

Perceptual Attitude Mindreading

1 Introduction

Mindreading, as defined by Jose Bermúdez, is the act of predicting the behavior of other creatures by one of the following means: recognizing a change in the psychological states of another creature (*minimal mindreading*), projecting possible perceptual representations onto other creatures (*perceptual mindreading*), or projecting possible propositional attitudes onto other creatures (*propositional attitude mindreading*). I argue that there is a fourth alternative wherein a non-linguistic creature has an attitude about a perception in the absence of language. These attitudes are functionally equivalent to propositional attitudes. By explicitly representing these kinds of attitudes in other creatures, they engage in *perceptual attitude mindreading*. *Perceptual attitude mindreading* would have a similar level of indistinctness¹ to *propositional attitude mindreading*, making it functionally analogous as such. To defend *perceptual attitude mindreading*, I argue that propositions themselves do not have any special properties which get inherited by propositional attitudes. That is, propositions and analog images can be considered to be two species of the same genus—representational content about the world.

Bermúdez’s primary goal² is to show that *propositional attitude mindreading* does not and cannot exist in the absence of language. This due to the ‘canonical structure’ of propositions. He argues that propositions are necessarily linguistic in nature, and thus creatures that lack language lack the ability to have propositional attitudes. *Propositional attitude mindreading* is the act of predicting the behavior of other creatures by explicitly representing some possible propositional attitudes that that creature has. I intend to show that non-linguistic creatures can participate in what Bermúdez calls complex *mindreading*; that is, they can predict the behavior of linguistic creatures by representing their attitudes appropriately.

Propositional attitudes are generally considered to be beliefs, desires, intentions, and so on. If, per Bermúdez, propositions have a necessarily linguistic structure³, then non-linguistic creatures cannot have attitudes towards propositions. I do not accept the claim that propositions have some special status as opposed to analog images. As such, it follows that non-linguistic animals can appropriately attribute certain attitudes to linguistic creatures by projecting non-linguistic attitudes to linguistic creatures as stand-ins for propositional attitudes. Moreover, they can and do make successful predictions about the behavior of linguistic animals.

Attitudes are subjective mental stances that creatures take towards some concrete or abstract entity. These stances are evaluative. Eagly and Chaiken define attitudes as, “...psychological tendenc[ies]...expressed by evaluating a particular entity with some degree of favor or disfavor.”⁴ I agree that ‘propositional attitudes’ are a subjective stance that can only be taken towards propositions which are expressed linguistically—i.e. as sentences. I disagree with Bermúdez that their ‘canonical structure’ gives them a special status. The ‘canonical structure’ of propositions is as follows: “Subject-copula-Predicate; where a copula links a subject, which may consist of a quantifier and a general term, to a general term.”⁵ This ‘canonical structure’ is inherited from Aristotelian logic.

¹ This is defined more specifically near the end of the introduction, but it is helpful to think of distinctness in terms of variability. If some representational content can be multiply-realized, it has a high level of indistinctness.

² Jose Bermúdez, “Mindreading in the Animal Kingdom?”. *The Philosophy of Animal Minds* (2009): 163. “The principal aim of this essay was to argue that propositional attitude mindreading does not and cannot exist in the absence of language.”

³ Bermúdez, “*Mindreading*,” 162.

⁴ Alice H. Eagly and Shelly Chaiken. “Attitude, Structure and Function.” *Handbook of Social Psychology* (1998): 1.

⁵ Paul Pietroski, “Logical Form.” *The Stanford Encyclopedia of Philosophy* (2016): §2 Propositions and Traditional Grammar

The purpose of deriving this ‘canonical structure’ is to uncover some syntax which is universal amongst all thought. Starting with Kant, it has been under scrutiny as it allows for—and sometimes requires—illogical inferences.⁶ It allows for motion from premises to conclusions such as: ‘(P1) That cow is a mother’ and ‘(P2) That cow is Bill’s’ to ‘(C3) That cow is Bill’s mother’. The syntax of thought, if it is directly correlated to the structure of language, will not allow for those kinds of inferences. The pursuit of the relationship between the syntax of thought and the syntax of language is one that has gripped philosophers for centuries.

