Dual systems and dual attitudes *

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Abstract: It can be argued that dual-system theorists should adopt an *action-based* view of System 2 (S2), on which S2 reasoning is an intentional activity. It can also be argued that they should adopt a *dual-attitude* theory, on which the two systems have distinct sets of propositional attitudes. However, Peter Carruthers has argued that on the action-based view there are no S2 attitudes. This paper replies to Carruthers, proposing a view of S2 attitudes as virtual ones, which are partially realized in S1 attitudes. This view is compatible with, and a natural extension of, the action-based view.

1. Introduction

According to dual-system theory, humans possess two reasoning systems, usually referred to as *System 1* and *System 2* (henceforth S1 and S2). Typically, S1 is characterized as a collection of autonomous subsystems, many of them evolutionarily ancient, which are shaped by biology and personal experience, and whose operations are fast, automatic, non-conscious, parallel, and independent of working memory. S2, by contrast, is held to be a uniquely human system, which is shaped by culture and formal tuition, and whose processes are slow, controlled, conscious, serial, and demanding of working memory.

Numerous converging lines of argument from different disciplines support this broad picture (for surveys, see Frankish and Evans 2009; Frankish 2010; Evans 2011). However, many issues remain unsettled, in particular about how the two systems are realized in the brain. And there are pressing questions about S2. Why did a new reasoning system evolve alongside the older one, especially as there appear to be a number of specifically human adaptations *within* S1, including systems for language and theory of mind? And how could S2 processes be shaped by culture and formal tuition? How could one learn to *reprogram* one's reasoning system? (Carruthers 2009).

There is a way of thinking about S2 that offers answers to these questions. The idea is to think of S2 processes as intentional actions, involving the manipulation of sensory images, in particular linguistic ones. On this *action-based* view, S2 is a 'virtual' system, which does not have a separate neural basis, but is partially realized in S1 processes.

Peter Carruthers has described a detailed action-based architecture for S2. This paper examines this architecture and explores a question about its interpretation. Specifically, it asks whether it is compatible with the view that S2 has its own suite of propositional attitudes, distinct from those associated with S1. (By 'propositional attitudes', or 'attitudes' for short, I mean any thoughts with propositional content –

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beliefs, desires, intentions, hopes, etc.) In other words, does the action-based version of dual-system theory support a dual-*attitude* theory as well? Carruthers argues that it does not, and that (with limited exceptions) talk of conscious attitudes should be eliminated (Carruthers 2011, ch.12). However, I shall argue that this is too hasty. There are good reasons to believe that we have distinct S2 attitudes, and, developed in the right way, the action-based view allows for this.

The rest of the paper is structured as follows. Section 2 sketches the action-based view and its advantages. Section 3 introduces dual-attitude theory and explains Carruthers's case for its incompatibility with the action-based view. Section 4 replies, arguing for a view of S2 attitudes as virtual ones, which are partially realized in S1 attitudes. The final section considers some objections to this view and responds to them.

2. The action-based view of S2

According to Carruthers, S2 depends on our capacity for the mental rehearsal of action (Carruthers 2006, 2009, 2011). Simplifying somewhat, the account runs as follows.[1]

Normally, when an action schema is activated, an internal efference copy of it is created, which is used to create a 'forward model' of the action. This generates proprioceptive and other sensory representations of the movements involved, which are used to guide the execution of the action and anticipate its consequences. This mechanism is probably evolutionarily old, but humans (and perhaps other primates) also have the capacity to activate action schemata *offline*, with the commands to the muscles suppressed but the efference copies still issued. In this case, the sensory images generated allow us to mentally rehearse potential actions and assess their desirability.

This happens through a process of global broadcasting. S1 has a global workspace architecture (e.g., Baars 1988). When targeted by attention, the outputs of sensory systems are globally broadcast to all S1 systems, which then process them according to their various specialisms – drawing inferences, forming memories, producing emotional responses, and so on. The imagery generated in mental rehearsal can also be globally broadcast, with similar effects, though the beliefs formed will be conditional – beliefs about what *would* happen if the rehearsed action were performed. The process may also trigger emotional and motivational responses to an imagined action, which may prompt a decision as to whether or not to perform it. In other cases, global broadcasting may lead to further acts of mental rehearsal, creating cycles of conscious imagery.

