

Neurosentimentalism and moral agency

ABSTRACT

Metaethics has recently been confronted by evidence from cognitive neuroscience that tacit emotional processes play an essential causal role in moral judgement. Most neuroscientists, and some metaethicists, take this evidence to vindicate a version of metaethical sentimentalism. In this paper we argue that the “dual process” model of cognition that frames the discussion within and without philosophy does not do justice to an important constraint on any theory of deliberation and judgement. Namely, decision-making is the exercise of a capacity for agency. Agency, in turn, requires a capacity to conceive of *oneself* as temporally extended: to inhabit, in both memory and imagination, an autobiographical past and future. To plan, to commit to plans and act in accordance with previous plans requires a diachronic self, able to transcend the present moment. While this fact about agency is central to much of moral philosophy (e.g., in discussions of autonomy and moral responsibility) it is opaque to the dual process framework and those meta-ethical accounts which situate themselves within this model of cognition. We show how this is the case and argue for an empirically adequate account of moral judgement which gives sufficient role to memory and imagination as cognitive prerequisites of agency. We reconsider the empirical evidence, provide an alternative, agentic, interpretation of key findings and evaluate the consequences for metaethics.

Introduction: neurosentimentalism.

Many philosophers, and most neuroscientists, take recent work in cognitive science on the neural basis of social and moral decision making, to vindicate some version of sentimentalism in metaethics. The simplest version of this view is that moral cognition, like much social cognition, is largely automatic, scaffolded by tacit affective processes and encapsulated from explicit conscious reasoning. Moral judgements are expressions of the outcomes of tacit emotional processes. Even protagonists in these debates who reject the sentimentalist interpretation agree that the cognitive processes involved in moral judgement remain largely tacit, and that explicit reasoning plays the role of *ex post facto* rationalisation.

This consensus is generated by a theoretical framework with two features. Firstly moral cognition is tested by judgements about hypothetical scenarios. Secondly the judgements elicited are treated as the result of *either* explicit application of a moral rule or principle (maximise utility, treat people equally, don't use people as a means etc) *or* a tacit cognitive or affective process. Experiments seem to show that in many cases tacit processes are essential to moral judgement while explicit reasoning is extraneous. Experimentalists then probe the nature of tacit cognitive processes involved using a combination of imaging and deficit methodologies standard in cognitive neuroscience. A particularly important set of results involves patients with damage to the ventromedial prefrontal cortex (more accurately the orbitofrontal cortex directly, behind the eyes) which affects tacit affective processes. These patients show atypical patterns of reinforcement learning, personal decision making and moral judgment (Saver and Damasio, 1991; Moll et. al., 2002 ; Koenigs et. al., 2007). The

sentimentalist conclusion drawn from these experiments and others implicating affective processing in moral judgement is that moral judgment depends essentially on tacit affective processes. In the rest of this paper we refer to this version of sentimentalism as *neurosentimentalism* since it uses neuroscientific evidence to vindicate a sentimentalist position in metaethics.

We argue against neurosentimentalism on the basis that it divorces moral (and practical) judgement from moral (and practical) agency. This suggests neurosentimentalism is a far more radical doctrine than previously recognised. Neurosentimentalists took themselves to be vindicating the idea that moral judgement depends essentially on emotions, not the claim that moral judgement and moral agency are independent of each other. We take another approach to the evidence arguing that if moral judgement requires moral agency, then deficits in a capacity for moral judgement consequent on brain damage should be reconceptualised as impairments of agency. This does not require us to dismiss the evidence about the role of tacit emotional and cognitive processes in moral judgement but rather to re-evaluate their role in constituting the moral agent who makes judgements of rightness and wrongness.

The gap between judgement and agency created by neurosentimentalism emerges when we consider that the cognitive theories which provide the background to the neurosentimentalist interpretation of the performance of ventromedial prefrontal patients were developed in part to explain how people with amnesia could still make preference-based judgments or perform categorisation tasks using previously acquired information no longer explicitly available to them. The fact that these amnesics registered tacit emotional responses to preferred stimuli previously encountered is the basis of the theory that tacit affective processes can be the basis for decision-making.

Equally amnesics who retained a capacity for short term explicit reasoning (at least moment to moment) could apply a rule to a case, even if they could not recall previous applications of the rule or store an occurrent rationale to use in future.

Thus the decision making options for patients with episodic amnesia presented with a choice are either to reason explicitly about it using currently available information or to be prompted by tacit preferences. Their data base of relevant previous experience has either been destroyed or is no longer retrievable.

Although ventromedial prefrontal patients are not amnesic the neurosentimentalist interpretation of their decision making deficits reduces decision making to the exercise of the same restricted set of cognitive capacities available to episodic amnesic. The ventromedial prefrontal cortex is standardly described as a mechanism for associating tacit affective responses with explicitly-represented information, thereby enabling the formation of preferences and decision making. When that associative process is inaccessible, due to ventromedial damage, the subject has to rely on explicit reasoning alone, producing abnormal judgements in many areas of personal decision making including moral deliberation. In standard experiments the relevant reasoning processes are taken to be the application of procedural rules of inference to semantic knowledge. Drawing conclusions from propositions.

We shall call theories which take these options: explicit procedural reasoning or tacit affective processing, to exhaust the possible bases for judgement *synchronic* theories, since they do not require that the subject have explicit recall of previous events or be able to imagine the future consequences for herself of the judgements she makes. Instead she can either reason explicitly about the options using currently available information or act on a tacitly represented preference which surfaces in consciousness only as a gut feeling or inclination. Amnesics making judgements by either method are not moral agents, for familiar reasons, and cannot be held morally accountable for their judgments. Amnesics have no explicit access to a recalled or imaginatively constructed autobiographical history (we will discuss the evidence that amnesia impairs not only episodic memory but imagination). We shall suggest that agency requires the capacity for episodic memory (of events in a subjective autobiography) and imaginative projection into the future in order for the subject to have the requisite intertemporal perspective on her actions.

