Article

On the Nontechnical Limits of Brain Imaging

JUHA RÄIKKÄ

Abstract: Since the advent of neuroimaging technologies, their limits and possibilities have captivated scientists and philosophers. Thus far, the debate has largely concerned *technical* limits of our capacity to "read minds." This paper extends the discussion concerning the limitations of neuroimaging to issues that are not dependent on technical issues or on our understanding of the complexity of brain activities. The author argues that there is a serious chance that brain scanning cannot replace usual intentional assertions, and that neuroimaging has principled limits. The information that people usually receive by neuroimaging is different in kind from the information they hear from what others tell them. To assert something is to act in a certain way, and scanners do not usually scan actions, but brain activities and the neural correlates of actions. Although it is possible to scan "mental assertions," our usual assertions are not accompanied by separate "mental assertions."

Keywords: neuroimaging; neuroscience; the assurance view; the theatrical model; assertions; self-presentation

Introduction

Since the advent of neuroimaging technologies, their limits and possibilities have captivated scientists, philosophers and the public. The ethical significance of the debate on the prospects of brain imaging, in particular functional magnetic resonance imaging (fMRI), seems obvious. On the one hand, it is important not to raise unnecessary and groundless concerns (or hopes) but, on the other, it would be naive to close one's eyes to the risks that such technologies create, say, for democracy or for people's privacy. Thus far, the debate has largely concerned *technical* limits of our capacity to "read minds"; and this explains, at least partly, why the debate is continuing. When the technologies advance, the technical preconditions constantly change.[1] However, it is also important to ask whether brain imaging has limitations that are not dependent on the current stage of development—limitations that are here to stay, and not only because of the fundamental technical limits of fMRI, but because of more principled reasons. This kind of philosophical consideration has been quite rare although, admittedly, there have been some examples of principled discussions.[2]

In this paper, I aim to shed some light on the possible principled (nontechnical) limits of brain scanning by asking why it is that we are so interested in what people intentionally *tell* us, verbally or otherwise. It is likely, perhaps, that people would be interested in what others tell them even if, in the distant fictional future, we have neuroimaging technology that would allow us to scan one another's brains at any time and in any place in an easy, reliable, quick, open, socially acceptable, and pleasant way. If it can be shown that it would be reasonable to listen to what others say even in such circumstances, then it seems that there is a serious chance that brain

Acknowledgments: I would like to thank Valtteri Arstila, Maria Marloth, Andrei Rodin, Jukka Varelius and Lars Vinx for valuable comments on an earlier version of this paper. I am especially grateful for the Editor of the *Cambridge Quarterly of Healthcare Ethics* for the helpful suggestions. This paper has been produced as a part of the research project 318954 of the Academy of Finland.

Cambridge Quarterly of Healthcare Ethics (2020), **29**, 527–541.

doi:10.1017/S0963180120000298

scanning cannot replace what people intentionally assert even in principle, and that neuroimaging may have limits that are not related to merely technical matters. Of course, it is extremely unlikely that we will ever face circumstances in which brain scanning could be used in face-to-face interaction.[3] But it is equally unlikely that this should bother us when it is asked, *if* we faced such peculiar circumstances, would it *still* be reasonable for a person to concentrate on what she is told.[4]

In what follows, I will introduce two arguments that can be presented in defense of the claim that, surely, a person would have grounds to be interested in what she is told, even if she had unrealistically perfect scanning methods that could immediately reveal other people's beliefs, attitudes, emotions, and intentions. Both arguments suggest that there is something distinctive about acquiring information from what people intentionally tell us—something that could be achieved by brain scanning only if the assertions were so-called mental assertions, made by active thoughts. The arguments support the claim that the information that people usually get by neuroimaging is different *in kind* from the information they get by hearing what others tell them. My aim here is not provide a full defense of the two arguments, but instead to argue that they are both rather promising and plausible, if not in the form presented below then in some other form. I will attempt to defend, albeit moderately, the idea that there are principled limits on neuroimaging. It is often said that fMRI and monitoring of cortical activity may inform us about our emotions (such as love), attitudes (such as racist biases), and diseases (such as autism), among other things.[5] My purpose is not to deny this, but to indicate some issues that might be permanently beyond the reach of the scanners.

In the next section, I introduce *the argument from the assurance view*, and in the section that follows, *the argument from the theatrical model.* Before concluding, I discuss some of the objections that the arguments may raise, and reply to them.

The Argument from the Assurance View

The assurance view is the claim that when a person tells us something, say, that it is a rainy day, she also intentionally offers a guarantee that this is really so. She gives her word for it, and she assures that what she says is true. The speaker assumes responsibility for the acceptability of her claim, when her assertion is meant to inform the hearer. The argument from the assurance view is the claim that the usual information that we receive by brain scans and similar methods lacks the guarantee that voluntary assertions provide; and, therefore, there are some psychologically and epistemically interesting facts that brain scans cannot provide. Although by scanning we might be able to find out what beliefs a person has and how strongly she supports them, we will not be able, however advanced the technology we might have, to get the person's assurance merely by seeing inside her mind. For assuring something is an *act*, namely, a speech act. Of course, a person could tell something by *active thoughts*—that is, by acting via thoughts and choosing to have one thought rather than another. A scanner would reveal it. However, our usual assertions are not accompanied by separate "mental assertions." Scanner cannot reveal them, because normally there is nothing to reveal.[6]