We can also rehearse utterances, generating articulatory and auditory images (inner speech). Once broadcast, these images are received by the language comprehension system (among others), which attaches an interpretation to them, so that they are experienced as meaningful. (The mind-reading system can also be

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[1]   For other action-based views of conscious thought, see Dennett 1991; Frankish 2004, 2009.

involved, determining what mental attitude rehearsed utterances express.) In this way, the content of a rehearsed utterance is made available to other S1 systems, which produce cognitive and motivational responses reflecting its implications, coherence with existing beliefs, and so on. Thus, rehearsing an utterance allows us not only to assess the desirability of making it, but also to evaluate its content. Rehearsing utterances of other types may also have useful effects: rehearsing a question may prompt S1 systems to supply an answer; rehearsing an instruction may stimulate motivational systems to execute it, and so on. We can also rehearse *sequences* of utterances, constructing arguments in line with our beliefs about which thought-sequences are normatively warranted.

Mental rehearsal thus provides a mechanism for hypothetical thinking, argument construction, and general-purpose problem solving, and (Carruthers argues) it is the basis of S2. S2 reasoning involves cycles of mental rehearsal, global broadcast, and non-conscious processing, in effect creating a new level of reasoning, whose processes are partially realized in ones at the S1 level.

This view has many attractions, as Carruthers notes (Carruthers 2009). First, it explains the distinctive features and limitations of S2. S2 processes are slow because they involve cycles of S1 activity; they are serial because only one action can be rehearsed at a time; they are (in part) conscious because they involve the global broadcasting of sensory imagery (global broadcasting is widely agreed to be co-extensive with consciousness); and they draw on working memory because they involve attending to and manipulating sensory imagery. (Carruthers regards working memory as an executive system for directing attention and sustaining and manipulating imagery in the global workspace.)

The action-based view also offers answers to the puzzles about the evolution of S2 and the malleability of its processes. On this view, the emergence of S2 did not involve the construction of a separate reasoning system, duplicating S1. Rather, it involved assembling a 'virtual' system, which piggybacks on S1 and uses components and capacities (mental rehearsal, speech, mind-reading, etc.) that originally evolved for other purposes. As for how S2 processes can be modified by culture and tuition, this follows directly from the claim that they are actions, since actions can be modified by imitation, instruction, and self-regulation:

> We acquire behavioral skills and abilities by imitation of others, by receiving verbal instruction, and by forming normative beliefs about the ways in which one should behave. So we can predict that System 2 thinking skills should be acquirable by imitation and by instruction, and that sequences of System 2 reasoning should be shaped by beliefs about the ways in which one *should* reason. (Carruthers 2009, p.121)

So the action-based view of S2 has considerable virtues. I turn now to the question of whether it is compatible with the view that S2 has its own suite of attitudes.

3. S2 attitudes: for and against

There is reason to think that we should supplement a dual-system theory with a dual-attitude one. It is well established that people's social judgments and perceptions are unconsciously influenced by cultural stereotypes and prejudices which may conflict with the attitudes expressed in their verbal reports. This has led some social psychologists to posit dual attitudes, implicit and explicit, associated respectively with non-conscious automatic processing and conscious effortful reasoning (e.g. Devine 1989; Wilson, Lindsey and Schooler 2000). Some philosophers, too, have distinguished two kinds of belief (or belief-like attitude), one implicit and non-linguistic, the other explicit and language-involving (see, e.g., Dennett 1978, ch.16; Cohen 1992; Frankish 2004). A dual-attitude view is also confirmed by everyday experience, where conscious beliefs may clash with, and sometimes override, implicit ones. For example, driving to work one day I automatically follow my usual route, acting on an implicit belief that it is the quickest way, until I consciously recall that roadworks are taking place and suddenly change direction.

These brief considerations are not decisive, of course, but they provide motivation for asking whether the action-based view of S2 is compatible with the existence of S2 attitudes.