Neurosentimentalism is a synchronic theory and our argument against it proceeds by showing that it cannot do justice to the connection between moral agency and moral judgement. A moral agent needs to be able to conceive of *herself* as a temporally extended entity as a necessary condition for moral reflection and decision-making. Yet the recent work in cognitive neuroscience, especially on patients with impaired ventromedial functioning, concentrates on synchronic judgments of rightness or wrongness of hypothetical actions, which do not require this type of intertemporal perspective on action. Those judgments can be made by applying a rule to a case which is why ventromedial patients do make impersonal judgements without experiencing the conflict produced in normal subjects by personal and emotional aspects of a situation.

We will argue that in fact there is good evidence that ventromedial damage impairs agency as well as judgment, and that the impairments in judgment may well result from impairments to agency.

Of course subjects with ventromedial prefrontal cortical damage do not have episodic amnesia but we shall try and show that they do have impairments in the ability to construct a temporally extended autobiography which impairs their capacities for agency in a similar way to amnesia.

The rest of the paper proceeds as follows:

In the first section we describe the dual process model of the mind which generates the contrast between tacit affective processes and explicit reasoning which shapes the synchronic theory. For dual process theorists moral judgement depends on distinct and dissociable systems. One cognitive system which recruits limbic and posterior neural structures performs “[S]ocial-emotional processes inherited from our primate ancestors...shaped and refined by culture bound experience”. As in all dual process theories these “social-emotional” processes are tacit and automatic. Another cognitive system which recruits prefrontal cortical structures performs “abstract thinking and high level cognitive control (Greene et. al., 2007 p398)”. These explicit processes, as we shall call them, occur more slowly under the voluntary control of the agent.

In the second section we show how dual-process models support versions of neurosentimentalism and/or rationalist externalism (the view that moral judgements based on rational processes are not intrinsically motivating). The short argument is that tacit social-emotional processes are intrinsically connected to action while the explicit processes are motivationally inert. This view that reason is motivationally inert is an ancient philosophical one which now claims empirical support from cases of dissociation between motivation and explicit reasoning following damage to the ventromedial prefrontal cortex. We discuss the somatic marker hypothesis, which provides a conceptual framework for the application of dual process theories to moral decision-making and is now recruited by neurosentimentalists as empirical refutation of rationalist internalism.

In the third section we develop the agentic framework for interpreting the results which give rise to the somatic marker hypothesis and neurosentimentalism, arguing that the deficits in question impair agency not just judgement. Given that we are contesting the use of empirical evidence to support the synchronic interpretation we need to provide an empirically adequate diachronic account of agency. We suggest that crucial cognitive processes are episodic memory and imagination which combine under executive control to allow a person to conceive of herself as temporally extended (the capacity has been baptised mental time travel because it allows a self to escape the present moment by constructing and reconstructing alternative personal histories, linking episodes of memory and imagination). A striking feature of patients with ventromedial prefrontal damage is that they exhibit not only the unusual patterns of judgment emphasised by the synchronic conception, but impairments of agency and mental time travel. Our claim is not that these patients are amnesic (their damage is not to areas which cause episodic amnesia) but their inability to use executive processes to assemble and inhabit the episodes necessary to support adequate deliberation impairs their capacity for agency and hence judgement.

Finally we consider the consequences of this wider interpretation for the sentimentalist/externalist picture that dominates the theoretical landscape. On our view synchronic versions of either theory are not plausible. Moral judgement cannot be reduced to automatic preferences evoked by the situation or, as rationalist externalists have argued, the application of procedural rules. Our wider interpretation makes room for *diachronic* sentimentalists and rationalists who wish to incorporate a role for reflection and deliberation linked to a personal intertemporal perspective on action. The key is understanding the role played by the ventromedial prefrontal cortex in helping to create a moral agent constituted by the connection between deliberation, emotion and diachronic selfhood, not just a decision calculus contingently connected to phylogenetically ancient motivational impulses.

DUAL PROCESSING THEORIES

Dual processing theories partition cognition according to the degree of conscious control a subject is able to exert over a process (Barbur, 1993; Weiskrantz, 1974). Conscious control is related to a number of other features, slow processing speed, voluntariness, effortfulness, and domain generality. These types of voluntary process are typically recruited in planning and deliberation and require the flexible control of attention, working and long term memory to retrieve, manipulate, compare and evaluate representations of varying degrees of abstractness. We will call these

processes *explicit* since the term connotes availability to higher, central, metacognitive processes required for voluntary control.

These explicit processes contrast with specialised cognitive processes which occur automatically beyond the intentional or conscious control of the agent. These automatic, involuntary, processes are typically rapid and inflexible. Importantly they include affective responses to stereotyped stimuli.

That affective processes can be tacit is shown in many neuropsychological conditions. Blindsight, amnesia, prosopagnosia, and hemi-neglect (see Faulkner & Foster, 2002 for a review) provide cases in which tacit affective processing is preserved following impairment to explicit processing. Famously a densely amnesic patient acquired aversion to shaking hands with a person from whom she received a pinprick even though she could not remember the painful episode. A similar dissociation has been demonstrated for explicit and implicit *decision making*, leading to the somatic marker hypothesis popularised by Antonio Damasio and collaborators and applied to the case of moral cognition by sentimentalists such as Jonathan Haidt.

The somatic marker hypothesis is a theory of the role emotions play in decision making developed to explain decision-making deficits in brain-damaged patients with a lesion of the ventromedial prefrontal cortex. (Damasio et al., 1991; Bechara et al., 1996). The Iowa Gambling Task was created to probe the nature of these deficits.

