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The nature of epistemic feelings

Santiago Arango-Muñoz

Among the phenomena that make up the mind, cognitive psychologists and philosophers have postulated a puzzling one that they have called ''epistemic feelings.'' This paper aims to (1) characterize these experiences according to their intentional content and phenomenal character, and (2) describe the nature of these mental states as nonconceptual in the cases of animals and infants, and as conceptual mental states in the case of adult human beings. Finally, (3) the paper will contrast three accounts of the causes and mechanisms of epistemic feelings: the doxastic account; the mental scanner account; and the heuristic mechanism account. The paper will argue in favor of the heuristic mechanism account.

Keywords: Emotions; Feelings; Mental Actions; Metacognition; Nonconceptual Content

1. Introduction

Among the different phenomena that make up the mind, cognitive psychologists have postulated a puzzling one that they have called ''epistemic feelings'' or ''noetic feelings'' (henceforth E-feelings).[1] As with other feelings, their main characteristics are that they are phenomenal experiences and that they have a specific intentional content.[2] The following are some instances of E-feelings: the feeling of knowing (henceforth FOK); confidence; uncertainty; the feeling of forgetting; and the tip-of-the-tongue phenomenon (henceforth TOT). Philosophers and psychologists have become interested in these experiences not only because of their puzzling character, but also because of the role they might play within the cognitive architecture and mental life of a subject.

To understand why these kinds of experiences seem puzzling, think about the feeling of forgetting (henceforth FOF). Almost every person has experienced a sudden FOF on his or her way out of a room at least once. This experience seems puzzling because it indicates that something, to which the subject does not have access, is missing. It indicates that something is lacking, that there is a gap; and at the same

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time, it indicates it in a very specific way: only a specific object would relieve the subject from this feeling. So, it is of interest to understand how this kind of feeling is produced and how it can point to an absent object, an object of which the subject is unaware.

This paper aims to (1) characterize these experiences according to their intentional content and phenomenal character, and (2) describe the nature of this kind of mental state as nonconceptual in the cases of animals and infants, and as conceptual mental states in the case of adult human beings. Finally, (3) the paper will contrast three accounts that have been proposed to explain the eliciting of E-feelings: the doxastic account; the mental scanner account; and the heuristic mechanism account. The paper will argue in favor of the last one. Because of space constraints, the paper will focus only on examples extracted from memory studies to determine the nature of E-feelings.

Feelings play an essential role in the production and explanation of bodily action (de Sousa, 1987; Döring, 2003) and also in mental action, e.g., remembering, mentally calculating, and imagining (Peacocke, 2007, 2009; Proust, 2009a). Even though this is not a new claim, it has not yet been adequately integrated into our understanding of how the mind works and how our conscious experiences shape behavior (de Sousa, 2008; Efklides, 2006; Schwartz & Metcalfe, 2010). Hence, it is worth arguing for this claim once more. On the one hand, this view goes against the widespread tendency in philosophy of mind to explain behavior solely on the basis of belief-desire interactions. On the other hand, this account also rejects what Tulving (1989) calls the ''doctrine of the concordance'' that holds that knowledge, behavior, and experience always go together: as the cases of E-feelings discussed in the paper will show, knowledge, behavior, and experience can come apart. For example, the TOT subjects feel that they know something they cannot retrieve. Here, experience is dissociated from behavior and, to some extent, from knowledge. As Schwartz notes:

> TOT research refutes the doctrine of concordance . . . by demonstrating that the processes of retrieval are not always identical to the processes that elicit TOTs. There is growing evidence to suggest that the etiology of TOTs differs from the processes that effect retrieval, leaving open the possibility for a breakdown in concordance. (2002, p. 17)

'Feeling' will be used to refer to the conscious, phenomenal, or qualitative experience that a subject undergoes when faced with a given stimulus or a given circumstance. This mental state can also be characterized similarly to the concept of affect (Carver, 2003) as something being to some degree pleasant or painful and motivating behaviors such as approach and avoidance (Carver & Scheier, 1998). Feelings can also be understood, following the ''concern-based construal theory of emotions,'' as a sort of *perception* or *sensitivity*: ''an event of receptivity structured by a synthetic unity of 'factual' and 'evaluative' attribution'' (Roberts, 2009, p. 218), which is fairly close to Millikan's ''pushmi-pullyu representations'': ''representations that are undifferentiated between being indicative and being imperative, between describing and directing'' (Millikan, 2004, 2006, p. 119). In the following, I will

explore the content of E-feelings and how this content motivates some types of bodily and mental actions.