If the ‘canonical structure’ of propositions cannot be postulated as necessary or absolute, then propositional attitudes do not necessarily inherit some special status given only that they are attitudes towards propositions. While I may defend this claim in the depth it deserves in a later work, this is an exclusive claim as regards *mindreading* for the purposes of this paper. In short, I will defend the view that attitudes towards propositions and attitudes towards the content which those propositions represent are functionally equivalent as regards the prediction of the behavior of others. The scope of my claim pertains only to propositions which point to concrete entities. This is because certain abstract entities may require linguistic determination. It follows that the scope of my claims pertains specifically to attitudes which evaluate concrete entities.

Even if propositions themselves were necessarily linguistic, their functional role in *mindreading* is not propped up by their linguistic structure, but by what I will call their ‘distinctness’. *Distinctness* is a property I attribute to representational content within the framework of Bermúdez’s claims about *mindreading*. The more *distinct* some representational content is, the less variability or variety it will have. Bermúdez argues: “The more complex and variable the relevant elements of the background psychological profile, the more necessary explicit representation becomes, and the more extensive it has to be.”⁷ He goes on to explain that he takes ‘complexity’ and ‘variability’ to be different phenomena; just because something is complex does not mean that it must be represented explicitly. It is the variability of a background psychological profile which lends itself to the failure of behavior prediction. This variability is a measure of the realizability of psychological profiles. They can be configured in a multitude of ways and produce similar or different behaviors.

Variability, on Bermúdez’s view, does not only apply to psychological states, but to analog images, propositions themselves, mental representations, and so on. *Distinctness*, then, is a measure of this variability. It is not the complexity of some content which is at issue in behavior prediction, and so I will not rely on complexity when discussing the continuum or spectrum of *distinctness* and how it applies to *mindreading*. I will show that Bermúdez is implicitly arguing for the thesis that the more *distinct* some content is—the closer it is to being realizable in only one way—the more likely it is that said content will have direct implications for behavior. Given this relationship between the realizability of content and implications for behavior, I argue that—within Bermúdez’s framework—non-linguistic animals can and do participate in substantial intellectual achievements⁸ that are functionally analogous to *propositional attitude mindreading*.

Bermúdez argues that, “...psychological states lie on a continuum in terms of the directness of their implications for behavior.”⁹ This directness of their implication of behavior has a direct correlation with the possible *distinctness* of some content. The more distinct the representational content—the lower the chance for variability—the more direct the implication for behavior becomes. Bermúdez claims that, “...propositional attitudes are collectively located at one end of our continuum. They typically do not have direct implications into action.”¹⁰ He then claims that propositions themselves are ‘canonical’ in structure, leading to their lack of variability.

⁶ Paul Pietroski, “Logical Form.” (2016): §3

⁷ Bermúdez, “*Mindreading*,” 150.

⁸ Bermúdez, “*Mindreading*,” 150.

⁹ Bermúdez, “*Mindreading*,” 149.

¹⁰ Bermúdez, “*Mindreading*,” 151.

This lack of variability, or high *distinctness*, places propositions *per se* at the opposite end of the continuum from propositional attitudes. Similarly, Bermúdez claims that analog images themselves are highly indistinct because of their ‘non-canonical nature’¹¹, while *perceptual mindreading* is highly distinct given its very low variability and its exploitation of representational contents which have very direct implications for action. What I call *perceptual attitude mindreading* will have a similar level of *indistinctness* as *propositional attitude mindreading*. As regards behavior prediction, it is multiply-realizable. I argue that non-linguistic animals can and do have non-linguistic attitudes about their perceptions of the world. They have beliefs, desires, and intentions which, though non-linguistic, affect their behavior in very meaningful though indirect ways. This can in turn be exploited by others. The ability to predict the behavior of others in a functionally analogous way to *propositional attitude mindreading* is a great cognitive feat for any creature. Although it seems he has failed to realize it, Bermúdez has given us a framework wherein we can attribute what he considers to be complex *mindreading* to non-linguistic animals.