The assurance view is often presented as an alternative to the Humean approach to *testimony*, an approach that treats people's utterances merely as *evidence*.[7] On the Humean approach, someone's assertion that "It is a rainy day" is merely evidence of the possible fact that this is so, and it can be actually rather poor evidence, as people

can lie, be unaware of their own beliefs, express their beliefs carelessly, and be mistaken. The assurance view strengthens the intuition that our fellow citizens' words are more than evidence. According to the assurance view, when a person tells us something, she invites us to trust her. When we believe her, we take her word for it and believe what she says on that basis. To a certain degree, assertions resemble promises. We can speak of "guarantees" in connection both with assertions and promises.[8] The assurance view has many supporters and it comes in many forms. A version of the assurance view can be found in the writing of Pierce, who argued that "the assuming of responsibility" must "be present in every genuine assertion."[9] Supporters of this view include: Ross, Watson, Hinchman, Moran, and Origgi.[10]

Here, I will concentrate only on the version defended by Moran, who has used the label "the assurance view."[11] Moran's starting point is the observation that, in many cases, people use the fact that someone has told them something as a reason to believe that something. "*Telling* someone something is not simply giving expression to what is on your mind, but is making a statement with the understanding that here it is your word that is to be relied on."[12] Assertions resemble promises, for they both can provide reasons for believing something, and in both cases it is up to the speaker whether she gives those reasons—by telling, or by promising. If a person promises that she will come to your office in the afternoon, then you have a reason to believe that she will come. Similarly, if someone tells you, say, that it is cold outside, you have a reason to believe that it is cold outside.[13] If another person then asks you why you believe that it is cold outside, it would not be unnatural or strange to reply that you believe this because you were just told that it is cold.

Why do assertions provide reasons to believe? Because by making an assertion the speaker explicitly assumes a "responsibility for the truth of what is said"[14] and becomes accountable, conferring a "right of complaint on his audience"[15] should the claim be false. The speaker has the "authority to determine the illocutionary status of his utterance,"[16] and the epistemic import of what a person does is "dependent on the speaker's attitude toward his utterance and presentation of it in a certain spirit."[17] If the speaker intends to *tell* us something, then he becomes accountable for the truth of what he says, and in doing so "offers a kind of guarantee for this truth."[18] Moran explains that this "is no more (or less) mysterious than how an explicit agreement or contract alters one's responsibilities."[19]

Of course, in relying on what a person says, the hearer is incurring a risk that the behavior the speaker is manifesting "may be deliberately calculated to mislead" the hearer as to what the speaker believes.[20] Moran notices that this kind of "risk of error is not a possibility at all for those ways, real or imaginary, of learning someone's beliefs directly and without the mediation of voluntary expression or behavior at all (i.e., whatever is imagined in imagining the effects of truth serum, hypnotism, or brain-scans)."[21] However, by their assertions people *assure* something, and what people tell us occupies a "privileged place in what we learn from other people."[22] By intentionally telling us something they can guarantee that they have facts right. Information gathered in this way is "different in kind from anything provided by evidence alone."[23] Telling is free action, and it is one thing to tell something and another thing to talk in one's sleep or have the utterance of some words "be produced by electrical stimulation of the cortex."[24] In the two latter cases, we may certainly learn something, but the speaker does not *intend* to provide us reasons to believe.

Free assertions provide reasons to believe, but are they good reasons? Not necessarily. Moran confesses that, of course, the speaker's intention and her guarantee of the truth of the assertion is merely a necessary condition for the assertion's epistemic significance. If a speaker says "It is a rainy day" only in order to give an example of a sentence that concerns the weather, her intention is not to tell us something about the weather, and she does not guarantee that it is a rainy day. Her utterance is epistemically irrelevant for a person who is interested in the weather. However, it is clear that even if a person does claim that it is a rainy day, this does not mean that the hearer has a good reason to think so. Whether the reason is good does not depend on the speaker's "illocutionary authority" but on her sincerity and on having charged her "epistemic responsibilities with respect to the belief in question."[25] The speaker's voluntary assertion constitutes a good reason to believe something only if it also assumed "that the speaker does indeed satisfy the right conditions"—for example that she "possesses relevant knowledge, trustworthiness, and reliability."[26] This addition is important. If someone tells you that it is cold outside and you believe it, then it is natural to say, if asked, that you believe it because you were told. But what you really mean is that you believe it because you were told, *and* you think that the speaker was trustworthy and reliable and possessed relevant knowledge—or something similar. As Moran explains, the assurance view is not a claim that "the speaker's words 'all by themselves' should count as a reason for belief, or that the speaker's authority over the constitution of the particular speech act he is performing (e.g., as assertion rather than recitation) shoulders the epistemic burden all by itself."[27]

The assurance view sounds plausible, as it is a rather weak claim. All it says is that it is one thing to learn something by hearing it from a reliable and trustworthy person who voluntarily tells it and another thing to learn something by checking (say, by scanning) what beliefs a reliable and trustworthy person happens to have. Only in the former case can we possibly *blame* a person for what she says, should we get false information; only in the former case are we involved in something which is *social* and interactive; only in the former case is the speaker's *trustworthiness* relevant in the first place.[28] There is something distinctive about acquiring information from what people intentionally tell us.

The argument from the assurance view sounds plausible too, although its main message is not that weak. It says that there are principled limits on neuroimaging. The argument from the assurance view identifies that limitation by pointing out that the brain scanners cannot provide, even in principle, what assertions as speech acts do provide, namely, *guarantees.* Of course, in principle, someone could scan the brain of a person who intends or has decided to assert something, and thus find out that the person will soon give a guarantee. Perhaps someone could even scan the brain of a person who is actually asserting something and thus she would find out, by seeing the results of the scan, that now the speaker is asserting and assuring something for someone. However, these findings would not give her a guarantee of anything. She would certainly *not* be in a position to complain or to blame the speaker in the usual way, should the speaker make a mistake in making the assertion. Perhaps she could blame the speaker for having wrongful intentions or mistaken beliefs, but she could not lay blame for assuring something that was not really true. Such criticism is available only for a person who listened to the speaker and accepted the invitation to trust them—but was then betrayed.[29] Usual guarantees and assurances are beyond the reach of the scanners, although a talented

scientist might, perhaps, see their "pictures."[30] Of course, "mental assertions" form an exception, but that is more or less irrelevant, as people do not make separate "mental assertions" when they tell something.