2. The Intentional Content of Epistemic Feelings

Intentionalist or representationalist theories claim that feelings are defined as particular experiences about an object or state of affairs that may or may not exist (Crane, 2001; de Sousa, 1987; Dretske, 1995; Goldie, 2000; Tye, 1995). These representational experiences have two ingredients: *bodily feelings* and *feeling towards* (following Goldie, 2000, 2002). The former are perceptions or experiences of an internal condition inside (or on the surface) of the subject's body, such as limb positions, muscular reactions, and organ pressures; they are caused by certain bodily reactions (including neural reactions). The latter are experiences directed towards an external object in the world such as a thing, person, event, action, or state of affairs that may or may not exist. Thus, the basic idea is that feelings always have a bodily change as their representational vehicle. For example, your feeling of hunger consists of the unpleasant contractions of your stomach together with a feeling of hunger directed towards some food. I will adopt the representational theory as a framework to analyze E-feelings without committing my account to the strong thesis that the phenomenal character of *all* conscious experiences is totally determined by their representational content.[3] Even if E-feelings lack an articulate or specific content, they are not experiences that lack content altogether. The first step to understanding what E-feelings are is to determine broadly their intentional content. I will mainly characterize E-feelings as feelings towards and, at the end of the section, make some remarks about the bodily component.

Let us start by analyzing the FOK as a feeling towards. It is an experience the subject undergoes when he or she faces a question and is about to recall some information. For example, the experience that he or she undergoes when asked ''what is the capital of Brazil?'' Assuming that the subject has a FOK, this experience seems to indicate to the subject that he or she has the appropriate information to answer the question and that he or she will be able to recall it (''Brasilia'') at some point in time. Consider, for example, the experience that you underwent in school when the teacher asked a question to one of your classmates and you felt that you would have been able to answer it, even before you or your classmate could retrieve the correct answer (Reder, 1987, 1988, 1996).

Psychologists studying memory retrieval have noticed that subjects often are able to accurately determine whether they are going to be able to recall the information by means of the FOK *before* they can even try to recall it (Reder, 1987, 1988, 1996). Paynter, Reder, and Kieffaber (2009), for example, estimate that the production of the feeling happens in the 300–500 ms time window, whereas the retrieval of an item from memory takes longer. In other words, subjects' FOKs seem *somehow* to accurately predict their future cognitive performance and motivate the subject to act accordingly. In everyday life, this phenomenon is well illustrated by game shows

where participants compete with others to answer general knowledge questions. Each participant has a button and has to press it as quickly as possible, if and only if he or she knows the answer to the question. Psychological studies have shown that in this case, participants are guided by E-feelings that predict their future performance, allowing them to determine whether they will find the right answer (Reder, 1987, 1988, 1996).

Another example is the frustrating TOT. In the TOT experience, the subject has a feeling that he or she is in possession of the information but is unable to access or recall it. Remarkably, even if he or she is unable to recall the precise object, the subject has access to partial information or characteristics of it, such as the first letter, the semantic field, or what the word sounds like. Moreover, he or she is able to discriminate among different possible objects if confronted with them (Brown & McNeill, 1966; Schwartz, 2002): ''if wrong names are proposed to us, this singularly definite gap acts immediately so as to negate them'' (James, 1964, p. 251). These characteristics support the representational theory's idea that feelings are always *directed towards* an object or piece of information; it is this very feature of feelings that allows the subject to discriminate accurately the object of his or her E-feeling from other possible objects even if he or she is unaware of the precise object.[4]

According to these considerations, the content of the feeling is dual. It comprises both (A) a representation of value by means of positive or negative valence,[5] and (B) the object or specific piece of information. For example, in the case of memory, the content is (A) a positive valence that points to the possibility to retrieve *whatever* the subject wants to retrieve, and (B) the specific object that the subject is looking for. But in the cases described so far (FOK, TOT, and FOF), the object of the feeling, (B), is somehow absent because the object has not yet been retrieved in the FOK and TOT, and lost in the case of FOF. As James remarked, it seems as if they pointed to a ''gap.''

In this sense, E-feelings do not fulfill the transparency condition of most phenomenal experiences. The transparency thesis claims that experience is transparent about its object: the object constitutes the experience and the subject cannot attend to anything but the object (Dretske, 1995; Harman, 1990; Tye, 1995, 2000). The content of conscious experience is nothing but the external objects that are presented to the subject. In contrast, in the case of E-feelings, the subject is conscious of (A), the particular valence (positive or negative) of his or her feeling, but not of (B), the intentional object as such. This is not peculiar to E-feelings: you can, for example, feel anxious without knowing what you are anxious about (Roberts, 2009). The difference between FOK and TOT is that in the former, the subject feels that he or she will access the information easily, whereas in the latter, he or she feels that he or she possesses the information together with the impossibility of accessing it. This means that both feelings happen at different stages of the memory retrieval: FOK happens before memory retrieval whereas TOT happens after a failed retrieval attempt (see section 4 and Table 1).

As noted at the outset, E-feelings, like other types of experiences, are embodied: they are directed to an *internal condition* of the subject's body, in the sense of being caused by or attached to certain bodily reactions (Prinz, 2004). Damasio (1999) has

Table 1 List of Positive and Negative E-feelings According to the Functional Stage Where They Occur and the Motivations They Afford.

