Recent years have seen increasing numbers of transcranial magnetic stimulation (TMS) studies focusing on somatosensory processing. Most have centered on the primary somatosensory functions of tactile detection, localization and discrimination, and have applied TMS to primary somatosensory areas. These studies confirm the basic functions of primary somatosensory areas, and the behavioural and physiological effects of different TMS protocols. Fewer studies, however, have investigated higher somatosensory function. Here, we review the somatosensory TMS literature both in and beyond primary somatosensory areas. We discuss the plausibility of modulating multisensory representations of one’s own body via TMS, and highlight the potential for TMS to probe higher cognitive functions through the modulation of unimodal perceptual systems such as touch, vision or proprioception.

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Somatosensory processing involves a broad range of cognitive functions from straightforward perception (e.g., tactile detection or discrimination) to higher-order cognition based on somatosensory input. However, the use of transcranial magnetic stimulation (TMS) in the study of somatosensation has been mainly concerned with primary perceptual phenomena and processes (see Table 1). Higher-order aspects of tactile cognition have been relatively neglected. This bias reflects, in part, the classical methodological problems associated with studying higher cognition, but also an overall limitation in understanding more cognitive applications of TMS.

1. TMS and the study of primary somatosensory perception

The primary somatosensory cortex (SI; see Fig. 1) has been a major anatomical target of TMS studies. In most cases, these studies focus primarily on TMS methodology and the physiology that underlies it, rather than on somatosensory function per se. In fact, the well defined somatotopic arrangement of SI makes it a suitable model system for exploring brain mechanisms of plasticity under different protocols. Studies such as summarised in Table 1, have confirmed that single-pulse TMS applied over SI can be used to mask tactile sensation at the skin, whereas repetitive TMS (rTMS) has been shown to modify excitability of the human SI. These basic studies also provide unique information about the general principles that
High frequency evoked potentials; MI, primary motor cortex.

1997; **). In the last case, only these last results are detailed. HFOs indicate high frequency oscillations; ISI, interstimulus interval; MEPs, motor specific assessment of posterior brain sites was reported (as a control experiment; 3–4 subjects; Cohen et al., 1991; Kujirai et al., 1993; Seyal et al., 1992, 1993) are not cited, unless articles focusing on the sensorimotor cortex when the target was specifically the motor area (i.e., Seyal et al., 1992, 1993) are not cited, unless.

theta frequency. In the 74% of the studies the coil was placed 1–2 cm posterior (sometimes also laterally) to the motor hot spot. The rest moved rTMS applied offline, minutes before the experimental session. TBS is also a repetitive paradigm, but bursts of low-intensity stimuli applied in the 74% of the studies the coil was placed 1–2 cm posterior (sometimes also laterally) to the motor hot spot. The rest moved rTMS applied offline, minutes before the experimental session. TBS is also a repetitive paradigm, but bursts of low-intensity stimuli applied in the 74% of the studies the coil was placed 1–2 cm posterior (sometimes also laterally) to the motor hot spot. The rest moved rTMS applied offline, minutes before the experimental session. TBS is also a repetitive paradigm, but bursts of low-intensity stimuli applied in the 74% of the studies the coil was placed 1–2 cm posterior (sometimes also laterally) to the motor hot spot. The rest moved rTMS applied offline, minutes before the experimental session. TBS is also a repetitive paradigm, but bursts of low-intensity stimuli applied in.
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