The Argument from the Theatrical Model

The argument from the assurance view concerns situations in which a person trusts the speaker and assumes that what the speaker says is true. After all, she has the speaker's guarantee of that. The argument from the theatrical model applies also in those circumstances in which a person is interested in what she is told even if she does *not* assume that the speaker is reliable and trustworthy.[31] Let us now turn to the argument from the theatrical model.

The theatrical model is the claim that there is an analogy between acting for reasons, in general, and improvisational theatrical acting. When a person talks to you—suppose they tell you that the Seminar Room H3 is too hot—they also present themselves in a certain manner in a certain role. That gives you important information on how they would like to present themselves, and their words help you to make the next move; maybe you decide to raise your eyebrows and say: "Oh, again? They should fix the air-conditioner." The argument from the theatrical model is the claim that the information that we get by brain scans and similar methods lacks the dramaturgic element that we need in order to know how to proceed in face-to-face interaction, and that therefore brain scans cannot provide certain psychologically and socially important information. Although by scanning we might be able to see a person's decision concerning their self-presentation, we will not be able to see the actual self-presentation, however brilliant the technology we may have. This is because presenting oneself in a certain way is to *act* in a certain way that communicates one's *social persona* to others in the social context. Of course, a person *could* present themselves only by "actions via thoughts" and others could then scan the act. But, again, this is not what we normally do. Our self-presentations are *not* accompanied by separate "mental self-presentations."

The theatrical model derives from the self-presentation theory as formulated by Goffman in *The Presentation of Self in Everyday Life* (1959) and elsewhere.[32] Goffman argued that our behavior should be understood on the basis of the theatrical (or dramaturgic) model so that the actions of a person are seen as performances by which the actor asks the audience to believe that the character they see "actually possesses the attributed they appear to possess."[33] Of course, similar ideas were defended much earlier. James argued that "a man has as many social selves as there are individuals who recognize him,"[34] and Simmel wrote that we reveal "only fragments of our inner life" in social interaction—"even to our closest fellowmen."[35] Here, I will concentrate on a recent version of the theatrical model as described by Velleman.[36] His formulation of the theatrical model does not emphasize *strategic aspects* of our behavior, but considers presentation of self as a part of *any* intentional action.[37]

Velleman's starting point is the idea that people's ordinary behavior resembles improvisational theatrical acting with the difference being that the role a person plays in his daily life is the role of himself. When a person behaves in a certain way he is, in Velleman's view, "an actor who plays himself, responding to his actual circumstances and manifesting the occurrent thoughts and feelings that the circumstances actually arouse in him, given his actual attitudes and traits."[38] Theatrical actors portray fictional characters, but an ordinary person's "character is

himself, and so what would be understandable coming from the character, given the character's motives, is what would be understandable coming from him, given the motives he actually has."[39] Thus when a person acts, "he manifests his actual thoughts and feelings, as elicited from his actual makeup by his actual circumstances, in accordance with his idea of what it makes sense for him to do in light of them."[40]

According to Velleman, a motive in *all* action is the growth of self-understanding. We have a "drive toward self-understanding."[41] When a person tries to understand himself, he "learns that he can make sense of himself by making sense to himself—that is, by doing what makes sense to him."[42] Velleman explains that once a person is "equipped with an objective self-concept" he "becomes an audience seeking to understand his own behavior, and he begins to accommodate this audience by enacting ideas of what it would be intelligible for him to do."[43] In practical reasoning, considerations weigh in favor of a certain action "insofar as they contribute to an overall understanding of the action, given how the agent conceives of himself and his situation."[44]

But the action needs to be understandable because it serves the natural desire to understand oneself. In practical reasoning a person is "supplying himself with the materials for self-understanding,"[45] and such reasoning "aims at self-understanding."[46] A capacity for practical reasoning is what makes a person an autonomous agent.[47]

Of course, a motive to understand oneself is not the only motive behind the actions. The aims of our action are "whatever they ordinarily seem to be: pleasure, health, friendship, chocolate."[48] Velleman makes clear that, actually, our aim to understand our own selves is "an aim with respect to our *manner* of pursuing these and other aims, which we pursue for their own sakes."[49] We strive for self-understanding just as we may strive for *efficiency*. We cannot pursue efficiency alone and, similarly, we cannot pursue self-understanding without pursuing something else as well. Velleman writes that the drive toward self-understanding exerts a "fairly minor, modulating role" in our practical affairs, but it does influence "which desired objects we choose to pursue, how we harmonize them with one another, organize our efforts toward them, and express our thoughts and feelings along the way."[50] An authentic person enacts her role so that it reflects truly who and what she really is, although it is clear that a person always has "distinct overt and covert selves."[51]

In this picture of human action, listening to what others tell you is very important. For what is the most intelligible action for you in a social context depends essentially on what others have done and said; and which action makes most sense to you depends largely on others' previous acts, including speech acts. Velleman points out that the "motive that each of us has for making himself understood to himself" favors making himself understood to others as well.[52] Your role makes sense to you only if it is an acceptable part of a larger drama, and we "seek agreement on scenarios for various kinds of interaction, specifying how those interactions are carried out."[53] For instance, in a restaurant scenario we know which kinds of actions and assertions are likely to be most sensible (wait to be seated, or seat yourself; say hello, or greet formally).[54] Knowing oneself is largely a social process, as it is often a result of what is called "identity negotiation," a process by which people "tacitly agree upon a set of roles for each of them to play."[55] Such negotiation may end as a result in which you are perceived somehow unacceptable (say, "noisy" or "belligerent") both by yourself

and by others, but the cost of this kind of image is outweighed by the gains that the agreement gives, namely, the growth of self-understanding and practical knowledge on how to behave, verbally and otherwise.[56]