In the Iowa Gambling Task subjects, starting with a sum of money provided by the experimenter, draw 100 times from four decks of cards which prescribe a monetary outcome (e.g. receive \$100 from a bank provided by the experimenter or pay \$10 to the bank). Some contain many cards which provide small gains and losses leading to a modest overall profit. Others contain cards which prescribe larger rewards but intermittent large losses leading to an overall loss. Typically neurotypical subjects start by choosing at random and then develop a preference for rewarding rather than punishing schedules. Importantly this pattern of advantageous selection develops before the subjects can explicitly articulate the punishment schedule as a rationale for their selections. Thus it appears that ability to learn and subsequently retrieve information about the value of the decks involves tacit processes.

Importantly the development of advantageous preferences is correlated with the presence of “anticipatory” Skin Conductance Responses (SCRs) when considering decks associated with punishments. SCRs are considered to be indices of “somatic markers”: tacit affective responses to stimuli produced by the amygdala and limbic system. (The “somatic” terminology reflects the James Lange theory of emotions which has it that emotions are ultimately bodily states).

This finding is consistent with findings that subjects with impaired amygdala function show diminished SCR to emotionally-salient stimuli and fail to learn from experience, with disastrous consequences for decision making (Bechara et al., 1999). *The same is true of patients with damage to the ventromedial prefrontal cortex leading to the hypothesis that the ventromedial prefrontal cortex is a structure which allows subjects to access and use tacit affective memories in situations which require learning and decision making.* This is reflected in their performance in the Iowa Gambling Task in which their choices do not come to reflect the punishment schedules even though they

can learn them explicitly. Unlike neurotypicals, however, this explicit learning is not preceded by a period of implicit learning associated with SCRs or by the acquisition of a preference for rewarding decks.

Thus the patient with damage to the ventromedial prefrontal cortex is in the paradoxical situation of being able to understand intellectually that some decks are disadvantageous but nonetheless choosing the disadvantageous decks.

Bechara explains their performance this way

When subjects decide to select from a specific deck the neural activity pertaining to this information is signalled to the ventromedial prefrontal cortex which in turn activates the amygdala (A. R. Damasio et al., 1991). This latter activity would reconstitute a state that integrates numerous conflicting instances of reward and punishment encountered with individual draws from that deck. If, in the end, negative somatic states outweigh the positive ones, an overall negative state is enacted and is indexed by the anticipatory SCRs we observed before the selection of cards from the disadvantageous decks. In turn, this influences the decision to avoid the deck under consideration (Bechara et al., 1999).

To summarise: in the experiment neurotypical subjects are able to make choices which reflect previous patterns of reward and punishment *before* they can consciously describe those patterns or articulate a rationale for their choices. On a very popular dual processing interpretation of these results they can do so because the ventromedial prefrontal cortex retrieves tacitly represented information about the valence of options which then plays a role in regulating decisions (see Dunn et. al. 2005 for a critical review). The crucial point is that this “trafficking” role of the ventromedial prefrontal cortex as Marc Hauser calls it is tacit and automatic. At the level of conscious processing the subject may only have a “gut feeling” or be aware of a preference. This role for the ventromedial prefrontal cortex is shown by the fact that patients with ventromedial prefrontal cortex damage do not make advantageous decisions even though they can explicitly learn the punishment schedules.

These types of case are marshalled in support of two theses crucial to the current debate over the nature of moral cognition. The first is that explicit and tacit processes dissociate. The second is that tacit somatic markers which determine preferences need not be available to consciousness: they may be experienced as “gut feelings” or inclinations. The subject cannot verbally explicate them or modify them using explicit reasoning processes. They are cognitively impenetrable as cognitive scientists say (Pylyshyn 1999).

DUAL PROCESSING AND META ETHICS

There are now many experiments and neuropsychological case studies demonstrating similar dissociations between explicit and implicit cognition in moral judgement. Data collected by Jonathan Haidt suggests that the bulk of our ordinary moral judgments are the products of automatic unconscious processing. Haidt argues that

moral judgments are: ‘gut feelings or intuitions’. (Haidt 2002, 54) These ‘moral intuitions’ are a form of automatic process:

the sudden appearance in consciousness of a moral judgment, including an affective valence (good-bad, like-dislike), without any conscious awareness of having gone through the steps of searching, weighing evidence, or inferring a conclusion (Haidt 2001, 818)

According to Haidt moral intuitions normally lead directly to moral judgments, explicit moral reasoning is rare, and if moral reasoning *is* engaged it is “not left free to search for the truth but is ... employed only to seek confirmation of preordained conclusions” (Haidt 2001, 822). Haidt claims on the basis of a series of ‘moral dumbfounding’ experiments in which subjects were left unable to justify their moral responses to e.g., sibling incest, that moral reasoning is merely *post hoc* rationalisation of emotionally driven responses. In these experiments subjects were provided with an incest scenario from which the common justifications for condemning incest were removed – there was no possibility of pregnancy, the siblings’ relationship was not damaged, etc., – yet they showed no disposition to revise their negative judgments when this was pointed out to them.¹ Haidt concludes that the roots of morality are to be found not “in our ability to search and evaluate evidence in an open and unbiased way” using explicit reasoning but rather “in what the mind [tacitly] does best: perception, intuition, and other mental operations that are quick, effortless, and generally quite accurate.” (Haidt, 2001, pp. 821-22).

