive Experiences in Consumer Judgment and Decision Making.* Journal of Consumer Psychology **14**(4), 332-348, 2004, http://dx.doi.org/10.1207/s15327663jcp1404_2,
[21] Strle, T.: *Metacognition and Decision Making: Between First and Third Person Perspective.* Interdisciplinary Description of Complex Systems **10**(3), 284-297, 2012, http://dx.doi.org/10.7906/indecs.10.3.6,
[22] Yeung, N. and Summerfield, C.: *Metacognition in human decision-making: confidence and error monitoring.* Philosophical Transactions of the Royal Society B: Biological Sciences **367**(1594), 1310-1321, 2012, http://dx.doi.org/10.1098/rstb.2011.0416,
[23] Wilson, M.: *Six views of embodied cognition.* Psychonomic Bulletin and Review **9**(4), 625-636, 2002, http://dx.doi.org/10.3758/BF03196322,
[24] Gollwitzer, P.M.: *Implementation intentions: Strong effects of simple plans.* American Psychologist **54**(7), 493-503, 1999, http://dx.doi.org/10.1037/0003-066X.54.7.493,
[25] Mele, A.R.: *Effective Intentions: The Power of Conscious Will*. Oxford University Press, New York, 2009,
[26] Gollwitzer, P.M. and Schaal, B.: *Metacognition in Action: The Importance of Implementation Intentions.* Personality and Social Psychology Review **2**(2), 124-136, 1998, http://dx.doi.org/10.1207/s15327957pspr0202_5,
[27] Schweiger Gallo, I.; Keil, A.; McCulloch, K.C.; Rockstroh, B. and Gollwitzer, P.M.: *Strategic automation of emotion control.* Journal of Personality and Social Psychology **96**(1), 11-31, 2009, http://dx.doi.org/10.1037/a0013460,
[28] Gollwitzer, P.M. and Oettingen, G.: *Planning Promotes goal Striving.* In: Vohs, K.D. and Baumeister, R.F., eds.: *Handbook of Self-Regulation: Research, theory, and applications*. The Guilford Press, New York and London, pp.162-185, 2011,
[29] Gollwitzer, P.M. and Sheeran, P.: *Self-regulation of consumer decision making and behavior: The role of implementation intentions.* Journal of Consumer Psychology **19**(4), 593-607, 2009, http://dx.doi.org/10.1016/j.jcps.2009.08.004,
[30] Baumeister, R.F.; Vohs, K.D.; DeWall, C.N. and Zhang, L.: *How Emotion Shapes Behavior: Feedback, Anticipation, and Reflection, Rather Than Direct Causation.* Personality and Social Psychology Review **11**(2), 167-203, 2007, http://dx.doi.org/10.1177/1088868307301033,
[31] Baumeister, R.F.; Masicampo, E.J. and Vohs, K.D.: *Do conscious thoughts cause behavior?* Annual Review of Psychology **62**(1), 331-361, 2011, http://dx.doi.org/10.1146/annurev.psych.093008.131126,
[32] Newell, B.R. and Shanks, D.R.: *Unconscious influences on decision making: a critical review.* The Behavioral and Brain Sciences **37**(1), 1-61 (with commentaries), 2014, http://dx.doi.org/10.1017/S0140525X12003214,
[33] Pfister, H.-R. and Böhm, G.: *The multiplicity of emotions: A framework of emotional functions in decision making.* Judgment and Decision Making **3**(1), 5-17, 2008, http://journal.sjdm.org/bb1/bb1.html,
[34] Bechara, A.; Damasio, H.; Tranel, D. and Damasio, A.R.: *Deciding advantageously before knowing the advantageous strategy*. Science **275**(5304), 1293-1295, 1997, http://dx.doi.org/10.1126/science.275.5304.1293,
[35] Colombetti, G.: *The Feeling Body: Affective Science Meets the Enactive Mind.* The MIT Press, Cambridge, 2014,

[36] Anderson, C.J.: *The psychology of doing nothing: Forms of decision avoidance result from reason and emotion.*
Psychological Bulletin **129**(1), 139-167, 2003,
http://dx.doi.org/10.1037/0033-2909.129.1.139,
[37] Kahneman, D.; Knetsch, J.L. and Thaler, R.H.: *Experimental Tests of the Endowment Effect and the Coase Theorem.*
Journal of Political Economy **98**(6), 1325-1348, 1990,
http://dx.doi.org/10.1086/261737,
[38] Wilson, T.D. and Gilbert, D.T.: *Affective Forecasting Knowing What to Want.*
Current Directions in Psychological Science **14**(3), 131-134, 2005,
http://dx.doi.org/10.1111/j.0963-7214.2005.00355.x,
[39] James, W.: *The principles of Psychology*.
Henry Holt and Company, New York, 1890,
http://psychclassics.yorku.ca/James/Principles, accessed 11th September 2016,
[40] Baron, J.: *Thinking and deciding*.
Cambridge University Press, New York, 2007,
[41] Strle, T.: *Decision-Making: from Lab to Real-Life*. In Slovenian.
Analiza **20**(1), in press, 2016,
[42] Strle, T.: *Embodied, Enacted and Experienced Decision-Making.*
Phainomena, in press, 2016,
[43] Van Manen, M.A.: *On Ethical (In)Decisions Experienced by Parents of Infants in Neonatal Intensive Care*.
Qualitative Health Research **24**(2), 279-287, 2014,
http://dx.doi.org/10.1177/1049732313520081,
[44] Di Paolo E.A.; Rohde, M. and De Jaegher, H.: *Horizons for the enactive mind: values, social interaction, and play*.
In Stewart, J.; Gapenne, O. and Di Paolo, E., eds.: *Enaction: Toward a new paradigm for cognitive science*. The MIT Press, Cambridge, pp.33-87, 2010,
[45] Merleau-Ponty, M.: *Phenomenology of Perception*.
Translated by Smith, C. Routledge and Kegan Paul, London, 1962,
[46] Varela, F.J.; Tompson, E. and Rosch, E.: *The embodied mind: Cognitive science and human experience*.
The MIT Press, Cambridge, 1993,
[47] Pessoa, L.: *On the relationship between emotion and cognition.*
Nature Reviews Neuroscience **9**(2), 148-158, 2008,
http://dx.doi.org/10.1038/nrn2317,
[48] Dokic, J.: *Seeds of self-knowledge: noetic feelings and metacognition.*
In: Beran, M.J.; Brandl, J.L.; Perner, J. and Proust, J., eds.: *Foundations of Metacognition*. Oxford University Press, Oxford, pp.302-321, 2012.