Carruthers argues that it is not (Carruthers 2011, ch.4).[2] He focuses on intentions and beliefs, and the acts of decision and judgement which generate them, but the argument generalizes to other propositional attitudes, such as desires and wonderings. Carruthers concedes that there are S2 events which *resemble* decisions and judgements. For example, after rehearsing and evaluating various options, I might rehearse the concluding utterance 'So, I shall go to the bank' (Carruthers's example). And this event might assume the appearance of a decision. For when broadcast, it might be interpreted by the mind-reading system as a commitment or decision, and consequently give rise to the S1 belief that *I have committed myself* to going to the bank, or that *I have decided* to go. And if I have a standing S1 desire to execute my commitments, or to do what I have decided to do, then this will motivate me to go to the bank. The same may happen with judgement. After evaluating various hypotheses about the future of the economy, I may rehearse the utterance, 'So there will be a recession'. And when broadcast, this may give rise to a belief that *I am committed to the view* that there will be a recession, or that *I have judged* that there will be, and given a desire to execute my commitments, or to act in line with my judgements, this will lead to behaviour appropriate to a judgement that there will be a recession.

In these ways, rehearsed utterances can have effects appropriate to decisions and judgements. However, Carruthers argues, they are not *themselves* decisions and judgments. For they do not have the right causal roles. A decision *settles* what we will

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[2]   Carruthers does not present his argument as one for the incompatibility of the action-based view and dual-attitude theory. He is concerned with self-knowledge, and his aim is to show that (with limited exceptions) we have no conscious propositional attitudes. Nevertheless, his argument bears directly on the compatibility issue.

do; it concludes practical deliberation and initiates action. Even if further deliberation does occur, it will be about the *means* to performing the action, not about the action itself. Similarly, a judgement settles what we think and terminates theoretical reasoning on the matter in hand. But in the scenarios described the rehearsed utterances do not have these roles. To generate appropriate action, further reasoning at the S1 level is required, involving higher-order attitudes. In the decision case, the belief that I have committed myself to going to the bank (or decided to go) needs to interact with a desire to execute my commitments (or to act upon my decisions) in order to generate a decision to go to the bank. Similarly, in the judgement case the belief that I have committed myself to the view that there will be a recession (or judged that there will be) needs to interact with a similar desire in order to motivate appropriate action. Thus, the rehearsed utterances do not qualify as genuine decisions and judgements.

4. S2 attitudes as virtual

On Carruthers's view, then, we have just one set of attitudes, which are formed exclusively by S1 processes, and S2 achieves its effects by modifying these attitudes. However, there is another way of interpreting the action-based view, on which utterances in inner speech can count as judgments and decisions.

I begin with a small but crucial modification to Carruthers's picture. I agree that S2 events influence action in virtue of higher-order S1 beliefs. Now, Carruthers writes as if these beliefs concern overt actions: when one interprets an utterance as a decision to A, one forms the belief that one is committed to *A-ing*; when one interprets an utterance as a judgement that P, one forms the belief that one is committed to *acting* (overtly) in ways required by the truth of P. (For simplicity, I omit the alternative scenarios in which the beliefs formed are about what one has decided or judged.) I want to propose a slightly different view, on which the commitments involved extend to covert reasoning activities as well to overt action. (By 'reasoning' here, I mean S2 reasoning; since this is under intentional control, we can commit ourselves to regulating it in various ways.) When one interprets oneself as deciding to A, I suggest, one forms the belief that one is committed, not only to A-ing, but also to taking A-ing as a goal in one's reasoning (constraining other plans to fit, working out what means to use, etc). Similarly, when one interprets oneself as judging that P, one forms the belief that one is committed, not only to acting in ways required by the truth of P, but also to reasoning in ways required by it (taking P as a premise, dismissing hypotheses that conflict with P, and so on). That is, the commitments adopted are to open-ended policies of self-regulation in reasoning and action. This view can easily be extended to other propositional attitudes, such as desire (a commitment to reasoning and acting in ways required by some goal).[3]

As on Carruthers's version, the S1 beliefs involved here do not have to be about commitments. One might simply form the higher-order S1 belief that one has decided

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[3]   For more on the nature and extent of these policies, see Frankish 2004.

to A (or judged that P). Given a standing S1 belief that if one has decided to A (or judged that P), then one ought to reason and act in ways required by the goal of A-ing (or by the truth of P), this will motivate a similar pattern of covert and overt activity. For simplicity, I shall focus on the commitment formulation in what follows.[4]

This is a minor adjustment to the action-based view (and might even be regarded as a spelling out of it), but it has far-reaching consequences.

