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Imagination and Simulation in Audience Responses to Fiction

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A central problem in contemporary aesthetic theory is the psychology of consumers of fiction. What cognitive processes or mechanisms are activated or engaged when people read novels or observe films, television, and theatrical productions? One question here is how to make sense of the fact that consumers of fiction get emotionally involved in, or have affective reactions to, fictional works. This is puzzling, because consumers know that the described or depicted scenarios are not actual; they are merely fiction. So why do the works engage their emotions? Can we make sense of the empathy they ostensibly display vis-à-vis characters in these works? Fiction focuses heavily on the mental states of the characters it portrays, their aspirations, motivations, feelings, and the like. So it wouldn't be surprising if the cognitive mechanisms utilized by consumers of fiction overlap with those used in detecting and responding to the mental states of real people (mindreading). Exactly how extensive this overlap is, however, and what it implies about engagements with fiction, remains to be explored.

1. SUPPOSITIONAL AND ENACTMENT IMAGINATION

Mental engagement with fiction involves the imagination, at least to a minimal extent. The reader or observer must imagine that certain states of affairs or scenarios *p*, *q*, and *r*—scenarios depicted in the narrative work—are happening or have happened. This is not 'pure' imagination, perhaps, because the reader/observer's mental representation of the scenario is partly guided by actions and scenes actually perceived (on stage or screen) or verbally described by someone else (the author). Still, we may presume that every consumer of a fictional work recognizes that what is shown or related is intended to depict a fictional series of events. The consumer is invited to *suppose* that such-and-such occurs, in the absence of evidence that it actually does occur and despite disbelieving (in the typical case) that it actually occurs. This mental act of supposition is what I mean by the 'minimal' sense in which consuming fiction involves imagination. Let us call this type of imagination *supposition-imagination*

(S-imagination). S-imagination is typically formulated with a 'that'-clause, 'X imagines that *p*', where *p* can refer, unrestrictedly, to any sort of state-of-affairs. To S-imagine that *p* is to entertain the hypothesis that *p*, to posit that *p*, to assume that *p*. Unlike some forms of imagination, S-imagination has no sensory aspect; it is purely conceptual.

By contrast with the notion of S-imagination, I want to introduce the concept of *enactment-imagination* (E-imagination). Elsewhere I introduce this notion in connection with mindreading, and specifically, the simulation approach to mindreading (Goldman 2006; cf. Currie and Ravenscroft 2002). But it isn't inherently related to mindreading. Enactment-imagination is a matter of creating or trying to create in one's own mind a selected mental state, or at least a rough facsimile of such a state, through the faculty of imagination. Prime examples of E-imagination include sensory forms of imagination, where one creates, through imagination, perception-like states. Acts of visual and auditory imagination, which involve the production of vision-like or hearing-like states, are familiar types of E-imagination. Another type of E-imagination is motor imagination, where one produces action-directed representational states, without intending to execute the selected action. The term 'imagery' is commonly applied to these cases; there is visual imagery, auditory imagery, and motor imagery. (Motor imagery is less familiar introspectively, because it is only minimally conscious.) Not all modes of E-imagination, however, involve imagery.

Is it true that episodes of visual, auditory, and motor imagery are facsimiles of seeing, hearing, and issuing motor commands respectively? Do these imagination-generated states really *resemble,* to any appreciable degree, the percepts produced by genuine perception or the representations involved in genuine motor execution? Both behavioral studies and cognitive neuroscience provide extensive evidence of such similarities. Let me give some sample pieces of such evidence (for more extensive presentation of the evidence, see Goldman 2006: ch. 7).

It may seem unlikely that visualizing a scene corresponds at all closely to seeing that scene, because seeing usually involves saccadic eye movements whereby the objects are scanned. Where there is no scene to be scanned, isn't this important part of seeing omitted? No. Michael Spivey et al. (2000) had subjects listen to spoken scene descriptions while their eye movements were tracked by a hidden camera. Their eyes tended to move in directions that accorded with the directionality of the scene described. A downward story, for example, was a vignette in which someone is described as standing at the top of a canyon watching people rappel down to the canyon floor. In four critical stories, the average proportion of eye movements in a preferred direction was significantly greater than the average proportion of eye movements in the unpreferred directions. Thus, subjects apparently *enacted* seeing so robustly that their enactment was not confined to pure imagination, but extended to oculomotor activity as well.

