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UNDERSTANDING OTHER CONSCIOUS MINDS

by

NICHOLAS ALONSO

Under the Direction of Neil Van Leeuwen, PhD

ABSTRACT

Thinking about others' conscious experiences (emotional feelings, perceptual experience, moods, etc.) seems commonplace in human social life, yet this aspect of social cognition has been largely ignored by social psychologists and philosophers. In this paper, I develop the beginnings of an account of how we understand other conscious minds. My view builds off of the dominant hybrid theory, which is the view that people use two distinct processes to think about others' mental states: theorizing and mental simulation. My main argument is that we can attribute conscious experiences to others using either simulation or theorizing, but simulations are better mental representations of others' conscious experiences than instances of theorizing. Simulations thereby provide us with a deeper understanding of others' experiences than theorizing does.

INDEX WORDS: Folk Psychology, Theory of Mind, Consciousness, Simulation Theory

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Master of Arts

in the College of Arts and Sciences

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1 INTRODUCTION

People think about other people's conscious experiences. We often, for instance, think about what others are feeling or what it is like to see the world from their point of view. The way we come to understand others' conscious experiences, however, is a topic that has historically received little attention by social psychologists and philosophers. Traditionally, the focus has been on explaining the way people understand the contents and causal-functional properties of other people's attitudes (e.g. beliefs, intentions, and desires) for the purpose of predicting and explaining others' behavior — a practice often called 'folk psychology' or 'mindreading' (e.g. Daniel Dennett, 1987; Alison Gopnik & Andrew Meltzoff, 1997; Shaun Nichols & Stephen Stich, 2003). But, conscious experiences have properties that are distinct from causal properties. They also have phenomenal character or what-it-is-likeness. Moreover, many conscious experiences have contents that seem distinct from the contents of attitudes. Contents of experience seem, for example, much more rich and finely grained than the contents of attitudes like belief (Raffman, 1995; Block, 2011). Thus, the question of how we come to understand the *experiential* properties of other minds is a question that has been left largely unanswered.

In this paper, I develop the beginnings of an account of how we understand other people's conscious experiences. My view builds off of the currently dominant hybrid theory, which is the view that people use two distinct processes to mindread: theorizing and mental simulation.¹ Theorizing involves the use of a body of information about mental states (a theory of mind) stored in our brains to make inferences about other people's mental states and behaviors. Simulation processes involve replicating other people's mental processes in our own minds through the reuse of our own cognitive mechanisms. My main argument is that people attribute

¹ Shannon Spaulding's (2018) recent assessment is that hybrid theories are the "main contemporary general theories" of mindreading (64).

conscious experiences to others using both simulations and theorizing, but simulations are better mental representations of others' conscious experiences than instances of theorizing. Simulations, for this reason, provide us with a deeper understanding of others' conscious experiences than theorizing does.

That we gain a deeper understanding of others' conscious experiences through simulation is an idea that has already received some attention. Philip Robbins & Anthony Jack (2006), for example, discuss the importance of empathy (a process often equated or tied to simulation processes) for attributing conscious experiences to others. Ravenscroft (1998) and Steven Biggs (2007, 2009) have also argued for the importance of simulations for understanding others' experiences.² All of these views, however, come up short in explaining *why* simulations are so important for understanding others' experiences. One problem is that all of these views focus solely on discussing the way we understand the phenomenal character, or what-it-is-likeness, of others' conscious states, while ignoring the way we understand other properties often associated with conscious experience, such as richness and fineness of grain. Furthermore, what these views have to say about the way we understand the phenomenal character of others' experiences, in my opinion, is not quite right, and I present my alternative account below. Thus, although the importance of simulation for understanding others' experiences has already been noted, we are still in need of an adequate explanation of *why* they are so important and superior to theorizing. I aim to provide such an explanation in this paper and, in so doing, provide the beginnings of an account of the way we understand other conscious minds.

I argue there are four properties of conscious experience that simulations can represent which instances of theorizing cannot. Consider a visual experience of seeing the Mona Lisa.

² See also Alvin Goldman (1993, 2002) and Adam Arico et. al (2011) for further discussions of folk psychology and consciousness.

First, this experience has phenomenal character. There is something it is like to see the painting. Second, there is a perspectival aspect to the experience, which refers, roughly, to the aspects of the experience of the painting that change with viewing position. Third, the contents of the experience are finely-grained or highly specific. One does not just experience a face-like shape, one experiences a face with a very particular shape. Fourth, the experience is rich in that it represents a great many visual details (colors, shapes, etc.), more than can be contained in a single thought. My claim is that when one theorizes about others' experiences, their theory-based mental representations will not represent these experiential properties. In order to mentally represent them, and in turn understand another's experience, one must mentally simulate the experience. In this case, a simulation would be a mental image of the Mona Lisa seen from another's point of view.³

This view can be separated into two theses:

Deficiency of Theorizing Thesis: People cannot represent the phenomenal character, the perspectival aspect, the richness, or the fineness of grain of others' conscious experiences through theorizing alone.

Advantage of Simulation Thesis: People are able to represent the phenomenal character, the perspectival aspect, the richness, and fineness of grain of others' experiences through simulation.

Two clarifications: First, these theses are claims about the psychological limitations of people. They are not intended to identify any metaphysical limitations on the representability of conscious experience. I accept that there could, in principle, exist a being with an advanced theory of mind that can adequately represent all the experiential properties of others' conscious states through theorizing. I only mean to argue that *humans* are not such beings due to

³ I will be using the term 'understand' to refer to our ability to mentally represent something. This is distinct from about our ability know things. I do not make any claims about our ability to know others' experiences, just claims about our abilities to form mental representations of them.

psychological limitations. Second, as I explain in detail below, I do not mean to claim simulations are perfect representations of others' experiences, only that they can represent experiential properties and can do so well.

Why can humans represent the experiential properties of others' mental states through simulation but not through theorizing? My argument rests on the different way each mindreading process represents mental properties. The core argument runs as follows:

- 1) In order for our ToM (and ToM-based thought) to represent some mental property, it must describe that mental property using an underlying representational medium.
- 2) In order for simulations to represent a mental property, they must replicate it.
- 3) Experiential properties are too difficult to describe in the representational medium underlying our theory of mind but not too difficult to replicate through simulation.
- 4) Thus, we can represent experiential properties through simulation but not through theorizing.

The main crux of this argument is premise three. Premises one and two are not meant to be controversial, but they do need some explanation, which is provided in sections two and three along with a detailed description of each mindreading process and their representational properties. In sections four and five, I defend premise three. In section six, I discuss some limitations simulations have, and I conclude by discussing what my account explains and what questions it leaves open.

