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Charles Lassiter
Gonzaga University, lassiter@gonzaga.edu

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Externalizing Communicative Intentions

Charles Lassiter
Department of Philosophy
Fordham University, USA
Email: Charles.lassiter@gmail.com

Abstract

In this paper, I argue that an embodied cognition theorist has resources available to her to fulfill the explanatory role of "communicative intention" without postulating inner, private intentions, as is typically done by cognitivists. I argue for this conclusion by identifying a publicity requirement and a sensitivity requirement that must be satisfied by realizers of communicative intentions – a theoretical posit that explains the difference between linguistic meaning, as in "John means *cats are mammals* by his utterance 'cats are mammals'", and other sorts of meaning, as in "that bell means the train doors are closing". I then show that a cognitivist model and an embodied model of communicative intentions can satisfy these requirements. However, because the embodied model is more theoretically parsimonious than its cognitivist competitor, the embodied model is superior. In the first section, I argue that communicative intentions exhibit the properties of publicity and sensitivity and that whatever satisfies the role of communicative intentions in a theory about cognition must also exhibit those properties. In the second and third sections, I present a cognitivist model and an embodied model of communicative intentions and show that each model exhibits the properties of publicity and sensitivity. In the fourth section, I argue that while both models equally explain the data, the embodied model does so more parsimoniously than the cognitivist model, and this gives us good reason to endorse the embodied model. Finally, I present an objection concerning explanatory power on behalf of the cognitivist and reply to it.

Keywords: Paul Grice, cognitivism, communicative intention, embodied mind.

1. Communicative Intentions, Publicity and Sensitivity

If speaker S communicates p to hearer H, then H believes that p, and S's communicative intention is H's reason for believing that p. A *communicative intention*, also called a "reflexive" or "Gricean" intention, is an intention for a hearer to believe that p and an intention that the intention for the hearer to believe that p be recognized as an intention for the hearer to

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believe that p. A communicative intention is an intention to convey some belief that is also an intention to be recognized as an intention to convey some belief. It is both a first-order intention for the hearer to believe that p as well as a second-order intention for the hearer to recognize that the first-order intention for the hearer to believe that p as a first-order intention for the hearer to believe that p. Saying "S communicates p to H" comes to the same thing as saying "S communicatively intends for H to believe that p".[1]

Communicative intentions exhibit two key features: publicity and sensitivity. Communicative intentions are public in the sense that if S communicates that p to H, then S's intention to communicate that p to H is known by both S and H and each knows the other to know this. I will put this by saying that S and H *mutually recognize* S's communicative intention; such mutual recognition is evidence of the publicity of communicative intentions. What is meant here by "mutual recognition" is just that, if asked whether or not the speaker meant to communicate that p to the hearer, both the speaker and the hearer would say "yes" – not that communicative intentions have to be consciously entertained.[2]

What motivates publicity as a requirement for whatever mechanism is picked out by "communicative intention" is that communication is a public event and the publicity of the content of a communicative intention is secured by the intention's reflexivity. That is, what a pair of communicators is talking about is known to both. It seems a reasonable requirement that if the content of the message is public, then the vehicle by which the content is made public also be public.

What is meant here by "sensitivity" is that speakers' communicative intentions change with the context of communication, and such intentions change with context because communicative agents stand in at least *some* relation to the communicative context – while the context of the communicating agent does not determine the agent's communicative intentions, the context makes some contribution to the agent's intention. For example, say that Vera communicatively intends Wendell to believe

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1 Grice, in his papers discussing speaker meaning, is interested in understanding the locution "S means x by p" – not explicitly with communication.

2 I prefer the term "publicity" to the terms "mutual knowledge" and "mutual manifestness", which are already in circulation, for the following reasons. The latter term is one coined by relevance theorists and I do not wish to engender confusion: the relevance theoretic account of communication is internalist and the present account is externalist. The former term is sometimes associated with an infinite recursion of intentions, typically taken to be problematic. I am not interested in that problem in this paper. "Publicity" captures this important aspect of communication that I am interested in at present without the undesired associations.

that the library is closed this afternoon by uttering "the library is closed this afternoon". Vera's communicative intention exhibits sensitivity if it changes in case Wendell does not understand English or in case an utterance "the library is closed this afternoon" does not produce in Wendell the belief that the library is closed this afternoon. I motivate my claim for this account of sensitivity in greater detail below.

What motivates sensitivity as a requirement for whatever mechanism is picked out by "communicative intention" is how context-bound language-use is. The ways in which people use language are strongly affected by the physical and social contexts in which they find themselves: the sort of joke that is appropriate to say to one's friend at a bar may not be appropriate to say to one's friend at a funeral. If language-use is interestingly context-sensitive, then one would expect the mechanisms underwriting language-use to be context-sensitive as well.

Why think that communicative intentions exhibit the characteristic of publicity? For a speaker to mean that p by her utterance, the speaker's communicative intention has to be the reason for why hearer H believes that p. If S's communicative intention is H's reason for believing that p, then H recognizes S's communicative intention. In most cases, if S communicates something to H, then S recognizes her own communicative intention – we don't often find unconscious agents giving directions to the Metropolitan Museum of Art. S and H both mutually recognize the communicative intention.[3] This mutual recognition of S's communicative intention as the reason for H to believe that p *just is* what it means for a communicative intention to exhibit publicity. When S and H mutually recognize S's communicative intention, then (i) S recognizes that she intends for H to believe that p, (ii) H recognizes S's intention that H believes that p, and (iii) S and H each recognize (i) and (ii) – that is, (i) and (ii) are public.