I return now to Carruthers's argument. I concede that decisions and judgements are events that terminate reasoning on a topic. However, if we have two sets of attitudes, associated with different levels of reasoning, then this claim should be relativized to the two levels. That is, we should think of S1 decisions and judgements as terminating reasoning at the S1 level, and S2 decisions and judgements as terminating reasoning at the S2 level. To do otherwise would risk begging the question against a dual-attitude view. And on this reading, suitable rehearsed utterances *would* count as decisions and judgements. For they would settle the matter *as far as S2 reasoning is concerned*. Note, too, that these events would terminate *all* reasoning *on the relevant topic*. When I rehearse the sentence 'There will be a recession', this terminates my reasoning about the economy. The subsequent S1 reasoning is about how to execute the commitment expressed by this utterance, not about whether its content is true. Similarly with an S2 decision to go to the bank: the subsequent S1 reasoning is not about the bank, but about the execution of my bank-going commitment.

Still, this isn't the full story. For a rehearsed utterance *on its own* does not constitute a decision or judgement. Considered simply as an item of inner speech, a putative decision or judgement would be indistinguishable from a fantasy, speculation, or hypothesis. A rehearsed utterance assumes the causal powers of a decision or judgement only when it has been interpreted and has generated a suitable higher-order S1 belief. But again, with a two-level picture in place, this is not a problem. For we can think of the S2 attitude as realized by a combination of the rehearsed utterance and the resulting higher-order S1 belief. (We might include the standing S1 desire to execute one's commitments in the realization base, too.) This is a natural counterpart to the layered view of S2. Just as S2 processes are partially realized in S1 ones, so S2 attitudes as partially realized in S1 ones.

An advantage of this suggestion is that it can be extended to give a response to another problem for dual-attitude theory, not mentioned by Carruthers. This is what to say about *standing* S2 attitudes. We may identify activated, occurrent attitudes with utterances in inner speech, but what do we say about non-active ones stored in memory? There does not seem to *be* a memory system associated with S2. Extending the proposed view, I suggest we identify standing S2 attitudes with (standing) higher-order S1 beliefs about one's commitments (or with suitable alternative S1 beliefs). To have the standing S2 belief that P is to have the S1 belief that one is committed to

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[4]   Note that for a rehearsed utterance to produce a belief that one is committed to something, it need not be *heard* as a commitment. An utterance heard as a decision or a judgement will produce such a belief, provided one believes that decisions and judgements involve commitment.

reasoning and acting in ways required by the truth of P. To have a standing intention of A-ing is to have the S1 belief that one is committed to reasoning and acting in ways required by the goal of A-ing, and so on. So, on this view, the S2 memory system is a virtual one, piggybacking on S1 memory, just as S2 reasoning piggybacks on S1 reasoning.[5]

5. Objections and replies

Carruthers anticipates the proposals in the previous section and responds to them, as well as outlining some further objections to S2 attitudes (Carruthers 2011, ch.4).

With regard to the suggestion that the causal roles of attitudes should be relativized to different levels, Carruthers points out that beliefs generate actions only in conjunction with desires and subsequent decisions. If there are two sets of attitudes, then this should mean that an S2 belief will lead to action only if an *S2* desire is activated too, generating an *S2* decision. But, he notes, this is often not the case:

> it is often the case that the last conscious attitude-like event to happen before I pick up my umbrella when leaving the house is me saying to myself, "It will rain soon." No conscious goal of staying dry needs to be articulated, nor do I need to say to myself, "So I shall carry an umbrella. (Carruthers, 2011, p.111)

Thus, it seems, the rehearsed utterance does not occupy the right role in S2 reasoning to count as a judgement.