2 Mindreading in the Animal Kingdom

2.1 The predictive power of mindreading

Minimal mindreading aside, any creature that successfully participates in either *perceptual* or *propositional attitude* mindreading will be more or less successful in predicting the future behavior of the creature whose mind is being read. Participating in *perceptual mindreading* does not require explicitly representing some possible mental representations of another creature in order to successfully predict their behavior. It only requires being in some perceptual relationship with them such that one can predict what is within the scope of their perceptual field. Bermúdez relies on an example of leaving a hundred-dollar bill on the ground in the middle of a pathway; simply seeing someone see the bill is enough for one to make an inference that they will pick it up. One need not explicitly represent their mental representation of the bill in order to make the inference.

When it comes to *propositional attitude mindreading*, one must explicitly represent the possible propositional attitudes of the other person in order to predict their behavior. For example, if someone looked as though they were going to jump across a chasm where failure would lead to certain death, one would have to explicitly represent the propositional attitudes that that person intends to jump the chasm, that they believe they can make the jump, and so on.¹² If there was a tiger backing them towards the chasm their intent or belief in their making the jump would be less relevant. Seeing that that person notice the tiger would be better evidence to infer that they *might* attempt to jump the chasm, beliefs, and intentions aside.

I argue that participating in *perceptual attitude mindreading* requires explicit representation of the possible perceptual—non-linguistic—attitudes that a creature holds in order to predict their behavior. A dog at the park may see a goose which is equidistant from a bush and a lake. The dog believes that the goose will, when approached, attempt to take refuge in either the bush or the lake. The goose, in forming a non-linguistic attitude about the dog, may have the intention of making it to the lake, where she will be on superior footing to escape. The dog, in explicitly representing that intention, may cut the goose off towards the lake in order to force it towards its second escape route. In relying on each other’s background psychological profiles and attitudes, each is predicting the behavior of others in complex ways. These ways are highly indistinct due to their variability and also allow for a kind of primitive, proto-theoretical deception that is somewhat common in the non-linguistic animal kingdom.¹³

2.2 Minimal Mindreading

¹¹ Bermúdez, “*Mindreading*,” 159.

¹² William James, *The Will to Believe and Other Essays* (New York: Longmans, Green, and Co., 1897), §183.5.

¹³ Bermúdez, “*Mindreading*,” 159. “The aim in tactical deception... is to generate false beliefs in another agent[.]”

For Bermúdez, many creatures participate in *minimal mindreading*; the only prerequisite for participation in this kind of mindreading is to be able to recognize that the psychological state of another has changed at all. It is not necessary for the creature participating in the mindreading to project what the content of the previous or the new psychological state was or is, just that it is different now than it was then; the possible content of the psychological states is irrelevant.

2.2.1 Changes in the psychological states of others affect behavior of the mind reader

An example of minimal mindreading is shown in the experiments explained by Bermúdez about a dog presented with a treat hidden in one of two or three opaque containers. When the experimenter gestures towards the container, looks at the container by moving their eyes, or gives other ‘social cues’, the dog does significantly better at selecting the container that is hiding the treat than it would on its own. It is posited that it is the change in the psychological profile of the experimenter that leads to the higher success rate in this case. As such, the dog is participating in *minimal mindreading*. *Minimal mindreading* yields highly distinct predictions about behavior, but of the creature doing the mindreading, and not of the other. As such, it does not fall on the spectrum of comparative distinctness in the relevant way.

