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TIME OF CONSCIOUS INTENTION TO ACT IN RELATION TO ONSET OF CEREBRAL ACTIVITY (READINESS-POTENTIAL)

THE UNCONSCIOUS INITIATION OF A FREELY VOLUNTARY ACT

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Summary

The recordable cerebral activity (readiness-potential, RP) that precedes a freely voluntary, fully endogenous motor act was directly compared with the reportable time (W) for appearance of the subjective experience of 'wanting' or intending to act. The onset of cerebral activity clearly preceded by at least several hundred milliseconds the reported time of conscious intention to act. This relationship held even for those series (with 'type II' RPs) in which subjects reported that all of the 40 self-initiated movements in the series appeared 'spontaneously' and capriciously.

Data were obtained in at least 6 different experimental sessions with each of 5 subjects. In series with type II RPs, onset of the main negative shift in each RP preceded the corresponding mean W value by an average of about 350 ms, and by a minimum of about 150 ms. In series with type I RPs, in which an experience of preplanning occurred in some of the 40 self-initiated acts, onset of RP preceded W by an average of about 800 ms (or by 500 ms, taking onset of RP at 90 per cent of its area).

Reports of W time depended upon the subject's recall of the spatial 'clock-position' of a revolving spot at the time of his initial awareness of wanting or intending to move. Two different modes of recall produced similar values. Subjects distinguished awareness of wanting to move (W) from awareness of actually moving (M). W times were consistently and substantially negative to, in advance of, mean times reported for M and also those for S, the sensation elicited by a task-related skin stimulus delivered at irregular times that were unknown to the subject.

It is concluded that cerebral initiation of a spontaneous, freely voluntary act can begin unconsciously, that is, before there is any (at least recallable) subjective awareness that a 'decision' to act has already been initiated cerebrally. This introduces certain constraints on the potentiality for conscious initiation and control of voluntary acts.