

The Epistemic Value of Resonance: Intuitive Thinking in Theoretical Understanding

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This dissertation is dedicated to all who are uncertain, earnest, and willing to put forth the often monumental effort to understand better than they did before.

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Abstract

We commonly say that an explanation for something we do not quite understand ‘resonates’. And we seem to take the resonance of the explanation to count epistemically in its favor. What is resonance and what is its epistemic value? I propose that resonance is a psychological state in which a consciously considered explanation coheres with the unconscious representational content in the mind of an individual, and that this psychological state is metacognitively signaled by a feeling which we also call ‘resonance’. This account of resonance implies that theoretical understanding, rather than knowledge, is the epistemic domain of its functioning. That is, when an explanation resonates, the usual case is that a consciously considered explanatory framework coheres with a rich, unconscious representational nexus associated with the object purportedly explained.

I pursue the question of the value of resonance by developing the features of theoretical understanding. Theoretical understanding of an object, I take it, is when an individual grasps an accurate explanatory framework for that object. Hence, understanding is normed by both accuracy and grasping. Accuracy, however, is secured through warrant. Resonance, I argue, can increase one’s warrant, but not very much. Grasping, on the other hand, is a stop-and-go process of integrating explanations and representational content in long-term memory. Resonance, I argue, improves grasping by ensuring coherence and motivating persistence. Further, resonance seems to be *practically necessary* to theoretical understanding, insofar as understanding aims toward an aspirational mastery. Resonance enables us to invest cognitive resources in explanatory frameworks we do not yet understand and it prevents us from becoming rigidly attached to a familiar but failing explanatory framework.

I conclude by addressing three worries about the epistemic value of resonance: (1) that the feeling of resonance cannot be distinguished from similar, non-epistemic feelings, (2) that the pleasantness of this feeling conflicts with the accuracy norm for understanding, and (3) that an explanatory framework might resonate with false unconscious beliefs, thus inhibiting accuracy in one’s understanding. Of these, the last is the most worrisome and suggests that attuning to resonance is only one part of a virtuous epistemic life.

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Introduction

Few will admit merely parroting orthodoxy without question. This approach seems obviously mistaken, as if one had sacrificed her intellectual autonomy. Similarly, feeling utterly adrift with no trustworthy source to turn to either within or without oneself seems like a tragic near-insanity.¹ Being so adrift sounds at first like an implausible skeptical scenario not to be taken too seriously, like brains in vats. Don't we all at least have common sense, shared perception, *science*? We are so confident in the stable network of our representations of reality that it is sometimes hard to imagine how another might see no epistemically stabilizing influence, including her own best judgment. Such an individual finds her judgment painfully inadequate, yet constantly pressured to issue judgments about how to act within a complex society replete with competing and noisy orthodoxies. And the stakes are high: vulnerable human lives hang in the balance awaiting collective resolution of the epistemic competition in which she has a *de facto* vote. Far from a near-insanity, this seems to be our shared circumstance. And this circumstance even leads to personal tragedies among those whom we would want to say are not in the throes of a near-insanity, not at first, anyway. There are countless tales of individuals who, following their best judgment, intentionally chose not to parrot orthodoxies, only to find themselves victims to opportunists who happily take advantage of the painfully imperfect judgment of others.

The standard advice is that good reasoning can bring us around to a stable and level-headed form of independent yet collaborative inquiry. This is, in fact, the advice of those noisy orthodoxies. Despite the stable endurance of their enterprises, however, these orthodoxies have still failed to constitute either a just world, or even a world that doesn't knowingly exacerbate multiple, simultaneous crises of survival at both the ecological and social levels. We can all see that something

¹ MacIntyre (2006), p. 13 accuses Hume of just such a near-insanity.

is deeply wrong and that these orthodoxies have somehow participated in the error. Moreover, the trouble with the standard advice is that good reasoning depends on good judgment, for how else do I know I'm actually doing good reasoning? The question of what counts as good judgment, then, merely replicates the original problem, threatening circularity in doing so: good judgment produces orthodox results.

Even one's most trusted relationships can gradually morph into obscene sagas of manipulation and abuse. In contemporary society, we must intentionally shield ourselves from media outlets to avoid seeing a stream of factual tales of decent but naïve people who fall into just such a bind. Though we clearly depend on one another and cannot help but trust one another, there is still a sense in which we are each epistemically on our own. Who I ought to trust depends on how I understand the world around me, and no one else can understand the world on my behalf. The accumulated body of scientific research might seem to be a reliable foundation. But science moves slowly; it has bouts of degeneration; and our lives can't wait until all the many gaps in our collective scientific understanding are filled—if they ever will be. Besides, science falls silent once our questions become more poignant. What, then, will be my North Star in the dark? What familiar call can cut through the din of competing orthodoxies and opportunistic snake-oil merchants?

The question that drives this dissertation belongs to a field we might call *vulnerable epistemology*. I am not asking how we are to find certainty or dispel doubt. I am not even asking what causes us to fail in our efforts or how we can be manipulated by those who know our weaknesses. *I am asking where we ought to turn in our most epistemically vulnerable hours.* These hours arise for us throughout our lives and seem to cut across all the most important arenas of life: When I notice a pattern of disrespectful actions in my romantic partner, should I continue to trust that she really loves me and wants to treat me well or should I begin to take seriously the idea that she is ultimately

just manipulating me for her own purposes? When, in pushing for a political cause I believe in, I see myself sometimes sacrificing the good of others to the good of the whole, should I accept the non-ideal nature of political action, or should I question my conception of justice? In allowing a metaphysical worldview—religious or not—to shape my guiding values, do I end up living a good life or obstructing my potential good life? In attempting to form a relatively fixed conception of who I am and what I want for myself, am I stifling my personality by enforcing a self-conception onto it or am I developing my personality by giving it structure?

These questions (and many others like them) simmer in the background of this project, though the project itself focuses on none of them. Instead of individual treatments of these questions, I aim at their underlying similarities. First, they are all instances of attempting to *understand* ourselves, others, and the world around us. Second, this understanding is partly constituted by the *conceptions* we form about the various individuals, concepts, and objects we care about. Third, our conceptions are generated, maintained, and curated by the *interpretive habits* we have picked up along the way, whether intentionally or not. Fourth, these questions arise in the space of *nonexpert understanding*. Even when they touch on a person's expertise, the conceptions at stake still extend past the expertise of the individual attempting to understand through the conception. They cannot be confined to an individual's narrow field of expertise, whatever it happens to be; rather these questions demand integration among all our other conceptions into a holistic picture of a good epistemic life, despite being constrained by profound practical limitations on our ability to ensure our conceptions are accurate. Fifth, in scenarios like these, we are inevitably presented with *affective feelings* that incline us in one direction or another, feelings whose connection to accurate conceptions is often uncertain.

My proposal is that in these vulnerable moments, a particular category of feelings offers the needed guiding light. I call them feelings of *resonance* and *muteness*. In short, a feeling of resonance is a feeling that a view gets things right in important ways that are not yet apparent to me. Conversely, a feeling of muteness is a feeling that a view gets things wrong in important ways that are likewise unapparent. Feelings of resonance and muteness might at first seem like a clairvoyant ability to assess what a not yet fully understood view promises to offer in my epistemic future. I do not think these feelings are genuinely clairvoyant. Nor do I think they are infallible. However, I will ultimately defend the claim that where effortful reasoning either fails or is impractical, where trusted sources of understanding are inadequate, and where we can see that our own judgments are likely to be influenced by how we desire the world to be rather than how it is, the most faithful source of guidance available to us is a carefully attuned sensitivity to texture of feelings of resonance and muteness.

Justifying the crucial epistemic role I assign to feelings of resonance and muteness will require that I demystify the phenomenon. It seems, initially, that encouraging such a fundamental dependency on feelings threatens to subvert the normal reasoning processes that help us separate good views from bad. Epistemologists and psychologists alike tend to emphasize the misleading potentials of using feelings as a guide to accuracy. To combat these default attitudes about feelings of resonance and muteness, I have organized my project into a study of their broad epistemic value to our understanding projects in general, expert and nonexpert alike. Throughout this dissertation, I will draw out the ways that a psychological resonance mechanism, far from conflicting with the rational features of understanding, is not only compatible with careful reasoning, but in fact enters careful deliberation at multiple stages, often in small ways that we do not notice. Hence, the project

is as much a study of the nature of theoretical understanding as it is a study of the epistemic value of the resonance mechanism.²

Though I have called the form of understanding I am after ‘nonexpert,’ this term is shorthand. ‘Nonexpert understanding,’ as I intend the term, is inclusive of expert understanding and even partly constituted by expert understanding, insofar as expert understanding is an achievable approximation of the ideal of full understanding. However, there is a version of ‘expert’ understanding that I *exclude* in this project. This is what is sometimes called ‘scientific understanding.’ The term ‘scientific understanding’ is often used to describe what ‘we’ know or understand in virtue of the work of an entire scientific community. On this usage, the term refers to a collective form of understanding that is not attributable to any particular individual who has mastered the subject. I acknowledge the importance of this form of understanding, as well as our dependence on it for individual mastery. However, my concern is with the kind of understanding that leads toward individual mastery. I am after understanding as a psychological state rather than a communal achievement. While the psychological state is deeply dependent on our many communal achievements, I can only tackle so much at once.