2 BRIEF OVERVIEW OF MINDREADING

I will assume the currently dominant hybrid view of mindreading — the view that we use both theorizing and simulations to attribute mental states to others — so we will need to understand the basics behind each mindreading process.

2.1 Basics of theorizing

Theorizing is a process that involves the access and utilization of a mentally represented theory of mind (ToM). Our ToM is a rich body of information about mental states, behaviors, and their relations that is thought to be structured somewhat like a scientific theory.⁴ The process of theorizing works in, roughly, the following way: first, we gather information about others (e.g. we may gather behavioral information through observation). Next, we use this gathered information and information stored in our ToM to make mental state attributions (e.g. *she believes it is noon*). Finally, we (may) predict others' behavior based on these mental state attributions and other information in our ToM (e.g. *she will take her lunch break soon*).

Many agree our ToM has a theory-like structure, but there is some disagreement about what that theory-like structure is. Early theories held that our ToM consisted of something like a set sentences expressing psychological laws or generalizations about mental states and behaviors (see Ravenscroft, 2016; Alison Gopnik & Andrew Meltzoff, 1997). A generalization, for example, might be that if someone wants X and believes that action A will help them acquire X, they will perform A. Thus, theorizing involves a deductive reasoning process in which one uses a generalization and knowledge about a particular person (or persons) to deduce what they will do or what mental states they have. If one observes another perform action A, and their ToM contains the generalization that only mental state M causes action A, for example, one can deduce that the other has M.

Nowadays, the view that our ToM consists of laws or generalizations is resisted somewhat. Instead, an alternative view has emerged that is gaining traction. The view, first forwarded by Heidi Maibom (2003) and Peter Godfrey-Smith (2005) and recently endorsed by others like Shannon Spaulding (2018), is the view that our ToM consists of a collection of

⁴ I use the term "information" here and in what follows to mean mental content.

psychological *models* rather than law-like generalizations. Theorizing, under this view, is understood as a process of model building rather than deductive reasoning using generalizations. Models are hypothetical structures used to describe some target system(s). In the case of folk psychology, the idea is that when we theorize about others' mental states and predict their behaviors, we construct models of others' mental states (beliefs, percepts, desires, etc.), their interactions, and their influences on behavior (Godfrey-Smith, 2005, 5). We may use more abstract and general models, which we can store and apply to various people at different times, or we may develop much more specific models on the spot, which we apply to a particular individual at a specific time (Godfrey-Smith, 2005, 5-8).

2.2 Basics of simulation

Simulations are mental processes which have the function of replicating other people's mental states (Goldman, 2006, 36-38). Theories of mental simulations attempt to explain the common process of putting ourselves in others' shoes. The basic idea is that our minds work like other people's do, so we can explain and predict what others will do or think by putting our own minds into the same (or similar) state as another's and observing the resulting mental processes. If I, for instance, want to predict what decision my friend will make, instead of theorizing about what she might decide, I can pretend I have the same relevant beliefs and desires as she does. I can then run these pretend beliefs and desires through my own decision-making mechanism (which is assumed to work like hers) and observe what (pretend) decision is outputted. After replicating my friend's decision, I then attribute or project it to her, which means I form a belief that my friend made the decision I simulated. Importantly, simulations are run offline — they are inhibited from affecting the simulator's behaviors and other mental states (Goldman, 2006, 26-41). Simulating my friend's decision will not cause me to act on the simulated decision.

Some theorizing may be involved in simulation processes. For example, when we observe another's behavior or acquire information about another's decision, we may need to use our ToM to reason backward from this information to the possible mental states that caused the behavior or decision. These inferred mental states can then be simulated and their outputs assessed. If they caused the right (inhibited) motor signal or (pretend) decision then we may conclude that the target has the simulated mental states. If not, we may test other possible causes (Goldman, 2006, 44-45). The difference between this process and pure theorizing is that the representation of the target's mental state is a simulation, not a ToM-based thought (more on this in the next section).

There is disagreement about the range of mental states we can simulate. Some hybrid theorists hold that there are only a few mental processes we simulate when mindreading (e.g. Stich & Nichols, 2003), while others believe simulations are much more widespread (e.g. Alvin Goldman, 2006). My theses depend on the claim that we can and do simulate other people's perceptual states, emotions, and sensations, so I assume we at least simulate these states. I cannot fully defend this assumption here, but I present some key evidence in support of it.

Alvin Goldman (2006) is the main developer and proponent of the simulation theory of mindreading. Goldman distinguishes between two sorts of simulation processes: low-level and high-level simulations (113-191). Low-level simulations are involuntary, fast, and automatic. These sorts of simulations are implemented in mirror neurons, which are groups of neurons that activate both when one is in a particular mental state (e.g. disgust) and when one observes another in the same mental state (e.g. observes another make a disgusted face) (Goldman, 2009b, 311-314). Mirror neurons underlie several sorts of states including motor intentions, tactile sensations, and several emotions. Some evidence for the existence of mirror neurons is fMRI

data which shows the same areas of the brain activating both when one is in a certain mental state and when one observes another behaviorally express that same mental state. Evidence that mirror neurons are used in mindreading, specifically, comes, in part, from cases of mirror neuron damage. In these cases, patients have deficits both in feeling a particular emotion or sensation and deficits in the ability to *recognize* that emotion or sensation in other people (see Goldman, 2009b, 317-320).⁵

High-level simulations, unlike low-level simulations are controlled, deliberate, imaginative processes. We can use high-level simulations to replicate other people's visual states (e.g. seeing a red apple), auditory perceptions (e.g. hearing Stairway to Heaven), motor plans (e.g. wiggling your fingers), among other states. Evidence for high-level simulations comes, in part, from evidence that general, controlled, imaginative processes use many of the same brain areas as the mental states they simulate. There is good evidence, for instance, that we use areas of our visual cortex for both visual perception and visual imagination, and we use the same motor areas of the brain to produce motor imagery (e.g. imagining wiggling one's own fingers) and actual motor movements, suggesting that if we simulate others' mental states using these imaginative processes, we are indeed replicating others' mental states. (Kosslyn, Ganis, and Thompson, 2001).

There is also empirical evidence that strongly supports the claim that these general imaginative processes are used by people to mindread. For example, there is evidence that people have visual perceptual biases — information from one visual field is processed better than information from the other visual field. Cognitive neuroscientists Brandon Bio, Taylor Webb, and Michael Graziano (2017) created a mindreading task in which one must assess what a person

⁵ Some, such as Shannon Spaulding (2012), argue that mirror neurons are not used in mindreading. These criticisms tend to focus on mirror neurons underlying motor intentions. Goldman (2009a) points out, however, that the best evidence mirror neurons are used in mindreading exists for emotions and tactile sensations, not motor intentions.

displayed in a graphic is able to see. The person in the graphic is viewed from above and is facing to the subject's right. In some trials the displayed person's view is obstructed by a barrier. When asked if the person in the display can see an object, it was found that people's reaction times differed depending on which of the displayed agent's fields of views (right or left) the object was present in. The only way to explain this is that people must be imagining (i.e. simulating) what the displayed agent can see, which then results in the attributer's own visual biases affecting the time it takes them to attribute a mental state to the displayed agent. If the subjects were only theorizing, we would not expect their perceptual biases to affect their reaction times because theorizing would not utilize our perceptual systems.

