

The Information-Processing Function of Conscious Intentions

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We argue that conscious intentions are central to the cognitive control of activity, in contrast to the view that the experience of conscious control is an illusion (Wegner & Wheatley, 1999). We suggest that instantiating a goal to form a conscious intention serves the information-processing function of establishing a procedural frame of reference that organizes mental activity. Information that specifies the origin of this frame of reference simultaneously specifies the conscious agent, the “I” who performs the action. This *cospecification hypothesis* is part of a more general theory of consciousness (Carlson, 1997). We briefly describe this hypothesis and its theoretical basis, and consider several empirical predictions and results bearing on those predictions.

Theory and Hypotheses

The cospecification hypothesis suggests that the content of a conscious intention represents the self as achieving an outcome by performing an operation on an object. For example, a conscious intention to add two digits represents the self as performing a calculation on particular tokens of those digits. Activating this representation serves to initiate a procedure to which the digit tokens are assimilated, and to establish a subjective “point of view” from which the digits are considered. The representation of an outcome that satisfies a conscious intention will thus be structurally very similar to the representation of the intention. This description parallels the representation of goals in ACT-R (Anderson & Lebiere, 1998), in which operands and results complete slots in the goal representation.

Our research has considered several implications of this hypothesis for the information-processing dynamics of goal-driven cognition. First, goal instantiation must precede effective consideration of objects to be processed (operands). Second, the availability of information specifying goals should constrain the temporal coordination of processes such as managing working memory and picking up information from the environment. Third, failures of coordination (e.g., placekeeping errors) should be reduced by activities or information that increase the spatial and temporal precision with which the acting self is specified. Fourth, the need to update the self’s spatial and temporal location and orientation should constrain the strategies available for organizing sequential activities; for example, activating an intention directed toward appropriate objects may depend on updating one’s perspective on the prior step. Fifth, the construction of explicitly retrievable episodic memories should be associated with goal instantiation

because it involves “taking note” of the self as a spatial and temporal marker.

Empirical Results

We have examined each of these implications, using experimental paradigms that examine skilled performance of mental sequences in which the environmental availability of information is constrained. For example, in a number of studies participants solved cascaded, multiple-step arithmetic or spatial path problems in which the outcome of each step served as a starting point for the next step. These studies provide support for the first and second predictions outlined above. Under temporal constraints, individuals can effectively coordinate information pickup and cognitive processes – a process we call *temporal tuning* – only when information specifying upcoming goals is available, allowing those goals to be instantiated as intentions.

In another series of studies, we examined the use of externalizing strategies such as pointing that serve to support temporal coordination. In these experiments, participants performed simple tasks such as counting under varying temporal and strategy constraints. The results suggest that externalizing strategies can serve both to enhance the individuation of objects to be processed (coordination between steps) and to reduce intention-outcome confusions (coordination within steps).

We consider these and other results in relation to the hypotheses sketched above.

Conclusions

In general, these studies provide support for the predictions derived from the cospecification hypothesis. However, some predictions have been disconfirmed in ways that suggest further hypotheses about the constraints on explicit goal instantiation. For example, neither procedural nor explicit declarative knowledge of operator sequences allows the temporal tuning observed when operators are specified by displayed information. We consider the implications of these successes and failures for the general theory of consciousness described in Carlson (1997).

References

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