To see that mutual recognition of the speaker's communicative intention is needed for the speaker to convey something by her utterance, consider these examples:

Case 1

Imagine that Susan is talking on the phone in the kitchen and Harry is in another room nearby, unbeknownst to Susan. Susan says, "I'll be at the dentist's tomorrow at 9". Susan, after hanging up the phone, walks into the room where Harry is, showing a bit of surprise that Harry is in the room. Harry says to Susan, "I'll take you to the dentist's tomorrow".

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[3] Some pathological cases may present interesting challenges, but they do not fundamentally undermine the necessity of publicity of intention in communication.

Case 2
Imagine that Susan is again on the phone in the kitchen. Harry is the next room, and Susan knows this. Susan, still on the phone, waves at Harry, thereby attracting his attention, and says to the person on the other end, somewhat more loudly than necessary, "I'll be at the dentist's tomorrow at 9". Susan, after hanging up the phone, walks into the room where Harry is and Harry says to Susan, "I'll take you to the dentist's tomorrow".

Case 3
As before, Susan is on the phone in the kitchen. Harry is in the next room and Susan knows this. Susan says to the person on the other end unusually loudly, "I'll be at the dentist's tomorrow at 9", intending to communicate to Harry that she's telling him that she'll be at the dentist's tomorrow at 9. Harry, though hearing *that* Susan was talking, took no note of *what* she was saying.

In Case 1, Susan does not communicate anything to Harry – overhearing someone doesn't count as a case of communication. If anything, it seems like Harry arrives at his belief through a process of inference. Even though Harry forms the belief that Susan will be at the dentist's tomorrow at 9, Susan does not give any obvious cues that she intended for Harry to believe that she's going to the dentist's tomorrow at 9. Susan knows that she's going to the dentist's tomorrow at 9, and Harry knows that Susan is going to the dentist's tomorrow at 9. Harry even knows that Susan knows that Susan is going to the dentist's tomorrow at 9. But, Susan doesn't know that Harry knows and Harry doesn't know that Susan doesn't know that Harry knows. In short, each knows the same fact but neither knows that the other knows the same fact. The failure of communication here is simple: Susan had no communicative intention for Harry to form any belief, so there can be no mutual recognition if there's no communicative intention to mutually recognize.

In Case 2, it seems intuitive to regard Susan as communicating that she's going to the dentist tomorrow at 9 to Harry. She gives obvious cues for her intending for Harry to believe that she's going to the dentist's tomorrow at 9; he gives obvious cues that he now believes that she's going to the dentist's tomorrow at 9; and given the description it seems obvious that Harry believes that p on the basis of Susan's actions. Susan communicatively intends for Harry to believe that she is going to the dentist's tomorrow at 9. The communicative intention is Harry's reason for believing that Susan is going to the dentist's tomorrow. Susan successfully communicates to Harry that Susan is going to the dentist's tomorrow at 9 – Susan and Harry mutually recognize Susan's communicative intention, giving strong reason to think that communicative intentions exhibit publicity.

In Case 3, Susan does not communicate anything to Harry since Harry failed to form the requisite belief; however, Harry's failure is particularly instructive since Susan communicatively intended for Harry to believe that

she is going to the dentist's tomorrow at 9, but he failed to recognize her communicative intention. Susan has the appropriate communicative intention, but Harry fails to recognize her intention. Even though Susan communicatively intended for Harry to believe that she's going to the dentist's tomorrow at 9, Harry did not pick up on her intention. So, Susan's communicative intention could not have acted as the reason for Harry to have any beliefs about Susan's morning plans.

In Case 1, Susan has no communicative intention toward Harry and so does not communicate anything to him. In Case 2, Susan communicatively intends Harry to believe that she is going to the dentist's tomorrow at 9 and Harry forms the appropriate belief in virtue of recognizing her communicative intention. In Case 3, Susan communicatively intends Harry to believe that she is going to the dentist's tomorrow at 9, but Harry fails to recognize her intention; so, Susan cannot be said to have communicated anything to Harry. What these cases suggest is that communicative intentions, if a speaker is to communicate something, must be mutually recognized as reasons for belief; and, if they are mutually recognized, then that strongly suggests their publicity.

Now we move onto sensitivity. Why think that communicative intentions exhibit sensitivity? The reason comes from a consideration of intentions in general. Intentions exhibit sensitivity to context. Because communicative intentions are a species of intentions, communicative intentions exhibit sensitivity to context.

What reasons are there to think that intentions exhibit sensitivity to context? Before going into this, an important caveat is in order: here it is claimed that the context of the intending agent constrains the sorts of intentions an agent can form, but there are obvious cases in which such a claim is seemingly strained. If I intend to become a classical guitarist, then it's difficult to see how forming this intention in New York instead of New Hampshire would affect my intention. Or, if I intend to bake a loaf of bread this evening but get side-tracked and do not end up baking bread, then my getting side-tracked does not change that I had an intention to bake bread. Or, if I intend to drink a glass of water and it turns out what I believed to be water is actually gin, then the fact that there is gin in the glass and not water doesn't change the fact that I intended to drink a glass of water.

Of course discussions of intention and context are fraught with difficulty; but, following what was said above, the claim here is minimal: the context of the agent constrains the sorts of intentions an agent can form. For example, it's unlikely that I am to form the intention to drink a glass of water if I'm in the middle of the desert. I may have a *desire* for a glass of water, but it's unlikely that I'll have the *intention* to drink a glass of water. This is just because there is no water around for me to intend to drink. Again, it's unlikely that I will intend to punch Herod in the nose,

though I may have a desire to do so. It's unlikely that I'll have such an intention because Herod is dead. Again, it's difficult to see how I can intend to sing the Queen of the Night's aria if I do not know the melody or if I cannot sing. In these cases, the intention the agent forms is sensitive to context in *some* way, which is what I am here claiming.

