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When our thoughts are not our own: Investigating agency misattributions using the Mind-to-Mind paradigm



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ABSTRACT

At the core of the sense of agency for self-produced action is the sense that I, and not some other agent, am producing and directing those actions. While there is an ever-expanding body of empirical research investigating the sense of agency for bodily action, there has, to date, been little empirical investigation of the sense of agency for thought. The present study uses the novel Mind-to-Mind paradigm, in which the agentive source of a target thought is ambiguous, to measure misattributions of agency. Seventy-two percent of participants made at least one misattribution of agency during a 5-min trial. Misattributions were significantly more frequent when the target thought was an arousing negative thought as compared to a neutral control. The findings establish a novel protocol for measuring the sense of agency for thought, and suggest that both contextual factors and emotional experience play a role in its generation.

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1. Introduction

In recent years there has been an explosion of interest in the cognitive underpinnings and phenomenology of what is widely termed the sense of agency, attracting the attention of researchers from a variety of disciplines, including philosophy, psychology, and neuroscience (Balconi, 2010; David, Newen, & Vogeley, 2008; Dijksterhuis, Preston, Wegner, & Aarts, 2008; Farrer et al., 2003; Gallagher, 2012). Fundamental to characterizing the sense of agency is the notion of agent attribution; when I act, I have the sense that I, and not some other agent, am causing and directing those actions. This self-attributional element of the sense of agency—the sense of self-agency—has been of particular interest to theorists and researchers in large part because of puzzling reports given by psychiatric patients indicating that movements of their body or thoughts in their mind are in some sense “not theirs”. Such reports have been held by various theorists to constitute attributions of external agency for a given bodily movement or thought, and thus to indicate a disruption to the normal experience of agency. Specifically, the diagnostic symptom of delusions of control—in which the patient reports that parts of their body are being moved by another agent—is widely interpreted as indicating a disruption to the sense of agency for bodily action (e.g. Frith, 2005), while the delusion of thought insertion—in which the patient reports that another person’s thoughts are being inserted into their mind—has been held by many to indicate a disruption to the sense of agency for thought (e.g. Gallagher, 2004; Sousa & Swiney, 2011).¹ Additionally, many theorists argue that Auditory Verbal Hallucinations (AVHs)—the experience of hearing a voice in the absence of appropriate stimuli—may be characterized as external attributions of agency for verbal thought (Jones & Fernyhough, 2007; Langland-Hassan, 2008; Stephens & Graham, 2003; Synofzik, Vosgerau, & Newen, 2008a). While the term ‘thought’ is used across the cognitive sciences to refer to many different types of mental event, the

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¹ But see Bortolotti and Broome (2009) and Fernández (2010) for alternative characterizations.

literature on the sense of agency broadly pertains to occurrent mental events, excluding perceptual states, of which we are first-personally aware.

In the case of bodily action, the recent explosion of conceptual work and the explication of relevant cognitive mechanisms involved in the sense of agency has been accompanied and enhanced by the development of a variety of ingenious experimental paradigms (e.g. Blakemore, Oakley, & Frith, 2003; Farrer & Frith, 2002; Moore & Haggard, 2010; Wegner, Sparrow, & Winerman, 2004). By contrast, while conceptual and theoretical debates relating to the case of mental action have developed, there has been a noted dearth of accompanying empirical investigation, perhaps due to the difficulty of submitting mental action to experimental investigation (Frith, 2005, 2012). In fact, we are aware of only one attempt in the existing literature to experimentally investigate the sense of agency for thought.² Sugimori, Asai, and Tanno (2011a) have recently argued that the existing Deese–Roediger–McDermott (DRM) memory paradigm (Roediger & McDermott, 1995), can be considered a measure of the sense of agency for thought. While this use of the DRM constitutes an inventive attempt to measure the sense of agency for thought, it provides a measure that is arguably problematic, and at best indirect. The DRM paradigm involves presenting individuals with a list of words which are closely related to a specific other word known as the critical lure (e.g. the words hill, climb valley, summit, etc. are closely related to the critical lure “mountain”) and then later asking participants if the critical lure was presented in the original list. Because the presentation of the original word list activates the semantic network, causing the critical lure to be more accessible, normal healthy controls often incorrectly recall being presented with the critical lure (Roediger & McDermott, 1995). Sugimori et al. argue that false memories of the critical lure can be taken as an indication of a weak sense of agency for thought, since the participant fails to recognize that the familiarity of the word is the result of earlier self-generated mental activity. But since the semantic activation of the critical lure during the initial word list presentation occurs “unconsciously and automatically” (Sugimori et al., 2011a, p. 693), it is unclear whether it constitutes thought in a sense relevant to understanding first person phenomenology. Moreover, differences in this activation of the semantic network that may affect memory of the critical lure need have nothing to do with the experience of agency; for instance, memory may be affected by the degree to which the semantic activation engages the acoustic components of the language system, an especially relevant possibility since the original word list was read aloud to participants, and one which might also explain their primary finding that false memories of the critical lure were associated with proneness to AVH. Finally, the viability of the measure rests on the proposal that a weak sense of agency over the original semantic activation will also lead to a weak “agency memory” at the moment of recall, but the theoretical framework on which this assumption rests has only been demonstrated for the bodily act of speech (Sugimori, Asai, & Tanno, 2011b). Overall, it is not clear that the DRM paradigm provides a suitable measure of the sense of agency for thought. It certainly does not allow the measurement of either occurrent or explicit agency attributions or the exploration of phenomenological dimensions of the sense of agency.