This dissertation has some additional themes as well, such as: (a) Understanding is not static: it develops and transforms over the course of our lives. (b) The psychological contents through which we understand are complex, multifaceted, holistic, and have a dynamic inertia. (c) The psychological processes and dispositions that figure into our epistemic system, though essentially distinct from one another, are integrated together in our minds into complex, inaccessible processes whose consciously accessible results often blend our various motivations together to produce apparently fully-formed monolithic judgments about the accuracy of a view on offer. (d) In human

² Note that I take ‘theoretical understanding’ and ‘explanatory understanding’ to refer to the same psychological system, so I use these terms interchangeably.

understanding, sources of justification (or warrant) and inspiration (or etiology) are bound up with another.³ The etiology of our conceptions affects the warrant we have for assenting to those conceptions. This connection is independent of non-epistemic motives. Etiology enters the justification of a conception as a form of warrant for itself—not as fully accurate, but as potentially accurate.

My subject matter is complex, and my project is correspondingly ambitious. I will develop technical terminology as I go, and I will ask the reader to keep track of many distinctions and definitions. However, I hope to aid the reader with a guiding methodological principle: it is better to precisify the normal meanings of common words than to stipulate artificial meanings. To further aid the reader's comprehension, whenever I introduce or reintroduce a technical concept without giving a full explanation of it, I will refer the reader to the parts of the dissertation where I discuss the concept more fully.

The main concepts

Here is a brief introduction to the four main concepts of this dissertation: theoretical understanding, conceptions, resonance, and perspectives. I will review the basic features of these concepts many times throughout the dissertation. There are many moving parts to this project, so I hope the repetition helps.

Theoretical understanding

Roughly, *theoretical understanding* is the capacity to explain features of the world to oneself by representing them in ways that get at their nature. Theoretical understanding characteristically comes

³ In the philosophy of science literature, this distinction is commonly signified by the terms 'context of justification' and 'context of discovery'.

in degrees: it can be better or worse. As the term ‘theoretical’ implies, understanding is primarily about objects, broadly construed. There are two basic evaluative dimensions (or norms) by which theoretical understanding might be better or worse: *accuracy* and *grasping*. That is, my understanding is better the more I grasp a conception and the more accurate the conception is.

Conceptions

The term ‘theoretical’ suggests that the representational unit of understanding is a *theory*. However, this term is usually too narrowly interpreted to be useful for the broad capacity I am interested in. Many of our efforts to explain through representation fall outside the scope of scientific theories, objective explanations,⁴ models,⁵ or exemplars.⁶ I might, for example, explain a person’s behavior to myself in terms of their goals, interests, and history. And if the explanation is roughly accurate, then I might understand that person. Hence, I take *conceptions* as the general form of representation for theoretical understanding.

Resonance

Feelings of resonance are distinct from judgments of correctness: I presuppose that one might have either of these in the absence of the other. A feeling, however, is characteristically not an epistemic reason. For the feeling to function this way, it needs to at least *carry* evidence. If so, then feelings of resonance, though experientially prominent and consciously accessible, are not the target phenomenon. The target phenomenon is the condition that either produces or is partly constituted by epistemic feelings. That is, the feeling would have to function as an epistemic reason in virtue of

⁴ See, for example, Hempel (1965), Salmon (1971, 1984), and Kitscher (1989).

⁵ See, for example, Giere (1990).

⁶ See, for example, Kuhn (1996) and Smith and Medin (1981).

its functioning to carry evidence that is not otherwise consciously accessible. When an individual has an explicit feeling of resonance that carries positive or confirming information about inaccessible evidence, I will say the individual is in a psychological state of *resonance*. Similarly, feelings of muteness might carry or communicate the psychological state of *muteness*, in which one has inaccessible but negative, disconfirming evidence. A note on terminology: I will sometimes use the term ‘resonance’ as a shorthand for ‘resonance and muteness.’ These two concepts are as interdependent as the concepts of PAIN and PLEASURE.

Perspectives

The epistemic value of the psychological state of resonance, however, faces a major obstacle. Our meandering lives do not present the variety of available conceptions on equal footing. We are often initiated into conceptions through the gradual development of *holistic clusters of interpretive habits*, or *perspectives*, as Elisabeth Camp calls them, that condition our ongoing cognitive processes to generate and maintain those conceptions.⁷ The auto mechanic is attuned to certain diagnostic sounds a vehicle can make under certain conditions. To a non-mechanic’s ear, small differences in sounds are not salient. The mechanic’s attunement to a variety of diagnostic features expands and deepens her conception. Similarly, the religious adherent is accustomed to connecting metaphysical and moral concepts in ways that enable her mythic account of the universe to inform her moral judgments. These habits of conceptual connection reinforce her religious worldview by further entrenching in her mind certain cognitive pathways. Disrupting these metaphysical and moral links gradually becomes unthinkable. Each conception will typically have its own proprietary perspective whose holistic network of open-ended interpretive dispositions encourages fidelity to our

⁷ See Camp (2013, 2017, 2019a, 2019b, 2021).

conceptions as they are and resistance to any shifts in the conception radical enough to require significant shifts in the perspective that generates and maintains it.

Outline of the project

Here is the big-picture inferential structure of this project. Theoretical understanding is concerned with conceptions, but conceptions are very different from beliefs. These differences require that the standard by which theoretical understanding is measured is long-term understanding projects rather than static representations. We primarily evaluate such projects by expected, progressive increases in both warrant for our conceptions and grasping of our conceptions. Resonance is not only compatible with warrant; it can even contribute warrant and is especially well-suited to increasing the most important kind of warrant for theoretical understanding. Similarly, resonance is not only beneficial for increasing grasping; it seems to be both constitutively and causally *necessary* for grasping. These features establish the epistemic value of resonance even before the questions of vulnerable epistemology are raised. Once those questions are raised, however, resonance turns out to also be uniquely well-suited to stabilizing a balanced epistemic trajectory that avoids both dogmatic fidelity and ungrounded openness. It offers a way out from sticky and even perverse perspectives and it offers an inroad to unfamiliar but valuable perspectives that would otherwise not seem worth the trouble. This account of the epistemic importance of resonance, however, faces serious objections. First, feelings are difficult to distinguish from one another, and feelings of resonance seem especially vulnerable to misattribution. Second, even if I can reliably distinguish feelings of resonance from other feelings, many of the unconscious beliefs that produce resonance are probably false. A careful phenomenology of understanding defuses the first objection. However, the second objection reveals that felicitously following one's feelings of resonance is not a

master-virtue. It is one (important) part of a network of epistemic virtues that each assist us in moving stably forward on a lifelong epistemic journey.

Now I will give a more detailed outline of the project. I begin in chapter 1 by delineating the unit of representation appropriate to theoretical understanding: the conception. I list many features of conceptions which will be relevant to the project, usually at multiple different stages.

Conceptions, for example, represent objects (as opposed to states of affairs). They are also structured in multiple ways, including, notably, a set of gestalt patterns non-systematically collected by the individual, an explanatory framework, and an epistemic support structure. With the nature of conceptions established, I turn to a particularly important question for this project: how do we establish the numerical identity of a conception over time? That is, when is a conception of the same object no longer the same conception? I argue that the conception's explanatory structure establishes numerical identity, especially at the higher levels of that structure.

I close chapter 1 with a discussion of the concept of resonance. First I give a detailed definition of the resonance mechanism. Resonance is the fit (or coherence) within the mind of an individual between a consciously, occurrently considered explanatory framework for a conception and the inaccessible representational content that partly constitutes that conception. Less technically, resonance is a psychological state in which there is coherence between the conscious and unconscious parts of a conception. The resonance mechanism includes a process that assesses this coherence and then signals it through conscious affective feelings. I defend the existence of this mechanism with four distinct arguments. First, I argue that common use of the term 'resonance,' even among experts, presupposes the existence of such a mechanism. Second, I argue that it is implied in the nature of conceptions. Third, I argue that the resonance mechanism functions analogously to most emotions, and that this functioning of emotions is relatively uncontroversial. Finally, I argue that the

empirical evidence from psychologists supports the existence of the resonance mechanism, roughly according to my definition.

With the representational unit of understanding established and the central concept of the dissertation defined, chapters 2 and 3 take up the concept of theoretical (or explanatory) understanding. I begin chapter 2 with a basic account of this epistemic capacity. Following most accounts of understanding, I claim that an individual's degree of theoretical understanding depends on (a) the accuracy of her conception and (b) how well she grasps the conception. That is, understanding has two basic norms: accuracy and grasping. Because resonance has distinctive relations to each of these norms, I treat them independently. In chapter 2, I take up the accuracy norm, while in chapter 3, I take up the grasping norm.

With the basic concept of theoretical understanding established in the first section of chapter 2, the next three sections of the chapter discuss the complex relationships between doxastic commitment, epistemic support, and accuracy—each of which comes in degrees. Accuracy is an external norm, which entails that there is no way to directly measure it. If there were, then *that* would be the best way to achieve understanding. Additionally, a conception can be more or less accurate along multiple dimensions, which makes accuracy even more difficult to assess as a single graded measure. As a rule, we assess the degree of accuracy a conception has achieved based on the epistemic support (or 'warrant' as I prefer to call it) available. Warrant, too, comes in multiple different forms and along multiple dimensions. But because it is an internal norm, it is easier to achieve a single, holistic, graded measure. In a well-functioning epistemic system, the individual's degree of doxastic commitment (or 'assent' as I prefer to call it) should be psychologically regulated to be commensurate with the individual's degree of warrant. This regulation functions to keep the individual's degree of assent commensurate with the conception's degree of accuracy. I argue that

the kind of warrant we want for successful understanding is just whatever moves us closer to mastery in an understanding project.