The meta-ethical positions which are most clearly accommodated by a dual processing model are versions of sentimentalism and externalism. Indeed Haidt explicitly takes his work to have demonstrated Hume’s sentimentalist claim that reason is always and only a slave to the passions. Sentimentalists think that moral judgements are essentially expressions of emotional responses to situations, acts, or agents driven from below. “When we utter ‘ought’” says Jesse Prinz, “we express our own sentiments and factual knowledge is not sufficient for having sentiments” (2006, 38). One could not, he argues, “sincerely attest that killing is wrong without being disposed to have negative emotions towards killing” (2006, 32). Neurosentimentalism would be largely vindicated if moral judgment depended on cognitively impenetrable emotional processes, and in fact Prinz and others explicitly argue from evidence that moral judgement depends on processes, typically involving the affective systems, which are not sensitive to beliefs, expectations and goals, to sentimentalism. Prinz claims that emotions are both *necessary* and *sufficient* for moral judgment: he points to work by Wheatley and Haidt suggesting that “a negative feeling can give rise to a negative moral appraisal without any specific belief about some property in virtue of

¹ Haidt’s results have been widely discussed and his interpretations of them are not uncontroversial. See e.g., Saltzstein, Herbert D & Kasachkoff, Tziporah (2004)

which something is wrong”². If gut feelings are both necessary and sufficient for moral judgment then it seems clear that the neurosentimentalist account of moral judgment does not require a moral agent.

The externalist account of moral judgment on the other hand locates it entirely in controlled, reflective processes. Claims about what is morally required are to be thought of as judgments about the correct application of a set of moral standards to some situation, arrived at through explicit procedural reasoning. Moral judgments are argued to be thus analogous to judgments about the requirements of etiquette (e.g., Foot, 1987) or of the law (Roskies, 2003;2008). Our beliefs in these domains have no necessary connection to motivation. They can only motivate when paired with our contingent affective responses via the kinds of mechanisms described in the previous section. And it is conceivable on this account that agents with full moral knowledge (semantic knowledge of the standards and the conditions under which they apply) might be impaired either in the trafficking mechanism or in their affective responses and so fail to be motivated in accordance with their moral judgments. While some externalists might be willing to concede that automatic affective processes are necessary for the *acquisition* of moral concepts (perhaps in something like the way suggested by Shaun Nichols³) they maintain they are not essential to the *application* and manipulation of those concepts in moral reasoning and judgment. They thus interpret cases of ‘acquired sociopathy’ following damage to the ventromedial prefrontal cortex as demonstrating a dissociation between moral judgment and moral

² Wheatley T and Haidt J (2005) ‘Hypnotically induced disgust makes moral judgment more severe’. In this experiment subjects were hypnotized to feel disgust when they heard morally neutral terms such as ‘often’. Subjects were more inclined to judge morally admirable characters negatively in vignettes containing the target word. However, as Jill Craigie has pointed out to us, an examination of the data shows the effects were relatively slight.

³ Shaun Nichols argues that the normal affective response to harm infuses core moral rules (those which specify the harm based violations) with a special status (Nichols 2002, 2004). With regard to the psychopath Nichols argues that ‘since psychopaths have a deficiency in their affective response to harm in others, this plausibly explains why they fail to treat harm norms seriously’. (Nichols p.300) But it is not clear that this generalises to a broader set of moral rules.

motivation⁴ We suggest that they are likewise committed to regarding amnesics, who retain semantic knowledge of moral rules and the capacity to apply them using currently available information, as full moral agents.

Insofar as the term ‘moral judgment’ is used to refer to an agent’s beliefs about the content of morality, conventionally understood, sentimentalists will agree that such judgments have no essential connection to motivation. And they will also agree that because emotional responses are independent of procedural reasoning the *rational* aspect of moral judgment is motivationally inert.

Sentimentalists and rationalist *externalists* thus disagree on where in cognition moral judgment occurs but they agree on the cognitive impenetrability of the automatic processes which provide motivation. The dissociation between intact reasoning and impaired affective processing evidenced by ventromedial patients can be recruited by sentimentalists or externalists because in effect they embrace different horns of a dilemma about the basis of moral judgement: procedural rationality or affective processing.

⁴ Adina Roskies (2003) relies upon the case of EVR to argue that patients with ventromedial frontal lobe damage possess unimpaired moral reasoning abilities, yet are not motivated by the moral judgments they make. EVR had resections of his ventromedial prefrontal cortex in order to remove a brain tumour. He subsequently attracted a diagnosis of ‘acquired sociopathy’ on the basis of features such as an ‘inability to sustain consistent work behavior’, ‘lack of ability to function as a responsible parent’, and ‘defective planning’. According to Roskies this, plus his failure to produce anticipatory skin conductance responses on the Iowa Gambling Task and another task, is evidence of a failure of moral motivation. However EVR performed at an advanced level on a Kohlbergian moral reasoning test (Saver & Damasio, 1991) and gave principled responses to hypothetical ethical dilemmas (Eslinger & Damasio 1985) and Roskies claims this as evidence that his capacity for moral judgment is unimpaired. For discussion of these claims see Kennett & Fine (2008a, 2008b) and Roskies (2008)

Rationalist *internalists* hold that the link between moral judgment and motivation is necessary. They therefore agree with sentimentalists that externalism does not provide a sufficient account of moral motivation. However, because rationalists think that genuine moral judgments are not simply emotional responses but must be the product of, or shaped by, reason, they require a different account of the connection between moral judgment and motivation than that offered by sentimentalists. The account of moral reasoning given by externalists which relies on narrowly rational processes of inference from a set of rules or principles – processes which may be intact in patients with amnesia and ventromedial damage – is clearly insufficient to deliver this link.

The insufficiency of affective processing and procedural reasoning (even when they are both intact as in amnesia) results from the role played by these processes in the life of the subject. A person, such as an amnesic, who cannot incorporate procedural judgments or affective preferences *as her own* is not an agent. The reason is that she cannot represent the results of these processes to herself, because she is not a diachronic self but a bundle of habits linked to reasoning system.