Finally, it should be noted that sometimes we do not need to use mirror neurons or imaginative processes to replicate others' mental states. Sometimes others just happen to be in the same state that we are in. If one is at a concert, for example, there is no need to imagine or mirror others' states. One can simply form the belief that others around them are hearing what they are. One is still simulating, in these cases, because they are treating their own current mental state as a replication of another's (Goldman, 2006, 41).

2.3 Representational distinctions

Crucial for our discussion is the different ways theorizing and simulation processes represent others' mental states. The main difference is that our ToM represents others' mental states using a *representational medium*, while simulations do not (see, e.g., Godfrey-Smith, 2005, p.7). A representational medium can be understood as some physical or functional "vehicle" for content. Words written in ink, for example, can be seen as physical vehicles carrying linguistic contents. Similarly, physical-functional structures in the mind can act as vehicles for mental content. I will call mental representational mediums mental codes. Our ToM

(whether it be sentences expressing psychological laws or models of mental states and behavior) is represented by this mental code. Our ToM can thus be seen as a mentally represented theory-like description of mental states and behaviors. Concepts used in ToM-based mindreading (*pain, belief, desire, seeing, etc.*) are constituents of our ToM, so when we theorize and utilize these concepts we are describing others' mental states using a representational medium (Weiskopf, 2009).⁶ A ToM-based concept of belief, for example, is a description of various properties of belief "written" in a mental code.

As mentioned earlier, some theorizing may be used to construct or generate simulations, but simulations themselves are what act as representations of others' mental states in simulation processes. Simulations do not represent others' mental states through a representational medium. They are not descriptions "written" in a mental code. Rather, simulations represent by *replicating* others' mental properties. Simulations are, in this way, physical-functional objects or processes. A simulation of belief is an *actual* (pretend) belief which (is supposed to have) the same properties as the target's belief, and by replicating its properties the simulation represents them.

Consider a common analogy that helps illustrate this distinction. Aeronautical engineers can test a new wing design in several ways. One way is to write down physics equations on paper that describe the wing and calculate how the wing will perform in various wind conditions. This is analogous to theorizing, as it uses a representational medium (mathematical symbols written on paper) to represent and reason about the physical properties of the wing. Another way to test a new wing design is to actually build the wing and put the wing in a wind tunnel. This is analogous to simulation processes as there is no representational medium, only a physical object meant to replicate the physical properties of the new wing.

⁶ Another view is that mental state concepts are not constituents of theories but rather are mini-theories themselves. I will assume the concepts as constituents view, as I think it is more widely assumed, but my arguments will apply to the concepts as mini-theories view also. See Weiskopf (2009) for further discussion.

3 A NOTE ABOUT MENTAL REPRESENTATION

We have just discussed some differences in the ways simulation processes and theorizing represent others' mental states. More needs to be said, however, about what I mean by 'represent' in general, as there are many theories of mental content and not much agreement about which is best.

Here, again, are premise one and two of my main argument:

- 1) In order for our ToM (or ToM-based thought) to represent some mental property, our ToM (or thought) must describe that property using a representational medium.
- 2) In order for a simulation to represent some mental property, the simulation must replicate it.

For a ToM-based attribution to represent the causal properties of another's belief, for instance, it must describe those causal properties using a representational medium, a mental code. In order for a simulation to represent the causal properties of another's belief it must replicate them.

These assumptions may seem obvious given what was said in the last section, but they are not uncontroversial within philosophical discussions of mental content. Some theories of mental content hold that a person can mentally represent some property or object despite the fact that she lacks any mental description (or mental replication) of the property or object. For example, someone's concept of water will under some views have the content *H2O* even if the person has no mental description of the molecule H₂O, its relation to water (i.e. that the two are, more or less, the same), or that it even exists. All that is required is that when one uses their concept of water they are *referring* to H₂O (see Lau & Deutsch, 2016). For example, people who lived several hundred years ago arguably had concepts of water that referred to H₂O without have any mental descriptions of the referent's molecular structure or its relation to water.

The reason I place a higher standard on what counts as mental representation is it seems necessary to explain the way we come to *understand* the properties of the world, including experiential properties of other people's mental states. Explaining the way we acquire such an understanding is, after all, the aim of this paper. If one's concept of water, for instance, contained a mental description of H₂O, one would understand the molecular structure of H₂O. Also, consider the concept *what it is like for that bat to echolocate*. This concept (when employed in thought) does refer to the phenomenal character of a bat's echolocative experience, and some views of mental content would, on these grounds, accept that the concept represents it. But, this concept does not yield an understanding of what it is like to be a bat echolocating. One can utilize this concept in thought without understanding bat phenomenology. But, if one's concept described its referent (phenomenal character of bat echolocation) then one would understand what it is like to be a bat. Or if we, through simulation, replicated bat phenomenology in our own minds, we would understand what it is like to be a bat. One way to explain why the requirement for description and replication better captures what it means to understand something is that they require contents play the right sort of *cognitive roles* for understanding. Roughly put, we understand things that are described or replicated in our own minds because mental descriptions and replicated mental properties play a significant cognitive role. In sum, under my view in order to mentally represent some property (in a way that yields understanding), a mental state must adequately describe or replicate that property. In the next section, I explain why or ToM and ToM-based thought cannot adequately describe experiential properties.

4 SOME PROPERTIES OF PHENOMENAL CONSCIOUSNESS

We now have a basic understanding of simulation and theorizing and their representational properties. Next, in order to understand why simulations are better than theorizing at representing others' conscious experiences, we will need to discuss phenomenal consciousness. There are four properties of phenomenal experiences that will be important for our discussion:

Phenomenal Character: A mental state is considered a phenomenal state or experience if there is something it is like to be in that state. Phenomenal states, in other words, have a certain *feel* to them. My visual perception of a red tomato, for example, is a phenomenal state because there is something it is like for me to see the tomato. What it is like to be in a state or the way a state feels is often referred to as the state's phenomenal character. Other phenomenal states include emotional feelings, pains, tickles, itches, auditory percepts, smells, and tastes.⁷

There is some debate about whether cognitive states, which includes states like belief and intentions, have phenomenal character. While many believe there may be some phenomenal character associated with these states, many doubt cognitive attitudes have any *distinctive* phenomenal character (e.g. Nichols & Stich, 2003; Goldman, 2006). For this reason, I will stick to using sensory and perceptual experiences as my primary examples of phenomenal states in what follows.

