Cognition and Emotion in Literature and Film, *or*

Is Cultural Study Possible Without Cognitive Neuroscience?

Patrick Colm Hogan

Department of English and Program in Cognitive Science

University of Connecticut

 Any of you who has attended a literary talk drawing on cognitive science has probably heard an exchange along the following lines. Audience member: “Professor Brainstem, thank you so much for your illuminating presentation, which gives us much to consider. Though I greatly enjoyed your talk, I am troubled by one thing. Cognitive science may have some valuable insights. But don’t you feel that it leaves out culture and history?” When asked questions of this sort, cognitivists—including myself—usually fumble about apologetically, saying that yes, some of us are guilty and we really need to do more to integrate culture into our cognitive analyses, etc.

But, on reflection, it seems that this gets things rather badly wrong. In fact, it seems fairly rare to find cognitivist literary critics who simply ignore culture and history. The bias of the profession as a whole is such that one simply has to know certain things about, say, Shakespeare’s time and place if one is going to be accepted as a critic of Shakespeare, if one is going to publish on Shakespeare, and so on. It simply is not possible, for example, to treat Shakespeare’s language and references as if they were not historically specific. Of course, this is not to say that the cultural part of cognitive literary study is always done well. But the same point holds for the cultural part of cultural studies. For example, one could argue that an unfortunate amount of postcolonial criticism in the culture studies mode is somewhat tone deaf to ethical, metaphysical, or other nuances in, say, South Asian cultural traditions. But the crucial point is that discursive and institutional constraints inhibit the degree to which criticism of any theoretical orientation can ignore history or culture.

 In contrast, there seem to be no constraints whatsoever on the degree to which criticism can ignore neuroscience, cognitive and affective research, developmental studies, group dynamics, or any other forms of understanding that contribute to our sense of cross-cultural and trans-historical commonality. In other words, it simply is not the case that cognitivists grossly ignore culture and history. But it is commonly the case that culturalists grossly ignore cognitivist and related research. Put more crudely, the prototypical scenario I sketched at the outset is backwards. It should be Brainstem who worries over what Professor de la Culture-Histoire leaves out.

If, then, the problem is that the entire discussion of cognition and culture is topsy-turvy, what difference would it make if we tried to correct the problem by introducing cognitive study into culturalism? Here, we may briefly consider Gallagher and Greenblatt’s well-known discussion of the potato debate, the debate over feeding English workers potatoes. Gallagher and Greenblatt have discussed this topic in an illuminating way. Nothing I wish to say undermines their historical work. But some conclusions they draw from this seem problematic. Specifically, they show that a wide range of factors were involved in the debate and in the rejection of potatoes by English workers. They conclude from this that there is a “need for a thorough historicization of what counted as food and what felt like hunger” (125).

My point here is not to argue that this claim is entirely wrong. Gallagher and Greenblatt are certainly getting at something. But they have formulated their conclusion in a way that grossly overstates the case. As such, it seems more mistaken than correct. This is largely because they leave out any sense of what constitutes hunger.

Here, we need to briefly sketch an account of emotion or motivation in general and hunger in particular. Emotion or motivation systems are largely sub-cortical systems, activated by a combination of endogenous and exogenous (body-internal and body-external) stimuli, which lead to subjective experiences of positive or negative hedonic tone, and orient one toward behavior that will reduce aversive experiences or enhance pleasurable experiences. The basic operation of these systems is adaptive in that central cases of aversive experiences are harmful and central cases of pleasurable experiences are conducive toward health or reproduction. For example, the fear system produces an aversive feeling and leads to flight from potentially dangerous situations. The different emotion systems may enhance or inhibit one another. For example, fear and attachment tend to be mutually inhibiting. Finally, there are reciprocal connections between prefrontal cortex and emotion systems such that emotional response may affect inferential and related processing, but emotional response may also be inhibited by such processing. For example, fear responses may guide one’s long-term planning, but one’s reflection on a current situation may serve to inhibit one’s fear response—perhaps one’s aversive feeling or perhaps only one’s behavior.

Hunger is a surprisingly complex case. First, there appear to be two distinct, but interrelated systems that are sometimes referred to as “hunger.” (On these systems, see chapters four and five of Wong.) One is the taste preference system. This is a system that bears on our hedonic relation to the experience of eating certain objects. Like other motivation systems, this has both innate and acquired components. The innate component involves, for example, an evolved aversion to the taste of certain toxins. The acquired component is largely a matter of habituation to certain tastes, as well as the association of tastes with emotional memories, particularly in critical period experiences. (These experiences would include, for example, the association of a particular food with food poisoning.)

The other relevant motivational system is that of feeding. Feeding behavior is a result of blood sugar regulation, gene expression related to amount of fatty tissue (see Gilliam, Kandel, and Jessel 47), and to some extent other factors such as the stimulation of stretch receptors in the stomach (see Wong 91). This system is closer to what we would ordinarily refer to as “hunger,” as in the phrase “I feel hungry” or when we say “I need to eat something.” In contrast, the taste preference system is more relevant to such expressions as “I’m hungry for a piece of cheesecake” or “I want something tasty.” These two systems are probably mutually excitatory and mutually inhibitory (though the relation may be asymmetrical). In addition, both are partially inhibited by disgust, though disgust appears to have a stronger impact on taste preference than on feeding motivation.

