One hypothesis concerning the human dorsal anterior cingulate cortex (ACC) is that it functions, in part, to signal the occurrence of conflicts in information processing, thereby triggering compensatory adjustments in cognitive control. Since this idea was first proposed, a great deal of relevant empirical evidence has accrued. This evidence has largely corroborated the conflict-monitoring hypothesis, and some very recent work has provided striking new support for the theory. At the same time, other findings have posed specific challenges, especially concerning the way the theory addresses the processing of errors. Recent research has also begun to shed light on the larger function of the ACC, suggesting some new possibilities concerning how conflict monitoring might fit into the cingulate's overall role in cognition and action [1)].

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A neglected question regarding cognitive control is how control processes might detect situations calling for their involvement. The authors propose here that the demand for control may be evaluated in part by monitoring for conflicts in information processing. This hypothesis is supported by data concerning the anterior cingulate cortex, a brain area involved in cognitive control, which also appears to respond to the occurrence of conflict. The present article reports two computational modeling studies, serving to articulate the conflict monitoring hypothesis and examine its implications. The first study tests the sufficiency of the hypothesis to account for brain activation data, applying a measure of conflict to existing models of tasks shown to engage the anterior cingulate. The second study implements a feedback loop connecting conflict monitoring to cognitive control, using this to simulate a number of important behavioral phenomena [2)].

1)
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2)
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