Perspectival Aspect: Second, visual and auditory experiences have perspectival aspects. One's visual and auditory experience of objects and sounds change depending on one's position and viewing angle. For example, when viewed from above, a coin laying on the ground will look circular. When viewed from an angle, although there is a sense in which the coin will still appear

⁷ I will use the words "experience", "phenomenal state", and "conscious state" interchangeably. All will refer to states that have phenomenal character or what-it-is-likeness.

circular, there is also a sense in which its shape now looks elliptical. Consider also the way a building looks from close up and far away. There is a sense in which the building in each case appears to be the same size, but also a sense in which their appearance differs depending the distance it is from the viewer (from far away there is a sense in which the building looks smaller than it does from close up). The aspect of one's experience that changes with view-point and position is the perspectival aspect of experience (Greene and Schellenberg, 2018).

There is some disagreement as to what the perspectival aspects of our experiences consist in. Some believe they consist in certain contents of experience (e.g. Greene and Schellenberg, 2017), while others believe they are non-representational properties (e.g. Peacocke, 1983). I remain neutral on these debates accepting only that there is *some* aspect of one's (visual and auditory) experience of an object that changes with one's perspective.

Fineness of Grain: Third, phenomenal experiences have contents that are much more finely grained than our general (or type) concepts (Tye, 2006, p.518). There is good empirical evidence, for example, that people are able to discriminate between (and presumably experience) thousands of different shades of color, and over a thousand different pitches of sound (Raffman, 1995). However, people are able to recognize (or type-identify) much fewer. We can see thousands of colors and hear thousands of pitches, but we certainly do not have as many general color concepts (red, green, blue, etc.) or general pitch concepts (C-sharp, F, etc.) that can be used to identify and distinguish each color and pitch we can experience. Besides visual and auditory experience, it is also plausible that other experiences, like pain or emotion, are finely grained. For example, it seems plausible that we can experience more intensities of pain or emotional feeling than we have corresponding general concepts for (e.g. intense, a little intense, etc.).

Some disagree about how finely grained our experiences really are (e.g. Papineau, forthcoming). However, it is much less controversial (given both intuition and empirical considerations) that our experiences are more finely grained than our general concepts. There are some complications to the fineness of grain hypothesis concerning the use of demonstratives (*this shade of red*), but, as I explain in the next section, these considerations do not threaten or matter much for what I am arguing here.

Richness: Fourth, many perceptual experiences have rich contents in that they represent more details than can be extracted for cognitive use (Tye, 2006; Block, 2011). Another way of describing the richness hypothesis is that there are more details represented by experience than can be contained in a single thought (Speaks, 2005).⁸ This hypothesis has intuitive force. Consider, for example, that your current visual experience is representing dozens of different shapes on your computer screen (every letter within your field of view) and their spatial locations. Consider, also the great many details represented in auditory experiences of music or tactile experiences of textured surfaces. There seem to be just too many details represented in these experiences to be contained in a single thought.

Empirical evidence also supports the richness hypothesis. Evidence often comes in "Sperling-style" experiments, which are experiments in which a stimuli is flashed briefly, then after a short period of time subjects are asked to report a portion of what they saw. In Sperlings' (1960) original experiment, an array with three rows of four letters is flashed on a screen. Shortly afterward, the subject is signaled to read back one of the rows. Most subjects are able to do so. But, what they are not able to do is read back *all* of the letters from all rows. Subjects, however,

⁸ To see how richness is distinct from fineness of grain, consider a "ganzfeld" or a visual experience of uniform field of one color. Such a visual experience would not be rich (it would only have one color property), but it would be finely grained as one would be experiencing a *particular shade* of color.

report experiencing an image of all the letters from all the rows after the array is flashed. Other similar experiments yield similar results (see Block, 2011). The conclusion many draw from such evidence is that people are unable to extract all the contents of experience into working memory for cognitive use. Only some contents can be extracted, suggesting that the informational capacity of working memory (and any cognitive process that utilizes it) is much smaller than that of perceptual experience. Thus, experience seems richer than cognition.

The richness hypothesis is much more controversial than the fineness of grain hypothesis and debates are ongoing (e.g. Dennett, 2001; Cohen & Dennett, 2011). I cannot do justice to the debate here. The richness hypothesis, however, is a plausible empirical hypothesis with growing empirical support (e.g. Block, 2011, 2014; D'Aloisio-Montilla, 2017). As such, I will treat it as the currently most plausible hypothesis in what follows, admitting that further empirical research might show it to be false.

Finally, it should be noted that not all conscious experiences have every one of these experiential properties. All experiences, by definition, will have phenomenal character. But, only visual and auditory experiences clearly have perspectival aspects. Some experiences, too, are not especially rich, like an auditory experience of a single tone or a simple pain sensation in one's back. But, many experiences do seem quite rich, such as visual and auditory experience, tactile sensations of texture, and multimodal experiences which combine information from multiple senses (e.g. the experience of driving a loud car down a bumpy street). My theses, then, can be seen as being more true the more experiential properties the target's mental states have and less true the fewer experiential properties their mental states have.

5 WHAT THEORIZING CANNOT DO

We can now turn to the argument for the Deficiency of Theorizing Thesis (DTT) and premise three of my main argument, which is that experiential properties are too difficult to describe through theorizing. The argument here is that the representational medium, or mental code, used to represent our ToM cannot describe experiential properties and thus will not play the right cognitive role to qualify as representing such properties. As mentioned above, I am not making the metaphysical claim that no representational medium can ever represent experiential properties. I only mean to make a claim about the psychological limitations of humans.

5.1 Theorizing about Phenomenal Character

Let's first consider phenomenal character and what we are able to theorize about it. It seems perfectly possible to refer to phenomenal states through theorizing. The ToM-based attributions *she is in pain* or *she is feeling joy* are thoughts that plausibly refer to phenomenal states. There is an interesting empirical question about which folk ToM concepts refer to phenomenal states and which do not that is still, in my opinion, open. Some studies have found that people are willing to attribute mental states like belief but not pain states to robots (e.g. Huebner, 2010). Studies like this provide some preliminary evidence that our ToM concepts of sensations like *pain* refer to phenomenal states, while ToM concepts of attitudes like *belief* refer to functional states. These experiments, however, do not test whether participants are theorizing or using simulations in the studies, so the results are somewhat ambiguous. In any case, I take it to be empirically plausible that at least some of our ToM concepts refer to phenomenal states and thus we can and sometimes do attribute phenomenal states when theorizing.