There is a potential objection to this minimal account. One may object that someone may *believe* that there is a glass of water in the desert and thereby intend to drink it. Thus, provided that the agent has the appropriate belief, she can have an intention to drink a glass of water in the desert, contrary to my example.

In reply, all this objection shows is that intentions are sensitive to beliefs, not that intentions are sensitive to *only* beliefs. That claim requires its own argument. My claim – that context constrains the intentions an agent can form – can incorporate sensitivity to belief with little or no problem: intentions are sensitive to what an agent believes and desires as well as the context in which the agent finds herself. But, since this paper is not about the relationship of intentions to beliefs and desires, I remain neutral on the issue.

Since context constrains the intentions an agent can form, context constrains the communicative intentions an agent can form. This is seen in returning to the Harry and Susan examples from above. If Harry is irrelevant to her dentist-related plans, Susan is unlikely to form the communicative intention for Harry to believe that her dentist's appointment is at 9 tomorrow.[4] Or, if Harry has left Susan's domicile for the day before Susan can tell him anything, then Susan's communicative intention for Harry to believe that she is going to the dentist's tomorrow at 9 will reflect the fact that Harry is not present to be told about Susan's plans.

A less simple, but relevant, example incorporates action into the account of intention. It is important to note that my position in this paper is independent of the account of the relation of intention to action given here; but, I introduce this example in order to show that communicative intentions are related to context in interesting and complex ways when one's account of intentions becomes increasingly interesting and complex. Let's say for the sake of the argument that having an intention to R is doing R intentionally and that if doing Q intentionally contributes to doing R intentionally, then doing Q intentionally is part of having an intention to R. For example, Gerald has an intention to bake a loaf of bread. On the above supposition, Gerald bakes a loaf of bread intentionally. As part of baking a loaf of bread intentionally, Gerald kneads the bread in-

[4] This fits with what Grice (1975) says about cooperation in communication. Cooperation is a kind of rational activity and part of being cooperative is not providing more information than is necessary for the joint venture at hand.

tentionally. So, on the above assumption, Gerald's kneading of the bread intentionally is part of Gerald's intention to bake a loaf of bread.[5]

Now apply this augmented account of intention to the second Susan and Harry case from above. Susan has a communicative intention for Harry to believe that she is going to the dentist's tomorrow at 9. Thus, Susan's getting Harry to believe that she is going to the dentist's tomorrow at 9 is intentional. Part of getting Harry to token this belief is Susan's waving at Harry and saying "I'll be at the dentist's tomorrow at 9". So, Susan's getting Harry's attention by waving at him and uttering "I'll be at the dentist's tomorrow at 9" intentionally, on the above supposition, are part of Susan's communicative intention for Harry to believe that she is going to the dentist's tomorrow at 9.

To see how Susan's communicative intention on the augmented account of intention is sensitive to context, we can modify the example in Case 2. For example, if Harry is blind, then attempts to get his attention by waving at him are fruitless. Since Susan's waving at Harry is part of her communicative intention, Harry's blindness affects her communicative intention. Susan will have to do something else – perhaps shout his name or tap him on the shoulder – in order to get Harry's attention. Since the action that is part of Susan's communicative intention changes with Harry's visual condition, Susan's communicative intention is sensitive to Harry's visual condition, i.e. to the context of communication. The same point can be made if Susan and Harry find themselves in the middle of a blackout: Susan can't get Harry's attention by waving her hand if it is too dark to see her waving her hand. So, Susan has to get his attention in some other way, and if the hand-waving is part of her communicative intention, then her communicative intention changes with the change in communicative context.

Of course this point can be extended beyond examples of visual cues. If Harry makes it a point not to listen to anything Susan is saying while she is on the phone (for fear of being taken to be an eavesdropper) and Susan is fully aware of this, then Susan's uttering "I'll be at the dentist's tomorrow at 9" while on the phone is communicatively fruitless with respect to Harry's beliefs. If uttering "I'll be at the dentist's tomorrow at 9" loudly is part of her communicative intention for Harry to believe that

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[5] An easy objection to this account of the relation of intention to action is as follows. In baking bread intentionally, Gerald wipes sweat from his brow intentionally. So, Gerald's intentionally wiping sweat from his brow is part of his intention to bake bread. The objection, then, is that this is counterintuitive: how is it that wiping sweat from his brow is part of Gerald's intention to bake bread? I recognize that this is a problem, but it is a problem for an account of the relation of action to intention, not of the position I'm arguing for in this paper.

Susan will be at the dentist's tomorrow at 9, then Susan's communicative intention changes with Harry's idiosyncrasy.

2. Cognitivist Model of Communicative Intentions

In this section, I present what I take to be a cognitivist model for the entity that fulfills the role of communicative intention. I use "cognitivist" here to pick out a cluster of related theses: the theory theory of mental state attributions and the computationalist and representationalist explanatory frameworks.[6] I will explain that private mental states fill the role of communicative intentions on the cognitivist model and show how private mental states satisfy the requirements of publicity and sensitivity.

I couple the theory theory with representationalism – though they are independent of one another – because I believe that this pairing makes for a very robust cognitivist model of communicative intentions. Communicative intentions are mental representations tokened in the appropriate belief and desire boxes and agents ascribe mental states to a subject by an exercise in theoretical reasoning, taking the subject's behaviors as the data. Theory theory accounts for how agents ascribe mental states to others, and representationalism accounts, at least in part, for that which makes such ascriptions true or false.

On the cognitivist account, cognition is the manipulation of mental representations in normative, law-like ways according to the rules of, for example, first-order logic with identity or probability theory.[7] Mental representations are information-bearing structures internal to the agent. Information about the world is delivered via transducers. This information is carried by the mental representation, whereupon it is available for manipulation by the mind's general problem solver. The agent is then motivated to act by some belief and desire – which means that the appropriate mental representation is put into the BELIEF, DESIRE or INTENTION box. The agent then has the intention to act accordingly and, all other things being equal, performs the action.