Now I concede that, if we want to explain the umbrella-carrying by reference to an S2 belief that it will rain, then we need to refer also to an S2 desire and an S2 intention.[6] However, I deny that these have to be *occurrent*, consciously articulated ones. For standing attitudes can shape reasoning and action without being occurrently activated. Much of our reasoning depends on suppressed premises and background assumptions, and it is likely that this is true for S1 processes as well as S2 ones (Frankish 2004, ch.2). And the 'missing' S2 attitudes in Carruthers's example may be similar. The S2 desire to stay dry may consist in a standing S1 belief that one is committed to the goal of staying dry (and to reasoning accordingly). Together with the S1 belief that one is committed to the view that it will rain soon (generated when the rehearsed utterance is broadcast), this will produce the belief that one is committed to the goal of carrying an umbrella, which constitutes a (non-occurrent) S2 intention to carry an umbrella. Given a standing S1 desire to execute one's commitments, this will generate the action.

Carruthers turns next to the suggestion that S2 attitudes are realized in complexes of rehearsed utterances and S1 attitudes. He objects that this is incompatible with the common-sense view that an utterance may express an already-formed attitude. He

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[5]   For this reason, I have elsewhere referred to S2 beliefs as 'virtual beliefs' and 'superbeliefs' (Frankish 1998, 2004).

[6]   Actually, I doubt that a mediating intention is needed when the action is performed immediately, but I shall not argue this here.

notes that when we hear another person say 'I shall go to the bank', we assume the utterance was caused by a prior decision to go the bank. On the proposed view, however, this is wrong:

> For the real decision to go to the bank (or at any rate the one that is a conscious, System 2, decision) can be the extended complex sequence of mental events that continues on in time beyond the episode of inner speech itself. (Carruthers, 2011, p.113)

Indeed, Carruthers argues, in some cases the status of a rehearsed utterance may remain undetermined for a long time. For if the envisaged action is in the distant future, the higher-order S1 attitudes that make the rehearsal event effective (e.g. a belief that one has made a commitment to the action and a desire to execute one's commitments) may not interact until the time for action arrives.

I have two points to make in response. First, the proposed view does have the consequence that some utterances are partially constitutive of decisions and judgements, and thus that they are not caused by those decisions and judgements. However, this is not incompatible with there being *other* utterances that express antecedently formed beliefs and intentions, either of the S1 type (which I assume can be verbally reported) or the S2 type. (In the latter case the utterances will be caused by an S1 desire to execute the commitments that constitute the attitudes, which will involve avowing the attitudes in appropriate circumstances.)

Second, it is true, too, that events subsequent to a rehearsed utterance will determine whether it qualifies as a decision or judgement. However, these will follow immediately. For all that is required is the interpretation of the utterance and the formation of a belief that one is committed to an appropriate policy of reasoning and action. This confers the status of a decision or judgement on the utterance, and, together with a standing S1 desire to execute one's commitments, forms the realization base for a persisting S2 attitude of the same kind. There is no need to expand the realization base to include later S1 *reasoning* involving these realizing attitudes.

Carruthers also raises a more general objection to S2 attitudes. If S2 attitudes are constituted by, and influence action in virtue of, sets of S1 attitudes, then what theoretical motivation is there for introducing them? We could derive the same explanations of behaviour by focusing solely on the S1 attitudes. Carruthers is careful to note that the fact that S2 events are reducible to S1 ones does not in itself impugn their utility. For there might still be generalizations that are apparent only at the S2 level. For example, the transition from the rehearsed utterance 'I shall go to the bank' to subsequent bank-going might be mediated by a variety of S1 processes involving different S1 attitudes (that one has committed oneself to going to the bank, that one has decided to go to the bank, etc). And the commonality in these processes might be capturable only by reference to an S2 decision to go to the bank. Carruthers argues, however, that this is not so. For the S1 processes will all converge on an S1 decision to go to the bank, and we can capture what the resulting actions have in common by

referring to this decision. Similarly, he argues, for judgement. Different S1 processes may mediate between an S2 utterance of 'It will rain soon' and the subsequent act of cancelling a planned picnic. But the commonality in the processes can be highlighted by noting that they all converge on an S1 desire to cancel the picnic, and there is thus no need to refer to an S2 judgement.

