

Postscript: The Way Forward

Matthew M. Botvinick
University of Pennsylvania

David C. Plaut
Carnegie Mellon University

In our view, the reply by Cooper and Shallice (2006) left our original responses more or less intact. Cooper and Shallice disparaged our account of anticipation errors by arguing that it serves only to “highlight the importance of the training set in shaping the [SRN] model’s errors” (p. 892). However, as we argued earlier, this link between errors and prior experience may be viewed as a strength of the SRN model rather than a weakness. They dismissed the idea of selecting among actions probabilistically in the SRN model (an idea they earlier seemed to promote) on the basis of the claim that such a selection procedure cannot be biased by previous intentions. However, it is easy to see how the setting of intentions could be encoded in the context layer, leading to amplification of intended action outputs and the suppression of competitors. They rejected our demonstration that the SRN model can, under appropriate circumstances, deal appropriately with novel initial conditions, but they did this by resorting to the confusing argument that the model’s correct performance must be understood as an error. They rejected our demonstration of object substitution errors in the SRN with the assertion that this class of error is defined in earlier work in terms of the actions following the actual incorrect use of an object, but we fail to find this kind of definition in the sources they cite (Reason, 1984; Schwartz et al., 1998). They responded to our analysis of the role of *goal nodes* in the IAN model with the assertion that this mechanism “captures the fact that some schemas have a common purpose” (p. 894). However, at the level of function (rather than description), goal nodes serve only to enforce the selection of one among a set of competing schemas. This functionality involves no direct reference to purpose or goal. Certainly, in human behavior, interchangeable action sequences often share a common goal. However, in the IAN model, this fact only informs the way that the network is wired up by the modeler. It is in no way intrinsically “captured” by the goal node mechanism.

Clearly, the present exchange will leave a range of questions unresolved. However, what we are left with is far from a hopeless

impasse. Instead, the debate has made clear what measures might be taken to shed further light on the mechanisms underlying routine sequential behavior. Clearly, one road forward involves implementing and evaluating the various refinements and extensions that have been proposed for both the SRN and IAN models. With regard to the SRN model, it may be particularly informative to develop further the simulation we offered to address the topic of interchangeable subsequences, considering more fully the problem of implicit negative evidence (the problem that led us to include “peripheral vision” inputs to the framework). With regard to the IAN model, what seems most urgently needed is an explicit, implemented account of how the goal-directed action system (or supervisory system) trains up the habit system (contention scheduling system). Here and in general, the present exchange has strongly highlighted the degree to which any account of the habit system will interact with how the goal-directed system is understood. Many of the points we have debated have turned out to depend on what assumptions are made about the goal-directed system and about how it interfaces with the habit system. In view of this, what seems necessary is to place our present accounts of routine sequential action within a larger computational framework that explicitly addresses both systems and their interrelations. We agree with Cooper and Shallice that such an enterprise might best concentrate on instances of behavior that depend critically on a collaboration between the two systems, such as error correction or coping with novel and unexpected environmental contingencies encountered during routine behavior. Building a larger theoretical framework, capable of dealing with such areas of behavior, will require innovative experimental research, because there are at present frustratingly few meaningful empirical benchmarks to constrain new modeling.

References

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