2.3 Perceptual Mindreading

Perceptual mindreading requires that a creature project a possible perceptual representational state onto another creature; the content of the possible perception is relevant in this case. This projection does not require explicitly representing the representational state of the other creature. As previously discussed in the case of the hundred-dollar bill, one only need perceive that another creature is properly poised to perceive some content in order to make inferences about their future behavior. Simply seeing another creature notice something that will distinctly and directly affect their behavior is evidence enough to make an inference that will likely yield true results.

2.3.1 Navigating stereotypical interactions

Per Bermúdez, linguistic and non-linguistic creatures engage in *perceptual mindreading* constantly. Humans use *perceptual mindreading* to navigate stereotypical social situations. When eating at a restaurant, simply perceiving the uniform of a waiter is enough to infer that they are the right person to ask for extra utensils. One need not explicitly represent the representational state of the waiter where they see themselves as performing that social role in order to make these high-yield, highly distinct inferences. In comparison to *minimal mindreading*, it is a less distinct form of mindreading. It has a much higher chance to yield false results. In the case of the waiter, it could be that someone has ill-fatedly dressed in attire that resembles that of a waiter’s at a restaurant, leading one to ask a person who is not fulfilling some social role to perform a task which they are in no position to perform. These kinds of mistakes are what put *perceptual mindreading* just below the level of ‘absolutely distinct’ on the comparative spectrum of distinctness explicated on in §3 below.

2.4 Propositional Attitude Mindreading

Propositional attitude mindreading has some similar requirements to *perceptual mindreading*, but also requires explicitly representing some possible propositional attitude such as a belief, desire, or intention of another creature in order to predict their behavior. *Propositional attitude mindreading* requires linguistic ability—or, for Bermúdez, the ability to explicitly represent propositions according to their necessarily linguistic ‘canonical structure’—as well as knowledge of the ‘background psychological profiles’ of the creature whose behavior is being predicted.

2.4.1 The distinctness of propositions as a singly-realizable phenomenon

On my view, it is not the ‘canonical structure’ of propositions that is being relied on for behavior prediction, but the distinctness of the way propositions map onto the world. The view of propositions that Bermúdez takes to be accurate relies on the subject-predicate form. Frege challenges this form with what he calls a ‘function-argument structure’.¹⁴ This structure maps functions of propositions into the whole which they represent. For Frege, although some—if not most—propositions can be represented with a subject-predicate form *in English*, this is not the underlying structure that propositions take. The underlying structure of propositions is more akin to what Frege calls ‘conditional mapping’¹⁵. On this treatment, “[Frege] departs radically from the traditional idea that the grammatical structure of sentences reflects the logical structure of the indicated proposition.”¹⁶ This radical departure is in direct opposition to Bermúdez’s claims about the ‘canonical structure’ of propositions. He outright denies the possibility of conditional mapping and posits that, “it is almost a tautology that sentences express propositions.”¹⁷

I have argued that *distinctness* is the target value that ought to be referred to when making claims about the kinds of *mindreading* that creatures, linguistic and non-linguistic alike, can participate in. Bermúdez’s claims that the ‘canonical structure’ of propositions is necessarily linguistic, and to defend his position, this makes sense; propositions are linguistic statements about the world—sentences—which are truth-apt.¹⁸ By his own account, however, propositions are powerful representations of the world because of their lack of variability, not their linguistic structure. Their linguistic structure is supposed to reveal their invariability, not provide it. It may be the case that non-linguistic animals cannot participate in *propositional attitude mindreading* simply because they lack the linguistic skills to grasp *sentences*, but not *propositions* themselves. On his own view, propositions are functional tokens with the purpose of representing or expressing some statement *about the world*. If perceptions have a similar level of variability to propositions—they are very *distinct*—then while linguistic sentences about the world are truth-apt, the functional token of analog images mapped onto propositions and vice versa can be equally relied on by linguistic and non-linguistic creatures alike as regards behavior prediction.