In the last section of chapter 2 I discuss the relevance of resonance to assessments of accuracy. Specifically, I ask whether resonance can warrant. I argue that it can warrant in two distinct ways, but only when defeaters are not present. The major sources of defeat are (a) inaccurate inaccessible representations, (b) feelings that mimic resonance, and (c) significant, persistent incoherencies in a conception, despite feelings of resonance. Absent these defeaters, an individual with a well-functioning epistemic system should undergo an increase in assent in response to resonance, other things equal. The kind of warrant the resonance offers, moreover, is well-suited to switching one's doxastic default from one conception to another.

I begin chapter 3 by discussing the most common definition of the grasping norm among epistemologists: representation manipulability. I argue that this capacity is merely a diagnostic mark of grasping; it does not express the nature of the grasping norm for theoretical understanding. Instead, I argue that we should conceive of grasping as having distinctive tiers or levels. The most basic form of grasping is self-comprehension, or the transparency of one's own thoughts. The next tier of grasping introduces the capacity for explanation, but not necessarily self-reflection: an individual grasps a conception better when her conception has explanatory links embedded in it, even if the individual is not aware of these links. Self-reflection enables what I call explanatory comprehension, in which an individual occurrently constructs for herself an explanatory framework for her conception and integrates this framework into her conception through repeated coherence checks. The highest level of grasping, however, is explanatory competence. This occurs when a conception is not only integrated with an explanatory framework that structures the conception, but it is also encoded in long-term memory in a way that enables it to regulate the individual's normal

cognitive interactions with the object represented by the conception. Explanatory competence, it turns out, is the level of grasping necessary for achieving the kind of representation manipulability that epistemologists associate with successful theoretical understanding. It is the kind of grasping indicative of mastery and thus the standard against which our assessments of grasping are measured.

With the concept of explanatory competence established, I close chapter 3 with two opposing considerations concerning resonance: (1) whether resonance is in fact *necessary* for explanatory competence, and (2) whether resonance can sometimes *prevent* explanatory competence. With regard to the first consideration, there are at least two objections to the view that explanatory competence requires resonance: (a) that one can grasp a false theory and (b) that one can grasp without ever having a feeling of resonance. I affirm both of these views, but argue that they do not entail an absence of resonance. Then, I defend the view that resonance is more necessary for explanatory competence the deeper that competence becomes. The reason is that resonance is a form of coherence across the conscious/unconscious divide. The more incoherency there is in a conception, the lower the ceiling for grasping will be.

With regard to the second consideration, it seems that an unintelligible explanatory framework might resonate. But then the unintelligibility of the framework will inhibit explanatory competence by embedding incoherence within the individual's conception. In response, I argue that our conceptions do not exist in isolation from one another. The unintelligibility of a resonating explanatory framework will put pressure on other conceptions, thereby generating mutenesses elsewhere in the individual's total representational system. Since these mutenesses are part of the resonance mechanism and can be signaled by feelings of resonance, they encourage grasping across the whole of one's system of conceptions rather than localized within a single conception. Thus, the

resonance mechanism comes equipped with an *internal* check on the potential of an unintelligible yet resonating explanatory framework.

Chapter 4 examines the involvement of resonance in achieving explanatory competence. In chapter 3, I argued that the *psychological state of resonance*, as a critical form of coherence, is *constitutively* necessary for explanatory competence. In chapter 4, by contrast, I examine the question whether relying on *feelings of resonance* is *practically* necessary in the process of achieving and deepening explanatory competence. In the first few sections of the chapter, I establish the diachronically developed interpretive dispositions that partly constitute explanatory competence. In the next few sections of the chapter, I establish the conative features of explanatory competence and their relationship to resonance. In the final sections of the chapter, I argue that resonance is beneficial for this process in two ways: it enables more efficient progress toward explanatory competence and it also protects against epistemic perversion.

Here is a more detailed plan for chapter 4. First, I distinguish an explanatory framework that is critically regulative from one that is not. Critical regulation requires that an individual is aware of the features of the explanatory framework that she is encoding into her long-term memory. Whether critically regulative or not, an explanatory framework that recruits cognitive resources for normal cognitive interaction with an object requires the individual to develop a holistic, open-ended network of interpretive dispositions which Elisabeth Camp calls a ‘perspective’.⁸ Following Camp, I divide these networks of dispositions into three kinds: dispositions of attention, dispositions of cognitive connection, and dispositions of evaluation. That is, we tend to notice certain features, connect them in certain ways, and have certain kinds of evaluative responses to them. A perspective will tend to generate a particular explanatory framework; likewise, an explanatory framework will

⁸ Camp (2008, 2013, 2017, 2019a, 2019b, 2021)

encourage a particular perspective. They are made for one another and they are also mutually reinforcing. However, in the case of critical regulation, the explanatory framework is typically the leading phenomenon. Whereas, in other cases, the perspective is typically the leading phenomenon. Hence, a critically regulative explanatory framework is easier to escape than any other kind of explanatory framework.

Because perspectives and their corresponding explanatory frameworks are difficult to escape, we need a source of motivation whenever we abandon one in preference for another. I argue that critical regulation requires conscious commitment of cognitive resources, which I call investment. When an explanatory framework recruits the same resources by subverting an individual's reflective capacity, I call this *mere contraction*. Mere contraction is not resonance; rather it is consciously recognized coherence between an explanatory framework and the familiar cognitive gestalt patterns in the object. An explanatory framework can be both contractive and mute. The source of motivation that enables an individual to change her perspective, then, must produce investment rather than mere contraction. I argue that such a source of motivation must be a *lodestar*: a consistent, stable, orienting sign by which an individual can always roughly assess her position on the aspirational path toward understanding (as mastery). I argue that resonance is the appropriate lodestar because it both motivates and guides and it does so without gradually losing its epistemic value the way a touchstone often does.

I conclude chapter 4 by identifying two benefits of treating resonance (and muteness) as a lodestar. The first benefit is that it opens the possibility of using metaphorical thinking to rapidly accelerate one's progress toward explanatory competence. This happens by jumping from evocative metaphor to evocative metaphor in a research project, while using resonance as a lodestar. The second benefit is that an individual who is attuned to resonance and muteness will thereby more

easily be able to escape perverse perspectives that commandeer our cognitive resources through propaganda intended to inculcate a merely contractive explanatory framework.

Finally, in chapter 5, I turn to what I take to be the three major objections to the idea that feelings of resonance can be a reliable guide to accuracy, even if only in the long run. The first is that since resonance is consciously recognized through a feeling, it is easy to mistake some other feeling for resonance. I reply to this worry by disambiguating the various feelings involved in understanding projects. Feelings of resonance, I argue, are not directly connected to agential feelings (confidence, success, frustration, failure) because resonance is not something that can be reliably worked toward in the way that other, similar epistemic feelings can. Resonance arrives unexpected, even when intentionally pursued. For this reason, resonance and muteness have a distinctive phenomenal profile which can be consciously recognized by an attuned individual.

The second objection is that the pleasantness of the feeling of resonance is a temptation to focus only on this feeling, to the exclusion of any attendant muteness or even accessible disconfirming evidence. I respond to this objection by treating pleasant and unpleasant feelings as a coordinated pair that function to compensate for potential excesses in either direction. Instances in which a pleasant experience commandeers an individual's attention by enabling the individual to maintain that affective state typically involve the suppression of corresponding unpleasant experiences. A smartphone game, for example, is designed to streamline pleasant feelings that reinforce the desire to play. However, resonance and muteness cannot be engineered the way a smartphone app can. Rather, any attempt to subvert or hide muteness only magnifies that muteness, especially to an individual who is attuned to these feelings.

The third objection is that even if everything goes well with the resonance mechanism, the inaccessible content that is resonating with an occurrently considered explanatory framework might,

itself, be inaccurate. This is a particularly challenging problem because the inaccessibility of the content limits an individual's ability to determine its accuracy. I respond to this objection, first, by admitting the possibility. However, I mollify this worry by noting that inaccurate inaccessible content will produce mutenesses elsewhere which, for an attuned individual should signal the need for reevaluation. Even so, not every individual will be psychologically ready for reevaluating her perspectives and explanatory frameworks when such mutenesses arise. Given this psychological weakness, I argue that we should think of our understanding projects as epistemic journeys whose various legs we travel when we have seen enough at the current explanatory location and are prepared for a new vista. Mastery may never come, and one's explanatory frameworks may remain inaccurate in large ways, but the project is still epistemically valuable, provided one does not doxastically overcommit.

Chapter 1. Resonating Conceptions

On most accounts, theoretical understanding primarily involves two types of evaluable relations. First, there is a relation between an individual's mind and her representation of reality, which I call the 'grasping norm'. Second, there is a relation between that representation and reality, which I call the 'accuracy norm'.⁹ The representation, on this view, mediates between mind and reality and both relations can be better or worse, thus affecting the quality of the individual's understanding. Accordingly, I will begin my consideration of the features of theoretical understanding with a discussion of the nature of its primary representational unit. Just as the primary unit of propositional knowledge is beliefs, so, I take it, the primary unit of theoretical understanding is conceptions.

The notion of conceptions that I develop here is meant to track a very common philosophical use of the term. While I do not hope to capture all uses of the term 'conception', I do hope to give a more technical articulation to a common and common-sense notion.¹⁰ Note that I am not offering a theory of conceptions; rather, I hope to identify common features that any minimally reflective reader will recognize as characteristic of a common form of representation.

The purpose of this chapter is to establish conceptions as a representational unit that is distinct from but related to other forms of representation, such as beliefs and explanations. Conceptions, I hope to show, are special in two ways: (a) they are well-suited to be the unit of theoretical understanding and (b) they are well-suited to be the subject of the psychological phenomenon commonly named 'resonance.' Note that I use the locution 'well-suited' to indicate

⁹ Wilkenfeld (2017a) explicitly endorses this view, but it can also be found in Kvanvig (2003), de Regt and Dieks (2005), de Regt (2009, 2017), Grimm (2010b), Strevens (2013), Baumberger (2014, 2019), Baumberger and Brun (2016), and Hills (2016). Even Elgin's (2004, 2007, 2017) work reveals not the absence of an accuracy norm, but complexities of the accuracy norm which are not comfortably describable as mere true beliefs. This double-norm view has detractors, including Trout (2002), Riaz (2015), and Hazlett (2018). I will discuss these views in section 2.1.d.