Turning to cognitive neuroscience, it is established that a region of the brain called the fusiform gyrus is distinctively activated when we see faces. The same region is also activated when we imagine faces (Kanwisher et al. 1997; O'Craven and Kanwisher 2000). Lesions to the fusiform face area impair both face recognition ability and the ability to imagine faces (Damasio et al. 1990; Young et al. 1994). Stephen Kosslyn has been the leading researcher defending the neural overlap between vision and visual imagery. Kosslyn concedes that only some processes used in vision are also used in visual imagery (Kosslyn 1994: 329–34; Kosslyn et al. 1997). This is not surprising, given that imagery relies on previously organized and stored information, whereas perception requires performance of all aspects of figure–ground segregation, recognition, and identification. In particular, we should not expect imagery to share low-level processes involved in organizing sensory input. Kosslyn et al. (1997) identified subsystems that perform high-level visual processing tasks in the analysis of perceptual or imagistic materials, and found that two-thirds of the activated areas were activated in common. I would consider this to be substantial similarity between the neural substrates of vision and visual imagery, respectively.

The evidence for similarities between motor execution and motor imagination are, if anything, more striking. In ordinary manipulation of objects, each hand is controlled by its opposite (contralateral) cerebral hemisphere. Parsons et al. (1998) showed that imaginative processes for the two hands are similarly controlled by their opposite hemispheres. Imagining a movement for a given hand appears to be executed by the same cerebral mechanism that executes ordinary movements of that hand. Sirigu et al. (1995) tested a subject who had motor cortex damage related to finger movements on one of her hands. One test involved a finger movement task to keep up with a metronome. In her actual performance, the subject's maximum speeds were 90 beats with the impaired hand and 170 beats with the intact hand. Doing the tasks in imagination, her maximum speeds were 95 beats with the impaired hand and 160 beats with the intact hand—remarkably similar. This suggests the use of the same mechanisms and processes for both execution and imagination.

A rather different example involves enhancement in athletic performance from mere motor imagination. Yue and Cole (1992) had subjects generate motor imagery of training, and compared their increases in muscular strength from such imagery with the increase in subjects who actually trained. Actual training produced a 30 percent increase in maximal force; motor imagery produced a 22 percent increase. This effect is solely the result of cortical activity, not covert muscular activity, because subjects did not make covert muscular contractions during motor imagery.

Thus, imagination uses very similar processes and/or produces very similar outputs across an interesting pair of domains. Analogous processes and outputs engaged by imagination have been less intensively studied in other domains. But it certainly appears that E-imagination, as we have defined it, is a robust

phenomenon. E-imaginative events have substantial similarities—including functional similarities—to their actual counterparts across an interesting array of domains.

Let us now return to S-imagination. How is it related to E-imagination? One possible approach holds that there are two distinct kinds of imagination, with no essential connection to one another. S-imagination is *sui generis*, a type of imagination different from, and irreducible to, E-imagination. A second possible approach holds that E-imagination is the fundamental kind of imagination, and that S-imagination is simply one species of it. Which species? It is the species in which the mental state enacted is belief. Supposing that *p* is E-imagining believing that *p*. Of course, this implies that some species of E-imagination involve no imagery. But that seems fully acceptable; there is no reason to tie E-imagination to the having of imagery. We should leave room for such states as E-imagining hoping that *p*, E-imagining intending to *A*, etc., all of which states are also devoid of imagery. I shall not make a firm choice between these alternative construals of S-imagination. In either case, there is a substantial difference between the view that S-imagination covers all important uses of imagination in the consumption of fiction and the view that E-imagination (even in its non-suppositional variants) is essential to the consumption and appreciation of fiction.

