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Studying Privileged Access with Functional MRI

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There is a long-standing philosophical debate regarding how people learn about their own states of mind. According to one view (Ryle, 1949), people acquire this knowledge in the same way they acquire knowledge about other people's beliefs, desires, preferences, etc, or about other phenomena--by accumulating evidence and making conclusions on the basis of this evidence. According to another view (Ayer, 1963), self-knowledge is qualitatively different from other kinds of knowledge in that people have "privileged access" to self-knowledge. Psychologists have recently developed several methods for studying privileged access (Wilson, 1992). One potential way of addressing this issue is by exploring brain mechanisms underlying various kinds of judgments (judgments about self, others, or judgments in a non-psychological domain).

Recent investigations of brain mechanisms underlying decision making point to the possibility that decision making in "psychological" or "theory of mind" domains involves different neural circuits than decision making in non-psychological, rational domains (Goel, Grafman, Sadato, & Hallett, 1997).

Three experiments compared the cortical activations associated with judgments about self, judgments about others, and rational, non-psychological judgments. There were 5 participants in the first experiment, and 3 participants in the second and third experiments. The method used involved functional magnetic resonance imaging (fMRI). Sixteen 4-mm thick slices were acquired in the horizontal plane of the Talairach and Tournoux atlas (1988) starting from 12 mm below the AC-PC line with a 0 mm interslice interval. fMRI was obtained with T2*-weighted gradient 3D echo spiral pulse sequence (1.5T, TR=1080 ms, TE = 40 ms, flip = 22 degrees, sampling interval = 4.32 s / image).

Participants saw names of food items on the screen (e.g., "ice cream") and made a judgment about the food item. In the first experiment, participants' task alternated between pressing a key for items that they themselves liked (*self judgment*) and pressing a key for items that an average

American liked (*other judgment*). In the next experiment, the task alternated between *self judgment* and pressing the key for the foods rich in calcium (*rational judgment*). In the last experiment, the task alternated between *other* and *rational judgments*.

We compared activation in the three critical areas: amygdala, medial frontal cortex, and dorsolateral prefrontal cortex. Activation in dorsolateral prefrontal cortex is associated with tasks that place heavy demands on working memory, such as reasoning and problem solving. Activation in medial frontal cortex is associated with tasks that are psychological, relative to non-psychological tasks (Goel, 1997). Results from the first experiment show greater activation in ventro-medial frontal areas in *self* relative to *other* condition. Results from the second experiment show greater activation in dorsolateral prefrontal areas for *rational judgment* relative to *self* or *other* conditions, and greater activation in ventro-medial frontal areas in *self* and *other* condition relative to the *rational judgment* condition. The different activations may reflect either that the information retrieved from memory in order to make a judgment is different for the three kinds of judgments, or the mechanism for making the judgments is different.

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