¹⁰ See Woodfield (1991) for a vivid exploration of the variety of common uses for the term 'conception'.

that something is capable of fulfilling a distinctive functional role within a system, and fulfilling that role well. This chapter will also lay the foundation for later chapters in which I focus on the accuracy norm (chapter 2) and the grasping norm (chapter 3).

Here is a working definition of conceptions:

Conception – S 's conception of x is the total representational component of a holistic psychological network that functions to accurately represent the features that specify x 's nature, history, and relevance to S , and to do so in a way that enables S to make sense of x .

Because a conception is constituted by the total representational content in an individual's mind concerning some object, in humans a conception will typically straddle the conscious-unconscious divide. That is, part of the conception will be occurrently accessible in the individual's conscious, reflective thinking, and part will remain inaccessible. This straddling feature of conceptions opens the possibility for a conception to *resonate*. Here is a working definition of resonance:

Resonance – A psychological state in which there is a good fit between the conscious and unconscious parts of a conception.

The state of resonance is signaled by occurrently felt, metacognitive feelings, which we might call feelings of rightness, feelings of correctness, or feelings of resonance. These feelings arise when one is occurrently considering the conscious features of one's conception which affect and relate to the unconscious features. These feelings often become especially prominent when one is considering a structural change to the explanatory features of one's conception. I take this account of resonance to capture the standard epistemic use of the term, as when we say that an explanation resonates. The phenomenon of resonance also seems broader than its epistemic expressions. For example, I might

choose a friend or a career in virtue of resonance, and this seems to have little to do with conceptions and explanations. I set this larger phenomenon aside.

Here is an outline of this chapter. It is divided into two parts. Sections 1 through 3 give an account of the nature of conceptions, while sections 4 and 5 give an account of the nature of resonance. I have conjoined these accounts into a single chapter because epistemic resonance, on my account, is a distinctive feature of conceptions. In section 1, I discuss about a dozen major features of conceptions as they exist and develop in our minds. Conceptions are a complex representational unit, both in their constitution and in their genesis and upkeep. Conceptions are organized around objects, concepts, and essences, but each in distinctive ways. They have multiple forms of structure, notably including an explanatory framework. They straddle the conscious/unconscious divide. They also organically develop to suit the changing interests and evidence available to the individual. This list of features both unpacks the above definition of conceptions and lays the groundwork for later chapters. I conclude section 1 with a brief contrast of conceptions and beliefs.

Sections 2 and 3 further elaborate conceptions by addressing two immediate worries about treating them as the unit of representation for theoretical understanding. In section 2, I take up the problem of numerical identity of conceptions. One of the major questions about the epistemic value of resonance is whether it can warrant abandoning one conception in favor of another.¹¹ This question, however, presupposes that conceptions can be numerically distinct even when the stabilizing object and concept of that conception remain the same. I motivate the view that numerical identity of conceptions supervenes on the essence an individual attributes to the object. In section 3, I close my discussion of the nature of conceptions by motivating my apparently

¹¹ I will take this question up directly in chapters 2 and 4.

counterintuitive choice to treat conceptions as the unit of theoretical understanding rather than explanations. Explanations, I argue, are narrow in their content and thoroughly dependent on conceptions in ways that are not eliminable given the nature of theoretical understanding. I close this section by defining an important concept: the explanatory framework. This is the unit of explanation that is commensurate with conceptions, since explanatory frameworks organize conceptions into coherent, structured wholes. Explanatory frameworks will figure prominently in later chapters.

In section 4, I offer an account of the resonance mechanism. It can be divided into three parts. The first is the psychological condition of resonance, a state in which the conscious and unconscious parts of a conception in the mind of an individual are in relative coherence with one another. The second is the passive resonance process, which is a metacognitive monitoring process that assesses the relative coherence of a conception in response to occurrently considered explanatory features of that conception. The third is the feeling of resonance, which is the output of the process. Feelings of resonance exist along an affective spectrum, with pleasant feelings of resonance at one end and unpleasant feelings of muteness at the other.

The existence of a psychological state of resonance is uncontroversial. The existence of feelings of resonance and muteness is also uncontroversial. The contentious part of this account is the passive resonance process which connects the two. In section 5, I defend its existence with four distinct arguments. First, I argue that the existence of such a process explains common and apparently ineliminable discourse even by experts about their choices of research projects. Second, I argue that the nature of conceptions, as described in section 1, entails the likely existence of a passive resonance process. Third, I argue that the controversial aspect of this process is commonly treated as relatively uncontroversial when it appears in paradigmatic emotions like anger and fear. Fourth, I assess evidence from experimental psychology to show that the existence of a passive

resonance process is plausible and that it may even be epistemically reliable under certain conditions.¹²

1.1. The nature of conceptions

I will begin with a brief summary of the nature of conceptions. Following that summary, subsections (a) through (k) will examine the individual features of conceptions that are most relevant to my project. Subsection (l) closes with a contrast between the features of conceptions and beliefs.

It may help to begin with a brief discussion of some of the things a conception is not. A conception is not identical to a concept. Concepts, as I use this term, fix the reference of words through the concepts those words pick out.¹³ Because concepts fix reference, they have a stabilizing effect on conceptions, but they are not identical to conceptions.

A conception is also neither an exemplar, a prototype, nor a stereotype. Exemplars are the paradigm cases we think of when we call to mind a concept.¹⁴ An exemplar is typically a representation pulled from both individual experience and cultural conditioning, whether through available instances in media or cultural icons. Exemplars are a mechanism by which we intuitively categorize objects, so exemplars can have a norming effect on concepts and hence also on conceptions.¹⁵ Exemplars also often stabilize our conceptions of the kinds we take these exemplars to exemplify. However, conceptions are more inclusive than exemplars in the sense that they include *all* the information we associate with the object of the conception. Additionally, we often have conceptions of singulars, such as a pet or an old house. Exemplars are not well-suited to expressing

¹² I do not specify these conditions in chapter 1. I will turn to this issue in chapters 4 and 5.

¹³ See Peacocke (1992).

¹⁴ See Smith and Medin (1981). Kuhn's (1996), pp. 187-198 view is similar, though for him, exemplars are central cases of problems with ready-made solutions which can be treated as instructive analogies to similar cases.

¹⁵ Smith and Medin (1981), pp. 144-146.

our representations of singulars. Furthermore, we typically attempt to unify our conceptions through explanatory relations, but exemplars are fundamentally disjunctive accounts of the categories they represent.¹⁶ Even when we assemble a single collection of prototypical signifying features possessed by the various exemplars, the resulting list of features is only a small (though important) part of the content of a conception. A prototype can heavily influence the representational content of a conception, but the prototype alone is not the conception, since individuals will commonly admit an instance to belong to a category despite failing to measure up very well to the prototype.¹⁷

A conception of an object is partly constituted by the total representational content in an individual's mind about the object. Note that this is intuitive: my conception of a horse is just how I think of horses. Conceptions also involve holistic networks of psychological parts, including both representational and phenomenal contents as well as sub-personal processes and dispositional links between contents that guide occurrent thinking about the object the conception represents. A conception does not exist in a psychological vacuum: it is generated, organized, developed, and supported through surrounding psychological contents, dispositions and processes. It is not clear whether these non-representational features should be thought of as partly constituting conceptions.¹⁸ That is, is a conception *merely* the representational component, or is it the larger psychological whole in which the representational component is embedded? I have no firm view, but, for the sake of clarity in writing, I will use the term 'conception' to refer only to the representational component (which is complex enough on its own).

¹⁶ Smith and Medin (1981), pp. 144-146.

¹⁷ This is the "conceptual core" that often stabilizes category membership in the normal use of terms. See Armstrong et al (1983). It is also reminiscent of Putnam's notion of a stereotype. See Putnam (1996), pp. 30-34. I will return to the notion of a "conceptual core" when I discuss essential natures in section 1.1.e.

¹⁸ See also Gardiner (forthcoming) for a helpful summary of the nature of conceptions.

Even if conceptions are partly constituted by holistic psychological networks, they function to represent. While the basic dimensions of evaluation for conceptions are accuracy and grasping, conceptions also have derivative norms, which improve the thinker's ability to achieve the basic norms. Derivative norms of conceptions include conceptual coherence, fit between remembered representational content and occurrent phenomenal content, and ease of occurrent use of conceptions. The non-representational features that support conceptions, then, enable smooth interfaces between representations and other psychological contents and processes. But the central function of a conception is representational, and the success condition for a conception is that it enables (or partly constitutes or produces) understanding. Here, again, is my working definition:

Conception – S 's conception of x is the total representational component of a holistic psychological network that functions to accurately represent the features that specify x 's nature, history, and relevance to S , and to do so in a way that enables S to make sense of x .

For example, a nonexpert's conception of frogs might include a stereotype image of a frog, strong hind legs, a long and versatile tongue, a distinctive croak, and a compliment of internal organs roughly similar to other vertebrate animals, and a relatively simple mind. This conception enables the individual to make sense of frogs as animals with respiratory and digestive needs as well as a conscious and representational point-of-view. As another example, a child's conception of school might include social interaction with peers, instruction from an adult, and subject matter instruction which is divided into distinct periods of time. The child's conception enables her to make sense of her school as both a place and a social phenomenon and to situate it as a distinctive context of meaningfulness within her life. Some paradigm objects of representation via conception include machines, natural kinds, events, abstract concepts, social constructs, other minds, and the contents of other minds.