2. COMPETING EXPLANATIONS OF IMAGINATION-INDUCED AFFECT

Which approach to the imagination's role in the cognizing of fiction is most promising: one that centers entirely on S-imagination, or one that emphasizes the role of E-imagination in its non-suppositional variants? Let's examine a specific proposal that develops the S-imagination approach, a proposal of Shaun Nichols (2004).

Nichols adopts a cognitive architecture developed elsewhere with Stephen Stich (Nichols and Stich 2003) and applies it to the role of imagination in fiction. Their architecture countenances supposition but not E-imagination. The architecture is presented in boxological terms, where each box depicts a cognitive system or kind of state. For present purposes we can focus on three boxes: the belief box, the desire box, and the possible world box, later called by Nichols the pretend box. Each box is understood to specify a distinct functional role. The boxes can contain representation tokens. In the case of the pretend box, the job of the tokens is not to represent the world as it is, but to represent what the world would be like given some set of 'assumptions' (Nichols and Stich 2003: 28). Nichols and Stich speak of the pretend box as containing pretense 'premises' (2003: 29). The language of 'assumptions' and 'premises' clearly intimates supposition rather than E-imagination more generally. Moreover, they elsewhere express skepticism about the existence of pretend desire (Nichols and

Stich 2000), which again suggests a restriction of pretense to pretend belief, i.e. supposition. Although I have allowed the possibility that supposition might be a species of E-imagination, I don't think that Nichols and Stich share my conception of E-imagination. So Nichols's approach to imagination and fiction seems quite different from the one I contemplate (and will elaborate upon below).

The first question, then, is whether Nichols's 'thin' conception of imagination, viz. supposition, accounts adequately for imagination's role in the experience of fiction. Returning to his boxological approach, what is the difference between belief representations (i.e. representations in the belief box) and pretense representations (i.e. representations in the pretense box)? Not the *content* of the representations, says Nichols, because pretense representations and beliefs can have exactly the same content. The natural cognitivist proposal, he says, is that pretend representations differ from belief representations by their *function* (Nichols 2004: 130). Just as desires are distinguished from beliefs by their characteristic functional roles, so pretenses are distinguished from beliefs by their functional roles. One thing they have in common, though, is that both kinds of representations use the 'same code'. This is a crucial theme in his paper entitled 'Imagining and Believing: The Promise of a Single Code'. Here is why sameness of code is important, says Nichols:

> If pretense representations and beliefs are in the same code, then mechanisms that take input from the pretense box and from the belief box will treat parallel representations much the same way. For instance, if a mechanism takes pretense representations as input, the single-code hypothesis maintains that if that mechanism is *activated* by the occurrent belief that *p*, it will also be activated by the occurrent pretense representation that *p*. More generally, for any mechanism that takes input from both the pretense box and the belief box, the pretense representation *p* will be processed much the same way as the belief representation *p*. I will count any theory that makes this claim as a 'single-code' theory. (2004: 131)

Nichols applies the single-code theory to his explanatory project in the theory of fiction. He wants to explain why pretense representations used by consumers of fiction have comparable affective consequences to belief representations. His answer is to invoke the single-code hypothesis:

> According to the single-code hypothesis … the emotional systems will respond to pretense representations much as they do to parallel beliefs. That is, if the pretense representation that *p* gets processed by an affective mechanism, the affective outputs should parallel those of the belief that *p*. (2004: 131)

So, Nichols proposes to explain the fact that pretense representations are processed by affective systems in 'much the same way' as beliefs by appeal to the fact that the two types of representations use the same code.

This purported explanation is unconvincing. It's in the nature of an explanation, I'll assume, that the explaining facts (the *explanans*) should imply, or at least

make probable, the fact to be explained (the *explanandum*). How does this apply here? It would have to be the case that if two tokens of the same representation, in one and the same code, are housed or contained in two different states (or boxes), then it's either guaranteed or quite probable that these representations will be processed equivalently by cognitive mechanisms. Is this plausible?