3 The Spectrum of Comparative Distinctness

In order to argue that Bermúdez has misunderstood what gives propositions their *distinctness*, it is important to get clear on Bermúdez’s claims about the difference between the fundamental structure of propositions—which he claims to be necessarily linguistic—and the fundamental structure of analog images. These underlying structures are supposed to be the major force behind his argument that non-linguistic animals cannot participate in the mindreading which relies on attitudes towards propositions. If certain kinds of mindreading require explicitly representing possible mental states of other creatures in order to predict their behavior, then creatures who lack the ability to explicitly represent certain kinds of mental states are barred from that participation by default. In short, if a certain kind of mindreading requires explicitly representing language, non-linguistic creatures are barred from participation. As previously noted, my claims pertain strictly to concrete entities which can be evaluated by attitudes.

3.1 Propositions versus Images

Bermúdez argues that in order to participate in *propositional attitude mindreading*, one needs the ability to represent propositions at all. If the ‘canonical structure’ of propositions are necessarily linguistic, then a prerequisite to participation in *propositional attitude mindreading* is being a linguistic creature. Bermúdez argues that the ‘canonical structure’ of propositions lends to their high level of *distinctness* in the way they represent the world. Propositions do not get realized with a high level of variability. Attitudes

¹⁴ Paul Pietroski, “Logical Form.” (2016): §4 Frege and Formal Language

¹⁵ Paul Pietroski, “Logical Form.” (2016): §4 Frege and Formal Language

¹⁶ Paul Pietroski, “Logical Form.” (2016): §4 Frege and Formal Language

¹⁷ Bermúdez, “*Mindreading*,” 158,162.

¹⁸ Bermúdez, “*Mindreading*,” 158.

towards propositions, however, are multiply-realizable and have an indirect implication for behavior. Contra propositions, analog images do not share this ‘canonical structure’, and thusly represent the world in highly indistinct, multiply-realizable ways. As previously noted, I do not share this view, although it seems to be the standard view throughout the literature.

3.1.1 Images as indistinct

Bermúdez argues that images are multiply-realizable, analyzable in many different ways and as such they cannot be said to have the same ‘canonical structure’ as propositions. This places them on the indistinct category on the spectrum of comparative distinctness.¹⁹ This means that images, or analog representations, are found around the same level of indistinctness of representation as propositional attitudes are. It follows that they have a similarly indirect implication for behavior.

3.1.2 Propositions as distinct

For Bermúdez, propositions, due to their lack of variability, are found to be very distinct on the spectrum. I am not sure that this claim is truth-oriented in itself, but as I am working within his framework, it does not need to be the case that it is. I aim only to show that whether propositions have low variability or not, their *distinctness* will ultimately covary with the *distinctness* of analog representations.²⁰ On his analysis, they are found in the same range of distinctness as *perceptual mindreading*. This similarity outlines the functional work that the *distinctness* of mental content is doing in Bermúdez’s framework. It is the *distinctness* of some mental content that lends to its direct or indirect implication for behavior. As propositions and *perceptual mindreading* are very distinct, each has a direct implication on behavior. It is this implication for behavior on which my view of analog images and propositions as variably equitable turns. Inconsequentially, whether propositions and analog images turn out to be *distinct* or *indistinct*, attitudes towards either will turn out to be *indistinct* given their high variability and indirect implication for action.