There are a number of rationalist stories about the deliberative processes that underpin moral judgement and the norms which govern them. In all these accounts moral deliberation and judgment cannot be separated from moral agency.

So for example, Michael Smith argues that: “it is a conceptual truth that claims about what we are morally required to do are claims about our reasons” (Smith 1994:84) Smith here is referring to *normative* reasons; considerations which individuals take to guide practical reflection and to justify, rather than merely passively explain, their decisions. On this account for an agent sincerely to attest that killing is wrong is for that agent to accept that she *herself* has a (decisive) reason not to kill and this has direct practical implications for her choices and actions. For rationalists therefore, moral judgments are exercises of agency. Indeed Christine Korsgaard claims that it is “from the standpoint of practical reason that moral thought and moral concepts... are generated” (Korsgaard 1992:132)

On the rationalist internalist interpretation then, patients with ventromedial damage and amnesia either fail to make such judgments, or are impaired *as agents* in their inability to choose and act in accordance with reasons they accept.

But this rationalist position cannot be mapped onto the dual process model which sees action as either driven from below by automatic affective preferences or from above by procedural reasoning detached from affect and personal motivation. And more sophisticated forms of sentimentalism which require reflective endorsement of the deliverances of automatic affective processes are likewise not fully represented by a dual process model since these more sophisticated diachronic sentimental accounts also require that our tacit emotion based judgments be cognitively penetrable – moderated by deliberation and reflection and sensitive to *our* beliefs, plans and expectations. Does the dual process model show that these positions are empirically unrealisable? Or should we rather suspect that the model provides an incomplete picture of human moral cognition by failing to adequately describe the processes of

practical reflection which are central to these views? In what follows we explore a process which we argue is critical to practical reflection, to self-regulation, and so to the construction of moral agency itself.

MENTAL TIME TRAVEL AND “MYOPIA FOR THE FUTURE”

Antoine Bechara coined the term “myopia for the future” to describe the impairment introduced by damage to the ventromedial prefrontal cortex. Although these patients know that some decks in the Iowa Gambling Task are disadvantageous they still choose from them. This is not because they are indifferent to punishment. Bad decks produce aversive SCRs at the time of selection. Patients with damage to the ventromedial prefrontal cortex however do not produce “anticipatory” SCRs when contemplating disadvantageous choices. Hence the idea that damage to the ventromedial prefrontal cortex introduces an inability to *foresee the consequences* of adverse decisions.

Most accounts of the role of the ventromedial prefrontal cortex in decision-making do not provide an account of foresight *per se*. Rather they suggest that foresight reduces to *either* explicit reasoning using semantic knowledge, such as expected utility calculation, or in a well-calibrated mind on explicit reasoning reinforced by tacit emotional processes.

However there is another way to understand foresight, concentrating on the intimate relationship between memory and imagination in planning. Recent work on memory has concentrated on the role in decision-making of episodic memory. Episodic memories are those in which a subject recreates the experience of a previous episode in her life. There seems to be a subtle difference between “pure episodic memory” which recreates perceptual or sensory content of experience and autobiographical memory. In the latter episodic memories combine with a sense of self, of being personally present in the episode (known as autoneoesis) (Klein, Loftus, & Kihlstrom, 2002; Levine, 2004; Levine B., 1999; Tulving, 2002; Wheeler, 1997). Autoneoesis is a term of art intended to capture that aspect of self consciousness which annexes experience to the self not just at a time, but over time. We might describe it as awareness of diachronic selfhood.

Of course in the normal case of episodic memory recruited for planning the “mine-ness” of an episode is experienced together with its content. My episodic memory of a sunny day at the beach is experienced as mine. However it seems that “mine-ness” is a cognitive achievement mediated by the ventromedial prefrontal cortex. While “pure” episodic memory studies (such as recall of visual scenes) do not activate the ventromedial prefrontal cortex “activations of the ventromedial prefrontal cortex are almost invariably found in autobiographical memory studies” (Gilboa 2004, 1336). Gilboa suggests that this is because “autobiographical memory relies on a quick intuitive ‘feeling of rightness’ to monitor the veracity and cohesiveness of retrieved memories in relation to an activated self-schema” (Gilboa 2004, 1336). Our interpretation of these results is that episodic memory is normally recruited for planning, coordinated by the ventromedial prefrontal cortex, and planning is the activity of a diachronic self. Thus autobiographical memory is episodic memory annexed to a self in the service of executive activity.

Recent accounts of episodic memory have shifted in emphasis from distinguishing it from semantic memory (using paradigms such as the “know /remember” test in which memory of either type is detached from personal goals. The targets are typically word lists or pictures) to understanding the contribution of autobiographical memory to global executive functions such as planning. However once we think of episodic memory this way, as providing autobiographical episodes for planning purposes, it seems that that the encoding and retrieval of *previous* experience is only part of the story. Planning and decision-making also involve information about the *future* as well as the past. And, as with memory, this information can be semantic or episodic. As well as representing factual knowledge about the future we can imagine ourselves living out future scenarios, rehearsing different possibilities. This form of imaginative rehearsal is known as *prospection*: the future- directed analogue of episodic memory (Suddendorf & Corballis, 1997, 2007).