The theatrical model is rather credible, at least if it is interpreted mainly as the claim that a person knows who she is and how she should present herself largely because she has listened to what others tell her and observed how they generally present themselves to her.[57] Human beings are reciprocal improvisers who get help from each other in performing their own roles. Suppose that someone who works in the same building as you, sees you in the entrance hall and says that it is raining again. Her intention is to tell you about the weather; you realize her intention, and you start to believe that it is raining, just because you were told so. But this is not all. You also learn that the person would like to present herself as a friendly or at least a polite person, and that she conceives you as worthy of such self-presentation. This may add something to your self-understanding (and possibly strengthen your picture of yourself as a nice person or a good colleague). Her words help you to make the next move, and perhaps you decide to smile and say: "Oh, again? It has been a rainy week." You decide to say something that nice persons (or good colleagues) tend to say in these circumstances.[58] Notice, however, that the intelligibility of this reply is not dependent on your belief that the person is reliable and trustworthy. Your reply would make sense even if you did not trust the person at all. Your information about her way of presenting herself is not dependent on her trustworthiness, as you have just *seen* how she wants to present herself to you.[59] You have *evidence* about how she would like to be seen by you.

The argument from the theatrical model is plausible, as the brain scanners cannot provide you with the evidence you get from someone's actual self-presentation by which a person tells you how she would like to be seen. Mutual improvisation and shared scenarios offer information that cannot be reached by means such as brain scans (unless we scan "mental self-presentations" made by active thoughts). To find out by a scanner that a person *has* a certain belief, say a belief that it is a rainy day, is not the information we usually need in social interaction.[60] For a person who *has* this belief need not be a person who would like to *present* herself as a person who thinks so, or as a person who has time for small talk. Of course, in principle, we may find out by a scanner how a person would like to present herself and how she would like to be seen by you in a specific social context (say, in a restaurant or in an entrance hall). But even that would not help you much, if you were not provided with any social persona with whom you could continue the scenario and make your own decisions that would spring from your self-understanding and at the same time increase your self-understanding. By merely having a "picture" of someone's would-be image would not help you to make the next move—the move that would be most intelligible and make most sense in that context—if your co-improviser's previous move were not there. Your possible response, "Oh, again? It has been a rainy week," makes sense only if someone has *actually told* you that it is raining (or something similar). *Actual* self-presentations are beyond the reach of the scanners, "mental self-presentations" aside.[61] Neuroimaging seems to have important limitations.[62]

Objection and Replies

I have argued that it would be reasonable to listen to what other people intentionally assert even if we had the most advanced technological means to scan people's

brains. Thus, it seems that there is a chance that brain scanning cannot replace what people are intentionally asserting, and that neuroimaging has principled limits. In this section I evaluate three objections that my discussion may raise, and I try to show that they do not provide sufficient grounds for the rejection of my suggestion that neuroimaging has principled limitations. I have selected these objections, as they are probably the ones that first come to the reader's mind.

1) First, it can be argued that my discussion is based on the assumption that the theories of Moran and Velleman are completely unproblematic, which they are not. On the contrary, there are many powerful objections against both theories. Lackey, among others, has criticized Moran's argument and pointed out that even if a speaker explicitly offers her hearer a guarantee of the truth of her assertion, it is not clear what this has to do with "the truth itself."[63] If a person is a "reliably unreliable testifier" she can assure her hearer of whatever comes to her mind. Hazlett, for one, has criticized Velleman's claim that we should "understand *all* action done for reasons (as opposed to involuntary behavior) on the model of improvisational theatrical acting," although "there seem to be actions, even entire species of actions, for which this model seems implausible."[64] For instance, to say that one of the motives of a person who eats a bagel is to do something intelligible is to posit "one thought too many" for that person. In Hazlett's view, eating a bagel may certainly "make sense," but it is unlikely that a person who eats a bagel *tries* to do something that makes sense by eating it.[65]

This objection is important, as it correctly points out that the approaches of Moran and Velleman are controversial. However, it is important to notice that my discussion does not presuppose that they are completely correct, or that their details are acceptable. I have made use of the arguments only as representatives of a more general line of thought, and I do not assume that no objection can be raised against them. As far as I see, my discussion is based on rather innocent assumptions. First, on the assumption that the assurance view is correct to the extent that it distinguishes between learning something by hearing it from a reliable and trustworthy person who voluntarily tells it and learning something by going behind someone's back to check what beliefs she might have, say, by scanning her brain. Second, on the assumption that the theatrical model is correct to the extent that it claims that the information that we get by brain scans lacks the dramaturgic element—an actual self-presentation of someone—that we need in order to know how to proceed in face-to-face interaction in the most intelligible way, given our motives, emotions, traits, and beliefs. These two assumptions can be (and most probably are) acceptable whether or not there are problems in the details of the approaches of Moran and Velleman.

2) Second, it can be objected that my discussion on the principled limitations of neuroimaging misses the target of the whole issue, as no one has ever claimed that neuroimaging could provide knowledge that can be acquired only by observing *actions* such as assurances (that are speech acts) or self-presentations (that usually include speech acts, besides other acts). It is obvious that neuroimaging is limited *in this way*—no neuroscientist or physician has ever denied it. But this kind of "limitation" is not interesting. The task of brain

scanning is elsewhere. As one author explains, "thousands of fMRI studies are published each year on topics ranging from perception to decisionmaking" and we "now know that the pattern of blood flow to the fusiform face area in the temporal lobe can indicate that a person is looking at a face instead of a ball; and that imagining playing tennis or walking around your house, say, elicits activations in different brain regions."[66] Brain scanning concerns brain activities, not actions—except possible "mental actions."