On one widely endorsed account,[8] there are three different levels involved with cognition. There is the knowledge (or "semantic") level that deals with beliefs and desires, a symbolic (or "computational") level that deals with the representations that the computational system manipulates, and a biolo-

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6 Cf. Fodor (1983) and Pylyshyn (1986).Though "cognitivist" may not be limited to a Fodorian paradigm. See, Sutton et al. (2010) for an extended mind account of memory that is self-described as "cognitivist".

7 See Pinker (2005).

8 Cf. Marr (1982) and Pylyshyn (1986).

gical level that deals with the nuts and bolts of the system. A mental representation's content, i.e. what the representation is a representation *of*, is the content of the corresponding belief or desire. So, if the mental representation whose content is *there is a cow in the field* is tokened in the subject's belief box, then the subject has the belief that there is a cow in the field.

On this account, mental states are private entities. This is because S's having a mental state M is for S to have a mental representation tokened in the appropriate belief or desire box. Because the mental representation is private, S's mental state is private. Mental states are attributed to a subject by the mindreading agent on the basis of the subject's behaviors, including verbal behaviors. On the theory theory of mental state attributions, folk psychology is regarded as a rudimentary but useful theory and mental state attributions are an exercise in theoretical reasoning: agents perceive behaviors of some subject and attribute folk psychological states on the basis of the behaviors. Agents predict future behaviors of agents using this same folk psychological framework.

The role of communicative intentions, on the cognitivist story, is satisfied by private mental states: S's having a communicative intention for H to believe that p is for S to have tokened an appropriate set of private beliefs and desires. If this is right, then private mental states exhibit publicity and sensitivity. We'll look at publicity first. In order for a communicative intention to act as a reason for the hearer to believe that p, the communicative intention has to be public, i.e. mutually recognized. But, how is it in the cognitivist case that private mental states are mutually recognized since mental representations are private entities?

The resources found in representationalism and theory theory solve this problem relatively simply. On the cognitivist account presented here, communicative intentions, i.e. private beliefs and desires, are recognized by the hearer in an indirect fashion. Obviously, H cannot directly perceive a private mental state; but, on the basis of S's behaviors, H ascribes to A the relevant beliefs and desires. H's ascription to S of the relevant beliefs and desires just is H's recognition of S's communicative intention.

To take Case 2 above, where Susan waves her hand to get Harry's attention and then says "I'll be at the dentist's tomorrow at 9", the cognitivist explanation is this. Harry perceives Susan's hand-waving and verbal behavior. On the basis of Susan's behaviors, Harry attributes to Susan these mental states:

(i) the desire for Harry to believe that Susan will be at the dentist's tomorrow at 9
(ii) the desire for Harry to believe that Susan believes that Harry believes that Susan will be at the dentist's tomorrow at 9
(iii) the belief that Harry believes that Susan will be at the dentist's tomorrow at 9

(iv) the belief that Harry believes that Susan believes that Harry believes that Susan will be at the dentist's tomorrow a 9.

If we incorporate action into our account of communicative intentions, then Harry may ascribe these mental states to Susan:

(v) the belief that Harry believes that in saying "I'll be at the dentist's tomorrow at 9" Harry will believe that Susan will be at the dentist's tomorrow at 9
(vi) the belief that Harry believes that Susan believes that in saying "I'll be at the dentist's tomorrow at 9" Harry will believe that Susan will be at the dentist's tomorrow at 9
(vii) the belief that Harry believes that Susan, in waving at him, is trying to get his attention
(viii) the belief that Harry believes that Susan believes that Susan, in waving at him, is trying to get his attention.

Collectively, these mental states, and possibly others, fulfill the theoretical role of Susan's communicative intention for Harry to believe that Susan will be at the dentist's tomorrow at 9.[9] Harry's recognition of Susan's mental states – which just is his attribution of these states to her – acts as his reason for believing that Susan will be at the dentist's tomorrow at 9.

So, on the cognitivist account presented here, mental states are indirectly public: they are public insofar as the behaviors by which agents attribute mental states to others are public. There is nothing about the publicity characteristic of communicative intentions that requires that whatever satisfies their theoretical role be directly public; so, internal mental states indirectly exhibit the characteristic of publicity – they are public insofar as the behaviors by which internal mental states are attributed to others are public.

Now, how do internal mental states satisfy the sensitivity requirement? This can be done in either of two ways, given one's philosophical commitments with respect to content externalism: indirectly or directly.

On the one hand, the cognitivist may leave the discussion of content externalism aside (or outright reject content externalism) and deal strictly with the underlying causal mechanisms involved with belief change. In such a case, internal mental states may exhibit sensitivity to context *indirectly*: as contexts change, the relevant hardware mechanisms reflect those changes, which thereby cause changes on the symbolic and semantic levels. For example, S is in brain state R1 as a result of being in world W at time

[9] How exactly Harry infers these mental states from Susan's behaviors is the job of the psychologist.

t1, which correlates with computational state C1 and the tokening of the belief B1. Now, if S is in W at t2 which causes S to go into R2, then S will also token the appropriate states C2 and B2. So, S's internal mental states indirectly reflect changes in context through causal relations S's brain has with the environment.

On the other hand, the cognitivist may endorse content externalism and leave aside discussion of neural mechanisms relevant to belief change. In such a case, private mental states reflect changes in the environment. In this case, private mental states do exhibit sensitivity to context because mental contents *do not* supervene on what's internal to the agent – whatever is in the agent's environment affects the agent's mental contents. In terms of Twin Earth,[10] Oscar on Earth has beliefs about H_2O and Twin Oscar on Twin Earth has beliefs about XYZ. If contents are wide, then mental states directly exhibit sensitivity to context because the content of the subject's mental states is determined, at least in part, by what's external to the agent.

