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Comment

Time and consciousness
Comment on "Creativity, information, and consciousness: The information dynamics of thinking" by Geraint Wiggins

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A topic often touched upon in Wiggins's paper is consciousness. Even though section 6.3 states that this topic is not a major focus of the paper, I will concentrate on it here, making two main points: (A) that the relationship of goals to consciousness in IDyOT theory needs to be straightened out; but (B) more importantly and positively, that a particular aspect of IDyOT theory, namely its spectral representations, can make a significant contribution the philosophy of consciousness, specifically on consciousness of time passing.

(A) Section 6.1 suggests that (at least some) "goals experienced as conscious decisions are in fact generated non-consciously, and then enter conscious awareness" and are "the end-states of plans that are made non-consciously"; implying that "the status of goals as driving forces is somewhat reduced." Continuing the theme, section 6.2 says IDyOT theory holds that "the distinguished status of goals [is] emergent from the overall behaviour of the architecture ... [N]o special data structure is necessary, and no a priori assignation of goals is required: goals are merely derived consequences of the current state that happen to be the focus of attention. ... Thus, goals are not given: they arise automatically through prediction, ..." And in section 7.1: "[IDyOT is] agnostic as to the origin of what humans experience as their goals. [As a matter of intrinsic drive] IDyOT is curious; ... it continually predicts and generates. Any goals it may have emerge from this behaviour."

My point is about an unwarranted assumption that seems to be made in the paper and partly revealed by these passages. This assumption is that if goals arise unconsciously in the first instance then they do not *lead to* the formation of plans—which is what is supposed to happen in traditional views of goals and plans—but instead *arise from* the formation of plans as their "end-states," or somehow drop out of prediction more generally. Note first that Wiggins is presumably not talking about goals arising from planning in the traditional way, i.e. goals being created as subgoals during planning to achieve other, already existing, goals, as when one develops the subgoal of finding a taxi to achieve the goal of going to a restaurant. This sort of subgoal-creation doesn't fit with his appeal to the "end-point" of a plan and by his drawing the consequence that "the status of goals as driving forces is somewhat reduced," because subgoal-creation is precisely a major way in which goals are driving forces.

To return to the main point, the idea that goals arise unconsciously seems perfectly believable, but this issue is surely orthogonal to the question of the relationship of goals to plans. For instance, why shouldn't goals that

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arise unconsciously be the result of processes other than prediction and planning, and therefore be able to lead to plan-formation (even in something like the traditional way), acting as a driving force? There may be some reason for thinking they cannot (or, in humans, just happen not to), but that case needs to be made. Or, if the claim is that goals are not important anyway in cognition, consciously or unconsciously, then there needs to be a firm commitment to an epiphenomenality of goals, whether unconsciously or consciously derived—we think they affect our behaviour (including our mental behaviour) but in fact they do not.

Also, it is left unclear how the term "goal" can be used felicitously for things arising as plan end-points or during prediction. Not everything that might happen to me according to my predictions is a goal of mine. I may predict that when the slow second movement in the minor key of a romantic symphony previously unknown to me comes along I'm going to feel sad, but that does not mean I have at any stage a goal (epiphenomenal or otherwise) of feeling sad. Plausibly, the intention is that only some products of prediction/planning be regarded as goals. But then much more needs to be said. For instance, one suggestion might be that when an act of prediction happens to hypothesize a future state that seems desirable, the state can start somehow to guide action preferentially in its direction. Or, a hypothesized future state might be recognized as similar to some past goal for the system, so it may be prompted to have some effect on action. But such circumstances are special ones requiring specific attention in the development of IDyOT theory, and do not just fall out of prediction or planning as such.

(B) Wiggins's spectral representations may help us investigate the consciousness of time. Many aspects of temporal consciousness have been investigated [1,3], but the aspect I focus on here is the [meta]physical nature of our sense of time passing/flowing (or of oneself moving through time). One view amongst many on this is that this sense is not itself fundamental but is based on qualia of change [4]: feelings that or about how external and/or internal states are changing. One might hold that such qualia in some way involve representations of changes. Now, amongst the many ways in which one can imagine representing change, spectral representations may have special advantages for supporting a sense of temporal passage. Spectral representations address most directly what happens over intervals of time as opposed to at instants, as they are directly about different frequencies at which quantities are changing, where frequencies are intrinsically a matter of change over intervals rather than state at any given instant. The representations therefore seem a better match to the content of both change qualia and the sense of temporal passage (and other temporal qualia such as a sense of duration) than would, say, a representation of time derivatives (first-order, second-order, third-order, ...) of quantities at instants: in the latter case, whatever the relationship of representation to temporal qualia such as a sense of passage, the relationship would need to include some collecting of information over time intervals. The spectral representations already reflect such collecting. These comments are highly programmatic and in need of further development and scrutiny, but they point in a fruitful direction.

I myself do not subscribe to the change-based view of the sense of passage, and incline more to regarding such temporal qualia as themselves *the* most fundamental ones, with pride of place accruing to a sense of continuing existence that is a constituent part of all qualia [2]. However, change qualia could still be more plausibly linked to spectral representations than to other representational approaches.

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