

# How We See Others: *The Psychobiology of Schemas and Transference*

By Dan J. Stein, MD, PhD

## ABSTRACT

Social cognition involves automatic and stimulus-driven processes; these may be important in mediating stereotypes in the community and schemas and transference in the clinic setting. Significant differences in self-related processing and other-related processing may also lead to important biases in our view of the other. The psychobiology of social cognition is gradually being delineated, and may be useful in understanding these phenomena, and in responding appropriately. In the clinic, schemas can be rigorously assessed, and schema-focused psychotherapy may be useful in a number of indications.

## CASE REPORT

Terry is a 33-year-old woman who presented because of difficulties in her relationships. Her childhood had been an unsettled one; her father had had to move jobs every year or two. During adolescence, she had used sex to forge relationships, frequently moving from one partner to another. Now, as an adult, she had difficulties in

maintaining a long-term caring relationship. At the start of therapy, Terry felt that the therapist was aloof and uncaring, and frequently threatened to quit. At a later point, she saw her therapist as very attractive, and voiced her wish for a sexual relationship outside of the therapy. Over the course of a schema-focused therapy, Terry gradually came to develop a more modulated view of her therapist.

## COGNITIVE-AFFECTIVE NEUROSCIENCE

Psychiatry has long been interested in the perception of others, and its abnormalities. A psychodynamic perspective has focused on transference phenomena.<sup>1-3</sup> The concept of schemas has been used in the psychodynamic literature, but is also widely used in cognitive science.<sup>4-6</sup> More recently, cognitive-affective literature has focused instead on constructs such as social cognition<sup>7,8</sup> and implicit attitudes (eg, in stereotypes).<sup>9,10</sup> This has laid the basis for rigorous study of the relevant psychobiology.

## Neuroanatomy/Neurochemistry

A range of brain regions have been implicated in social cognition.<sup>7</sup> Some processes may be relatively automatic and stimulus driven, while others are more controlled and context sensi-

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Author's note: This case is based on an amalgam of the author's experience.

tive.<sup>11</sup> Cognitive-affective processing involving stereotypes, for example, appears mediated by areas involved in evaluative processing (eg, ventromedial prefrontal cortex, amygdala) and in the presentation of action knowledge (eg, middle temporal gyrus).<sup>12</sup> In contrast, suppression of stereotypic attitudes may recruit other areas, such as the dorsolateral prefrontal cortex (Figure 1).<sup>13,14</sup>

While the processing of social categories may draw on regions involved in the processing of categories in general,<sup>15</sup> the neurocircuitry involved in evaluation of and knowledge about persons and objects appears dissociable.<sup>16-18</sup> Thus, in one study,<sup>16</sup> person knowledge was mediated by brain regions implicated in social cognition (eg, medial prefrontal cortex [mPFC], superior temporal cortex, intraparietal sulcus, and fusiform gyrus), while object knowledge was mediated by contrasting circuitry (eg, left inferior frontal gyrus, inferotemporal cortex, and posterior parietal cortex) (Figure 2).

There is some debate about the extent of differences in the neurocircuitry mediating self-related versus other-related processing.<sup>19</sup> Various

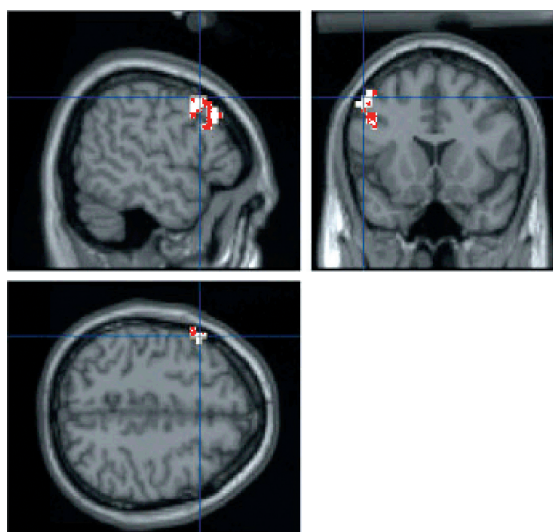
regions may be more active in self-related processing.<sup>20</sup> However, it seems clear that other-related processing relies in part on circuitry used in self-related processing.<sup>21,22</sup> Indeed, mentalizing about a similar other engaged a region of ventral mPFC linked to self-referential thought, whereas mentalizing about a dissimilar other engaged a more dorsal region of mPFC (Figure 3).<sup>23</sup> However, key differences in how we see ourselves and others (including our past and future selves) lead to a range of crucial biases.<sup>24</sup>

Monoaminergic and other systems play a key role in mediating cognition and affect in general, and so presumably must also be involved in social cognitive-affective processing, including the psychobiology of schemas and transference. Such systems certainly play an important role in mediating social hierarchy across species.<sup>7</sup> Nevertheless, the neurochemistry of our view of others deserves much further exploration.

### Gene/Environment

Both psychodynamic and cognitive-behavioral literatures often emphasize that stereotypes and schemas emerge from early environmental experi-

**FIGURE 1.**  
fMRI of the implicit association test indicated that suppression of stereotypic attitudes recruited the left dorsolateral prefrontal cortex<sup>14</sup>

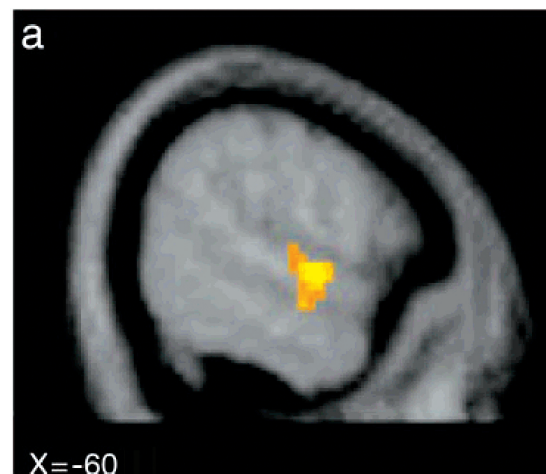


fMRI=functional magnetic resonance imaging.