And indeed it seems that planning involves the seamless integration of both forms of projection of oneself in time, episodic memory and *prospection*. For this reason the ability to retrieve past episodes and imagine future ones and integrate the results with other forms of knowledge as part of planning have been baptised *mental time travel*. (Bayley P., 2006; T. Suddendorf, T. & Corballis, M. 2007; Suddendorf, 2003; D'Argembeau, 2006; Steinworth S, 2006)

There is an emerging body of evidence that mental time travel does not exploit different systems for memory and imagination. Rather both memory and imagination involve the activation of relevant perceptual sensory and emotional systems in the absence of an environmental stimulus (Hassabis et. al. 2007; Klein, 2002; Miller, 2003). Thus the essential feature of mental time travel is the ability to create and recreate these experiences under voluntary control rather than via the presentation of an eliciting situation or object (Schacter, Addis et. al., 2007; 2008). The consequences for planning are enormous. Mental time travel gives humans an enormous database of situations and responses to them which can be safely rehearsed offline. It is not a coincidence that amnesic patients such as Alzheimers cases are deficient in planning and executive function. Their problem is not just loss of memory *per se* but the consequences for executive action.

It is this voluntary, executive, aspect of mental time travel which is so important and which makes it dependent on maturation of the frontal systems. (Frith, 1996; Gerrans, 2007; Kapur S, 1995; Knight, 1999; Miller & Cohen, 2001; Waltz, 1999; Wood & Grafman, 2003). Episodic information is encoded in a distributed system. Prefrontal systems coordinate its retrieval and manipulation. We might say that there is a distributed episodic database encoded by specialised systems⁵ which can be

⁵ Of course we do not think that this data-base is localised. The hippocampus and medial temporal lobes though a memory system do not directly encode percepts.

Rather they encode traces which allow the reconstruction of the relevant

accessed and manipulated by frontal systems involved in mental time travel to create actual and possible autobiographies. This is why “Patients with damage restricted to the frontal cortex are impaired when mentally required to re-experience a study episode in sufficient detail to recollect contextual information about that episode .even though they can often report about the factual contents of the same episode.” (Wheeler et. al. 1997 p342)

If this is the case then mental time travel could be compromised at different levels. Damage to the episodic database *or* damage to the frontal systems which access and manipulate the data in executive processes. Classic cases of amnesia correspond to the former and frontal damage which leads to failures of executive retrieval and manipulation of autobiographical information to the latter.

It is for this reason that recent work on the role of frontal systems in mental time travel is suggestive. It seems likely that the normal case of decision-making involves mental time travel. That is to say the subject remembers what happened last time and uses that information to create and inhabit a future scenario. In contrast a patient with ventromedial damage cannot perform mental time travel. Not because she lacks an episodic data base but because she cannot make use of it.

This hypothesis predicts that patients with ventromedial damage would perform poorly on a mental time travel task since such patients would have an intact experiential database but impaired ability to retrieve or manipulate it. Unfortunately the performance of patients with ventromedial damage in mental time travel tasks has not been directly tested, although to the extent that decision-making tasks depend on mental time travel the results are consistent with the prediction. Nonetheless Levine et. al. report a case of a patient, M.L. with amnesia and ventromedial damage with deficient mental time travel, as one would predict, *and* decision making deficits characteristic of Self Regulation Disorder (Levine B., 1999) which indicates a loss of agency.

A second prediction is that patients with a deficit in mental time travel would perform poorly on the Iowa Gambling Task irrespective of their ability to generate SCRs to disadvantageous decks.

Gutbrod et. al. tested the performance of amnesic patients on the Iowa Gambling Task. Clearly such patients are disabled with respect to mental time travel since they lack the database. Interestingly, 9 of 11 patients performed at chance and did not show differential anticipatory SCRs to advantageous and disadvantageous decks. Furthermore the magnitude of anticipatory SCRs did not correlate with behavioural performance, leading to the conclusion that “acquisition of a behavioural preference—be it for advantageous or disadvantageous choices—depends on the memory of previous reinforcements encountered in the task, *a capacity requiring explicit memory* (our italics).” (Gutbrod et. al. 2006 p1315). Of course the explicit

representations as required by current cognitive contexts. Episodic data base is

shorthand for this conception of memory.

memory involved may be semantic rather than episodic, but that explicit memory proves necessary for learning is as troubling for the somatic marker hypothesis as evidence that somatic marking is not always necessary (Heims et. al. 2004).

The fact that amnesics with an intact capacity for SCR perform poorly in the Iowa gambling task is a contribution to the debate over whether or not explicit or implicit learning is involved in IGT performance (Maia et. al. 2004, 2005). It is also evidence in favour of a richer interpretation of the nature of the deficits in ventromedial cases because it suggests that a deficit in mental time travel can lead to a deficit in decision-making.

The nature of that deficit is important. It is not just loss of information about future consequences but of an essentially indexical way of representing that information which impairs deliberation.

MENTAL TIME TRAVEL, AGENCY AND MORALITY

Only individuals who meet certain threshold conditions for agency can be morally accountable for the judgments and decisions that they make, and it is surely the analysis of the judgments of *those* individuals that is the primary task of meta-ethical accounts of moral judgment.

Michael Bratman (2000) argues that our reflectiveness, our planfulness, and our conception of our agency as temporally extended are core interrelated features of human agency. We do not simply act from moment to moment. We are not trapped in an eternal present. Rather, Bratman claims, we conceive of ourselves as agents who persist over time and so we construct and commit ourselves to future directed plans, which we intend should structure and coordinate our more particular decisions and activities. Such acts of planning and commitment clearly require cognitive resources that go beyond the pairing of tacit responses with explicit understanding of rules or outcomes.

Planning requires a capacity to imaginatively project oneself into the future; this in turn requires both a sense of oneself as the very same individual who will inhabit that future (autonoetic awareness), and also the kind of detailed self-knowledge that is supported by autobiographical memory. We exercise the capacity for mental time travel whenever we revise for this year a class we gave last year – remembering what worked and what didn't, whenever we reflect on what kind of career or job would best suit us, whenever we plan a holiday or a shopping trip, arrange a meeting, organise a party, or commit ourselves to a course of study, an exercise program, or a marriage. In so committing ourselves, as Velleman (1997, 2000) points out, we provide reasons for ourselves in the future, reasons which will be *ours*, but which we would otherwise not have had. In this way we construct ourselves as particular, temporally extended, *agents*. Our diachronic reasons, made salient to us via our capacity for mental time travel, are thus in a position to compete with synchronically occurring wants. In effect they become normative for us.