This objection is relevant in that it clarifies the purposes and function of brain scanning. However, my claim is *not* that "Neuroscientists have implicitly or explicitly implied that, in principle, brain scanning can be a substitute for what people are intentionally telling but, in fact, it cannot." My claim is that "Brain scanning cannot, even in principle, be a substitute for what people are intentionally telling, and that therefore neuroimaging has principled limitations." That is, my discussion concerns the limitations of neuroimaging and "mind reading," not the question whether we have been provided with false promises at some stage of the development of fMRI and other scanning technologies. I do not claim that neuroscientists and cognitive scientists are not doing what they are supposed to do. My point is to emphasize the limits of brain scanning (in one respect) by pointing out that daily chatting—which is presently an important source of knowledge—will be very important in the future as well, however enormous the technological advances may be. We will have to listen what others intentionally tell us also in the forthcoming years, no matter how well we are able to "read" people's minds. This is because by intentionally telling something people can, among other things, (1) voluntarily assure their hearers of something and (2) present a suitable social persona for social interaction. (No doubt, we can imagine a world in which people would not speak anymore and made only "mental assertions" and "mental self-presentations." My argument concerns the limitations of brain scanning in the actual world.) Notice, however, that I am *not* challenging a position that nobody takes seriously: in public debates, there are many who assume, implicitly or explicitly, that brain scanning can do almost everything in the future. But they are wrong.

3) Third, it can be argued that although it may be true that neuroimaging has the above-mentioned limitations, they exclude rather unimportant things from the eye of the brain scanner. Neuroimaging can be used to produce court room evidence, and fMRI and monitoring of cortical activity may inform us about emotions (so that we can try to solve possible emotional problems), attitudes (so that we can try to unlearn them if they are undesirable such as racial biases), and diseases (so that we could try to treat them more effectively).[67] The limitations mentioned above do not have any influence on these things, which are probably the most important matters. If we fail to get assurances or self-presentations by scanners, the loss is not significant. Arguably, even in politics we are interested in representatives' real beliefs and attitudes (that we can reveal by scanners) rather than their actual *claims* concerning their beliefs and attitudes. As Sahakian and Gottwald write, in the future "it might be possible to know what your favorite politician is really thinking, no matter how good his acting skills are."[68]

This objection correctly points out that the limitations I have mentioned do not show that neuroimaging is somehow unimportant. Obviously, I have not tried to

say that neuroscientists' work is not important. On the contrary, as I see it, the whole idea of discussing the issue of limits is meaningful just because neuroimaging is so significant—now and in the future. However, the view that it is not that important to know what people are actually saying does not sound correct to me. Surely, we want to know which kinds of opinions people *endorse*, not only which attitudes and beliefs they *have*. It is important to know what views people are ready to defend in their own names. It does not suffice to go behind their backs. This is especially true in politics. A politician who has, say, racial biases but who supports anti-racist policies and condemns her own biased attitudes may deserve our support, as opposed to a politician who does *not* condemn her prejudices. A politician who has good enough self-knowledge to understand that she has biased attitudes may try to get rid of them. When citizens vote, they primarily need information about the policies the candidates are willing support, and that kind of information becomes available when the candidates *tell* about it.[69] Of course, some (or perhaps many) candidates may be liars. But a politician who supports ideals that go against her prejudices need not be a liar. Even if a brain scan revealed to all of us that she has those prejudices we would still need to know which policies she publicly supports and what she possibly says about her prejudices.[70]

Concluding Remarks

Both the argument from the assurance view and the argument from the theatrical model suggests that brain scanning cannot replace what people are intentionally asserting. If the arguments (or some future versions of them) are acceptable, which seems likely, then neuroimaging has limits which are not related to merely technical matters. The information that people usually get by neuroimaging is different in kind from the information they get by hearing what others tell them. There is something distinctive about acquiring information from what people intentionally tell us—something that cannot be achieved by brain scanning (unless we scan mental acts and active thoughts). The reason for this is that to assert something is to act in a certain way, and scanners do not usually scan actions. Although the philosophical approaches of Moran and Velleman are usually discussed in separate contexts, they seem to have interesting points of convergence as the discussion here should show.

The common discussions regarding the limitations of neuroimaging concern its technical limits. For instance, it has been pointed out that although it is possible "to decode activity in the visual cortex in order to identify the general features of an image being viewed by an individual in a functional magnetic resonance imaging scanner, it is not possible to extrapolate an underlying emotion or mental state from brain activity if an individual is not performing a task specifically designed to elicit that emotion."[71] Thus deducing a person's mental or emotional state "solely on the basis of brain activity, a process called reverse inference, remains an important challenge that will require a more detailed understanding of how complex emotions are processed and represented throughout the brain and how brain activity gets combined across time and space."[72] My aim in this paper has been to extend the discussion concerning the limitations of neuroimaging to issues that are not really dependent on our understanding of the complexity of brain activities.