	Positive Feelings	Positive Motivations	Negative Feelings	Negative Motivations
Self-Prediction	FOK	Initiate the mental action	Feeling of uncertainty	Look for strategies
Intermediate Assessment	Feeling of fluency	Continue with the action	Feeling of difficulty	Switch the strategy
Post-Evaluation	Feeling of rightness, or TOT	Stop the action, or try again to recall if TOT	Feeling of error, or FOF	Revise the command

attempted, at length, to clarify the relation between bodily reactions and emotional experiences, and has pointed out five key features of this relationship:

> (a) emotional experiences are complicated collections of chemical and neural responses, forming a pattern; (b) they are biologically determined processes that depend on innate brain devices laid down by a long evolutionary history; (c) the devices that produce emotions occupy a fairly restricted group of subcortical regions, and these devices are part of a set of structures that both regulate and represent body states; (d) the devices can be engaged automatically, without conscious deliberation; and (e) emotional experiences use the body as their theater (internal milieu, visceral, vestibular, and musculoskeletal systems), but emotions also affect the mode of operation of numerous brain circuits. (Damasio, 1999, pp. 56–57)

At the present stage of scientific research, it is still unclear which of the neural features pointed out by Damasio also hold for E-feelings. Nevertheless, in contrast with the case of primary emotions that have a subcortical substrate, most recent studies suggest a cortical substrate of E-feelings: they have shown that some patterns of neural activation of the prefrontal cortex seem to be implicated in the set of the internal conditions that cause the E-feelings (Chua, Schacter, & Sperling, 2008; Fleming, Weil, Nagy, Dolan, & Rees, 2010; Maril, Simons, Weaver, & Schacter, 2005; Paynter, Reder, & Kieffaber, 2009; Shimamura, 2000). Furthermore, the facial expression adopted by the subject has an important influence in the felt experience of fluency or difficulty on a given task (Laird, 1974; Niedenthal, 2007; Stepper & Strack, 1993). For instance, the contraction of the corrugator muscle causes the experience of mental effort while carrying out a cognitive task. The FOK covaries with the distention of the muscle, whereas the feeling of difficulty or uncertainty covaries with its tension (Koriat & Nussinson, 2009).

3. The Nature of E-Feelings

3.1. E-Feelings as Nonconceptual Experiences

Some E-feelings are nonconceptual experiences. This means that the subject neither needs to possess mental concepts nor needs to be able to apply them in order to have

this kind of experience (Roberts, 2009; Tye, 2000, 2005). For example, feeling certain of something does not consist in having second-order thoughts about oneself (section 4.1), or self-ascribing the concept of certainty. A subject does not need to possess the concepts of CERTAINTY or UNCERTAINTY in order to undergo E-feelings such as feeling certain or uncertain about something (Proust, 2007, 2009a, 2009b). Some living beings that lack both the mindreading capacity and mental concepts (who are thus unable to introspect), such as young children and non-human animals (Bermúdez, 2009; Carruthers, 2008), are able to have these kinds of feelings and to exploit them in order to control some of their cognitive activities such as remembering or perceiving (see Hampton, 2001, and Smith, 2009, on animals; on young children, see Balcomb & Gerken, 2008). In other words, undergoing an E-feeling does not constitute an exercise of introspection.[6] A subject only needs to possess a kind of *sensitivity* (section 4) to his or her cognitive processing that allows him or her to engage in intentional behaviors accordingly.

Bodily feelings not only point to some object but also afford certain bodily actions. It has typically been accepted that pain affords avoidance behaviors and pleasure affords approaching behaviors (Carver, 2003). In the same way, certain E-feelings afford certain bodily or mental actions. The FOK, for example, affords trying to remember, the feeling of error affords verifying the outcome of a mental action, and so on. Hence, we can see that E-feelings are not only *intentional* (in the sense of being about something), but also *directional* in the sense of pointing to an action, such as remembering instead of calculating the result of a given multiplication (Reder, 1996; Walsh & Anderson, 2009). They do so by means of their valence, i.e., the subjective sense of positivity or negativity arising from the experience (Carver, 2003; Efklides, 2006; Russell, 2003).

Positive feelings motivate certain types of action and negative feelings motivate others. That is why it seems useful to conceptualize E-feelings as *mental affordances* (Proust, 2009a, 2009b) that point towards a possibility of mental action and motivate the subject to execute it. For instance, a feeling of uncertainty points to a lack of knowledge or indicates that something is wrong with our perceptual or mnemonic activity, allowing *and motivating* a subsequent correction or improvement, without the need for either a meta-belief or an introspective effort by the subject. That's why its content could also be described as "some (positive/negative) affect concerning a mental action" or "some (much/little) A-ing affordance" (Proust, 2009b) where "A-ing" is the afforded mental action, rather than as the meta-belief "I think that I remember X."