In the following subsections, I unpack the details of this account. This thorough examination of the details is necessary because the pages that follow depend upon the complexities of conceptions as I lay them out in subsections (a) through (k). Think of these subsections as an encyclopedia entry on *conceptions* rather than a mere definition entry.

*1.1.a. Conceptions are mental representations.*¹⁹

Mental representation requires both a subject and an object. The subject is the mind that represents, while the object is the reality represented. The representation itself, then, is a mental state had by the subject. Representation is intentional: it is *about* the reality it represents. Representation is also attributional: the content of a representation is the features attributed to the reality that the representation is about. Representation serves a constitutive function that is independent from any biological function that it might also serve: it functions to *accurately* attribute features to reality.²⁰ A conception can be inaccurate but also biologically beneficial as inaccurate, as in the case of a creature who over-represents predators as a survival mechanism. To say that the creature's representation is inaccurate but biologically beneficial implies two distinct norms: an accuracy norm and a survival norm. Hence, the accuracy norm can come apart from any biological norm conceptions might have.

Here, I should include two brief caveats on entrenched conflicts between philosophical frameworks: one metaphysical and one epistemic. First, the metaphysical caveat. As far as I know, nothing in this dissertation is theoretically affected by the fundamental nature of mind. My account should be compatible with materialist views, idealist views, dualist views, or any other variation. I treat mental representation as a primitive concept because working out the nature of this

¹⁹ I will often use the terms *mental representation* and *representation* interchangeably. I take for granted that all representation is somehow derivative of mental representation.

²⁰ See Burge (2010) p. 379.

phenomenon is not part of my project. A materialist, for example, should read my reference to mind and mental representation as shorthand for whatever the material basis of mind and mental representation turn out to be.

Second, the epistemic caveat. While I take a realist stance on the objects of mental representation, nothing about my view of theoretical understanding hinges on this realism. A pragmatist interpretation is always available, which only requires that representational accuracy is interpreted in terms of observation rather than in terms of objective reality. Since our accuracy judgments depend on observation, testimony and inference, this will turn out to be a difference that does not make a difference.²¹

1.1.b. Conceptions are representations of objects.

I use the term *object* inclusively: anything that can be thought about as a noun-like whole is an object. One can have a conception of a Ford *Model T*, the property of being a hat, the crowd in front of the tower, the Netflix company, one's spouse, monarch butterflies, justice, the proposition <God is good>, the number 5, and so on.

Representation of objects is probably psychologically prior to propositional representation, both phylogenetically and ontogenetically. Phylogenetically, creatures who apparently lack propositional attitudes (frogs, for example) have perceptual capacities and can recognize objects they have interacted with before. Ontogenetically, even infants who are probably not yet capable of representing states of affairs show signs of object permanence.²²

²¹ These features of the accuracy condition will reappear in Chapter 2, though I will not take up the pragmatism/realism debate.

²² Baillargeon's (1983, 2008) experiments reveal that, contra Piaget (1954), infants understand that objects continue to exist even when they are hidden from view. The primary obstacles to searching for hidden objects are not representational capacities; rather, infants fail to search for hidden items due to motor, attentional, and motivational limitations.

*1.1.c. The content of a conception attaches to a concept of the object the conception represents, as if gravitationally.*²³

Here, I take a concept to fix the reference of the object or class of objects whose features the conception represents. An individual can use concepts independently of context. The difference between a perceptual attributive and a concept is that the concept is available for attributing to anything regardless of whether the creature currently perceives it.²⁴

Concepts are often socially negotiated. The reference of a concept depends on the context in which one acquires the concept and often changes in response to communal use of the concept. Hence, concepts are frequently overlapping and contested. For example, whether stair vehicles and tractors are part of the reference of CAR will be negotiated by the community that uses the concept. The paradigm cases of a concept, once relatively fixed in one's mind, become an appropriate stabilizing reference class for a conception.²⁵

Part of the function of a conception of a kind, then, is to pick out the features that make it a single kind.²⁶ However, conceptions collect representational content automatically. Whatever information about the objects in our world makes its way into our minds becomes part of the conception of that object. It is as if a concept gravitationally attracts a conception.

Conceptions take on additional features of concepts in virtue of their being stabilized by concepts. For example, conceptions, like concepts, are hierarchically nested, but because concepts

²³ I follow Camp (2003), pp. 126-131 on the relationship between concepts and conceptions, where conceptions, as I use the term, should be understood as an instance of what Camp calls 'characterizations'.

²⁴ Burge and Camp argue independently that the primary constituting feature of concepts is that they are context-independent. See Burge (2010), p. 539-542, and Camp (2009).

²⁵ I follow Peacocke (1992, 1996) on the individuation of concepts: concepts function to fix the reference of a term, and are individuated from one another through their possession conditions, whatever those conditions are. However, the possession conditions of a concept, especially concepts of artifacts, are socially negotiated. One primary means of social negotiation of the possession conditions for a concept is the cultural stability of relatively central prototype (or paradigm) instances of the concept. This phenomenon was first explored by Smith and Medin (1981) and has since been developed by Armstrong et al (1983) and Lakoff (1987).

²⁶ This is similar to Putnam's description of the function of a "stereotype". See Putnam (1996), pp. 30-34. See also Lakoff (1987) for a detailed account of how multiple prototypical models converge into a single stereotype, deviation from which influences our judgments about whether and to what degree instances belong to a kind.

overlap, so too do hierarchies of both concepts and conceptions. Inconsideration might be a form of nonmoral rudeness, but it might also be a form of moral failure. It is not clear whether it is both, and this ambiguity will be reflected in one's conceptions of all three.

1.1.d. Our conceptions represent the features of objects as having a structure in virtue of which those features constitute a single whole.

All representation is representation-as. That is, for every object we represent, we already bring it under a repeatable attributive or singular, otherwise it would not register in our representational framework as a single object distinct from other objects. In visual perception, for example, sensory information is transformed by constancies in the visual system to be representable as falling under consistent, repeatable colors even when lighting changes.²⁷ The same holds for conceptual representation. After I acquire the concept BASKETBALL HOOP, I will see basketball hoops on the court and not merely large metal rings with netting attached. Kinds, like BASKETBALL HOOP, ascribe a shared structure to their members as complex wholes: basketball hoops are circular metal rings that have nearly twice the diameter of the basketballs they are made for, and which feature loops for attaching a net and a setting to attach to a backboard and pole.

But what is a structure? We represent structures of objects by combining at least three ingredients: (1) the features of the object, (2) a domain of positions that these features can occupy, and (3) an assignment that specifies which features (or kinds of features) are to occupy which positions.²⁸ In the above example, some of the features of the basketball hoop include its circular shape, its diameter, the backboard setting that allows the hoop to be attached at the right

²⁷ Burge (2010), 34-36 and Camp (2003), pp. 71-78 both argue for this point.

²⁸ These are the three ingredients proposed by Rescher and Oppenheim (1955), p.100, as constituting a gestalt object. See also Koslicki (2008), p. 239, and Harte (2002), pp. 161-162 for similar accounts.

orientation, and loops for the net. Some of these features are physical parts of a basketball hoop: ring, setting, loops. These parts must be physically related to one another according a certain domain of positions. Other features are functionally necessary attributes that are not proper parts, such as the ring size and a durable constituting material. In a conception, these features are organized into a representation of the functional nature of the basketball hoop. The structure of a conception, however, is not to be confused with the structure of the object the conception represents. A conception organizes the features of an object under a structure. When some of those features are physical, part of the organizing structure will be a spatial representation of the relationship between the parts of the object. However, conceptions often include more than merely physical features of an object, and these are also set in relation to one another through a structure.

Conceptions admit multiple forms of structure. In creatures that can form conceptions but lack the capacity for meta-representation, features are probably organized by (a) their relevance to the creature's interests and (b) their patterned predictability. Through observation of patterns relevant to a creature's interests, the creature will develop a repertoire of significant patterns it attributes to the features of the object. These patterned features appear in the creature's thinking as a seamless part of the creature's total gestalt in interacting with the object. While these structural features are not necessarily unified into a single patterned whole, they form chains and networks of representational features within the creature's conception of the object. That is, conceptions, even at their most basic level, are not mere bundles of features. These representational chains and networks connect with a broader psychological network that includes phenomenal consciousness, interpretive dispositions, and agential motivations. The creature's total psychological gestalt of the object is a product of this network as it guides the creature's cognition while interacting with the object. For example, a dog has a sense of its own territory and might associate the sound of a mail carrier's truck

with the threat of eminent invasion, becoming immediately alert and agitated. The dog's patterned experience with the mail carrier enables the dog to expect another repetition of suspicious behavior and to respond in anticipation of the apparent threat.

In creatures with the capacities for meta-representation and explanation, the features of an object will be connected through explanatory relations connecting features into explanatory hierarchies. Explanatory structures are sometimes referred to as 'models' or 'theories'. When they unify a whole conception, I will refer to them as 'explanatory frameworks'. Yet, just as a duck-rabbit image might be viewed as either a duck or a rabbit, the same set of features can admit multiple different potential explanatory structures. For example, my conception of an individual's personality might include stubbornness, willfulness, and a refusal to admit error. These features can be organized into multiple different explanatory structures, depending on how I take different features to explain one another. Some features will seem to need an explanation, while other features will seem to be explanatory. I might incorporate a just-so story into my conception: perhaps the person's childhood was marked by domineering parents who punished errors, so this person responded by insulating themselves from criticism. But a different just-so story might explain the same features, as when I interpret these features not as developed in childhood but as inborn, and so explanatory of other features rather than needing explanation themselves.