Let us return to the fictional scenario with which we started. In the distant fictional future, we would have handy thought-identification devices that would

allow us to scan one another's brains at any time and in any place in an easy, reliable, quick, open, socially acceptable and pleasant way. I have argued that even in such circumstances it would be reasonable to listen to what others say, as listening would be the only way to hear what people really assure and learn how they verbally present themselves for social interaction. One might ask whether life in such circumstances might be possible at all, as it would be acceptable and even pleasant to read others' personal thoughts, emotions and plans at any time. Maybe it would not. Kant argues in his book *Antropologie in pragmatischer Hinsicht* (1796) that if we lived on a planet where people "could not think in any other way but aloud" and "would not be able to have thoughts without voicing them at the same time, whether they be awake or asleep, whether in the company of others or alone," we could not "conceive how they would be able to live at peace with each other" (unless we assume that they all were as "pure as angels").[73] Notice, however, that even in a world where all of us used thought-identification devices a person would still have authority to decide what she actually presents as *true* and how she presents *herself*. Although we might know what she will say and how she will otherwise behave, it would be up to her whether she says what she says and whether she behaves as she behaves. In that respect, she would still be *free*.

Notes

1. See, for example, Farah MJ, Smith ME, Gawuga C, Lindsell D, Foster D. Brain imaging and brain privacy: A realistic concern? *Journal of Cognitive Neuroscience* 2008;21:119–27. Wolpe PR, Foster KR, Langleben DD. Emerging neurotechnologies for lie-detection: Promises and perils. *The American Journal of Bioethics* 2010;10:40–8. Sahakian BJ, Gottwald J. *Sex, Lies, and Brain Scans: How fMRI Reveals What Really Goes on in Our Minds.* Oxford: Oxford University Press; 2017. Poldrack RA. The risks of reading the brain. *Nature* 2017;541:156. Poldrack, RA. *The New Mind Readers: What Neuroimaging Can and Cannot Reveal about Our Thoughts.* Princeton: Princeton University Press; 2018. Baker C. Promises and pitfalls of imaging the brain. *Nature* 2018;562:340–2. A usual question has been "What the *current* conceptual and methodological limitations are."
2. See, for example, Buller T. Brains, lies, and psychological explanations. In: Illes J, ed. *Neuroethics.* Oxford: Oxford University Press; 2006. Of course, there is a plenty of discussion about "neuro-reductionism" and similar issues. See, for example, Buller T. Neurotechnology, invasiveness and the extended mind. *Neuroethics* 2013;6:593–605. Chandler J. Neurolaw and neuroethics. *Cambridge Quarterly of Healthcare Ethics* 2018;27:590–8. By "principled" limitations, I refer to limitations that are not contingent to the advances of future neuroscience.
3. Would it be important to hear what others say, even if the scanners could easily and accurately show a one-to-one relationship between particular psychological states and particular brain activities?
4. In that kind of world, we would not need to talk to one another simply because chatting is funny, for *ex hypothesis* scanning would be even funnier. Furthermore, in that kind of world, other people's words would not necessarily reveal anything new of the speaker's intentionally concealed thoughts and emotions, for we could scan those things as easily as other cognitive states, that is, if we wanted to.
5. See note 1, Poldrack 2018. See also Räikkä J, Smilansky S. The ethics of alien attitudes. *The Monist* 2012;95:511–32.
6. To tell someone that "It is a rainy day" is an act that is not usually accompanied by another act, namely, the act of actively thinking that "It is a rainy day." Surely, we *could* do both acts at the same time, but normally we do not. *If* people committed separate "mental assertions" while making ordinary assertions, then the brain scanner could scan the "mental assertions."
7. In many ways, we are dependent on other people's knowledge. We know that certain mushrooms are poisonous, that smoking causes cancer, that the battle of Waterloo happened, how to use certain words, and where we were born only because someone has told us these things. We are social creatures, and it is not clear whether we do or even could possess any knowledge which is not based on testimony, either directly or indirectly. Furthermore, it is rather optimistic to claim that,

afterwards, we can and do check our testimony-based beliefs by more reflective and critical methods. This does not seem to be true. For instance, we have known the names of some capital cities for almost all our lives without ever bothering to check whether the information we have is correct. In many cases, learning from teachers, colleagues, experts, textbooks, documents, and relatives seems to be the only way we *can* know certain things. Cf. Fricker E. Testimony and epistemic autonomy. In: Lackey J, Sosa E, eds. *The Epistemology of Testimony.* Oxford, UK: Clarendon Press; 2006.