To summarize: Private mental states satisfy the theoretical role of communicative intentions. Private mental states are *indirectly* public: an agent S ascribes private mental states to a subject H in virtue of H's public behaviors. Private mental states are either directly or indirectly sensitive to context: they are directly sensitive if the cognitivist also endorses content externalism and they are indirectly sensitive if mental states change in response to changes in the hardware (i.e. neural) level.

3. An Embodied Model of Communicative Intentions

The cognitivist model is one way to think about communicative intentions, and in this section I present a model drawing on embodied cognition and mental states. The argument in this paper compares these two models, but it is worthwhile noting that these choices do not exhaust the field of models for communicative intentions (or mental representations more generally). For example, Chalmers,[11] Clark,[12] and Shea[13] suggest ways to understand distributed representations in connectionist networks that are fundamentally dissimilar from the cognitivist representations discussed in section 2. Spivey[14] offers a dynamic systems theory model of representations in which a mental representation is a point towards which patterns

10 Putnam (1975).
11 Chalmers (1990).
12 Clark (1993).
13 Shea (2007).
14 Spivey (2008).

of neural firings gravitate. Paul Churchland's [15] account understands representations as positions in a neural state space. These accounts are neither wholly cognitivist accounts nor wholly embodied cognition accounts, but they represent possible accounts of the realizers of communicative intentions. I do not consider these accounts in this paper, because I am most interested in showing that embodied cognition has the resources for a sound alternative to the widely endorsed cognitivist model.

Now consider a different model of communicative intentions, one that does not rely on inner representations or treating mental state ascriptions as an exercise in theoretical reasoning. Such a different model is to be found within an embodied cognition framework. By "embodied cognition", I mean that at least some (but perhaps all) cognitive states and processes are *constituted* by bodily activities and structures that are not limited to the brain.[16] I combine this view of embodied cognition with a dispositional account of mental states – where "dispositions" covers phenomenal and cognitive as well as behavioral dispositions. The resulting account is this: mental state terms pick out a range of behavioral, phenomenal, and cognitive dispositions and part of the role of the embodied cognition researcher is to uncover mechanisms underlying the dispositions. While I shall not mount a full-scale argument in favor of combining this vision of embodied cognition with a dispositional theory of mental states, I will say this: they make for a good pairing, at least prima facie, insofar as a dispositional theory of mental states identifies a mental state, in part, in terms of bodily behaviors, and the account of embodied cognition I endorse here claims that cognitive states and processes are constituted by bodily activities in structures.

It is worthwhile noting at this point that it could be that cognitive and phenomenal dispositions are importantly grounded in behavioral dispositions or that cognitive dispositions are importantly grounded in phenomenal and behavioral dispositions. Lakoff & Johnson's[17] work on the relationships between concepts and bodies is applicable to a dispositional account of mental states. It is also worthwhile noting in this connection that the numerous studies reporting how bodily positions tend to affect thoughts and feelings also fit with a dispositional theory of mental states: it could just turn out that behavioral, phenomenal, and cognitive dispositions are mutually influencing.[18]

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15 Churchland (1979, 1989).

16 See Rowlands (2010, 52-58).

17 Lakoff & Johnson (1999).

18 These are, to my mind, interesting ways of developing a dispositional account of mental states and perhaps suggest further research; but, it will not be developed in detail here.

Part of fleshing out this model of embodied cognition I am here endorsing involves an appeal to a dispositional model of mental states, versions of which are found in Aristotle's *De Anima,* Ryle,[19] Wittgenstein,[20] Kenny,[21] Schwitzgebel[22] and Jaworski.[23] While the details for these accounts may diverge, that divergence is not of crucial importance for the present paper. What these accounts have in common is a view of, at least some (but perhaps all), mental states and processes that are importantly *dispositional*: mental states and processes have dispositional properties, including behavioral, phenomenal, and cognitive dispositions.[24]

The model of embodied cognition – as being partially fleshed out in terms of dispositional mental states – can be seen in an analysis of anger. When an agent is described as "angry", then the agent is engaging in specific dispositions. Behavioral dispositions associated with being angry can include stomping, throwing objects, shouting "I'm mad as hell!", saying uncharacteristically critical things of loved ones, kicking walls etc. People also tend, among other things, to pull their eyebrows down and together, raise the upper eyelids, tighten the lower eyelids, and narrow and press together the lips.[25] People who are angry often yell, assault objects, and make a stabbing motion with the index finger; their voices tend to reflect acoustical regularities, such as an increased pitch and articulation.[26]There are also characteristic phenomenal dispositions associated with anger – people tend to feel a sort of tightness in the chest, a feeling of desire for revenge, and feelings of unhappiness. Cognitive dispositions associated with anger include having counterfactual thoughts (e.g. if X hadn't happened I could be doing Y right now) and recalling memories of past angry events.[27] While this is a small sampling of the sorts of dispositions associated with anger, what it points to is that for an agent to be angry is for that agent to engage in, and experience, patterns of behaviors, feelings and thoughts. These patterns of behaviors, feelings and thoughts, are the sorts of things that are up for discovery by embodied cognition researchers.