I think not. As we've seen, talk of cognitive 'boxes' is talk of functional roles. Different boxes have different functional roles associated with them, and this applies to the pretense and belief boxes. Now, functional roles are specified largely by dispositions to interact with other states and mechanisms in the larger cognitive system. Since pretense differs from belief in functional role, why should it be true that 'for any mechanism that takes input from both the pretense box and the belief box, the pretense representation *p* will be processed much the same way as the belief representation *p*'? It could happen, of course, that some selected mechanism would process a pretense representation *p* and a belief representation *p* equivalently. But why is this implied, predicted, or made probable, for a random mechanism? Having a representation in a given code is only one component of the complex state of affairs (the propositional attitude token). Another component is the box that contains the representation, i.e. the attitude type. Why is sameness of code *sufficient* to guarantee, or even make probable, the equivalence of treatment by processing mechanisms? On the contrary, one would think that the distinctive functional role associated with each box or attitude type would also be relevant. And it would tilt in the general direction of difference in treatment. So why does sameness of code imply, or make probable, sameness of treatment?

Let's reflect more on Nichols's proposal. Consider the case of desire and belief. Desire representations and belief representations should also share the same code. Otherwise, how could desires and beliefs 'talk' to one another, which they have to do when a person executes practical reasoning? Despite a shared code, desires and beliefs with the same content (believing that *p* and desiring that *p*) are certainly not processed in an equivalent way. By parity of thinking, why should pretenses and beliefs be processed in an equivalent way? Or take a second example. Agnosticism is a distinct attitude type from belief. In the Nichols–Stich approach to cognitive architecture, there should therefore be a belief box and an agnosticism box, and their respective representations would surely use the same code. But this hardly makes it reasonable to expect content-equivalent inputs from these two boxes to generate equivalent outputs.

Now let us consider the E-imagination approach. Fundamental to the E-imagination approach is that pretense, or imagination, isn't yet another mental state category, analogous to belief, desire, fear, and so forth. Rather, E-imagination is a method or faculty that causes mental states of the various categories. Instead of causing them in a 'primary' way (each mental state type has its own distinctive cluster of primary causes), E-imagination is a 'secondary' way of causing tokens of the same (or a very similar) type. A familiar kind of

E-imaginative causation is causation by the *will*. Somehow (and the details are murky) one can successfully will to have a visual experience as of seeing the surf at the beach, despite having no current perceptual access to any beach. Admittedly, a good image of the surf requires more than the will alone. One also needs information stored in visual memory about what the surf looks like. If one has never seen the surf, either directly or in pictures, one's willed image probably won't approximate a percept of the surf.

E-imagination isn't always triggered by the will; that may not even be the most common mode of triggering. An avid surfer who hears someone else utter the word 'surf' might have an involuntary image of the surf spring to mind. This is still the product of E-imagination. Whichever way visual E-imagination is triggered, it can generate a state that resembles a counterpart perceptual state. Importantly, the imagined state resembles its perceptual counterpart not only in their shared *code* and *content*, but in a shared kind of *state*, in this instance a *visual* kind of state. State resemblance is what Nichols's approach neglects. Sharing a kind of state (which frequently reflects a sharing of neural substrate) normally implies *some* downstream causal similarities. Among the downstream causal similarities in the surf case is probably the activation of action propensities that would prepare the agent for interacting with the represented scene in appropriate ways. For an avid surfer, this would mean mental preparations for maneuvering a surfboard in specific ways. Of course, merely having a visual image of the surf doesn't lead to actual surfing behavior. But this might equally be true of seeing the surf. Perhaps no surfboard is available; perhaps one sees the surf on television; or perhaps one's leg is in a cast that makes surfing impossible. Still, similar modes of mental action preparation would flow both from seeing the surf and from having a visual image of the surf. Once we recognize this general characteristic of states generated by E-imagination, we can approach the effects of imagination in the consumption of fiction more fruitfully.