The capacity for mental time travel is arguably required in order for *any* demand to be normative for a person – for them to have reasons whose force is independent of immediate stimulus bound responses. Morality, as Jay Wallace (1999) argues in his defence of internalism, is very widely taken to be a normative domain. We suggest that the process of becoming an agent capable of engaging in this normative domain just is the process of learning to transcend the present moment, both cognitively and behaviourally. This necessarily involves the meta-cognitive capacity to conceive of and adopt reasons which extend over time. In this respect we are in sympathy with Christine Korsgaard (2002) when she says that reasons must be defined in terms of our rational nature, rather than the other way round. She asks what is it about us that makes reasons exist for us, and answers that it is our self-consciousness. Perhaps surprisingly, this version of rationalism finds empirical support in some of the central cases neurosentimentalists and externalist draw upon, and we think better explains our ordinary intuitions about the absence or impairment of agency across a range of cases.

Insofar as genuine moral judgements must be made by those who meet a threshold of moral agency, and such agency depends in part upon the capacity for mental time travel, this capacity is necessary for moral judgement. The recognition of the role played by mental time travel in practical reasoning and agency helps to explain why animals and small children, who may display the tacit affectively based responses (and in the case of small children some explicit grasp of moral rules) highlighted in neurosentimentalist accounts of moral judgment, are not accounted as full moral agents and why they are not held morally responsible for their actions, as well as having significant implications for the interpretation of moral judgment in cases of amnesia and ventromedial damage. Moral agents must be able to take some considerations as *normative* and this we suggest is what those who are impaired in the capacity for mental time travel or in whom the capacity is not developed, cannot do.⁶

Of course there are a number of different ways in which an adult person's agency may be impaired, not all of which turn upon failures of mental time travel. An individual is a grossly impaired agent if the plans and decisions she arrives at in deliberation are constantly overwhelmed by compulsive desires or if she is so depressed that she cannot bring herself to act at all. In these kinds of cases there may be no failure of the capacity for mental time travel. But other cases of impaired agency do turn upon

⁶ Our view finds further support in studies of the self-regulatory capacities of children which have found links between levels of inhibitory control (which includes the rules of delay) and moral development. (Kochanska 1996, 1997) Children with high levels of control – that is, those who are successful in extending their agency across time – show higher levels of internalization of normative rules of conduct, moreover different levels of inhibitory control predict subsequent moral development.

failures to conceive of or feel appropriately connected to one's future self. An individual will not meet the threshold for moral agency if she cannot make choices and decisions which commit her future self to certain courses of action, either because she is incapable of delving into her personal future and evaluating future possibilities or because she will not, when the time for action arrives, be able to remember or feel normatively bound by the plans she makes now. Where the capacity for mental time travel is seriously damaged there is no sense in which the individual might be said to be shaping her own life or acting on the basis of reasons over enough time so as to satisfy the threshold for moral agency.

Patient M.L reported by Levine, appears to be such a case. M.L was unable to episodically re-experience post-injury events to the same extent as control subjects, although he could use familiarity or other non-episodic processes to distinguish events he had experienced from those he had not experienced. He continued to report a feeling of *subjective distance* from recall of events occurring *after* his recovery. His errors of judgment and failures to understand his responsibilities as a parent required supervision of his behaviour and structured routines, suggesting that merely semantic access to past and future events is not enough to support agency. A more profound case of amnesia is reported by Tulving (1985). Patient N.N could not recall a single instance from his past nor imagine the future. When asked what he would be doing tomorrow he would reply that he did not know. When asked to characterise what it is like for him when he tries to think about the past or future he described it as "like being asleep" or "it's a big blankness", "It's like being in a room with nothing there and having a guy tell you to go find a chair and there's nothing there" (Tulving 1985:4). That patients whose agency is so grossly impaired might nevertheless be able to satisfy neurosentimentalist or externalist accounts of what it takes to make moral judgments, as we have suggested they might, calls for a response from proponents of those accounts.

Ventromedial patients too are notably impaired in their capacity for planning and here too we think this affects their capacity to take moral considerations as genuinely normative. The typical ventromedial patient is described as impulsive and unable to plan, and incapable, because unmotivated, of acting on the basis of conclusions she reaches as a result of rational deliberation. They appear uninterested in their own shortcomings. Such a person might acknowledge for example that money is required for a spouse's operation but spend the money on an impulse. She might then agree that the money should have been spent on a spouse's operation, but show no remorse or real interest in the matter.

Antonio Damasio has described such patients as having intact rational capacities but lacking the ability to associate those rational processes with emotionally significant information. For such a person explicit reasoning about even personally significant events becomes motivationally inert. He and others sometimes speak as if what is lost by ventromedial patients is the ability to associate explicit semantic representations such as linguistic thoughts, or the reasoning processes which manipulate them, with emotional valence, and hence to act appropriately on the results of rational deliberation.

What is distinctive about this story is the poverty of its characterisation of the process of rational deliberation and indeed of planning. It leaves out the fact that choices are

made and upheld in an autobiographical context generated by mental time travel, not just via the association of hedonic states with options to generate a preference ranking. The framework of autobiographical memory gives sense and meaning to the activities of deliberation and choice, which may be considerably more nuanced, sophisticated and meaningful than the simple generation of future oriented gut reactions.