Knutson KM, Mah L, Manly CF, Grafman J. Neural correlates of automatic beliefs about gender and race. *Hum Brain Mapp*. 2007;28:915-930. Reprinted with permission, copyright 2007.

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**FIGURE 2.**  
fMRI during judgment of people or objects demonstrated increased activation during object trials compared with subjects trials in the left inferior prefrontal cortex and the left inferotemporal cortex<sup>16</sup>



fMRI=functional magnetic resonance imaging.

Mitchell JP, Heatherton TF, Macrae CN. Distinct neural systems subserve person and object knowledge. *Proc Natl Acad Sci U S A*. 2002;99:15238-15243. Reprinted with permission, copyright 2007.

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ences.<sup>25-27</sup> Over the course of development, structures used to mediate self- versus other-processing change.<sup>19</sup> The relevant cognitive-affective processes are doubtlessly also influenced by genetic variation. Much more work is necessary to delineate gene-environment interactions in this area.

### Evolutionary Approaches

An evolutionary approach focuses on the adaptive features of brain and cognition,<sup>28,29</sup> and so might emphasize that stereotypes and schemas play a role in improving the efficiency of human information processing.<sup>30</sup> Differences in self-related and other-related processing may also be adaptive.<sup>24</sup> There may

be evolutionary advantages in having particular assumptions about others.<sup>31-33</sup> Again, more work in this area is needed.

## CLINICAL IMPLICATIONS

### DSM-IV-TR Diagnosis

Many psychiatric disorders are characterized by alterations in our view of others. Thus, in psychosis, we may have delusions about the other, and in mood disorders, there may also be significant distortions in our view of others. However, personality disorders are particularly relevant here, insofar as they may be specifically characterized by disturbances in cognitive-affective processing of the other.

### Assessment/Evaluation

A number of indirect or implicit measures of attitudes are available, and the implicit association test has been particularly widely studied.<sup>10,34</sup> In the clinical setting, schemas can be assessed in a number of different ways,<sup>4,25</sup> and there appears to be increasing use of Young's schema questionnaire<sup>25</sup> in practice and research trials. The patient-doctor relationship can be assessed using the working alliance inventory.<sup>35,36</sup>

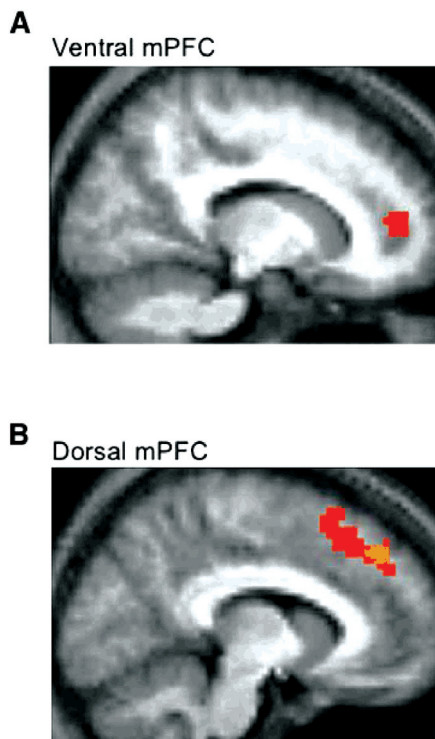
### Pharmacotherapy/Psychotherapy

Theoretically, stereotypes can be regulated,<sup>10</sup> and schemas and the transference can be modulated.<sup>4,25</sup> Indeed, there is a growing body of preliminary evidence that schema-focused psychotherapy is useful for certain personality disorders.<sup>37-39</sup> Given that cognitive-affective social processing is mediated by a range of brain regions, it would not be surprising if pharmacotherapy were also able to modulate effectively certain schemas.<sup>40</sup>

## CONCLUSION

While our stereotypes and schemas may allow efficient cognitive-affective processing, they may also be biased.<sup>4,9,25</sup> Viewing transference in terms of concepts such as the heightened activation of enduring patterns of cognitive-affective processing in the therapeutic relationship may facilitate its empirical study.<sup>2,5,41,42</sup> (Counter-transference, analogously, can be described in terms of the therapist's cognitive-affective processing of the patient). Furthermore, the asymmetry between our experience of others and of the self has cru-

**FIGURE 3.** During fMRI, mentalizing about a similar other engaged a region of ventral mPFC linked to self-referential thought (A), whereas mentalizing about a dissimilar other engaged a more dorsal region of mPFC (B)<sup>23</sup>



fMRI=functional magnetic resonance imaging; mPFC=medial prefrontal cortex.

Mitchell JP, Macrae CN, Banaji MR. Dissociable medial prefrontal contributions to judgments of similar and dissimilar others. *Neuron*. 2006;50:655-663. Reprinted with permission, copyright 2007.

Stein DJ. *CNS Spectr*. Vol 14, No 1. 2009.

cial consequences, with people judging others differently from the way they judge themselves.<sup>24</sup>

Particular brain regions, such as the fusiform face area and the extrastriate body, are involved in the recognition of human faces and bodies.<sup>43</sup> In addition, the psychobiology of other-related cognitive-affective processing is gradually being unraveled. In the clinical setting, schemas can be rigorously assessed and the way that they influence the therapeutic relationship can be explored, and there is some evidence that over the course of such schema-focused treatment there can be positive change in the relevant underlying cognitive-affective processes and the symptoms that they produce. **CNS**

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