To illustrate the idea, let's borrow a familiar example from the aesthetics literature, Kendall Walton's (1997) spelunking example. Walton writes as follows:

> Imagine going on a spelunking expedition. You lower yourself into a hole in the ground and enter a dank, winding passageway. After a couple of bends there is absolute pitch darkness. You light the carbide lamp on your helmet and continue. The passage narrows. You squeeze between the walls. After a while you have to stoop, and then crawl on your hands and knees. On and on, for hours, twisting and turning and descending. Your companion, following behind you, began the trip with enthusiasm and confidence; in fact she talked you into it. But you notice an increasingly nervous edge in her voice. Eventually, the ceiling gets too low even for crawling; you wriggle on your belly. Even so, there isn't room for the pack on your back. You slip it off, reach back, and tie it to your foot; then continue, dragging the pack behind you. The passage bends sharply to the left, as it descends further. You contort your body, adjusting the angles of your shoulders and pelvis, and squeeze around and down. Now your companion is really panicked. Your

lamp flickers a few times, then goes out. Absolute pitch darkness. You fumble with the mechanism . . . . (1997: 39)

As Walton remarks, this experiment demonstrates the power of the imagination. When composing the paragraph, he says, he found his imaginative experience genuinely distressing; it gave him the shivers. What accounts for this?

Walton's explanation is that his imagining the spelunking expedition tapped into his actual personality and character, and that's why it affected him as it did. Imagining the expedition released psychological mechanisms he really possesses, and brought on genuine distress. I don't disagree with this explanation, as far as it goes, but it doesn't plumb deeply enough. It doesn't explain why merely imagining the spelunking episode triggered the same psychological mechanisms that actually experiencing the described episode would have triggered. The further explanation is straightforward, and fits precisely with what I have been arguing; but it needs to be added to complete the explanation. The reason why imagining the episode and really experiencing the episode trigger the same psychological mechanisms (which in turn yield the affective responses) is that the real experience and the E-imagining of it (when accurate) are intrinsically pretty similar. With their neural similarities, the imagining state is wired into many of the same neural circuits as the state that would occur if the episode were real. So it is understandable that they should produce some of the same downstream consequences. The whole idea of E-imagination is that it is capable of producing (when guided by suitable information) states with these sorts of similarities to states produced in 'primary' ways. Imagination simulates, or replicates, in many important respects, the hypothetical situation as it would transpire.

Am I ascribing excessive powers to E-imagination? Colin McGinn would probably say so. Although McGinn (2004: ch. 1) credits the imagination with a great deal of power and importance, he views the outputs of imagination (images) as quite different from the outputs of perception (percepts). First, images, unlike percepts, are subject to the will, and hence are mental *actions*, which percepts aren't. Second, percepts are informative about the world, whereas images aren't, because the latter contain only what their subject intentionally bestows upon them. Third, there are a variety of phenomenological differences between images and percepts. McGinn sums this up by saying that images differ 'dramatically' from percepts (2004: 41). This is why I think he would object to my characterization.

But McGinn's characterization, examined more carefully, does not warrant the conclusion that images differ dramatically from percepts, especially not in *intrinsic* terms. McGinn agrees that being the product of the will versus the environment is only an extrinsic difference, not an intrinsic difference, between images and percepts. Moreover, as he acknowledges, images aren't always caused by the will. So, the difference between being caused by the will and being caused otherwise is a difference that distinguishes among visual state *tokens*, not visual

state *types* (at least not intrinsic types), as McGinn seems to think. Second, the different epistemological status of images and percepts is a direct result of their extrinsic differences, not of any intrinsic differences. It's because they are (often) the product of the will that images aren't informative about the world. With respect to the phenomenological differences that McGinn presents, some of them I find questionable (though there isn't room to pursue this in detail), and others simply flow from the different psychological and neurological characteristics we conceded earlier. Despite these differences, there are many significant similarities, which are more fully documented in the scientific literature (see Kosslyn 1994; Palmer 1999: 607–13; Goldman 2006: sect. 7.3).