Additionally, it seems perfectly possible to theorize about phenomenal character, in particular. We can, for instance, theorize (without simulation) *pain has a phenomenal character*

or *there is something it is like to be a bat*. Such thoughts are uncommon in lay people, but common in philosophers. These thoughts would refer, specifically, to the phenomenal character of certain conscious states.

Even though it seems plausible that some of our ToM-based concepts refer to phenomenal states and that people can form ToM-based thoughts that refer to phenomenal character, such thoughts and concepts *do not describe* the phenomenal character of the states they refer to. The concept *what it is like to be a bat* might refer to the phenomenal character of bat echolocation, but it does not describe the character of that state in a way that would allow one to understand what it is like to be a bat. Similarly, my claim is that a ToM-based concept *pain* might refer to a phenomenal state, but will not describe what the phenomenal character of pain is. Such concepts might be said to describe the general fact *that* certain states have a phenomenal character, but these concepts will not describe *what* the phenomenal character of that state is. Therefore, ToM based thoughts and concepts will not play the sort of cognitive role needed to represent what it is like to have various phenomenal states.

Why can such concepts not describe phenomenal character? The reason is simply that phenomenal character is very difficult to describe — too difficult for our ToM to describe in practice. The difficulty of describing phenomenal character has been discussed by many philosophers. Thomas Nagel (1974) argues that physical-functional descriptions of bat brains do not lead us to understand the phenomenal character of echolocation. Frank Jackson (1982) argues that a person who has never seen color cannot come to know what it is like to see color by studying a complete physical-functional description of the human visual system. Many have also pointed out that it seems impossible to verbally describe the phenomenal character of one's own experience to another (e.g. Chalmers, 1996, 222-225). A sighted person, for example, cannot

explain to a congenitally blind person what it is like to see color by verbally describing their current color experience.⁹ The basic idea behind these claims is that if one learns these descriptions, and thereby mentally represents their contents, they do not come to mentally represent facts about what it is like to have the described experience. They do not learn what the phenomenal character of those experiences are. So, it seems, such facts were not contained in or represented by the descriptions in the first place.

Some of these arguments (e.g. Jackson, 1982) are used to make controversial metaphysical claims about consciousness: roughly, because a complete physical-functional description of the brain cannot lead one to understand the what-it-is-likeness of experience, consciousness is non-physical. But, my view does not rest on these controversial claims. The DTT does not rest on the claim that the phenomenal character of an experience is indescribable *in principle*. It only rests on the claim that phenomenal character cannot be described by our ToM or ToM-based thought *in practice*. The DTT is completely compatible with physicalism. One can accept that the phenomenal character of an experience is completely describable in principle but indescribable in practice.

Why is phenomenal character indescribable, in practice? The main reason is that there is still very little consensus among philosophers and scientists about what consciousness even is, let alone what, if any, physical-functional states of the brain consciousness reduces to. If scientists and philosophers who study consciousness lack descriptions and theories of consciousness that

⁹ Some aspects of experience are describable. An experience's form or structure (e.g. spatial-temporal form) and some of the contents of experience, for example, seem describable (see Chalmers, 1996, 222-225). I will assume, however, that phenomenal character goes beyond the mere structure and content of experience.

capture the phenomenal characters of conscious states, then we cannot expect that anyone's ToM will have such descriptions.¹⁰

Furthermore, even if a satisfactory theory of consciousness existed, it would likely not be the sort of theory that would be psychologically integrated with a folk ToM and used in typical social situations. Such a theory, after all, would likely be incredibly complex, involving either complicated mathematical or computational details (not unlike, for example, those involved in information integration theory) or complex neuronal or functional details (Tononi, 2004). These are just not the sorts of details we would expect a lay person to have stored in their intuitive ToM or utilized in social situations to describe the character of others' particular conscious states. The situation would be similar to a physicist using her scientific knowledge of a complex theory of space and gravity to calculate, very quickly, the projectile motion of a ball thrown to her. It just does not seem possible for her to do. Her scientific knowledge, in other words, would not get integrated with her folk physics knowledge in such a way that it would be utilized in everyday situations where one needs to make quick judgments about some physical system's behavior.¹¹

This argument can be formed into a less controversial analog of Jackson's (1982) Mary the neuroscientist argument. Jackson argues that even if Mary, a neuroscientist who has been trapped in a colorless room her whole life, learned all the physical-functional facts about color vision, she would not come to know what it is like to see color. My argument, on the other hand, is only that if Mary acquired all the information contained in a typical folk ToM (or had a ToM

¹⁰ Biggs (2009) also argues that phenomenal experience is ineffable in practice, and he, from this, argues that the only way to mentally represent others experience is through simulation (and a phenomenal concept) (653-656). The problem is he follows Dennett (2002) in believing phenomenal experience is ineffable in practice because experiences are too rich to describe. But, consider, for example, a simple experience of a red screen. Even though this experience is not rich, one is still unable to describe this experience to a congenitally blind person, at least, in practice. Richness, thus, is not what lies at the root of the ineffability of experience, phenomenal character does.

¹¹ There exists good empirical evidence that people with scientific knowledge of physics do not use their scientific knowledge to make judgments about the behavior of physical systems when put under time constraints. Rather, they tend to fall back on their folk physics system.

"downloaded" to her brain), she would not come to know what it is like to see color because facts about what it is like to see color will not be represented in a typical folk ToM.

Furthermore, even if her knowledge of the physical-functional facts about the human visual system *did* fully describe color experience, this knowledge would not get integrated with her ToM in a way that would allow her to utilize it in practice in everyday social situations (say, with colorless people). She would not be able to mentally represent what the phenomenal character of others' color experiences were as she were interacting with them, not unlike the way physicists cannot use their knowledge of scientific physics to quickly calculate the projectile motion of an object thrown to them.¹²

In sum, when people theorize about others' mental states, they sometimes may be referring to phenomenal states, but their ToM-based thoughts and concepts will not be describing the phenomenal character of those states and thus will not be representing what the phenomenal character of those states are. The character of experience is just too difficult to describe, and even if such descriptions were available, they would not be of the sort that would get integrated with our ToM and utilized in practice.

5.2 Theorizing and the Perspectival Aspect of Experience

Next, why can we not represent the perspectival aspect of others' experience through theorizing? When we are theorizing about what another is seeing, why can we not represent the perspective-dependent 'look' the object has? The answer here is that forming such a description in the mental code underlying our ToM seems too computationally difficult to do in practice, and there is no empirical evidence to say otherwise.

¹² Thanks to Neil Van Leeuwen pointing out the Mary analogy.