An explanatory structure unifies partly in virtue of its integrating and explaining a *conceptual gestalt*. By 'conceptual gestalt,' I mean that a particular arrangement of features attributed to the object registers to the representing mind as patterned in ways that are indicative of natural groupings.²⁹ We register visual gestalts, for example, in virtue of proximity of features, symmetry

²⁹ Grouping by patterns is probably representationally basic. It begins in perception and follows law-like principles in the same way that perceptual constancies do. See Tse and Palmer (2012) on perceptual gestalt groupings. See Palmer (2002), pp. 122-133 on visual constancies.

between features, parallelism between features, continuity of features, and so on.³⁰ The visual system translates these patterns into natural groupings. In our conceptions of objects, we take these patterns up as basic elements of our representational structuring of the physical features of objects.

However, gestalt formation through pattern-recognition does not end with perception. The same tendency for gestalt formation through pattern-recognition can occur at the level of the conception itself. In the same way that natural groupings emerge through visual patterns, so natural groupings can emerge in patterns of features we attribute to objects in ways that extend beyond the merely perceptual. My conception of elected officials, for example, might include a pattern of disconnection between candidates' campaign comportment and their activity in office; it might also include patterns of public dissembling and political compromise. These patterns of behavior are partly constituted by the significance they have in broader political life. But my registry of these patterns demands their explanation through other features attributed to elected officials, such as the motive to win reelection.

Conceptual gestalts, however, do not necessarily follow inborn, law-like principles the way perceptual gestalts do. Rather, the conceptual patterns I form in my thinking about an object can be the product of interpretive dispositions that I have picked up from my culture. If I fail to recognize the cultural contingencies of my interpretive dispositions, I may not recognize that conceptual patterns which strike me as natural and in need of explanation are actually partly generated by my existing habits of interpretation.³¹ Yet, even if I am aware that a conceptual gestalt is the result of cultural exposure, the gestalt patterns in my conception may still seem in need of explanation, especially if they track reality. Often, a cultural perspective enables an individual to see what others

³⁰ Tse and Palmer (2012), p. 190-194.

³¹ I will return to this point in chapter 4.

cannot. The culturally developed nature of conceptual gestalts does not make them unreal or inaccurate; it only means they are not instinctive.

I have so far discussed two ways conceptions are structured in creatures like ourselves: they are structured by explanatory relations and by conceptual gestalts. The gestalt produced by the features I notice as patterned calls for an explanation that structures the conception into a whole in which some parts explain others but all of them together form, if possible, a single explanatory framework. A gestalt is a structure that emerges through and is partly constituted by the features I have observed, while the framework is a structure that I endorse as explanatory of the gestalt and the features that constitute it.

Conceptions also have an *epistemic support structure*. This support structure is constituted by what some philosophers call ‘basing relations’. These are the relations between features and claims by which an individual establishes the epistemic support of any given part of the conception and of the explanatory structure as a whole. Even if two individuals had the same features within their conceptions, the same conceptual gestalts, and the same explanatory framework, they might still have distinct epistemic support structures depending on the sequence and strategies of reasoning they use to form their explanatory frameworks. Explanatory frameworks organize conceptions according to the explanatory dependencies we represent as actually inhering in those objects; epistemic support structures organize conceptions into a justificatory structure by which we stabilize the evidence we have for asserting any given explanatory relation or framework.³²

³² I will develop the relationship between these two structures more fully in section 2.4.c.

1.1.e. Conceptions of objects are organized around the essential natures we take the objects to have.

Explanatory structure unifies features in a conception. Explanatory structures are hierarchical: some features explain others. If a conception is organized under an explanatory framework unifying the entire conception, then some features will occupy the top of the hierarchy. These are typically the features we take to be most essential to the object's nature. An object's essential nature is whatever makes it what it is.³³ Attributing essential natures allows us to explain the object's other features, which we take to be consequent on or grounded in their natures.³⁴ As Ruth Millikan puts it, "a 'substance' is something about which one can learn from one encounter things to apply on other occasions where this possibility is not coincidental but grounded. That is, there is an explanation or cause of the samenesses."³⁵ With explanatory frameworks come essential natures, even if an object lacks an essential nature.

Note first that attributing a nature to an object is probably not necessary for having a conception. Conceptions are probably phylogenetically and ontogenetically prior to explanations and attributions of natures. Creatures that lack meta-representation probably do not attribute natures. Yet, they do attribute behavior, by which I mean functional whole-entity movement.³⁶ Mere attribution of functions is probably enough for a creature to organize the structure of a conception

³³ While I draw this intuitively appealing definition from Kripke (1972), it stretches back through the medieval philosophers to Plato and Aristotle.

³⁴ As Rey (1983), p. 247 emphasizes, regardless of the metaphysical question, essences seem to be a psychologically real phenomenon. Medin (1989) and Medin and Ortony (1989) noticed the consistency of this phenomenon among adults. Experiments by Gelman and Wellman (1991) reveal that even preschool age children represent essences in multiple different ways, including the primacy of the "inside," features that inhere in objects, and features that are generative of an object's identity.

³⁵ Millikan (1998), p. 58.

³⁶ Tomasello et al. (1987), for example, show that when chimpanzees observe a human using a metal T-bar to pull food closer to themselves, they, too, start using the T-bar as a tool, though not necessarily using the same method as the human. This suggests that apes recognize the human's functional whole-entity movement, that is: the human is attempting to pull the food closer. After seeing that the T-bar can be used this way, the chimpanzees attempt to use it as a tool as well. Nagell et al. (1993) performed a similar experiment comparing chimpanzees to 2-year old children. The children tended to mimick the demonstrator's method, while the chimpanzees did not. This suggests that the children are attempting to do what they take the demonstrator to be doing, while the chimpanzees are only attempting to use the tool for the same purpose as the demonstrator.

into a nonarbitrary, unified representation of an object. This entails that relatively unified conceptions probably come online before meta-representation. However, this form of unification is not explanatory.

How do we represent essential natures? Often, representing an essential nature involves a list of essential features of the object, though we probably never incorporate complete lists of essential features in our conceptions of objects. Typically, a conception will specify the essential features that distinguish the object from others of its kind, but the essential features of that kind are left to our conception of the kind. Thus, while naturally developing lungs is an essential feature of humans (as a kind), it seems wrong to say that naturally developing lungs is part of what makes my spouse who she is.³⁷ A mere list of essential features, however, is not itself unified. So it's hard to see how such a list could explain the unity of the object's other features.

Imagine you notice a mechanical device that you have never seen before. It would be natural to attempt to figure out what it is. In doing so, you might examine all the parts and imagine them operating in whatever way the device's designer had in mind. The three formal elements of the structure of the object (parts, positions, assignment) are all subordinate to the last element of the structure of the object: its purpose. Part of what makes the device a whole is the operation of the parts as a coordinated unit according to the underlying principles you take to have motivated the production of the device.³⁸

³⁷ I allow, of course, that not all instances of a kind instantiate the essential features of that kind, as when a deformed embryo fails to develop lungs. The absence of lungs in the deformed case is a manifest expression of the essentiality of lungs to the kind.

³⁸ Murphy and Medin (1985) argue that the way we achieve coherence and unity in our conceptions is through explanatory frameworks, or "representations of concepts," as they call them. Through explanatory relations, we can articulate why two members might belong to the same kind yet not share very many similar features. Their list of the coherence-making benefits of explanatory frameworks revolves around the value of "underlying principles" which explain the presence of other features in the object (p. 298).

Now suppose that someone tells you what the device is for. If your initial guess was way off, then suddenly you will see the relationship between the parts differently than you had before. Perhaps parts that seemed like aesthetic flourishes now take on functional significance. Again, nothing about the formal elements of the object's structure have changed, yet the structure of your conception of the object has changed because the parts relate to one another differently in this new configuration of your conception.

While functions are a paradigmatic case of representing the operational relationships between parts of a physical object and the unifying nature of the object, they are not necessary for unifying a conception. We can attribute pseudo-functions instead. Objects have *powers* in a minimal (and noncontroversial) sense. Following Jessica Wilson (2015), I will use the term 'power' to mean that "what causes an entity may potentially bring about (perhaps only contingently) are associated with how the entity is—that is, with its features."³⁹ These powers may be triggered to produce processes.⁴⁰ For example, the temperature of an environment can trigger water's power to freeze, producing the freezing process. Moreover, when the parts of objects have complimentary powers that can be triggered to produce processes which then coordinate to constitute a higher-level process, we can say that the whole object has a power that the parts do not have. For example, the volcano's power to erupt—and the process of eruption when it happens—is constituted by the complimentary lower-level powers of the parts of the volcano, which can be triggered to produce a coordinated set of processes that constitute the higher-level process of eruption. In objects without functions, our conceptions of these objects unify them under a single nature in virtue of the higher-level powers that we take to be emergent from the powers of their parts. A volcano does not function to erupt, yet its power to erupt is a part of what makes it what it is.

³⁹ Wilson (2015), p. 348.

⁴⁰ See Gillett (2016), p. 64.