3.2. E-Feelings as Conceptual Experiences

Although some E-feelings, such as the feeling of certainty or the feeling of uncertainty, refer in a nonconceptual way, it also seems that possessing certain concepts, such as the concept of FORGET, may facilitate the production of some experiences, such as the FOF, that would not be elicited otherwise (Finn, 2008; Koriat, Bjork, Sheffer, & Bar, 2004). Other conceptual E-feelings are the FOK, the

feeling of error, the feeling of rightness, the feeling of wrongness, and the feeling of understanding, among others.[7]

The following experiment illustrates the conceptual nature of the FOF. Koriat et al. (2004) designed an experiment to investigate subjects' sensitivity to the forgetting caused by the retention interval between study time and the test. Subjects were presented with a list of 60 word pairs and had to estimate how many pairs they would be able to remember after only one of three intervals: 10 minutes; one day; or one week. They found that subjects were insensitive to the retention interval and overconfident concerning their future performance, unless they were asked to estimate recall rates for different retention intervals at the same time, or when the notion of forgetting was made salient by framing the recall predictions in terms of forgetting rather than remembering.

Finn's (2008) findings on framing effects are congruent with this line of thought: forgetting-framed judgments of learning (i.e., "do you think that you will *forget* this") were considerably better calibrated than remembering-framed judgments of learning (i.e., "do you think that you will *remember* this"). These framing effects suggest that E-feelings are not cognitively impenetrable, as perceptual experience seems to be (e.g., in the classic case of the Müller-Lyer illusion; Döring, 2008). That is, having some beliefs about your mental abilities may trigger or modify some particular experience concerning your cognitive activity. For example, thinking about the fallibility and unreliability of your memory may trigger a strong feeling of uncertainty that might even interfere with your normal cognitive performance (Pieschl, 2010; Sanna & Schwarz, 2003).

The penetrable character of E-feelings also suggests that they are in some way determined by the conceptual capacities of the subject and by his or her context, i.e., the set of concepts that the subject possesses and is able to apply, in addition to the properties of the cognitive task the subject is confronting. These factors (the subject's conceptual capacity, context, and the properties of the cognitive task) determine the content, strength, and character of E-feelings. The fact that some E-feelings are constituted by concepts suggests a gradation among E-feelings: from nonconceptual feelings to conceptual ones, ranging from sheer certainty to the FOK, and from the feeling of uncertainty to the FOF or the feeling of error.[8] On this view, concepts not only accompany experiences, but also sometimes play a *constitutive role* in experience.

The range of E-feelings that a subject may undergo is enriched by the range of concepts that he or she possesses as well as the cognitive tasks that he or she is able to confront.[9] Babies and nonhuman animals may feel the nonconceptual experience of certainty, but stricto sensu not the FOK, because they do not yet possess the concept of knowledge and have not yet been introduced to the social practice of justifying their own beliefs and confronting others' beliefs. Still, they can and do feel certain or uncertain concerning their own cognitive process and the implicated information. From a conceptual point of view, this kind of E-feeling is simpler. These E-feelings are pleasant or unpleasant experiences caused by various sensory cues such as the perceptual fluency of a signal (Whittlesea, 1993; Whittlesea & Williams, 2001), the

frequency with which a given stimulus is encountered (Reder, 1996), or simply the fluency of the processing of the information (Koriat, 2000).

Ryle conspicuously put this claim forward a long time ago without much effect on the philosophical discussions:

> Thirst, as the baby is thirsty, is quite unsophisticated. Thirst for a cup of hot, sweet tea demands more sophistication. The transition from feeling thirsty to feeling like drinking some hot, sweet tea and from this to feeling like going out for a country walk or feeling like writing to *The Times* seems to be a fairly smooth transition, though of course the gap between the terminals is very wide indeed. (1951, p. 199)

Once the conceptual capacity is in play, the valence of the nonconceptual experience or affect—the mental affordance—is attached to an epistemic or mental concept, thus generating a *conceptual experience*. The content of this experience could be schematically characterized as: some (positive/negative) affordance + a mental concept (KNOWLEDGE, REMEMBER, FORGET, etc.) + an opaque object. The penetrable character of the E-feelings points to the essential fact that our mind "is a product not just of natural selection," in terms of experiences selected to carry on some cognitive functions, but also of "cultural redesign" (Dennett, 1996, p. 153; see also Bogdan, 2010), generating experiences by means of the cultural background of the agent.[10] Only after coming to possess the concept KNOWLEDGE, which is acquired in the social practice of interaction and confrontation, can a subject undergo an experience with the property of "something being known." One also needs to acquire the concept ERROR before undergoing the feeling of error, the concept FORGET before undergoing the feeling of forgetting, and so on.

We can therefore characterize the gradations of E-feelings as ranging from the feeling of uncertainty to the feeling of error. The former may be characterized as an unpleasant experience that points to a lack of information without describing it *as such* and then moves the subject to search for information; the latter may be characterized as an unpleasant experience pointing to the uncertain character of a propositional content, involving mental concepts and motivating the subject to revise it. The first moves the subject to perform an *information-acquiring act* in the world as some animals do, whereas the second motivates a more intellectual scrutiny dealing with the truth or falsity of a given representation. These remarks suggest two levels of representational complexity that may correspond to two levels of development of the mind; in particular, two levels of metacognitive capacity (Arango-Muñoz, 2011; Koriat, 2000; Thompson, 2009).