On this account, mental states are embodied because mental state terms refer to dispositions, which, importantly, include behavioral dispositions. Just as one cannot describe a smile without talking about a mouth, one cannot talk about anger without talking about faces, voices, bodily

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19 Ryle (1949/1984).
20 Wittgenstein (1953/2003).
21 Kenny (1992).
22 Schwitzgebel (1992).
23 Jaworski (2011).
24 This particular account is due to Schwitzgebel (2002).
25 Ekman (1993).
26 Banse & Scherer (1996).
27 Sukhodolsky et al. (2001).

position, typical feelings and characteristic thought patterns. In the same way, one cannot talk about beliefs or desires without talking about, among other things, behavioral dispositions, including specifically utterance behavior and bodily movement. This is all to say that to have a belief or a desire that p means to behave in patterned ways; believing or desiring that p is constituted (at least in part) by the agent's extra-cranial body.

This model appears similar to a traditional behaviorist account, like that of Hempel,[28] but there two important differences. First, traditional behaviorists are reductivists about psychological theories: they claim that talk about observations of behavior can take over the descriptive and explanatory roles of talk about psychological states. The above account is nonreductivist: behavior-talk cannot take over the descriptive and explanatory framework of psychology. Second, traditional behaviorist accounts appeal only to observable behaviors when performing translations of psychological terms to non-psychological conditionals. The above account includes both phenomenal and cognitive dispositions alongside behavioral dispositions in explaining what mental states are. Even though the account of embodied mental states endorsed in this paper claims that observable behaviors are a part of the dispositional stereotype for some mental state, phenomenal and cognitive dispositions are part of the dispositional stereotype as well. Reductivism and appeal only to observable behaviors are two hallmarks of traditional behaviorism; and, both hallmarks are incompatible with the account of communicative intentions presented above.

The theoretical role of communicative intentions, on this embodied model, is satisfied by *embodied mental states* – that is dispositional mental states, whose typical expressions are the sorts of things discovered by embodied cognition researchers. If this account is to satisfy the theoretical role of communicative intentions, then embodied states must exhibit the characteristics of publicity and sensitivity. We will discuss publicity first.

On this account, embodied mental states are obviously public. If S ascribes a belief or desire to H, then that means that S identifies a pattern of behaviors in which H engages. H's bodily behaviors are out in the open; embodied mental states are directly public.

What sorts of behavioral patterns satisfy the role S's communicative intentions? One very important element is eye gaze. Agents identify that to which we are attending through understanding where our gaze is directed; when we look at something, we are typically paying attention to that thing.[29] It is worth noting that psychologist Michael Tomasello[30] suggests that one reason why humans have such pronounced sclera relative to other

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28 Hempel (1949).
29 Moll, H., Koring, C., Carpenter, M. & Tomasello, M. (2006).
30 Tomasello (2008).

primates is that humans are unique in the degree to which we cooperate with one another and that part of our success in this is being able to identify what our conspecifics attend to. Pronounced sclera would allow conspecifics to more easily determine what an agent is attending to through determining the direction of the agent's gaze. So, when a speaker looks at a hearer, this is one pattern of behavior that the hearer can identify as part of the speaker's communicative intention.

Another pattern of interaction is found when speakers are in the midst of conversation. When two agents interact with one another, they tend to mimic each other's mannerisms.[31] Lawrence Rosenblum[32] writes that we will adopt interlocutors' tonal patterns and speech rhythms unconsciously, and we in fact notice when such imitation is missing from dialogue: the dialogue sounds unnatural.[33] Given that communicators are sensitive to speech patterns – in that communicators imitate others' speech patterns and people notice when such imitation is absent – another pattern of behavior includes imitation of speech patterns of interlocutors.

Yet another pattern is found in acoustic features of interlocutors' speech patterns. The fundamental frequency of a speaker's voice – that is, the speaker's base pitch for some utterance – changes between self-directed talk and other-directed talk. On the whole, a speaker's voice tends to be at a higher pitch for self-directed talk than for family- or friend-directed talk.[34] That the fundamental frequency of family- and friend-directed talk is higher than self-directed talk constitutes another bodily pattern that is characteristic of communicative interactions and partially constitutive of communicative intentions.

Anecdotal accounts are ready to hand. If S is addressing H, then S will speak more, not less, loudly. If H is not paying attention to S, then S can say H's name loudly to get H's attention. S will repeat her message if H appears not to understand it. S will wait for H to give some confirmation of having understood the message.

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31 Bargh & Williams (2006), Chartrand & Bargh (1999).

32 Rosenblum (2010).

33 Rosenblum relates on his blog an anecdote about John Travolta's and Susie Essman's voices for the main characters in the animated film *Bolt*. Travolta and Essman recorded their lines for their parts many months apart. The director had them repeat each line between 10 and 30 times, reciting them at different speeds and with different inflections. The director then selected from the massive array of recordings which ones would sound most natural. Wes Anderson, directing the animated film *Fantastic Mr. Fox*, had the actors record their lines together in the studio to avoid such problems. See http://www.psychologytoday.com/blog/sensory-superpowers/201009/imitating-oprah

34 Campbell (2004).

Now, we shift focus from the publicity of embodied mental states to their sensitivity. Embodied mental states, on the present account, are sensitive to context. Mental states terms pick out, among other things, behavioral dispositions: if S believes that there is beer in the fridge, then S will say "there is beer in the fridge" in the appropriate conditions, will walk to the fridge if she desires a beer, will offer a beer to a friend who drops by etc. And, if the environment changes, then the mental state also changes. If S believes that p, and "belief that p" picks out a set of dispositions, the manifestations of which involves S's environment, then if the environment changes in some way relevant to S's behaviors, then the S's manifested behavioral dispositions likewise change. If there is no fridge nearby, then it is difficult to ascribe to S the belief that there is beer in the fridge; there is simply no fridge in the environment with which S can interact. We may, using subjunctive conditionals, claim that *if* there were a fridge nearby and *if* it had beer in it, then S would believe that there is beer in the fridge; but, this just further highlights the sensitivity of belief to contexts – if the context were changed so that there were a fridge with beer in it, then S would believe that there is beer in the fridge.