Representing the coordination of parts to produce higher-level powers and processes allows us to unify the structures of objects which we know to have a function, even when that function is difficult to state or identify. The parts of a grasshopper's body have many known functions, but the function of the grasshopper itself is difficult to state, even if we can readily assemble some of that function's features.⁴¹ The problem of locating the function of a creature becomes even more prominent first when the creature has a mind and again as the mind of the creature complexifies. Yet our conceptions must still structure the minds of such creatures as unified under a single nature. We do this by integrating the parts of the creature's mind into coordinated processes that we take to serve some function, even if that function is mysterious. And, in the case of humans, at least part of that function is self-constituted. The project of forming conceptions of another person's mind, then, involves (a) assembling a working representation of the various features of the person's mind and then iteratively interpreting how those features might coordinate to serve a function, (b) what that function might be in light of what we know about how those features are arranged, and (c) what other possible structural arrangements of these features are available given the variety of possible functions the person might self-constitute. That is, in forming conceptions of the minds of other individuals, we attempt to work out who they are and what they care about by making what we know about them fit into a relatively unified picture, albeit a picture that is always subject to revision.

Yet, some objects are neither readily articulable in terms of coordinated higher-level powers nor clearly have essential natures in the usual sense. Some social constructs (gender, for example) seem to follow this pattern. While we likely (and mistakenly) attribute a single, underlying essential nature to these constructs, they might still be stabilized by a homeostatic family of features that

⁴¹ On Hursthouse's analysis of the flourishing for animals, for example, there are at least four functions: individual survival, species survival, pursuit of pleasures and pains proper to the creature's form of life, and social well-functioning. See Hursthouse (1999), pp. 197-202. This account is somewhat controversial.

historically cluster together. They are homeostatic in the sense that there are underlying processes that maintain the clustering of these features. Such objects may still have essences, but they are not functional principles for the construct. Rather, the essences of objects of this kind are a disjunctive, historically mediated account of the clustering of features. A set of underlying principles which govern the unity of the conception will explain why these features cluster and which real features in the world cause the clustering.⁴²

A conception, then, is unified not merely in virtue of its structure, but because that structure expresses explanatory relations between the features of the object on the one hand, and the underlying nature, essence, or pseudo-essence that an individual attributes to the object, on the other. Even if an object lacks an essence altogether, it is still a psychological reality that we organize our conceptions around essences.

1.1.f. We map non-representational mental content onto our conceptions

Different perceptual modes can be mapped onto the same representational structure, as when I take a smell of cookies to come from the freshly baked cookies I can see. Likewise, my experience of the cookies—the sensate what-it’s-likeness—can be mapped onto my representation of the room.⁴³ I might fondly remember stepping into that room because it smelled like freshly baked cookies. In the same way, conscious, phenomenal mental content—that is, our experiences with objects—can be mapped onto our conceptions of those objects. How a person makes me feel can be part of my conception of that person. And it can even affect my representation of that person’s mind, since how she makes me feel should be at least partly explained by who she is. A

⁴² See Boyd (1999), pp. 143-148 for a brief overview.

⁴³ Here, I follow Nagel’s (1974) account of phenomenal consciousness.

conception, though representational in function, is subsumed within a larger psychological network governing my interaction with that object, and this larger whole can have nonrepresentational parts.

Phenomenological memories are tricky. Remembering a migraine headache I had does not recreate the headache, nor does remembering an excellent chocolate I once tasted recreate the pleasure of tasting the chocolate. However, imaginarily playing a favorite song can generate enjoyment of that song. And imagining or even remembering colors produces imaginary phenomenology. It seems that imagination can produce perceptual phenomenology, but not the feeling states associated with perception. Now, recalling an emotional event might seem to be a counterexample to this claim. However, the emotion arises only after I replay the memory, which suggests that I am not feeling the same emotion as I did during the memory, but feeling a new emotion in response to the replayed memory. Plausibly, this is why remembering the song can make me feel something, but remembering the headache cannot.

For the above reasons, I will provisionally accept that perceptual phenomenology, but not feeling states, can be remembered and imagined.⁴⁴ This feature of memory, together with the mapping of phenomenal content onto conceptions, entails that the present is privileged for affective influences on conception formation. Feeling states are probably productive of evaluative judgments in virtue of their valences: other things equal, we will judge a painful experience to be bad and a pleasant experience to be good. If these feeling states cannot be remembered, then their associated evaluative judgments might be both easy to malform and difficult to dislodge. If I was having a bad day and listened to a good song, I might judge the song was bad because I didn't enjoy it. Tragically, I never return to the song.

⁴⁴ That is, I take this to be the most plausible of the options.

Additionally, phenomenal content is probably presented to the mind holistically. Consider, for example, the experience of listening to an instrumental song with remarkable drumming, bass and guitars. If I listen to the song twice, focusing my attention on the drums and bass for the first play though and on the guitars for the second, I will have two different experiences of the song. Nothing will have changed except where I place the focus of my attention. The change, then, is in how the different phenomenal parts of the experience are structured in relation to my attention. That is, they can be relatively focal or peripheral. The attentional structure of my experience presents the phenomenal parts already as a gestalt.⁴⁵ The gestalt presentation of phenomenology probably partially bleeds through to events and objects that we consciously represent as separate from the one at the focus of attention. For example, my experience of the song might also be influenced by my feelings of hunger or the temperature and background noise of the room. And this can remain so against my will.

Because phenomenology is probably presented as a gestalt, integration of phenomenal features into conceptions must be sensitive to the holistic way we tend to onboard phenomenal content. Sometimes this means that some phenomenal parts are difficult to explain in a conception, as when an apparently trustworthy person gives you the heebie-jeebies. Other times, it means that phenomenal parts must be carefully excluded from a conception, possibly by recreating a phenomenal experience under different background circumstances—as in the case of a good song listened to on a bad day.

In short, affective phenomenal content is encoded in a conception representationally, not phenomenally. However, occurrent affective phenomenal content is part of the proprietary holistic

⁴⁵ See Watzl (2017), p. 193-208 for an extended argument along these lines. See also Nes (2012), who defends the claim that some episodes of thinking have a phenomenology in virtue of their thematically unifying associated phenomenology.

psychological network in which a conception is embedded. For this reason, a conception's explanatory framework is answerable to both my representations of past affective phenomenal states *and* my occurrent, unmediated, affective phenomenal states themselves.⁴⁶

1.1.g. Much of the content of our conceptions is stored below the level of consciousness

For each object we represent to ourselves, there is a holistic psychological network that functions to organize and integrate perception, phenomenal content and thought about that object into a unified conception of the object. Conception formation and development is partly passive: no more effort needs to be involved in conception formation and development than is involved in concept acquisition. The reason for this is analogous to the reason it takes no effort to see patterns of light as distal objects: our representational systems automatically translate dense information into objects that bear relations to one another.⁴⁷ Concept acquisition attracts conception formation as if gravitationally.⁴⁸ Conceptions are therefore constituted by parts that never rise to the level of occurrent, conscious, focal thought. As a rule, conceptions straddle both our conscious and unconscious mental resources.⁴⁹

⁴⁶ These features will reappear in section 4.7.

⁴⁷ See Bargh and Chartrand (1999, 2014) for an exploration of the many forms of automatic thinking.

⁴⁸ Even infants, who plausibly lack meta-representation, incorporate accrued knowledge about objects into their conceptions to produce increasingly accurate predictions about those objects over time. For an overview, see Baillargeon's (1993) discussion, pp. 308-311.

⁴⁹ Conceptions of highly abstract and abstruse objects (such as obscure mathematical objects) are plausibly an exception to this rule.

1.1.b. We develop conceptions at the intersection between features we take to be most central to the object's nature and features we take to be most relevant to our concerns.

We are not and probably cannot be fully disinterested spectators. This fact about us extends also to our limited cognitive resources. When we form conceptions about objects, we do indeed mean to get at their natures. However, individuals form their conceptions unevenly, deepening them according to their interests. The complexity of the objects we form conceptions about and the limitations on the time and energy we can give to deepening a conception make the prospect of disinterested conception-formation unrealistic. Moreover, forming accurate conceptions often requires careful cognitive effort and intentional revision, which is not something we will be inclined to do unless and insofar as we are interested in the object represented (for whatever reason).

1.1.i. Conceptions are poised for further development

An inclined plane is a paradigmatically simple object. It is not difficult to form a complete conception of the nature and function of an inclined plane. Yet even an inclined plane may reveal itself to be useful in new ways. Conceptions are always open and even sensitive to development, which contrasts with belief. When I form a belief, my doxastic commitment to that belief will remain in place unless I have a reason to revise it and perhaps jettison the belief. Conceptions are usually cognitively sprawling, collecting and organizing more mental content than arises to occurrent, conscious thinking. One in-principle reason this should be so is that our cognitive resources are limited, which makes it impractical to attempt exhaustive conceptions of objects. Total mastery of understanding is rare and probably only occurs in the simplest of cases. More commonly, our conceptions develop in the directions of our interests, which motivate even our automatic cognitive processes. Insofar as we are interested in an object, our conception of that object will be

poised for further development, in the case that we stumble upon any new information about that object. This openness to development is probably a fixed feature of our psychology, since our minds evolved to handle a continuous stream of dense information in rapidly changing situations.

1.1.j. No two individuals have the same network of representations of the same object.

This is implied by the previous two points. Conceptions have many moving parts; people have many diverse and distinct interests; our resources for forming conceptions are limited. For these reasons, conceptions will be distinctive from person to person. This feature of conceptions compounds the difficulty of forming conceptions of other human minds and their contents. An accurate conception of another mind often requires accurate representation of their conceptions of other objects, as well as of themselves. Because conceptions are poised for development and people have different interests, our conceptions of objects cannot substitute for others' in our representations of the contents of their minds. Since conceptions are an important part of our epistemic lives, they will usually be an important part of our conceptions of others.

Despite the extreme unlikelihood of identical representational networks in two distinct minds, it is still meaningful to say that two individuals share the same conception. Numerical identity of conceptions, then, cannot work the same way as numerical identity of belief. Two beliefs are identical just in case they express the same proposition. But two conceptions must be able to be identical even if their representational parts are different. I will address this problem in section 1.2.