3.2 Analog images and propositions as variably equitable

Given my earlier discussion of Frege and post-Aristotelian considerations, my argument posits that analog images belong on the variably distinct side of the spectrum. Bermúdez categorizes images as indistinct because they do not share the ‘canonical structure’ of propositions, and thus are multiply-realizable. This is a mistake. As I argued in §2.4.1, his considerations of the ‘canonical structure’ of propositions can be rejected on multiple grounds. I agree that there may be a ‘canonical structure’ to linguistic expressions of propositions (i.e. sentences). Propositions themselves are more appropriately considered functional maps of content-about-the-world. Bermúdez defines propositions as representations of a state of affairs.²¹ Analog images are also representations of states of affairs. Without his distinction which turns on the ‘canonical structure’ of propositions, it is the relationship to some state of affairs which determines the variability of each. As such, I argue that their *distinctness* is similar. It follows that attitudes towards propositions or analog images—both of which are representations of states of affairs—will turn out to be *indistinct* given their variability and indirect implication for action. *Distinctness*, both in cases of *propositional attitude* and *perceptual attitude mindreading*, is functionally equivalent.

¹⁹ See Fig 1 on the next page. This is an analog representation of where Bermúdez places the content he discusses given its variability and directness of implication for behavior. I rely on his analysis of where the content belongs on the spectrum to make my claims, although I point out my disagreements on some of this placement throughout the paper. Fig 2 contains my rearranging of the content.

²⁰ See §3.2.

²¹ Bermúdez, “*Mindreading*,” 158.

4 The Spectrum of Comparative Distinctness in Behavior Prediction

Throughout this essay I have been arguing that it is not the ‘canonical structure’ of propositions that lends to their functional role in *mindreading*. It is their *comparative distinctness* that is the appropriate property to lean on in terms of their functional role in behavior prediction. I use the term ‘comparative distinctness’ to point to the inconsequential covariation of this *distinctness* of propositions and analog images alluded to in §3.2. *Fig 1* (below) shows Bermúdez’s categorization of these representations of states of affairs and attitudes towards them as he outlines them. This relies on his understanding of propositions as maintaining a ‘canonical structure’ which dignifies them above analog representations. This dignity is inherited by propositional attitudes, and thus raises *propositional attitude mindreading*, on his view, to the highest form of *substantive mindreading*.

On the other hand, if the functional role of any representation of some state of affairs as regards behavior prediction through *mindreading* is based on its *distinctness* as I have argued, then we find that the Spectrum of Comparative Distinctness takes the form of *Fig 2*. Notice, ‘images’ have moved from *indistinct* to *distinct* under ‘propositions’, and *perceptual attitude mindreading* can be found above *propositional attitude mindreading*.

When we separate the poles of the spectrum into two categories—those that require explicit representation and those that do not—we can see how ‘propositional attitudes’ and ‘images’ require explicit representation in order to predict behavior based on attributions of those states on Bermúdez’s view. However, something has gone wrong here. Bermúdez succinctly claims that relying on analog representations of the world *does not* require explicit representation in order for behavior prediction to occur. *Perceptual mindreading* requires nothing more than finding oneself in a perceptual relationship between another and some state of affairs to accurately predict their behavior.

After making the adjustments to *Fig 1* such that we get *Fig 2*, we find that any attitudes towards perceptions—*perceptual attitudes*—will be on the indistinct side of the spectrum with *propositional attitudes*. As such, they will require similar kinds of representation in order for behavior prediction to occur. Propositions and images, per *Fig 2* (and my view) have a functionally analogous role in behavior prediction. Propositions do not rely on some ‘canonical structure’, nor does *propositional attitude mindreading* inherit some special status from that structure. When parsing out Bermúdez’s implicit underlying categorization of kinds of representational content and comparing them with his claims about their functional role in *mindreading*, *Fig 2* more accurately represents his claims about their roles.