8. Cf. Watson 2004, at 66. Much of the discussion concerning the assurance view is actually a debate about the nature of assertions and their relation to promises.
9. Peirce C. Belief and judgment. In: *Collected Papers V*. Cambridge, MA: Harvard, 1934. Cited by Watson G. Asserting and promising. *Philosophical Studies* 2004;117:57–77.
10. Ross A. Why do we believe what we are told. *Ratio* 1986;28:69–88. Hinchman E. Telling as inviting to trust. *Philosophy and Phenomenological Research* 2005;70:562–587. Origgi G. What does it mean to trust in epistemic authority? In: *7th Annual Roundtable of Philosophy of Social Science*, Columbia University; 2005: 1–26. See also Dannenberg J. Serving two masters: Ethics, epistemology, and taking people at their word. *Australasian Journal of Philosophy* 2019;98:1–18.
11. Moran R. Getting told and being believed. In: Lackey J, Sosa E, eds. *The Epistemology of Testimony.* Oxford, UK: Clarendon Press; 2006: 250–72.
12. See note 11, Moran 2006, at 280.
13. Of course, if a person tells us that she will go to Florence in the spring, that does not imply that she has a promise-based obligation to go there. Cf. Friedrich D, Southwood N. Promises and trust. In: Sheinman H, ed. *Promises and Agreements: Philosophical Essays.* Oxford: Oxford University Press; 2011: 277–94.
14. See note 11, Moran 2006, at 291.
15. See note 11, Moran 2006, at 295.
16. See note 11, Moran 2006, at 294.
17. See note 11, Moran 2006, at 297.
18. See note 11, Moran 2006, at 283.
19. See note 11, Moran 2006, at 289.
20. See note 11, Moran 2006, at 277.
21. See note 11, Moran 2006, at 277.
22. See note 11, Moran 2006, at 277. Moran (p. 278) writes that, on the assurance view, "going behind his back to learn his beliefs would not be better, or even just as good. Rather, it is essential to the distinctive reason for belief that I get from assertion that it proceeds from something freely undertaken by the other person. Only as a free declaration does it have that value for me."
23. See note 11, Moran 2006, at 279.
24. See note 11, Moran 2006, at 292. Moran notices (p. 292) that we "express our freedom not only in our considered actions but also in the actions that go wrong or are forced upon us, and the outbursts that we immediately regret." Thus, his argument cannot be criticized by claiming that it assumes that assertions that are made under pressure do not have similar epistemic significance as those that are made freely. For such criticism, see Owens D. Testimony and assertion. *Philosophical Studies* 2006;130:105–29. Assertions can be relevantly "free" even when they are forced upon us. Owens (p. 119) formulates the key message of the assurance view by pointing out that we "may learn what someone believes from a brain scan but inferring that he is right from the scan is not an instance of learning by trusting him."
25. See note 11, Moran 2006, at 295.
26. See note 11, Moran 2006, at 289.
27. See note 11, Moran 2006, at 289. See also Moran R. *The Exchange of Words: Speech, Testimony, and Intersubjectivity.* Oxford: Oxford University Press; 2018, at 58.
28. The point is not that we get more certain information by listening to reliable and trustworthy people. As Moran writes: "When someone gives me his assurance that it's cold out he explicitly assumes a certain responsibility for what I believe. What this provides me with is different in kind, though not necessarily in degree of certainty, from beliefs I might have read off from his behavior, just as what I gain from his declaration of intention differs from the firm expectation I may form from knowing his habits." See note 11, Moran 2006, at 278.
29. Cf. Zagzebski LT. *Epistemic Authority.* Oxford: Oxford University Press; 2012. Zagzebski (p. 123) writes that "there is no explanation for feeling let down when the testimony is false if testimony is evidence."

30. To some extent, the assurance view explains why we are so interested in what we are told, and why we probably would be interested in the words of others even if we could scan their brains in a second. Of course, one may ask whether people are *reasonable* when they implicitly assume that others are trustworthy and reliable. For usually there is no way of checking the reliability of the testimony or the trustworthiness of the testifier, and at least in some cases we should check these things. Cf. Guerrero AA. Living with ignorance in a world of experts. In: Peels R, ed. *Perspectives on Ignorance from Moral and Social Philosophy.* New York, NY: Routledge; 2017: 156–85.
31. Quite often we do *not* think that the speaker is trustworthy and reliable, but we are *still* very interested in what we are told and *how* others talk to us.
32. Goffman E. *The Presentation of Self in Everyday Life.* New York, NY: Woodstock; 1973.
33. See note 32, Goffman 1973, at 17.
34. James W. *The Principles of Psychology.* Cambridge, MA: Harvard University Press; 1983, at 281.
35. Simmel G. The secret and the secret society. In Wolff KH, trans. *Part IV of The Sociology of Georg Simmel.* Florence, MA: The Free Press; 1950, at 311–2. Cited in Velleman JD. The genesis of shame. *Philosophy & Public Affairs* 2001;30:27–52.
36. Velleman JD. *How We Get Along.* Cambridge: Cambridge University Press; 2009. Velleman does not use the label of the "theatrical model."
37. Self-presentation is quite often seen as a form of strategic action. See, for example, Leary MR. *Self-Presentation: Impression Management and Interpersonal Behavior.* Boulder, CO: Westview Press; 1995.
38. See note 36, Velleman 2009, at 14.
39. See note 36, Velleman 2009, at 14.
40. See note 36, Velleman 2009, at 14.
41. See note 36, Velleman 2009, at 17.
42. See note 36, Velleman 2009, at 17.
43. See note 36, Velleman 2009, at 18.
44. See note 36, Velleman 2009, at 19.
45. See note 36, Velleman 2009, at 22.
46. See note 36, Velleman 2009, at 26.
47. See note 36, Velleman 2009, at 94. He writes that if "a person were not presenting himself to himself, he would not be an autonomous agent capable of practical reasoning." Thus, self-presentation is not primarily a social issue. Velleman argues: "Putting an outward face on our behavior sounds like an essentially social enterprise, but I think that this enterprise is inherent in the structure of the individual will. Even Robinson Crusoe chose which of his desires to act on, and his need to understand and coordinate his activities required him to make choices by which he could consistently abide. He therefore lived in accordance with a persona that he composed, even though there was no audience for whom he composed it. Or, rather, he composed this persona for an audience consisting only of himself, insofar as it was designed to help him keep track and make sense of his solitary life. So even Robinson Crusoe had distinct overt and covert selves—the personality that he acted out, and a personality that differed from it by virtue of including all of the inclinations and impulses on which he chose not to act." See note 35, Velleman 2001, at 35.
48. See note 36, Velleman 2009, at 27.
49. See note 36, Velleman 2009, at 27. Emphasis added.
50. See note 36, Velleman 2009, at 28. Velleman (p. 25, footnote 16) argues that in certain circumstances, a person's practical thinking may function "like a theatrical prompter, following along in the script independently while standing ready to intervene if errors occur. The ability to think along with oneself in this way, with thoughts that neither follow nor lead one's behavior, depends on a degree of self-knowledge that can be attained only through long practice in the more deliberate, thought-first mode of action. It is a long-term accomplishment of rational agency."
51. See note 36, Velleman 2009, at 102. Of course, authenticity does not require that one is brutally frank. As Velleman (p. 69) explains, one of your "motives may be a desire for social harmony, which you can best promote in some circumstances by assuming an amiable expression and keeping your true sentiments to yourself. In those circumstances, putting on an amiable expression makes more sense than baring your soul. A pretense of this kind is not usually designed to deceive, however. On the contrary, your social face is meant to be seen for what it is, a mask adopted in order to promote social harmony. This mask provides you and others with a shared basis for understanding your behavior, on two levels. On the surface, you proceed to act in ways that would make sense in light of the amiable attributes that your face pretends to express, and others pretend to understand your actions

in terms of those attitudes. At deeper level, all parties understand the surface performance as a pretense motivated by a desire for social harmony."