3.3. E-Feelings and Transparency

According to representational theories of consciousness, conscious experiences are transparent about their object: the object constitutes the experience and the subject cannot attend to anything but the object (Dretske, 1995; Harman, 1990; Tye, 1995, 2000). Actually, there are some E-feelings, such as the feeling of confidence, that fulfill this condition. When asked about the capital of Serbia a subject may feel very confident about her answer: "Belgrade." Some E-feelings, however, do not seem to

fulfill this condition because the subject undergoes these experiences in the absence of the object they point to. The FOK, the TOT, and the FOF seem to be opaque or non-transparent experiences. The subject is conscious of the valence of his or her feeling as positive or negative, but he or she is not yet able to determine the intentional object of the feeling. The FOK and the TOT point to the fact that the subject knows something without determining *what* is known. The FOF points to the fact that the subject is forgetting something without determining *what* is forgotten. In other words, some E-feelings are not transparent with respect to their objects.

At first glance, the non-transparent character of E-feelings seems to pose a problem for strong first-order representationalism.[11] If a subject can be conscious of features or properties that are different from external ones in cases of E-feelings, then the phenomenal character of *all* conscious experiences *should be* something different from the content of first-order representations. But this argument has it wrong; it demands that our explanation of one phenomenon (perceptual experience) meet the same criteria as the explanation of another (E-feelings). Inasmuch as it would be an error to try to generalize the representational explanation of perception to account for E-feelings, it would be an error to extract conclusions about perceptual content from the very particular case of E-feelings. Perceptual experiences and E-feelings are two different kinds of experiences, and each one needs a different account.

This apparent problem is solved in two steps. Firstly, we should notice the difference between the contents of perceptual states and E-feelings. The former normally point to an actual or present condition of how the world looks to the subject (e.g., ''there is a red spot in front of me''), whereas the latter point to a dispositional condition of the subject's mind (e.g., ''I'm able to retrieve that memory''; ''I'm forgetting something''). Some E-feelings are opaque because they point to a condition that is not yet fulfilled or actual: they point to a disposition; for example, the possibility of retrieving an object or a piece of information. The FOK points to the fact that it is possible to retrieve something that has not yet been retrieved or accessed. I have a FOK concerning Eliot's *The waste land* even before I try to recall the first line of the poem. Thus, it points towards the *possibility* of the mental action of recalling the poem.

To clarify this point, E-feelings can be compared with feelings concerning bodily abilities. In order for one to feel that one is able to jump a given distance, it is not necessary that one actually jump the distance. The object of this bodily feeling is the subject's ability, but this is something that has not yet been enacted. Secondly, as Seager (2002) originally pointed out, we have to include the representation of valence (i.e., the positive or negative character) in the representational content of feelings and emotions, so that experience does not only represent external objects, as in the case of perceptual experience, but also contains an evaluation of those objects. Thus, representationalism needs to include the representation of value in order to account for feelings and emotional experiences (Seager, 2002; Tye, 2008). In the case of E-feelings, the phenomenal character is determined by the valence of the experience (i.e., positive or negative) while the object itself is missing.[12]

Other E-feelings are transparent. The feelings of confidence, of error, of rightness, of wrongness, and of understanding, among others, are transparent about their objects. After doing a mental calculation, the subject may feel confident or unsure about the result; he or she may also feel that he or she has made an error or that he or she is right about the whole mental process he or she has just carried out. In this case, the object of the feeling is transparent in the subject's mind: the whole mental process of solving the mathematical problem and the result. It should be clear that what is transparent in this case is the object of the feeling, not the causes of it. The subject is conscious about the result and feels that it is right or wrong, but is not conscious about why he or she feels that it is right or wrong. *Why* he or she feels this way, the cause of the feeling, is the topic of the next section.

4. The Mechanisms of E-Feelings

4.1. The Doxastic Account of E-Feelings

The third, and last, issue concerns the cause of E-feelings. Some philosophers have embraced the doxastic view that claims that emotions and feelings are identical to judgments or beliefs (Nussbaum, 2001; Solomon, 1993, 2004). According to this view, the FOF would just be the second-order belief that you are forgetting something, and the FOK would just be the second-order belief that you know the information. I resist this view and defend a non-doxastic account of E-feelings—though the cause of the E-feelings can be doxastic in certain circumstances, such as when thinking about the fallibility and unreliability of one's memory triggers a strong feeling of error, i.e., when concepts are involved.

Here is my argument against the doxastic view: according to a classic view, introspective self-ascriptions of perceptions, beliefs, and other mental states derive from an ascent routine in which the subject takes the content of his or her experience at face value and self-attributes that content: if the content of the experience is P, then the subject forms the self-ascription "I see (believe, hear, etc.) that P." If the subject sees that "it's raining" (P), then he or she self-ascribes the proposition "I see that P" (Byrne, 2005, 2011; Dretske, 1995, 2006; Tye, 1995, 2000). According to this view, transparency is a necessary condition for the formation of self-ascriptions and second-order beliefs: the subject cannot self-ascribe a mental property if he or she is not aware of it—that is, in the absence of the content. Given that in the cited cases (FOK, TOT, and FOF), the transparency condition is not fulfilled, the subject has no way to form the self-ascription or second-order belief. In FOK and TOT, the subject has not yet recalled the information, and therefore he or she does not yet have any means to form the self-ascription or second-order belief (that he or she has or does not have the answer). So, it is the other way around: it is the feeling that causes (or gives reasons to) the subject to believe that he or she will recall the information when he or she is confronted with a question.