3. INTERPERSONAL SIMULATION IN FICTION

I have been arguing that E-imagination, rather than merely S-imagination, is an important component in the cognitive processes associated with the consumption of fiction. As I have defined E-imagination, however, it has no essential connection to interpersonal mental simulation, i.e. to the activity of putting yourself in the mental shoes of *others*, or 'identifying' with them. Yet this is a very tempting story to tell about how readers or spectators get involved in works of fiction. They put themselves into the characters' shoes, and try to 're-live' their lives. There has been no shortage of theorists who have advanced this idea. Gregory Currie has held that simulation is central both to working out what is fictionally the case, primarily with respect to a character's experience, and to how and why we care about and affectively respond to fictional characters (Currie 1995: 153–4). Similarly, Susan Feagin (1996) argues that although there are important differences between empathizing with real people and empathizing with fictional characters, simulation underlies both types of empathy.

Noel Carroll, by contrast, rejects the view that our engagement with fiction typically involves taking up characters' points of view or simulating characters' psychological states (Carroll 1990, 1998, 2001). He writes:

> We do not typically emote with respect to fictions by simulating a character's mental state; rather . . . we respond emotionally to fiction from the outside. Our point of view is that of an observer of a situation and not . . . that of the participant in the situation. When a character is about to be ambushed, we feel fear for her; we do not imagine ourselves to be her and then experience 'her' fear. (2001: 311–12)

Carroll offers several arguments in support of this position (instructively summarized in Coplan 2004). First, readers' emotions have different objects from those of the characters. We feel *for* the character, which isn't the same as simulating her fear. Second, readers often have different (usually, more) information than the characters do, which commonly generates different emotions. In the opening sequence of *Jaws*, viewers who know that a killer shark is nearby have different emotions than the character swimming in the water, who

is happy and carefree in her ignorance. Third, readers often experience desires and preferences with regard to narrative outcomes that differ from the desires and preferences of the characters. Even when we care about the characters, we do not necessarily want them to get what they want.

These are good reasons to challenge the notion that the reader or observer of a fictional narrative usually adopts the perspective or position of a character or protagonist. But characters aren't the only candidates for the 'targets' of simulation by consumers of fiction. Currie (1997) has advanced a different, and to my mind more plausible, account: viz. that one usually adopts the position of a hypothetical 'reader of fact' (or observer of fact). This is a hypothetical person who observes or learns of the events portrayed in the narrative as if these events were facts (unlike a real reader or filmgoer who encounters the events as segments of a work of fiction). A fictional work, like a novel or a film, is presented at the entry level as an account of a series of events as if they were happening or did happen. This is not to suggest that an optimal aesthetic appreciation of the work accrues from adopting this simple perspective on the narrative to the exclusion of any other. Still, it is hard to follow a narrative at all, to imbibe what it is intended to convey, without using this perspective as a *baseline* for all further responses to the work. A typical narrative text or film is a *prop* that induces one to adopt the factual reader or factual observer perspective. Films make it highly compelling—at least in a prereflective, precritical stance—that one is seeing an unfolding scenario from the camera's perspective. It takes no creativity to E-imagine being such a hypothetical observer; the filmic medium makes it difficult to avoid being such, which helps account for its power. In Walton's (1990) terminology, it is difficult to avoid 'making believe' as a simulative response. Again, I do not suggest that taking the perspective of a hypothetical reader or observer of fact exhausts the stance of an actual reader or viewer, especially a sensitive one; but it's an important part of an actual consumer's stance.

The hypothetical-observer-of-fact theory readily accommodates Carroll's points. A hypothetical observer commonly has different information about the goings-on than do characters, and this breeds different emotions or emotional objects. A hypothetical observer of the *Jaws* scenario knows that a shark is around, and therefore feels fear *for* the swimmer; he doesn't feel *her* fear, because she doesn't have any. At the same time, the actual observer (who is simulating the hypothetical observer) feels fear, at least simulated fear, because E-imagined or make-believe knowledge that a shark is around produces (when fed into suitable emotion-generating equipment) fear or fear-like output. Cognitive mechanisms that operate on E-imagined input states produce roughly the same sorts of outputs as their genuine, non-imagined counterpart inputs produce.