An alternative interpretation of frontal lobe patients which focuses on the capacity for mental time travel is provided in a review article by Wheeler, Stuss, and Tulving (1997). They associate frontal pathology and the decision making impairments observed in such patients with deficits in recollection of the past, introspection of the present, and foresight, which they interpret as disruptions in autothetic consciousness. The problem as they see it is that affected patients have difficulty in relating available personal information to themselves. While such patients know about things that have happened to them they have lost the sense of personal connectedness to those events and so cannot make appropriate use of their knowledge in deliberation.

The apparent dissociation in patient EVR, an exemplary ventromedial patient, between superior third personal hypothetical reasoning and judgment and grossly impaired capacity for first personal planning and decision making is particularly suggestive of an inability to inhabit scenarios in his personal future.

Deciding where to dine might take hours, as he discussed each restaurant's seating plan, particulars of menu, atmosphere, and management. He would drive to each restaurant to see how busy it was, but even then he could not finally decide which to choose (Eslinger & Damasio, 1985; p1732)

And in referring to tests of social cognition during which he had to come up with solutions to social problems, Saver and Damasio report that "EVR noted with his customary insight that he came up with many options but '... I still would not know what to do.'" (Saver & Damasio, 1991, p1246).⁷ As in the case of amnesics his personal future is something of a mystery to him. It is not something over which he has agentive authority.

⁷ A patient reported by Stuss (1991) appears to show a similar dissociation between third personal knowledge and first personal judgments. When asked to assess someone's (her own) significant problems at work from a third personal perspective (that of a supervisor), she was able to analyse the situation competently and make appropriate recommendations. Yet asked for similar judgments from a first-personal perspective, she refused to agree with her previous recommendations.

Mental time travel is the mechanism by which we acquire the phenomenology of a temporally extended self with an integrated past present and future. What ventromedial patients lose is not just the ability to plan but the prerequisite sense of diachronic selfhood intimately connected to an autobiography with a distinctive emotional character. This provides an explanation of the observed incapacity of ventromedial patients to translate their impersonal social judgments – the products of explicit reasoning – into personal practical judgments. They have lost the sense of the ‘I’ to whom the judgment is to be indexed so they literally don’t know what to do.

CONCLUSION

Clearly claims of the form, *x is wrong/right* can be produced by either tacit processes alone, explicit processes alone or by iterative interaction between tacit and explicit processes. The question for meta-ethics is whether the kinds of judgments focused on by externalists and neurosentimentalists and produced by one or both of these cognitive processes deserve, or best deserve, the title of moral judgment.

We take ourselves to have shown here that it is a problem for sentimentalism and externalism that they make no essential connection between moral judgments and moral agents. For all they say the question of whether some individual has made a moral judgment is entirely disconnected from the question of whether they are a moral agent or an agent at all. But if we accept that moral judgments are essentially normative this cannot be the case, since such judgments can be normative only for moral agents. And this we have claimed, at least in human agents, requires in addition to tacit and explicit processing, the capacity for mental time travel.

In our view then, neurosentimentalism and externalism fail on empirical and conceptual grounds to offer an adequate account of moral judgment, because they leave the moral agent out of the picture. There is more to moral agency than the making of judgments using either tacit affectively scaffolded practices or the explicit application of rules. Our claim is that the dual process framework relied on explicitly by neurosentimentalists and implicitly by externalists, does not have the resources to distinguish between those who meet the threshold for moral agency and those who do not. Recourse to this framework in meta-ethics therefore results in a partitioning of moral judgment from the rest of the moral and practical domain or commits those who use it to the proposition that even densely amnesic patients can be moral agents.

If, as we contend, moral judgments require moral agents and agency is constituted in part through mental time travel this leaves unscathed those versions of rationalism and sentimentalism which allow a central place in moral deliberation and judgment to diachronic selfhood.

Our project has been to show that mental time travel is necessary to moral agency and so is a prerequisite for moral judgment, not that it is sufficient. As such it leaves the question of what else might be required for adequate moral judgment to further meta-ethical debate and empirical investigation. Sentimentalists will focus on empathic transference of concern from self to other. And it is likely that the processes used in mental time travel are also recruited when we imagine others’ situations. Rationalists may require that we be able to align our personal planning and decision making with the results of explicit impartial forms of reasoning to, where necessary, override the

influence of automatic tacit processing.⁸ But for rationalists who take a constructivist view of moral agency, such as Korsgaard, there is no fundamental tension between moral and practical judgment. She says:

The territory of practical reasons is not split into two domains – self-interested rationality concerned with the occupant of this particular body on the one hand, and reasons of impartial morality on the other. Instead the personal concern which begins with one’s life in a particular body finds its place in ever widening spheres of agency and enterprise, developing finally into a personal concern for the impersonal.(Korsgaard 1998:127)

Finally we note that mental time travel does also play a significant and *direct* role in moral judgment. There are many cases of moral judgment which are not well captured by the synchronic focus of most experimental work on moral cognition, where automated decision making or rule application does not capture the phenomenology of moral decision-making and will not be adequate to the situation faced by the agent. Moral reflection, planning, and choice is often undertaken in an autobiographical context. It engages our sense of self and our capacity to see ourselves, and others, and the world in which we find ourselves, diachronically. We thus need to distinguish between the largely automated synchronic application of clear cut ingrained moral rules, such as those against killing and assault, and more difficult, nuanced and complex decisions, such as whether to care for one’s demented father at home or place him in care, whether or not to end a marriage, or to leave one’s family behind in a refugee camp and take the only available sponsorship to emigrate to a new country. It is cases like these that press cognitive theories of morality to attend to the processes which create and sustain agency.

Philip Gerrans
Department of Philosophy
University of Adelaide

Jeanette Kennett
Department of Philosophy/Macquarie Centre for Cognitive Science
Macquarie University

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⁸ See Fine (2006;2009) for discussion of evidence that explicit reasoning may override automated responses and that reasoned responses may become automated over time.

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