Here, we may return to Gallagher and Greenblatt’s claims, specifically their assertion that we need to historicize hunger. An understanding of human hunger motivation suggests the following. First, it is extremely unlikely that feeding motivation varies historically. There are some exceptions to this. In cases of traumatic over-arousal, neurological systems suffer damage. This is undoubtedly true of the hunger system. Thus chronic hunger undoubtedly produces changes—almost certainly deleterious changes—in the operation of the feeding system in particular. One may speak of this as “historical” if one wishes. But the real variable is not historical culture, but famine (whatever the ambient culture might be).

So, if English workers feel hunger in the same ways and for the same reasons (changes in blood glucose, decline in fatty tissue, etc.), what explains the rejection of the potato? A neurological model suggests that there must have been some sort of inhibition of the feeding system. This leads to three possibilities. First, there could be inhibition from taste preference. Second, there could be inhibition from the disgust system. Finally, there could be prefrontal inhibition.

Undoubtedly, there was some taste preference inhibition. It seems that our emotion systems are calibrated slightly toward dispreference. For example, when faced with a stranger, our initial impulse is not trust, but mild distrust or wariness (see Oatley 73; for the more general point, see Zajonc 35). This is presumably the case for our taste and indeed feeding systems as well. Thus the lack of habituation to potatoes would produce a slight aversion. This is one implication of Gallagher and Greenblatt’s argument that is unsurprising. It seems clear that taste preference is historically and culturally differentiated in certain respects.

Even more importantly, Gallagher and Greenblatt make a good case that the debates over the potato involved the invocation of repulsive imagery, particularly of dirt. Cognitively, this rhetoric would have the effect of associating potatoes with digust-relevant emotional memories. Thus we have another form of inhibition that we would expect—the inhibition of both taste preference and feeding by an activated disgust system. Here, too, the conclusion is not terribly surprising.

This is not to say, however, that Gallagher and Greenblatt’s conclusions are banal. First, the exploration of dirt imagery in the rhetoric of the debate is revealing. Second, we really have not yet explained the rejection of the potato. Empirical studies show that the disgust system does not have strong inhibitory force on feeding behavior (see Hoefling and colleagues). Of course, we are dealing with abstract debates here, not a hungry person faced directly with a potato. Nonetheless, it seems that there are other things going on. This is where the Gallagher and Greenblatt’s analysis is most revealing. Or, rather, this is where their analysis could be revealing, if integrated with neuroscience of motivation (rather than being framed in terms of Saussurean “signifiers” [112]).

Specifically, Gallagher and Greenblatt suggest two other reasons for the rejection of the potato. First, there is anti-Irish feeling and the association of the Irish with the potato. It is well established that out-groups inspire anterior insula activation, which suggests disgust (see Fiske, Harris, and Cuddy). Gallagher and Greenblatt’s argument indicates that group division can lead to a hyper-activation of the disgust system regarding foods that are distinctively associated with the out-group. If valid, the suggestion genuinely advances our understanding of human motivation systems as well as our understanding of inter-group relations. I know of no research on disgust that makes this connection. Thus it is an example of the ways in which historical and cultural study can advance cognitive knowledge. On the other hand, we can gain this insight only by recognizing that hunger should not be subjected to “thorough historicization.” Rather, a partial historicization should be integrated with our understanding of human motivation systems.

The second point about Gallagher and Greenblatt’s analysis is that not all the rejection is due to disgust. There were rational reasons to resist the food insecurity that tended to go along with reduction of subsistence to the potato crop. This gives us a reason for the inhibition of feeding motivations that is not first of all subcortical, but rather prefrontal. (The point applies to the working classes themselves, but also to the capitalist and landlord classes for slightly more complex economic reasons, which Gallagher and Greenblatt outline.) This too is remarkable. It suggests, for example, that at least some of the workers were led to inhibit potentially strong motivational impulses due to long-term planning. This is something that one rarely associates with masses. But it is implied by Gallagher and Greenblatt’s research—though, again, this implication is recoverable only when that research is combined with neuroscientific work.

In sum, it seems clear that there is great benefit to the integration of cognitive science and cultural studies. However, common views in the field frame the issue wrongly. Cognitive research has already been drawing on cultural study. What has been lacking is the reverse. As to the question posed in my title—is cultural study possible without cognitive neuroscience?—the answer is “Yes, but only in an unnecessarily impoverished form.”

Works Cited

Fiske, Susan T., Lasana T. Harris, Amy J. C. Cuddy. “Why Ordinary People Torture Enemy Prisoners.” *Science* 306.5701 (26 November 2004): 1482-83.

Forgas, Joseph P., ed. *Feeling and Thinking: The Role of Affect in Social Cognition*. Cambridge: Cambridge University Press and Paris: Editions de la Maison des Sciences de l’Homme, 2000.

Gallagher, Catherine and Stephen Greenblatt. *Practicing New Historicism*. Chicago, IL: University of Chicago Press, 2000.

Gilliam, T. Conrad, Eric Kandel, and Thomas Jessell. “Genes and Behavior.” In *Principles of Neural Science*. Ed. Eric Kandel, James Schwartz, and Thomas Jessell. 4th ed. New York: McGraw-Hill, 2000, 36-62.

Hoefling, Atilla, *et al*. “When Hunger Finds No Fault With Moldy Corn: Food Deprivation Reduces Food-Related Disgust.” *Emotion* 9.1 (2009): 50-58.

Oatley, Keith. *Emotions: A Brief History*. Malden, MA: Blackwell, 2004.

Zajonc, Robert B. “Feeling and Thinking: Closing the Debate Over the Independence of Affect.” In Forgas, *Feeling*, 31-58.

Wong, Roderick. *Motivation: A Biobehavioural Approach*. Cambridge: Cambridge University Press, 2000.