Again, I shall make two points. First, we have prima facie motivation for positing dual attitudes. For, as mentioned earlier, there is abundant evidence for conflict between conscious and non-conscious belief systems. A person may sincerely assert that there are no differences in intelligence between ethnic groups, yet frequently behave in discriminatory ways, manifesting a belief that such differences exist. On Carruthers's view, the appearance of conflict here is an illusion. The person has a higher-order S1 belief that they are committed to the view that there are no intelligence differences between ethnic groups and a first-order S1 belief that there are intelligence differences between ethnic groups, and these two beliefs are compatible. Of course, Carruthers can explain why the person's behaviour gives the appearance of conflict. Their assertions are caused by the higher-order belief together with a desire to execute their commitments, and their discriminatory behaviour by the first-order belief together with a desire to give preference to more intelligent people. But Carruthers must deny that there is any *cognitive* conflict involved.

Second, Carruthers's objection depends on a narrow conception of the behavioural commitments involved in S2 attitudes. On the modified view proposed here, however, an S2 attitude involves an open-ended policy of reasoning and action guidance, which will generate many different actions, both covert and overt. This is obvious in the case of judgement. Reasoning and acting in ways required by the truth of P involves making inferences from P, rejecting hypotheses incompatible with P, performing actions that will realize one's goals if P is true, and so on. A decision, too, involves a commitment to many different activities. In adopting the goal of going to the bank, one commits oneself to reasoning about how to get to the bank, rejecting courses of action incompatible with going to the bank, performing actions instrumental to going to the bank, and so on. Moreover, as Carruthers allows, these activities may be motivated by different higher-order S1 beliefs (that one is committed to these activities, that one ought to perform these activities, etc.) – and, I would add these motivating beliefs may have varying strengths.[7] (In other words, S2 attitudes can be multiply realized.) Thus, the only common factor in the various resulting activities will be that they are the product of a single S2 attitude.

Carruthers's final objection is that, even if the proposed view were correct, S2 attitudes would be rare, since the required higher-level S1 desires are not common ones:

> Few people, besides philosophers, have as one of their goals behaving as they *should* behave given their judgments. Indeed, this is a remarkably esoteric goal. (2011, 116)

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7   On the case for regarding non-conscious belief as graded, see Frankish 2004.

Hence, he argues, few people will form S1 judgements, and those who do will do so infrequently. Carruthers concedes that a desire to do what one has decided to do (to be strong willed) may be more common, but argues that people will differ in the weight they give it, and thus that some people will make few S2 decisions.

This objection is weak. It may be true that few people are *explicitly* concerned with rational coherence between their judgements and behaviour, but this is not the issue. (Carruthers himself must accept that people have meta-cognitive desires concerning the conduct of their reasoning, which motivate their acts of mental rehearsal. Yet few people are explicitly concerned with such matters.) The question is whether people have a *non-conscious*, S1, desire to reason and act in line with judgements they have made. To determine this, we need to look at their behaviour, including their S2 reasoning behaviour. If people value coherence, then they will recall and rehearse their judgements in appropriate contexts, attempt to regulate their reasoning in line with them, reject views that conflict with them, and so on. Similarly, if they desire to be strong willed, they will rehearse their decisions, reason about how to implement them, try to act upon them, and so on. These are not implausible predictions. Of course, people often fail to reason and act in line with their judgements and decisions; but this does not show that they do not desire to do so, merely that they have other desires that are sometimes stronger. And they may manifest the desire in other ways, such as in expressions of regret for their failures.[8]

Conclusion

The action-based view of S2 can be reconciled with dual-attitude theory by adopting a view of S2 attitudes as virtual ones, partially realized in S1 attitudes. This is good news, since there are strong reasons to endorse both the action-based based view and dual-attitude theory.

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[8]   See Frankish, 2004 ch.8, for an analysis of akrasia along these lines.

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