The FOF can illustrate the argument. Think of the experience, which almost every person has experienced at least once, of being seized by a sudden FOF before

leaving a place. Just like the TOT, the FOF is a puzzling phenomenon because it indicates that something, to which the subject does not have access, is missing. It indicates that something is lacking, the presence of a gap, and at the same time it indicates it in a very precise way, i.e., only a precise object would relieve the subject from this feeling. It is a negative feeling that indicates a lack of information with an unpleasant experience, and thus motivates the subject to revise what he or she does and consider what he or she has forgotten or is about to forget. In this case, the subject can either attend to his or her feeling and try to remember what he or she is missing or overlook it and go out. However, what experience has taught him or her is that it is worth taking notice of the feeling; after all, he or she does not want to forget his or her keys or something important.

Again, the feeling is not (nor is it caused by) the second-order belief that he or she has forgotten something. It is the feeling that causes (or gives reason for) the subject to check his or her pockets and then believe that he or she is forgetting something. These considerations show that E-feelings often do not have a doxastic cause; on the contrary, they may cause (or give reasons for) some specific behavior (e.g., searching in the pockets) and/or some second-order belief (e.g., that "I am about to forget something"). Thompson stresses this point very well: "it is the interpretation of that feeling or affective response that produces a judgment" (2009, p. 181).

But E-feelings need not cause both action and second-order belief every time they occur. The subject may act guided by the E-feeling without forming the second-order belief, and he or she may form a second-order belief without acting. The first case is illustrated by our daily behavior. We perform many mental actions: we remember; calculate; reason; and we execute all of these actions in a very precise and controlled way guided by E-feelings without making second-order judgments about each mental action. The second case is illustrated by cases in which an E-feeling motivates a self-ascription or second-order belief, but we fail to act on it. A FOF makes a subject believe that he or she will forget something, but nevertheless the subject, because of hurriedness, stress, or simple neglect, is unable to do anything about it: he or she fails to check what he or she is about to forget.[13]

4.2. Two Versions of the Monitoring Mechanism

If E-feelings do not have a doxastic cause, then we need a different explanation for the phenomenon. Psychologists have proposed that the origin of E-feelings is low-level metacognition, which is a subpersonal mechanism that monitors the performance of different cognitive processes and elicits E-feelings.[14] Some theorists have conceptualized the monitoring mechanism in a rather obscure way as a subpersonal mechanism carrying out some kind of "mental scanning" (Cassam, 2010; Nichols & Stich, 2003) or as a "Google-like search engine" (Hill, 2011). But this is far from being a clear and distinct idea; as Schwitzgebel points out, "it would be helpful to have a clearer sense . . . of what it means to say that one subpersonal system detects [or monitors or scans] the states or contents of another" (2010). The other problem with this view is that it presupposes the naïve realistic view that the mind is

some kind of special medium full of discrete, persisting, and well-defined mental states and contents waiting for the subject to turn his or her gaze inwards and attend to them. This is the direct-access model of metacogntion (Brown & McNeill, 1966; Hart, 1965; Nelson & Narens, 1990).

A less demanding way of understanding the monitoring mechanism is to conceive it as a heuristic mechanism provided with a "reference rate" (Carver, 2003) that consists in a list of heuristics in the form of conditionals prescribing a given E-feeling for a given situation: if P-event then Q-feeling, if R-event then S-feeling, and so on. For example, in the case of memory, the heuristic mechanism diagnoses a good performance by a feeling of familiarity if the stimulus is perceptually fluent (Whittlesea, 1993; Whittlesea & Williams, 2001). And it also diagnoses a good performance by a FOK if the stimulus is a frequent one (Paynter, Reder, & Kieffaber, 2009; Reder, 1996). On this view, the heuristic mechanism does not work by detecting preexisting mental states, but evaluates mental activity by reference to external conditions or properties of the cognitive processing, as well as by reference to some salient concepts and theories, as the conceptual nature of some E-feelings suggests (section 3.2).[15] Koriat characterizes this model as follows:

> This model assumes that people have no knowledge of their own memory over and above what they can retrieve from it. They cannot monitor directly the presence of information that they cannot momentarily access. However, they can still take advantage of what they can retrieve to make inferences about what they cannot access. Thus, there is no separate monitoring module that has privileged access to information that is not already contained in the output of retrieval. Rather, the cues for the FOK reside in the products of the retrieval process itself. (2000, p. 159)

Let us see how this mechanism works in the case of remembering. There are three key moments in cognitive processing when the heuristic mechanism evaluates the mental action and triggers E-feelings: the *self-prediction* before the action of remembering; the *intermediate assessment* during the execution; and the *post-evaluation* at the end of the action (Efklides, 2006, p. 7; Nelson & Narens, 1990, p. 127):