None of this precludes the idea that there is also perspective taking of characters. Either the reader or observer 'directly' simulates a character, or she simulates a hypothetical-observer-of-fact simulating a character. The latter, indirect possibility is a bit more baroque, though by no means impossible, so

I shall focus on the former possibility. There is empirical research, summarized by Harris (2000) and by Coplan (2004), that people who read narratives track the perspective of one or more protagonists. This research supports the idea that character simulation is a common form of mental engagement with fiction.

Rinck and Bower (1995) had subjects memorize the diagram of a building and objects located within it. Then they had their subjects read narratives describing characters' movements and activities within the building. While reading, they were probed with sentences referring to memorized objects in the building's rooms. The consistent finding was that readers processed more quickly sentences describing objects close to the current location of the protagonist. The interpretation was that readers were experiencing the narrative from the spatiotemporal standpoint of the protagonist, and were moving through the building 'with' the protagonist. Other studies by Black et al. (1979), Bryant et al. (1992), and Rall and Harris (2000) lend further support to this idea. Finally, Gernsbacher, Goldsmith, and Robertson (1992) did a series of experiments indicating that readers often process the emotional implications of narrative events from the standpoint of one of the protagonists. Subjects read narratives in which a central character was likely to feel a particular emotion. They were then probed with target sentences, which included emotion terms that either matched the emotional state of the character or did not match it. They hypothesized that if readers appraise narrative events from the character's perspective, then target sentences matching the character's emotions should be processed more quickly than sentences not matching it. This is exactly what they found. A study by Harris and Martin (unpublished) provides additional support for the simulation, or empathizing, account (see Harris 2000: 70).

Matthew Kieran has offered a number of objections to the simulation theory of fictional engagement as *he* construes it (a construal responsive to earlier claims by simulationists like Currie and Feagin). Kieran considers the following two-part claim:

(1) When I want to really understand the nature of a character's experience and their attitude toward their own experience (what their character is really like), then I need to simulate. A deep understanding of fictional characters requires simulation, though a shallow understanding of them need not.

(2) In order to capture the full nature of our affective responses to a narrative, we must understand the simulation process that we go through as readers—because that simulation process is central to our acquiring an understanding of characters.
(Kieran 2003: 69–70)

Kieran denies that an understanding of characters requires me, as reader, to imagine myself in their shoes. It doesn't even require me to simulate the narrator or other hypothetical observer of the scene. To support these claims, Kieran presents the opening of Dickens's *Hard Times*, which portrays Gradgrind

delivering some emphatic statements about his teaching philosophy. Gradgrind's appearance and speaking mannerisms are described in vivid detail. Kieran claims that our understanding of, and affective response to, Gradgrind do not require simulation.

A wise simulationist should first respond by objecting to Kieran's formulations of the 'simulation thesis' as unnecessarily strong in certain respects. They are phrased in terms of simulation being 'needed' or 'required' for understanding. A simulationist might respond that simulation is something readers naturally *do*, even if it isn't something they are required to do to achieve understanding. She might add that when Kieran concludes that we acquire a deep and sophisticated understanding of Gradgrind just by making inferences (not Kieran's exact wording) from Dickens's description of him, how does Kieran purport to know this? The question of simulation versus inference is the nub of the simulation theory/theory-theory dispute, a matter not readily settled in the armchair. So Kieran is not entitled to conclude that simulation by the reader isn't needed, or isn't used. Finally, turning to the second part of Kieran's formulation of the simulation thesis, concerning affective responses, the *Hard Times* passage is a weak example for Kieran's purposes. Dickens's description of Gradgrind portrays his appearance as square-legged, square-shouldered, and hard set, his carriage as obstinate, and his voice as inflexible, dry, and dictatorial. Introspectively, my affective reaction to these descriptions seems to arise from the visual and auditory imagery I create in my mind of Gradgrind's appearance and speech. In other words, I imagine myself being present in the schoolroom and witnessing the scene described by Dickens. Whether or not I *need* to imagine this to elicit these affective reactions, it seems to me that I actually do it, contrary to what Kieran implies.