The perspectival aspect of experience refers to the aspect of one's experience that changes as one's position and viewing angle change (e.g. the aspect of one's visual experience of a coin's shape that changes as their viewing angle changes). To compute the way something looks from a particular position or viewing angle one must begin with information about the object being viewed and the angle from which it is viewed. We may be able to acquire such information through observation. For instance, I might observe that another is looking at a chair from the front and from a certain angle and distance. The next step is calculate the way the chair looks from that angle and distance away.

One way to calculate the perspectival aspect is to begin with a 3D representation of the chair and information about the viewing location and angle, then compute the pattern of light that reflects off the chair and falls on a flat 2D surface located some distance between the observation position and the chair (Noë, 2005). To do so, one must perform complex geometrical calculations to produce some sort of description (not an image) of the way the 3D object will reflect light onto a 2D surface located at a certain distance and angle away. These calculations, however, must be done without the use of imagery. There is little doubt, as I argue in the next section, that we are able to imagine, and thus simulate, the way things look from various angles (you can likely imagine, for example, the way your car looks from various angles). Remember, though, that using imagination to replicate others' mental states is just a form of (high-level) simulation. Thus, for theorizing to describe a perspectival aspect, it must generate, instead, some non-imagistic description of the pattern of light falling on the 2D surface. This task may be possible in principle. Some people may be able to do this if they sat down, with pen and paper, and performed these complex geometrical calculations. But it seems too complex a task for the

average person to do in practice in a typical social situation through the sort of reasoning involved in theorizing.¹³

Finally, there is no empirical evidence, at least that I can find, that supports the view that we compute perspectival aspects of others' perceptual experiences through theorizing. Any task that has been tested in which subjects make judgments about the perspectival aspects of others' (visual or auditory) perceptions, moreover, can likely be explained as instances in which the subject is utilizing simulations rather than theorizing. Thus, unless new empirical evidence emerges on this issue, the best explanation is that people just cannot form a mental description of the perspectival aspect of others' experiences through theorizing.

5.3 Theorizing and Fineness of Grain

The fineness of grain hypothesis says that our general (or type) concepts are more coarse grained than the corresponding contents of experience. The main limitation on theorizing is that we seem only able to use general concepts when theorizing. Theorizing is typically understood as a cognitive process and thus will be utilizing concepts available to cognitive processes (object recognition, reasoning, decision making) to attribute content. The evidence cited earlier, however, suggests that the concepts available for cognitive processes are type concepts which are much more coarse-grained than experience. It may be possible to theorize that *she is seeing red* or that *she is feeling very joyful*, but it does not seem possible to theorize *she is seeing red₂₃* or that *she is feeling joy₆* (where *red₂₃* describes a particular shade of red and *joy₆* describes a joyful feeling of a particular fine-grained intensity).

One complication here is that many believe we can use demonstratives to think about particular fine-grained contents of experience (e.g. Tye, 2006). For example, one can think about

¹³ There may be other ways to compute the perspectival aspect of experience, but any other method would likely have to be similar to the one described here and thus would face similar complexity.

this particular shade of red that they are experiencing or *this particular intensity of joy*. Such demonstratives seem to pick out particular fine-grained contents. But, this point is no challenge to my argument because if one uses a demonstrative, they are engaging in a simulation process and not theorizing. More specifically, their representation of the target's fine-grained content is a simulation of it (a replication) rather than a ToM-based concept of it. If one thinks that another person is experiencing, say, the same shade of red that they themselves are experiencing (*this shade*), then the attributer is treating a content of their own current experience (*this shade of red I see*) as replicating a content of another's mental state (the shade of red they see), which is just a form of simulation. Demonstratives, therefore, cannot be used in this way to theorize about others' mental contents.

One might argue, in response, that demonstratives can be applied to experiences we are not having, e.g. *they are seeing that same shade of red I saw an hour ago* (Speaks, 2005). And, one may, therefore, believe that we can use demonstratives to think about fine-grained contents of others' experiences. The problem with this response is that even if one could use demonstratives to refer to fine-grained contents of non-current experiences, there is good reason to believe such demonstratives would be too diminished to be as finely grained as experience. Sean Kelly (2001b) presents a useful example. Imagine there are several sets of poker chips that are very similar shades of red. When placed side by side, one can distinguish the colors of each chip. But, when asked to remember if a chip seen at time one is the same color as a different chip seen at time two, one would be unable to answer. One's concept *that shade of red seen at time one*, would be too diminished to tell whether the chip seen at time two is the same color as the chip seen at time one. What occurs here is that one's concept *that shade of red seen at time one* has diminished with time and become more course-grained. The concept cannot be used to

differentiate or recognize as many shades of color as one can experience. Demonstratives of non-current experience, therefore, cannot be used to attribute fine-grained content either. We must conclude, then, that theorizing is limited to attributing coarse-grained contents.¹⁴

5.4 Theorizing and Richness

The final component of the DTT is that our ToM cannot represent the richness of others' experiences. A visual experience of the Mona Lisa, an auditory experience of a symphony, a tactile sensation of a roughly textured surface all represent an enormous number of details, too many to be extracted into cognition or represented in a single thought. It follows from this that ToM-based attributions cannot represent the rich contents of others' experiences because ToM-based attributions are typically understood as cognitive processes or thoughts. If cognition is not rich, then ToM-based cognitive processes are not rich.

Moreover, in order to attribute rich contents when theorizing, it seems that demonstratives must be used. This is because, again, the rich details represented by an experience are fine-grained. As we saw earlier, though, demonstratives are unavailable for attribution of mental content in theorizing (or, if they are, they are more course grained than experiential contents). So they cannot be used to pick out all of the rich contents of another's experience and describe them. ToM-based thought is, thus, unable to employ the number or kind of concepts necessary to describe and represent the richness of others' conscious experiences.

¹⁴ It is also hard to see how one could think about a particular shade of color (or any other fine-grained content) that they are not currently experiencing without the use of mental imagery. Whenever I try to think about the particular shade of color my car is, for instance, I find myself forming a mental image of my car. The trouble is that, if one uses mental imagery whenever they think about a fine-grained content of another's experience one will just be engaging in a (high-level) simulation process and will not be theorizing.

6 WHAT SIMULATIONS CAN DO THAT THEORIZING CANNOT

We can now turn to the Advantage of Simulation Thesis (AST) and finish defending premise three of my main argument. Premise three states that experiential properties are too difficult to describe in the mental code underlying our ToM, but not too difficult to replicate using simulations. Because simulations can replicate experiential properties, it follows (from premise two) that they can represent these properties. Following Biggs (2007, 2009), I will call simulations that replicate experiential properties phenomenal simulations. Why should we believe we can generate phenomenal simulations? In general, both introspective and empirical evidence supports this claim.