Fig 1:

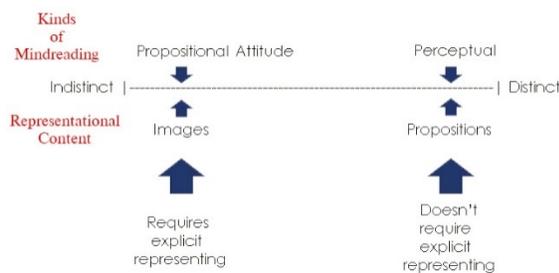
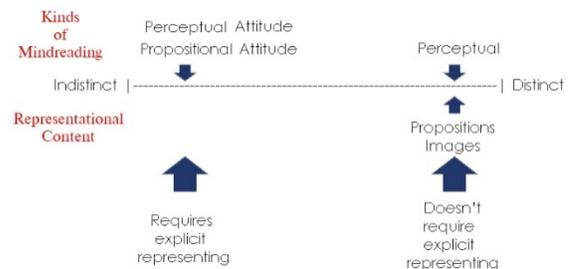


Fig 2:



4.1 Distinctness and failures of prediction have inverse correlations

Per *Fig 1* above, the representations that fall under very distinct do not require explicit representations. Due to this, a high level of distinctness covaries with a high level of direct success in predictions about the behavior of another. One need not represent the mental state of a person who sees a hundred-dollar bill on the ground to make a prediction that they will ultimately pick it up. Inversely, when we refer to the chasm-jumping example in §2.1, one needs to represent the possible attitudes that one has towards the mental token—either propositional or perceptual—in order to reason about whether or not that

creature will attempt the jump without countervailing forces present. This covariation holds between *Fig 1* and *Fig 2*. The covariation relationship helps to see why *Fig 2* is a reasonable mutation of the original claims found in Bermúdez's exposition of *mindreading*.

5 Conclusion

Given the inverse correlation between the distinctness of a representation and the failure of making predictions about the behavior of some creature undergoing that mental state, we can see why *propositional attitude* and *perceptual attitude mindreading* would require a similar level of cognitive ability in either linguistic or non-linguistic creatures. This lends to their functionally analogous nature. If a non-linguistic creature can have token attitudes about perceptions that do not have a direct impact on their behavior in a functionally analogous way to how propositional attitudes affect the behavior of linguistic creatures, then predicting the behavior of another creature through *perceptual attitude mindreading* will be similarly indistinct.

I argue that the *distinctness* of representational content and the necessity of its explicit representation have an inverse correlation. This is also the case between the *distinctness* of some representational content and the probability for failing to predict the behavior of others. If this is true, then *distinctness value* of some representation of a concrete entity is a reasonable property upon which to analyze the functional similarities between propositions and analog images or perceptions as regards a creature's ability to reason about and predict the behavior of other creatures. Being able to engage in (i) *minimal mindreading* and (ii) *perceptual mindreading* means being able to (i) perceive changes in the background psychological profiles of others and (ii) implicitly attribute certain kinds of mental states to that other. If the leap to (iii) *propositional attitude mindreading* requires (iii) an understanding of the background psychological profile of the other and the ability to reason about behavior given that profile, then the jump from (i) and (ii) to (iii) or its functionally analogous counterpart (iii*) *perceptual attitude mindreading* is possible given that attitudes towards perceptual states and propositions are functionally identical in terms of their role in behavior prediction by *mindreading* in the animal kingdom.

Works Cited

- Bermúdez, José Luis. “Mindreading in the Animal Kingdom?.” *The Philosophy of Animal Minds*, ed. Robert W. Lurz. New York: Cambridge University Press (2009): 145-164.
- Eagly, Alice H., and Shelly Chaiken. “Attitude, Structure and Function.” *Handbook of Social Psychology*, ed. D.T. Gilbert, Susan T. Fisk, and G. Lindsey. New York: McGowan-Hill (1998): 269–322.
- Frege, Gottlob. “Begriffsschrift: A formula language of pure thought modelled on that of arithmetic.” *The Frege Reader*, ed. Michael Beaney. New Jersey: Blackwell (1997).
- James, William. *The Will to Believe*. New York: Longmans, Green, and Co., 1897.
- Pietroski, Paul. “Logical Form.” *The Stanford Encyclopedia of Philosophy*, ed. Edward N. Zalta. (Last modified 2016): <https://plato.stanford.edu/archives/spr2016/entries/logical-form/>