Mapping this to communicative intentions, dispositions relevant to communication are sensitive to context. Return to the case of Susan and Harry from above. Susan waves her hand at Harry and says "I'll be at the dentist's tomorrow at 9", a set of actions which is Harry's reason for believing that Susan will be at the dentist's tomorrow at 9. Now, if Harry were blind, then obviously Susan's hand-waving action would not have the effect it has when Harry is sighted. Susan in such a case might shout "Harry – listen up!" before saying "I'll be at the dentist's tomorrow at 9". Her shouting "Harry – listen up!" has the same effect as her hand-waving in our case when Harry is sighted. Her communicative intention for Harry to believe that she'll be at the dentist's tomorrow at 9 is sensitive to context in that she changes her communicative behaviors to achieve the desired goal.

Examples of the sensitivity of embodied mental states satisfying the theoretical role of communicative intentions are as ubiquitous as examples of their publicity. If a speaker is talking on his phone in a crowded train station and notices an unwanted eavesdropper, he will typically lower his voice or move away from the eavesdropper. If a speaker knows that her audience is hard of hearing, she will speak more loudly and make eye contact. If a speaker communicatively intends her audience to believe that p and uttering "p" will not be reason for her audience to believe p, though uttering "q" will, then the speaker will utter "q".

In summary, this account of mental states – stemming from combining a robust account of embodied cognition with a dispositional theory of mental states – exhibits publicity and sensitivity. Embodied mental states are public because mental states include behavioral dispositions, which are

open to public view. They are sensitive to context because behaviors stemming from dispositions change with differences in the environment, so if the context changes then any mental state ascription will likewise change.

4. Cognitivist Account Versus the Embodied Account

The argument that follows compares the ontological commitments of the cognitivist model of communicative intentions and the embodied model and shows that the embodied model has fewer ontological commitments. On the basis of theoretical parsimony, the embodied model is superior to the cognitivist model. Let us now summarize these two accounts.

On the cognitivist account, private mental states satisfy the role of communicative intentions. Psychological language picks out private, internal entities. Agents ascribe private mental states to others based on behavior via a process of abduction.

On the embodied account, behavioral patterns satisfy the role of communicative intentions. Psychological language picks out behavioral, phenomenal and cognitive dispositions, and behavioral patterns are public. Agents ascribe embodied mental states to others by describing the pattern of behavior; for an agent to exhibit mental state M is just for the agent to manifest specific dispositions.

The argument that follows mentions only *behavioral* dispositions from the embodied account. This is because, for the sake of this argument, I am concerned only with the ascription, to S by H, of the relevant beliefs, desires, and intentions realizing some token communicative intention. While I believe that the embodied model is more elegant – and hence superior – to the cognitivist model, even when including phenomenal and cognitive dispositions, I here consider only behavioral dispositions to simplify the argument for space concerns. So, the cognitivist model and the embodied model of mental states are compared on the same points: mental state ascriptions and behavioral patterns. It should be noted, though, that these are terribly important points with respect to communicative intentions: in order for S to communicate p to H, not only must S have the appropriate communicative intention, realized as beliefs and desires, but H must also ascribe those beliefs and desires to S, at least partly in virtue of behavioral patterns.

The argument from this point is a simple matter of parsimony. The cognitivist account and the embodied account of mental states can both equally well satisfy the theoretical role of communicative intentions: both the cognitivist account and the embodied account endorse entities that satisfy the characteristics of publicity and sensitivity. The cognitivist account, however, has a larger ontology than the embodied account. Recall that on the cognitivist account, psychological terms pick out private, inter-

nal entities that exist *in addition to* the behaviors that agents use to ascribe those mental states. Agents ascribe mental states to others on the basis of behavior, and the internal state is what is responsible for S's behavior. For example, imagine that S utters to H, "Classes in logic are dull". If S means *classes in logic are dull* by her utterance, then S's tokens the relevant inner beliefs and desires for the realizing the communicative intention. H ascribes to S the relevant beliefs and desires on the basis of S's behaviors, e.g. uttering "Classes in logic are dull", S's looking at H while uttering it, S's using the appropriate tone relevant to a truthful assertion, etc. The cognitivist model, then, endorses in its ontology the relevant patterns of behavior for ascribing the beliefs and desires realizing S's communicative intentions *and* inner belief and desire states tokened in S. Put otherwise, psychological language picks out inner states and inner states are ascribed to agents in virtue of behavioral patterns; the cognitivist model's account of communicative intentions endorses, for some given communicative interaction, private states *and* behavioral patterns.

The embodied account, by contrast, has a leaner ontology. Psychological terms pick out behavioral, phenomenal and cognitive dispositions; mental states are embodied because to be in a mental state M means, at least in part, engaging in specific forms of bodily behaviors. Imagine, again, that S utters to H, "Classes in logic are dull" and means by her utterance that *classes in logic are dull*. Embodied mental states, on this account, realize S's communicative intention. H ascribes to S the relevant beliefs and desires on the basis of S's behaviors, e.g. uttering "Classes in logic are dull", S's looking at H while uttering it, S's using the appropriate tone relevant to a truthful assertion, etc. And S's having those beliefs and desires *just means* exhibiting the appropriate dispositions, such as those mentioned in the previous paragraph. Put otherwise, psychological language picks out behavioral patterns, and mental state ascriptions *just are* identifications of those behavioral patterns; the embodied model's account of communicative intentions endorses, for some given communicative interaction, behavioral patterns.

As we see, both the cognitivist account and the embodied account are capable of explaining the same phenomena, but the cognitivist endorses a larger ontology. Consequently, the embodied account is superior.