6.1 Simulating phenomenal character

First, let's consider whether we can generate simulations with phenomenal character. High-level simulations are simulations that utilize our general imaginative abilities. We can use high-level simulations to replicate other people's visual and auditory perceptions, bodily movement, and emotions among other states. Imagine seeing the Mona Lisa, raising your right arm, or imagine something that evokes an emotion (e.g. being attacked by a bear). When we imagine these things there is something it is like to imagine them, i.e. they have a phenomenal character that is apparent upon introspection. The phenomenal character might not be as vivid as an actual experience of the Mona Lisa, raising a right arm, etc. But, it is certainly there. Because high-level simulations just are imaginative processes used to replicate others' mental states, there is, therefore, good introspective evidence that we can generate high-level simulations with phenomenal character.

The introspective evidence that low-level simulations have phenomenal character is not as strong. Low-level simulations are realized in mirror neurons, which automatically activate in

response to others' behavioral cues like facial expressions. Mirror neurons underlie emotions like fear and disgust as well as sensations like pain. It may not be clear whether mirroring has phenomenal character because low-level simulations are fast and automatic, and consequently, may occur without our attending closely to them. But, there is some reason to believe there exist low-level simulations with phenomenal character. Consider the fact that when you watch another smell something gross or injure themselves it often *feels* unpleasant to you. A plausible explanation of this unpleasant feeling is that it is phenomenal character of pain or disgust simulated by certain mirror neurons firing in response to the behavioral cues observed in others (Biggs, 2007, 37-38).

The empirical evidence that simulations have phenomenal character consists of evidence that simulations use the same neural machinery as phenomenal states. This argument is made in detail by Stephen Biggs (2007). I only sketch it here. The idea is that, plausibly, the phenomenal character of an experience depends on the areas of the brain that realize it. My experience of the Mona Lisa has the phenomenal character that it does because of its underlying neural structures and processes. As we saw earlier, both high and low-level simulations use many of the same neural mechanisms as the states they simulate, and many of our simulations replicate phenomenal states. Specifically, low-level simulations replicate tactile sensations and emotions. High-level simulations replicate some sensory states, like visual and auditory experiences. Because such simulations use the same brain areas as phenomenal states, we have reason to believe that such simulations replicate the phenomenal character of those phenomenal states.¹⁵

¹⁵ One may argue that the same brain areas can be used in different ways, and, therefore, it is always possible that our simulations use their neural realizers differently than the states they are simulating. This suggests that simulations and the states they simulate may not have the same experiential properties. But, there is little evidence to suggest that simulations function very differently than the states they are simulating. There are some differences to be sure. But, converging evidence suggests that simulations use similar brain areas as the states they simulate and in similar ways. The aim of simulation after all is to replicate a mental state, including the way it functions (see Biggs (2007) for lengthier defense of this point).

Taken together, introspection and the neural underpinnings of simulations provide a strong case for the claim that some of our simulations have phenomenal character.

6.2 Simulating the perspectival aspect of experience

A similar argument can be made for simulating the perspectival aspect of experience, which is the aspect of one's experience of an object that changes with viewing position and angle. Remember, perspectival aspects seem largely limited to visual and auditory experience, so simulations of perspectival aspects would be limited to visual and auditory simulations, which are high-level simulations.

There is good introspective evidence that we can simulate the perspectival aspect of visual and auditory experience. When we imagine seeing an object, like, say, the Mona Lisa or a car, we can imagine viewing it from a point of view. One can imagine hearing a car horn, for example, coming from in front of them then imagine turning around and hearing the same car horn. Even though we imagine the sound coming from the same location, each imagined experience seems different (one sound comes toward my front, the other toward my back), and thus we simulate the perspectival aspects.

The perspectival aspect of experience is also plausibly dependent on its neural underpinnings. The perspectival contents exist because there are different angles and ways sensory information from the same object (i.e. reflected light, sound waves) can strike our retina and our inner ears. Because the perceptual areas of the brain that encode this perspectival information underlie simulations, we would expect phenomenal simulations to encode this information as well. There is also well established evidence that people can visually imagine objects from a particular points of view and mentally rotate them to determine how they appear

from different perspectives (Cohen, Kosslyn, Breiter, Belliveau, 1996). Thus, both the introspective and empirical considerations taken together provide good evidence we can and sometimes do generate simulations with perspectival aspects.

6.3 Simulating fineness of grain

Are simulations finely grained? There is some introspective evidence that suggests they are. A simulation of seeing a house seems to represent fine grained color and shape contents (a house of a particular shape and specific shade of color). Simulations of hearing a song seem to have fine-grained auditory contents, e.g. particular pitches. It seems plausible as well that low-level simulations (mirror neurons) can replicate fine grained contents by replicating the particular intensity of the emotional feeling or sensation being mirrored. Now, admittedly, the fine-grained contents of simulations seem somewhat fleeting or unstable. It is difficult to maintain a simulation with highly specific contents for a significant period of time. I find it difficult to maintain a high-level simulation of a specific shade of color for significant time, for instance. But, when the simulation is occurring its contents do indeed seem finely grained.

One source of empirical evidence is, again, evidence that simulations utilize the same areas of the brain as the states they simulate. The fineness of grain of experience likely has much to do with the way specific perceptual areas of the brain realize the perceptual experiences. Since simulations use the areas of the brain that realize finely grained percepts, we would expect our simulations to be finely grained too. Other empirical evidence supports this more directly. In one study on visual imagery a strong correlation was found between subjective reports of how vivid a mental image was and how much activity (relative to overall brain activity) was devoted to early areas of the visual cortex (Cui, Jeter, Yang, Montague, and Eagleman, 2007). It is not completely clear how participants are understanding 'vividness', but it is likely that they are in part

identifying how finely grained or specific the contents of their conscious mental image are. This is further evidence that using (more of) the perceptual areas of the brain that underlie fine-grained experiences yields finely grain simulations.

6.4 Simulating richness

That simulations have rich contents is not as clear upon introspection as, say, introspective evidence for the claim that simulations have phenomenal character. When simulating the Mona Lisa from another's point of view, the simulation does not seem on introspection to be as rich as an actual visual experience of the painting. It does not represent *all* of the different color hues and spatial details that would be present in an actual visual experience of the painting. A simulation of hearing a certain orchestral symphony lacks some of the temporal and tonal complexity of an experience of an actual symphony.

The fact that phenomenal simulations are not as rich as the experiences they simulate, however, does not imply they are not rich. Again, the richness hypothesis says that experiences represent more information than can be cognitively extracted into working memory (or contained in a single thought). Although my simulation of seeing the Mona Lisa may not be as rich as an actual conscious perception of the Mona Lisa, it does not mean this imaginative experience does not contain more information than can be contained in working memory or contained in thought.