The primary aim of this article is to fill this gap in the experimental literature by developing a paradigm that allows direct measurement of explicit attributions of agency for specific episodes of conscious thought. A key challenge in developing such a protocol is to provide plausible ambiguity as to the agentive source of an experienced thought. After all, who else but me could think a thought in my mind? In fact, there are real-world settings in which just such plausible ambiguity is raised. A prior belief in some sort of supernatural agent is a unifying feature of religious and spiritual systems (Boyer, 2002), and such belief systems make room for a belief in a plausible mechanism for external agency experiences for thought, to a greater or lesser degree. In some cases a belief in God’s ability to directly produce thoughts in a worshipper’s mind is explicit, and in such contexts it is perfectly sensible to ask questions about the agentive source of a given thought (Luhmann, 2005). While these examples rely on a supernatural mechanism for agentive disruption to thought (i.e. supernatural agents), they do suggest a possible approach for experimental investigation. The novel experimental protocol used in the present study will provide a supposedly scientifically plausible mechanism by which one person can experience thoughts that another person is thinking. Participants wear a fake Transcranial Magnetic Stimulation (TMS) headpiece which forms part of a phony ‘Mind-to-Mind Interface’ supposedly connecting their mind to that of another person using a combination of EEG and TMS technologies. The participant is asked to sit quietly and attend to their thoughts and to report, by clicking a mouse, whenever they judge that they have “experienced a thought that the other person is thinking”. The report constitutes an explicit judgment related to the act of thinking the thought, and can be considered an attribution of agency. Since the Mind-to-Mind Interface is phony and there is no other participant, any attribution to external agency is in fact a misattribution of agency.

A further aim of the present research is to use the novel Mind-to-Mind paradigm to shed light on the mechanisms underlying the sense of self-agency for thought in the general population. A variety of cognitive accounts have recently been outlined positing specific mechanisms implicated in the sense of agency for thought. While the differing predictions made by these accounts as to the circumstances under which self-produced thought will be misattributed to an external agent have received some empirical consideration (e.g. Carruthers, 2012), they have not been directly investigated experimentally. A distinction is often drawn between ‘bottom-up’ accounts, which implicate subpersonal cognitive mechanisms in giving rise to a feeling of agency, and ‘top-down’ accounts, which highlight the role of inferences and contextual factors at the level of judgments of agency for thought.³ One type of bottom-up account of the sense of agency for thought is based on a leading

² Although there are existing experimental paradigms which investigate mechanisms which may contribute to the sense of agency, such as those which measure the ability to intentionally suppress memories (e.g. Paulik, Badcock, & Maybery, 2008).

³ For an analysis of the sense of agency in terms of these two distinct functional and representational levels (feeling of agency and judgement of agency) see Synofzik et al. (2008a). For a similar analysis see Bayne and Pacherie (2007). In the present article both ‘sense’ and ‘experience’ are used in a broad sense to refer to both of these levels.

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