52. See note 36, Velleman 2009, at 62.
53. See note 36, Velleman 2009, at 70.
54. See note 36, Velleman 2009, at 71.
55. See note 36, Velleman 2009, at 66. See also Kusch M. How minds and selves are made: Some conceptual preliminaries. *Interaction Studies* 2005;6:21–34. "My self-classification as a member of a club is in good part dependent upon how other club members classify me."
56. See note 36, Velleman 2009, at 67–68. Velleman refers to Swann WB. *Resilient Identities: Self, Relationships, and the Construction of Social Reality*. New York, NY: Basic Books; 1999, at 70.
57. Goffman distinguishes between the expression that a person *gives* and what he *gives off*: "The first involves verbal symbols or their substitutes which he uses admittedly and solely to convey the information what he and the others are known to attach to these symbols. This is communication in the traditional and narrow sense. The second involves a wide range of action that others can treat as symptomatic of the actor, the expectation being that the action was performed for reasons other than the information conveyed in this way. As we shall have to see, this distinction has only initial validity. The individual does of course intentionally convey misinformation by means of both of these types of communication, the first involving deceit, the second feigning." See note 32, Goffman 1973, at 2.
58. Possibly, the speaker wants to present herself as a person who would like to talk about weather rather than about something more serious or personal.
59. When a person tells another person, say, that it is a rainy day, the hearer need not learn much about the weather. An important reason why we are so interested in what people say is that their words give information about the speakers themselves. In particular, their assertions tell how they would like to present themselves in the social context the assertions are uttered, and what kind of social persona they would like to offer in that specific context. Small talk may give an impression that people involved are not interested in the truth at all, and that they are (morally) worse persons than ordinary liars who, after all, are interested in the truth when they try to make other people believe things that are not true. However, it is likely that people who talk about the weather *are* interested in the truth, namely, truth about themselves and other people (if not the truth about the weather). For a discussion, see Frankfurt HG. *On Bullshit*. Princeton: Princeton University Press; 2005.
60. Of course, when something private about you is showing without your intention, you have failed to manage your public image, and others can certainly make use of such failure. See note 35, Velleman 2001, at 38.
61. Suppose that a person is able to communicate only by means of a scanner-like device. That would show that in some cases people are capable of intentional assertions only by means of a scanner. (The technology is already available. Adrian Owen has made important work in this field.)
62. I am not suggesting that "two-person neuroscience" is not possible. Neuroimaging of two interacting subjects to uncover brain mechanisms supporting social interaction is obviously something that has been already done. Possibly, we are able to interpret the data only by understanding the relevant social situation, and this brings social issues into the picture. The interpretation of the data need not be passive (in the sense of "looking" at the picture): it may require the interpreter to "participate" or "contribute," in a way or another.
63. Lackey J. Testimony: Acquiring knowledge from others. In: Goldman AI, Whitcomb D, eds. *Social Epistemology: Essential Readings*. Oxford: Oxford University Press; 2011: 71–91.
64. Hazlett A. *Review of How We Get Along*. *Notre Dame Philosophical Reviews*. Cambridge: Cambridge University Press; 2009.
65. See note 64, Hazlett 2009. Hazlett argues that there is a sense of "inauthenticity" in which *all* of our actions are inauthentic if Velleman's theory is correct: "However, there is something more involved in the everyday idea that theatrical acting is a paradigm of inauthenticity. It's the fact that acting seems to involve the aforementioned 'one thought too many': inauthentic people, we want to say, do not simply do what they want to do, but in addition they always think about what someone like them is supposed or expected to do under the circumstances that they are in. The decisions of the inauthentic person are always mediated by their self-conceptions; the decisions of the authentic person are not. In this sense of 'inauthenticity', Velleman's paradigm of acting for reasons is also a paradigm of inauthenticity."
66. See note 1, Baker 2018, at 340–1. (Also published as "The Brain Decoders.")
67. See note 1, Poldrack 2018, at 77 argues that the "use of neuroimaging to detect conscious awareness in people with brain injuries is a major advance that shows the real-world utility of fMRI decoding."

68. See note 1, Sahakian, Gottwald 2017, at 21.
69. See note 36, Velleman 2006, at 215, where Velleman points out that "people tend to manifest not just what they are feeling but also what they represent themselves as feeling. Whether they behave angrily depends, not just on whether they are angry, but on whether they interpret their feelings by updating their autobiographies with the attribution 'I'm angry'." Thus, if a brain scanner reveals what a person is "really thinking," that does not mean that the person will really behave in the way her most primitive thoughts might predict.
70. Notice also that presenting something publicly forces one think about the issue, and this process may alter her beliefs. Cf. Moran R. *Philosophical Imagination: Selected Essays*. New York, NY: Oxford University Press; 2017, at 286.
71. Robinson D. The new mind readers: A review. *Science Magazine* 2018 Sep 4.
72. See note 71, Robinson 2018.
73. Kant I. *Anthropology from a Pragmatic Point of View*. Carbondale, IL: Southern Illinois University Press; 1996, at 250. It is nowadays possible to translate a person's thoughts into recognizable speech by monitoring her brain activity.