4. AUTOMATIC RESONANCE RESPONSES TO DRAMATIZED WORKS

I have been arguing that immersion in a work of fiction typically involves a certain type of cognitive activity: viz. E-imagining in its interpersonal variant. One's imaginative powers are enlisted to create a series of states in the self that are intended to correspond to a series of states of some person or persons associated with a fictional work. (Of course, neither the persons in question nor the series of states in question are actual, in the typical case, so the correspondence relation is merely an intentional one. But that's OK.) Another class of cognitive activities is also important in our responses to fiction, but probably restricted to dramatized works that are viewed on stage or screen, or audio productions that are heard. This class of cognitive activities may also be considered 'simulational', though they don't involve the faculty of imagination (Goldman 2006).

The cognitive activities in question are examples of 'mirroring' or 'resonance' mechanisms. The discovery of these types of mechanisms is due to a group

of Italian neuroscientists led by Giacomo Rizzolatti. Mirror systems were initially discovered in the motor domain. In the premotor cortex of the monkey's brain, individual neurons are specially dedicated to the planning or preparation of specific types of movement: e.g. grasping, holding, or tearing. When one individual observes a second individual execute one of those actions, e.g. grasping, a particular subset of the observer's grasp-related neurons also fire (but don't usually produce imitative behavior). Those neurons that display this observation–execution matching property were dubbed 'mirror neurons' (Rizzolatti et al. 1996; Gallese et al. 1996). Similar systems in humans were also identified, using more inferential techniques, rather than single-cell recordings. A much wider range of mirroring systems have now been discovered, in which neural substrates associated with certain mental states and behavioral manifestations thereof prompt an observer's system to 'resonate' with activation of matching substrates in her own brain. For example, part of the somatosensory cortex of the brain that is activated when one's own body is touched is also activated when one merely observes another individual being touched (Keysers et al. 2004). Similarly, when one person's facial expression manifesting a certain emotion, such as fear or disgust, is observed by a second person, the second person automatically undergoes an experience of the matching emotion (Wicker et al. 2003). The observer's emotion usually occurs at a sub-threshold level; that is, it is quite attenuated, so it doesn't reach, or barely reaches, the level of consciousness. I call this interpersonal mental matching 'low-level' simulation (Goldman 2006: ch. 6). It contrasts with 'high-level' simulation, which I associate with the process of interpersonal E-imagination, as discussed earlier. Whereas E-imagination is often guided by the will, simulation of the mirroring, or resonance, variety is entirely involuntary. It is also confined (so far as is known) to observational modalities, i.e. sight and audition (see Kohler et al. 2002, for the auditory modality).

It is a further question whether mirroring, or resonance, simulation is used in mindreading. I think the answer to this question is affirmative. The category for which the evidence is strongest is the reading of other people's emotional states from their observed facial expressions (Goldman and Sripada 2005; Goldman 2006: ch. 6). The evidence that supports this mindreading conclusion is intricate, however, and I won't review it here. But it does support the notion that one strand of our understanding of others' mental states is based on automatic resonance, which might also be called 'empathy' (Gallese 2001; Gallese et al. 2004).

If all of the foregoing is correct, it seems likely that works of the performing arts in which expressions of feelings and emotions are seen or heard will produce a distinctive impact on viewers or listeners. Audience members will experience the same sorts of feelings and emotions as the characters (or the actors that portray them), though at an attenuated or minimally conscious level. In other words, in one sense of the term 'empathy', they undergo empathy with the characters seen or heard. In different terminology, the actors' feelings and emotions have

contagious effects on the audience. This is not an unprecedented insight. The novelty is that now there is a better scientific understanding of the phenomenon, which makes it harder to mount skeptical assaults on its reality and robustness. This enlarges our picture of how simulational mechanisms, of one kind or another, play important roles in audience reactions to works of fiction, especially when these are dramatized in a perceptually accessible medium.

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