1. In *self-prediction,* the mechanism considers and evaluates whether the information that the subject will search for is likely to be found in his or her memory, and whether the cost of searching in his or her memory is less than the cost of using a complementary strategy such as looking in a directory. This evaluation generates either a positive or a negative E-feeling concerning the mental action of remembering. The positive E-feeling is the feeling of certainty or the feeling of knowing (when conceptualized) and motivates the subject to try a mental action; the negative E-feeling is the feeling of uncertainty that motivates the subject to try an alternative strategy, such as looking in a directory (Reder, 1987, 1988, 1996).
2. During *intermediate assessment,* the mechanism evaluates the actual execution of the mental action, primarily whether the chosen strategy will lead to the intended outcome and whether the time required for the strategy is reasonably short. This evaluation generates either a positive or a negative E-feeling concerning the mental action of remembering: the positive E-feeling is the feeling of fluency of retrieval and motivates the subject to continue with the same strategy, and the negative feeling is the feeling of difficulty or the TOT.

The intermediate assessment motivates the subject to switch to another strategy when the chosen one is not producing the expected results during execution (Koriat, 2000; Thompson, 2009; Walsh & Anderson, 2009), so that the subject does not have to wait until the end of the process to correct it.

3. Finally, *post-evaluation* monitors the success of the mental action. It primarily evaluates whether the retrieved item of information is the right one and whether the subject is forgetting something. If the assessment is positive, it triggers the feeling of rightness (Thompson, 2009) that motivates the subject to stop the action; if negative, it elicits the feeling of error or the feeling of forgetting that motivates the subject to verify the command. If the retrieval fails, the mechanism elicits the TOT based on the amount of clues and partial information that the subject has been able to retrieve (Koriat, 1993, 1994, 2000).

Positive E-feelings motivate the initiation of the action by internal means or the continued execution of the action using mental strategies, whereas negative E-feelings motivate looking for alternative or complementary strategies to attain the goal, and to revise the command when necessary (Table 1). Thus, their function is motivational: they guide the subject to adaptively choose a strategy to attain a goal.

Some clarifications are necessary at this point. On the one hand, I have been writing, for the sake of simplicity, as if there is a single heuristic mechanism. However, researchers studying metacognition, control systems, and cognitive architecture seem to agree that it may be the case that there is a set of mechanisms rather than a single mechanism that controls all cognitive processes (Carver, 2003; Evans, 2008; Nichols & Stich, 2003; Thompson, 2009). There may be one heuristic mechanism for memory, another for perception, another for reasoning, and so on. On the other hand, this account does not mean that at every single moment there is a new E-feeling or set of feelings that arise(s) and populate(s) the mind. An overpopulation of E-feelings would not be favorable for the cognitive life of the subject. Instead, this would create doubt, perplexity, and hesitation in the normal flow of cognitive activities. The heuristic mechanism would elicit a feeling only when it detects a discrepancy between the ongoing cognitive activities and the ''reference rate'' of normal activity; otherwise, it would remain silent: ''if the rate of progress is below the criterion, negative affect arises. If the rate is high enough to exceed the criterion, positive affect arises. If the rate is not distinguishable from the criterion, no effect arises'' (Carver, 2003, p. 243). By means of E-feelings, the heuristic mechanism smoothly shapes the cognitive behavior of the agent, motivating him or her to adjust her behavior without needing to form second-order beliefs about his or her mind.

5. Conclusion

The project of naturalizing the mind is the project of explaining complex cognitive capacities, such as knowledge, action, emotion, rationality, and so on, on the basis of simpler cognitive operations that can be treated more straightforwardly by empirical sciences in terms of the functioning of brain mechanisms. The goal of this paper is to contribute to this project by providing a description and functional characterization

of the mental phenomenon of E-feelings that help us to understand it by studying simpler operations of brain mechanisms and learned behaviors.

To summarize: in the foregoing, I have tried to solve some of the puzzles concerning the nature of E-feelings by determining their relations to behavior and second-order beliefs. In the first part, I have described the contents and the intentional objects of E-feelings. Next, I have shown that, fundamentally, they refer in a nonconceptual and opaque way to the their objects, and only afterwards in the life of the subject do they become conceptual experiences. In section 4, I have criticized the doxastic and mental scanner accounts about the causes of E-feelings, and I have sketched an account of E-feelings according to which they are often caused by a heuristic mechanism. Throughout, I have also characterized the cognitive role played by E-feelings as motivators of certain kinds of mental action, that is, as mental affordances, and in so doing, I have shown that they constitute an important part of the cognitive and mental life of a subject.

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Notes

[1] Many psychologists and writers also use other terms to refer to this kind of experience, such as 'intuitions' or 'hunches' (Gladwell, 2007; Volz, Rübsamen, & Von Cramon, 2008). I will avoid using these terms because, in contrast to 'epistemic feelings', they are philosophically loaded.