5. Objection and Reply

Cognitivists could reply to the above argument by pointing out that their account, though less parsimonious, has a great deal of explanatory power.[35]

[35] Cf. Pylyshyn (1984).

For example, internal communicative intentions play a central role in explanations of social cognition. If Sam utters to Harriet, "I am hungry", then Harriet has a very good reason to think that Sam is hungry. But Sam could also write "I am hungry" or utter "Tengo hambre" to accomplish the same thing. Further, if Harriet were the one to utter "I am hungry", to write "I am hungry", or utter "Tengo hambre", then Sam would have very good reason to think that Harriet is hungry. What best explains how each figures out what the other believes or feels is that the belief or feeling is communicated to the hearer by an utterance caused by a private communicative intention. Appeals to brain states are explanatorily useless in this instance; and, each of Sam's and Harriet's behaviors are different, obviating a unifying feature that would explain why the hearer believes that the speaker is hungry. Appeals to private communicative intentions are explanatorily powerful in ways that appeals to behaviors and brain states are not.

Failures of communication are explained by appeal to private communicative intentions. Suppose Sam and Harriet are sitting on a park bench. Nearby is an ice cream vendor seen by Sam but not Harriet because Sam is blocking Harriet's view of the vendor. Sam knows that Harriet loves ice cream and will offer to buy a round should she see the vendor; Sam does not want to be overt in drawing Harriet's attention to the vendor for fear of being thought of taking advantage of Harriet's generosity and love of ice cream. Sam causally leans out of the way so that Harriet has a clear view of the vendor. Sam's plan works and Harriet, spying the ice cream cart, offers to buy ice cream for the both of them.

Intuitively, Sam does not *communicate* to Harriet anything about the ice cream vendor. By leaning back, he creates the conditions in which Harriet comes to believe there is an ice cream vendor nearby, but this is not the same as Sam's saying to Harriet, "Look, there's an ice cream vendor over there". The difference between Sam's leaning back and Sam's performing an utterance accomplishing the same thing is explained by appeal to a private communicative intention. In the case of the utterance, Sam's action was caused by a communicative intention that was recognized by Harriet. In the case of Sam's leaning back, Sam's action was caused by an intention for Harriet to see the ice cream vendor. The difference between Sam's intention in each case is that Sam's communicative intention for Harriet to believe there is an ice cream vendor nearby is itself recognized as an intention for Harriet to believe there is an ice cream vendor nearby. Sam's intention for Harriet to see the ice cream vendor is neither recognized nor intended to be recognized as an intention for Harriet to believe there is an ice cream vendor nearby. That is, the difference between how Harriet comes to believe that there is an ice cream vendor nearby is an appeal to Sam's internally located intention.

Private communicative intentions likewise form a crucial part of explanations in comparative psychology for why language use is characteristically human. Humans are capable of sophisticated sorts of communication while other primates, though having complex communicative systems of their own, are incapable of the type of sophistication human language use enjoys.[36] Humans have sophisticated communicative abilities because they are capable of forming private communicative intentions while other primates are incapable of forming such intentions.

In light of the explanatory power gained by positing private communicative intentions, worries about parsimony fall to the wayside. It is an acceptable practice in theory building to introduce elements into one's ontology when doing so greatly increases one's explanatory capacities, which is the case with internal, private intentions and linguistic behavior.

The response available to the embodiment theorist is to recognize the role of communicative intentions in linguistic interaction, but deny that private entities are required to explain the phenomena cited in favor of internal representations. Part of the response involves suggesting how the embodied cognition theorist has the resources to account for the range of phenomena explained on the cognitivist account. Fully addressing how the embodied cognition theorist can account for the phenomena the cognitivist can explain is outside the scope of this paper, but here I will suggest what such an account looks like, leaving aside the details.

On the cognitivist account, "communicative intention" denotes an internal representation, and communicative actions are generated by the tokening of the relevant communicative intention. On the account presented in this paper, "communicative intention" denotes dispositional stereotypes, consisting of clusters of behavioral, phenomenal and cognitive dispositions. Pylyshyn's[37] argument – that appeal to internal representations captures explanatory interests of the cognitive psychologist – seems right in that the neuroscientist and the behaviorist miss something important about our everyday explanations of behavior. Consistent with this intuition is endorsement of the explanatory power of folk psychology – explanations of behaviors in terms of beliefs, desires, goals, aims etc. – and an embodied account of thought and cognition. When Sam utters "I'm hungry" or "I'm famished", Harriet rightly thinks that Sam is hungry. What behaviorists miss, among other things, is the usefulness of ascribing to Sam the feeling of hunger or the belief that he is hungry. Behaviorists, in their attempt to reduce psychological language to behavioral language, miss the usefulness of psychological talk and the explanatory power of positing psychological entities. But, the explanatory power of positing folk

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36 Cf. Povinelli & Vonk (2003).
37 Pylyshyn (1986).

psychological entities does not itself require that those entities be private, internal representations. Rather, it could be that psychological entities picked out by belief-, desire-, and intention-talk are clusters of behavioral, cognitive, and phenomenal dispositions, none of which is reducible to behavioral language.

Concerns like those of explaining what makes human communication unique or what distinguishes instances of communication from inference are still addressable by an embodied account of thought and cognition. Instead of appeal to internal representations, such phenomena are explained by an appeal to dispositions. I suggest that appealing to dispositions places greater weight on the discovery of biological systems and structures that are sensitive to environmental conditions in some instance of communication.

Folk psychological explanations capture important generalizations in explanations of human behavior. An embodied account of thought and cognition can capture intuitions about the usefulness of folk psychological generalizations. Consequently, the cognitivist's appeal to the explanatory power of internal representations is otiose.[38]

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