Introspectively, my simulations of seeing the Mona Lisa or hearing a symphony do seem rich despite the fact that they are not as rich as the actual experiences they are supposed to simulate. Empirical evidence supports this claim too. Psychologists James Brockmole, Ranxiao Wang, and David Irwin (2002), for example, found that people were able to generate and maintain a mental image of twelve dots for around 5 seconds, and they were able to use that mental image to complete a task requiring they mentally superimpose the image onto another

grid of dots on a display screen (participants subjectively reported imagining and superimposing the dots during the task). This mental image is quite rich. The size, color, and relative spatial location of twelve dots is a lot of information to represent — more than can be contained in a single thought or in working memory with its limited capacity (Block, 2011). This provides good evidence that, even though phenomenal simulations may not be as rich as the experiences they simulate, phenomenal simulations are nonetheless rich.

6.5 Projecting Phenomenal Simulations

We have just seen that there is good reason to believe we can generate simulations with phenomenal character, perspectival aspects, fineness of grain, and richness. It follows that we can generate simulations that replicate the experiential properties of others' conscious states. Because simulations replicate the experiential properties of others' conscious states, simulations play the right cognitive role to qualify as representing these properties, as experiential properties replicated by a phenomenal simulation can be cognitively accessed and utilized by the simulator.

Exactly how we introspect and access our own conscious experiences is still debated (see, Balog, 2009). I am partial to a demonstrative view. It seems to me we can form beliefs like *that person is having this experience* where *this experience* is a concept that involves mentally pointing directly to a phenomenal simulation in one's own mind. It also seems possible to think about and project the particular phenomenal character, perspectival aspects, and finely-grained contents of a simulation. If one simulates, for instance, seeing the Mona Lisa, one can form the belief that the target is seeing a figure with *this particular shape and color* or as having a *this* particular look from a certain angle. One can form the belief that the phenomenal character of target's experience is like *this* where *this* involves mentally pointing directly to the particular feel or what-it-is-likeness of the phenomenal simulation. If our simulation is rich, we can also extract

and project the contents too. We will not be able to extract all the contents at once, but we can, over a period of time, attend to most or all of the contents and form the belief that another's experience has those contents. However introspection works, what is clear is that the experiential properties replicated by phenomenal simulations can play a significant cognitive role, and thus qualify as representing the experiential properties of others' experiences.

7 THE LIMITED RANGE OF PHENOMENAL SIMULATIONS

There is good reason to believe that we can and do generate phenomenal simulations and that these simulations can represent the experiential properties of others' conscious states. But, simulations have a limited range — we can only simulate a limited set of experiences. There are several factors that restrict the range of phenomenal simulations. First off, we may not have the necessary memories or concepts needed to generate certain high-level simulations. For example, if one has never seen the Mona Lisa, they will be unable to form a clear or detailed simulation of another's visual experience of the Mona Lisa. If one has never tasted a Durian fruit, they will likely be unable to simulate what it tastes like. And, if one does not remember the way a certain song sounds, they will be unable to simulate another's auditory experience of that song. In order to generate high-level simulations of these experiences, it seems one must have the right sorts of concepts or information stored in memory.

Second, simulations are limited by the simulator's cognitive or neural architecture. This claim is based on the idea that simulations utilize the same neural or cognitive machinery as the states they simulate. So, one who is completely color blind, for example, will be unable to simulate other people's color experiences because they lack the visual systems necessary to form such simulations. People will also be unable to simulate the experiences of animals which utilize perceptual systems humans lack. For example, one cannot simulate, the echolocative experiences

of bats because people do not have echolocative systems that can be used to generate such simulations (Nagel, 1974, 438-442).¹⁶ Brain damage to areas used to simulate experience will also limit the range of the phenomenal simulations one may use. A person with damage to mirror neurons underlying fear will be unable to generate low-level simulations of others' experiences of fear.

Stephen Biggs (2007) suggests another way in which the range of our phenomenal simulations is limited. Namely, he suggests that we do not simulate perceptual experiences. He finds it implausible that high-level simulations are used at all because they are not generated automatically in social situations. If we see someone viewing a painting, he argues, we do not automatically imagine the way the painting looks to them (Biggs, 2007, 38). If this suggestion is right, it would severely limit the range of our phenomenal simulations to only those few emotions and sensations that are simulated by our low-level simulations (mirror neurons).

There is little reason to buy Biggs' suggestion, however. Just because high-level simulations of perceptual experiences are not automatic does not mean they are not used. Many cognitive systems are not automatic, yet are still commonly utilized to carry out certain cognitive tasks (e.g. top-down attention). Furthermore, Biggs does not directly challenge any empirical evidence in support of high level simulations (including the study discussed in section two or any of the evidence presented by Goldman (2006, ch.7)). Therefore, although the range of our simulations are limited by our concepts, memories, and cognitive architecture, there is no reason to believe simulations are as limited as Biggs suggests.

¹⁶ Nagel's (1974) specific comment is that in order to understand the subjective character of another's experience, we must be able to "take up their point of view", and the greater the differences in mental or neural structure the "less success one can expect" in taking up their point of view (442).

8 CONCLUSIONS

In this paper, I argued that our ToM (and ToM-based thought) is unable to represent the phenomenal character, perspectival aspect, fineness of grain, or richness of other people's experiences, but simulations are able to represent these experiential properties. Simulations, for this reason, provide us with a deeper understanding of others' experiences than theorizing can. Although simulations can represent experiential properties, we also saw they are imperfect. They can represent the richness and fineness of grain of others' experiences but not in their full detail and specificity. Furthermore, simulations have a range limited by our finite memories, concepts, and cognitive architecture. Despite these limitations, however, simulations are clearly our best means for understanding the experiential properties of other people's minds.

My theses support a certain view about the division of labor between theorizing and simulation: theorizing is used to form less detailed, more abstract representations of other people's psychology, while simulations are used to create richer, more detailed representations (e.g. Godfrey-Smith, 2005, 7-9). This view may suggest that theorizing is more useful in common everyday interactions with others because forming less detailed descriptions of others' psychologies is less cognitively taxing than generating more detailed simulations. And in our everyday common interactions with others more abstract theorizing is likely enough to get by. An interesting question that an account of conscious state attribution and understanding must explain, that has not been discussed here, is what motivates one to construct more detailed simulations given that they are more cognitively taxing than theorizing. More specifically, what motivates one to shift from creating the more sparse and *objective* descriptions involved in theorizing, to a more detailed and *subjective* representation that captures the first-personal, experiential details of others' minds? Maybe there is some connection to moral psychology that

can explain this move. Maybe understanding the details of others' experiences plays a role in forming close social bonds with others. In any case, in order to answer these questions, an analogous shift is required within discussions concerning folk psychology — away from the traditional focus on explaining how people understand the causal properties and contents of others' attitudes and towards a new focus on explaining the way we understand the experiential properties of other conscious minds.

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