[2] In philosophy of mind, intentionality is the property of referring to objects in the world. My belief that ''the Earth is round'' refers to the planet Earth and is true if and only if it is the case that the Earth is round. This use of 'intentional' differs from the common use of this term to refer to a deliberate act.

[3] An anonymous reviewer suggested that it is an error to adopt the representationalist framework because my account of E-feelings as non-transparent, conceptual experiences conflicts with this view. However, the aim of this paper is not to confirm representationalism point by point, but to use it as a framework for explaining E-feelings. To see why non-transparent experiences pose no serious difficulty to representationalism, see section 3.3.

[4] This discriminatory capacity enabled by the TOT shows that it is not directed towards ''whatever,'' as a reviewer feared; it does have a determinate content that shapes behavior, even if the subject is unaware of the object.

[5] This kind of value has nothing to do with moral or ethical value. The value at issue is relative to the subject and the basic cognitive functions (see Seager, 2002; Tye, 2008).

[6] Here I am using a very precise sense of 'introspection' which is not accepted by all philosophers. I am following Carruthers' (2009) view, according to which introspection starts when a subject engages in second-order thoughts or reflection about her thoughts,

feelings, emotions, or phenomenology in general. For example, a subject introspects when she starts thinking about her pain and trying to determine whether it is more or less intense than the pain that she had last week. You are not introspecting simply in virtue of being aware of the pain in your finger after the smash of the hammer, nor when feeling sad because you fail your exam, nor when you appreciate the colors of the rainbow. It seems that the capacity for introspection is reserved for those living beings that possess the mental concept of PAIN, but to be able to use that concept in reflection it also seems necessary that one possess a language (Bermúdez, 2003, 2009) and a theory of mind (Bogdan, 2010; Flavell, 1998).

[7] Representational theorists often draw the distinction between experiences and thoughts in terms of nonconceptual versus conceptual mental states (Dretske, 1995; Tye, 1995, 2000). Given that my proposal that epistemic feelings are conceptual experiences violates this distinction, this seems to create a tension between my view and classic versions of representationalism. Thanks to an anonymous reviewer for this remark.

[8] The assumption here is that there should be at least one kind of nonconceptual primitive experience concerning mental activities, and that this experience is neutral concerning the cognitive task to which it points. I am assuming here that this kind of experience is the *experience* of certainty, but it may turn out that you also need the *concept* of certainty to undergo this experience. This is not a problem for my account. I am using 'certainty' as a name that refers to a particular kind of mental state that has a particular cognitive function, and as a name, it may be interchangeable with others. What really matters is the mental state that it refers to and the particular function that it carries out.

[9] This account is quite sympathetic to Russell's (2003) theory of the psychological construction of emotions, specifically the claim that each emotion—E-feelings included—is the product of a contextual recreation given a set of psychological concepts. However, the main difference is that in my view, psychological concepts do not merely redescribe the experience, as in Russell's account, but rather constitute it.

[10] This account of E-feelings is consistent with the bodily appraisal theory of emotions. Adopting this conceptual framework, one would classify nonconceptual E-feelings as primary emotions and conceptual E-feelings as secondary emotions: "primary emotions are part of our evolutionary inheritance, shared by all normal humans and tied to specific types of stimuli. Secondary emotions are acquired during development, show cultural and individual variation and are sensitive to more complex and abstract features of the stimulus situation" (Griffiths, 2003, p. 49).

[11] For example, Dretske (1995) and Tye (1995, 2000) hold that the content of experience is entirely exhausted by the represented object.

[12] Notice the contrast with the case of perception. Perception represents an object without attaching a positive or negative value to it. So, in the absence of a represented object, there is nothing left for the subject to be conscious of. That's why perceptual experience cannot be opaque as E-feelings are.

[13] An anonymous reviewer suggests that this case can be explained in a doxasic way, postulating the general background belief that "it is important not to forget something." This belief can be the cause of the FOF. I partially agree with this remark since I agree that the FOF needs a conceptual frame of mind (as shown in section 3.2). But it is still necessary to explain why a general background belief triggers a particular E-feeling on a given occasion, and this phenomenon cannot be accounted for in doxastic terms alone. Moreover, the central point of my discussion is that a token FOF cannot be caused by the particular belief "I'm forgetting something"; rather, it is the other way around.

[14] I use the term 'low-level metacognition' to refer to the experience-based kind of self-control that has been conceptualized by Arango-Muñoz (2011), Koriat (2000), and Proust (2007, 2009a, 2009b), in contrast with the "high-level metacognition" that has been discussed by

Carruthers (2009) and Flavell (1998). Shea and Heyes (2010) use these terms to draw a different distinction.

[15] An anonymous reviewer pointed out that this account of E-feelings as elicited by a mechanisms working according to a heuristic, and not scanning real mental states, is incompatible with the realism proposed by the representational theories that this paper assumes. However, on one hand, my claim is about the format of stored information in memory, and representational theories do not have a clear thesis about this. And on the other hand, this model fits very well with the wide consensus among memory researchers on the constructive nature of memory (Loftus, Coan, & Pickrell, 1996).

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