1.1.k. Our conceptions grow and change over time as we gain evidence and attempt to integrate our various conceptions together.

Numerical identity is also an issue for a single mind whose conceptions develop over time. Conceptions, as I have said already, are poised for development. Modest reflection reveals the incompleteness of our representations of the essences, important features, and narrative histories of the objects that concern us, especially when those objects are other minds and social constructs. A representational capacity whose representations are always poised for development must be a frequently updating capacity. In this regard, all conceptions are provisional: future versions will likely be improvements over old versions. Because the psychological function of the capacity for representation is accuracy, our efforts reach toward accuracy whether intentionally or not. Updating improves conceptions' accuracy and keeps them answerable to the continuous stream of new evidence a perceiving creature normally has. However, accuracy is not the only value we pursue, so the value of accuracy must sometimes compete with other psychological values, such as familiarity.⁵⁰ As agential creatures who use our conceptions of objects as guides to action, we will be regularly confronted with their inadequacy and thus spurred to improve them according to our motivating values, whether those values are properly epistemic or not.

1.1.l. Summary of the features of conceptions and comparison to beliefs

I have discussed 11 features of conceptions, each of which is significant, not only for distinguishing conceptions as a kind, but also for situating them as the representational unit of theoretical understanding. I will now briefly review these features. They will reappear throughout this dissertation, as they become relevant.

⁵⁰ I will return to this thought in section 5.5.

An individual represents objects to herself through a holistic network of psychological components which function to produce accurate conceptions of those objects. Each conception has a proprietary network of such components which maintain it, but because conceptions overlap and nest within one another, these psychological networks also overlap with one another. These psychological networks form automatically in the individual's mind around a reference-fixing concept. Conceptions have an organizing structure in virtue of the essence an individual attributes to the object, and this structure functions partly to account for the gestalts that arise for the individual in the patterns of features she notices in those objects. Individuals map phenomenal content onto a conception's representational structure in two ways. First, through the inborn psychological connections between phenomenal and representational content, such as the links between sensation and perception, or between emotion and evaluative representation. Second, by linking the conception's representational framework to the holistic structure of occurrent phenomenology associated in the individual's mind with the conception's object. That is, an individual often simultaneously experiences and cognizes the object. Because conceptions form automatically, much of their content, including often even their structure, is stored in memory that is difficult to intentionally access without prompting (that is, they are stored beneath the threshold of consciousness). Conceptions are always poised for further development, and their directions of development are guided both by the essence the individual takes the object to have and by the object's relevance to her interests. Conceptions thus grow organically and are distinctive for each individual.

These features of conceptions compare in some ways with those of beliefs. Like conceptions, beliefs function to mentally represent reality. Also like conceptions, we form beliefs automatically (though we need not). By contrast to conceptions, however, beliefs do not grow

organically; rather, a belief is formed all at once as a unity. Beliefs have a propositional structure in which objects figure as elements, but propositions represent individual relations among objects and properties. Beliefs, then, are organized around particular truths about objects, not around the objects themselves. For this reason, beliefs are much less complex than conceptions. While we often form beliefs in response to the phenomenology associated with objects, we do not integrate this phenomenology into the structure of our beliefs. The structure of an individual's conception of an object is sensitive to the individual's phenomenal interaction with that object, while the structure of a belief is always given by a proposition that asserts a purported truth. A phenomenal experience might cause an individual to disbelieve what she previously believed, but it does not augment the internal structure of the belief. Because beliefs are simpler and more unitary than conceptions, beliefs will always be either above or below the threshold of consciousness: they rarely if ever straddle our conscious and unconscious resources. Finally, beliefs are always poised for inference to further belief, but they are not poised for internal development the way conceptions are. On the contrary, once an individual forms a belief, it is difficult to later revise that belief.⁵¹ A conception, by contrast, is characteristically subject to present and future revision. However, a conception, once formed, is probably even more difficult to jettison than a belief because the conception straddles the threshold of consciousness.

The capacities for belief and conception are probably co-constituting. Beliefs partly constitute conceptions in the sense that an individual's beliefs about an object are characteristically part of her conception of that object. Thus, the structure of a conception functions partly to organize beliefs. Moreover, because beliefs are difficult to revise, they offer a stable psychological skeleton for the more organic features of conceptions to hang onto.

⁵¹ Stubenvoll and Matthes (2022), for example, found that not even explicit retractions of false claims are sufficient to correct misinformed statistical beliefs.

It is less obvious that conceptions partly constitute beliefs. Concepts are the constituent parts of a proposition. For example, <Grass is green> uses the concepts GREEN and GRASS to attribute greenness to grass. However, we almost never form beliefs based on concepts alone; rather, we form beliefs in response to the apparent truth of the proposition in light of what we know about the referents of those concepts. Our conceptions of greenness and grass, formed at a young age and developed over many years, both secure the proposition <Grass is green> and make it intelligible.

1.2. Numerical identity and congruity of conceptions

Conceptions are both poised for development and distinctive for each individual. Yet they are also difficult to dislodge and can be shared between individuals.⁵² The first pair of features seems to conflict with the second. However, this conflict can be resolved by establishing identity and congruency conditions for conceptions. Development of a conception need not make it a numerically distinct conception. Differences in two individuals' conceptions of the same object need not make their conceptions incongruent with one another. In this section, I will defend the claim that changes in the numerical identity and congruence of conceptions supervene on changes in the essence individuals attribute to the object the conception represents, and, consequently, changes in the explanatory structure which expresses that nature.

As in most accounts of the numerical identity of persons, conceptions must be able to change over time while remaining numerically identical to a previous version. If some change is possible without loss of numerical identity, this entails that conceptions can change in two ways: they can develop or they can transform. A conception develops when a later version is different

⁵² See sections 1.1.i and 1.1.j.

from a previous version but still numerically identical to it. A conception transforms when a later version is numerically distinct from a previous version.⁵³

Congruency of conceptions is when two individuals share a conception. Since conceptions are psychological networks within an individual mind, individuals cannot share numerically identical conceptions any more than they can share numerically identical minds.⁵⁴ What could it mean to say that two individuals share a conception? This concept, I think, is parasitic on numerical identity. I will assume that two conceptions are congruent iff: were they two versions of a conception (at different times) within an individual mind, those two versions would be numerically identical.

What makes a conception the same after change? The fixed reference of a concept is not enough because a concept can remain the same even as conceptions transform or are incongruous.⁵⁵ Rather, it seems that some *part* of a conception must be held fixed for numerical identity and congruency. I suggest that the part that remains the same is the essential nature attributed to the object, and I will motivate this view by illustrating that change or lack of change in essential nature intuitively tracks the development/transformation distinction.

Consider the simple case of tools, say a hammer. A mere tool is what it is in virtue of its designed function (such as a hammer) and, subordinately, its physical structure (steel claw hammer). Learning who invented the tool or gaining a subtler understanding of the tool's best use are forms of development: the conception has changed but remained numerically identical. However, if you learned that the tool had either another or a different function from what you thought, then your conception of the tool would transform and not merely develop. Suddenly, a whole new way of

⁵³ Note that the 'versions' will be indexed to the concept around which the conception clusters.

⁵⁴ However, if split brain thought experiments show that numerical identity of personhood possible between individuals, they also show that numerical identity of conceptions between individuals is possible.

⁵⁵ This possibility is implied in Rawls's influential account of the concept-conception distinction. See Rawls (1971), pp. 5-6.

thinking about the tool opens. And this can happen even if the additional function of the tool was not intended. A hammer is not merely a tool for driving in and pulling out nails; it is also a handy weapon, a tool for destruction, and sometimes a piece of art. These added functions transform the conception by expanding it. Conversely, if your first introduction to a hammer was as a weapon, then discovering its constructive function would also transform your conception.

Now consider a social construct, such as volunteering. An individual's conception of a volunteer remains numerically the same even as she gains more and more experience both with and as a volunteer in various capacities. She might develop her conception through experience either by offering herself for service or watching someone else do so. Her conception of volunteering, then, might develop entirely outside of formal institutional roles: to volunteer is to informally offer oneself for service, unpaid and uncoerced. But as she gets older, she might be exposed to formal volunteering roles, in which institutional norms and rules govern the details of the relation between volunteers and non-volunteers. She might also discover that her career goals require her to volunteer in certain ways, and that the institutions she might volunteer for understand and take advantage of this requirement. Thus, her conception of volunteering changes to incorporate both formal volunteering and a less black and white distinction between coerced and uncoerced. These changes to her conception of volunteering are much more dramatic than the gradual development of her conception before exposure to formal volunteering. They are changes to her attribution of the very nature of volunteering: whereas her previous conception was naïve about the voluntary nature of volunteering, her later conception is realistic. Again, a change in attributed nature of the object seems to be a natural divide between development and transformation.

This distinction becomes even more intuitive in considering abstract concepts, such as JUSTICE, MIND, and KNOWLEDGE. Rawls, for example, introduced the concept/conception

distinction to articulate the thought that individuals can disagree about the nature of justice despite agreeing about its reference.⁵⁶ Theorists might agree about which creatures have minds and even what the characteristic features of mind are, but disagree about the essential nature of a mind and how the essential features relate to one another in virtue of that nature. Similarly, epistemologists famously share broad agreement about the reference of PROPOSITIONAL KNOWLEDGE, but disagree about the specifics of its nature.

I take the above considerations to motivate the view that what makes the difference for identity and congruence of conceptions is that the same essential nature is attributed to the object. More specifically, since explanatory frameworks unify a conception by explaining non-essential features in terms of essential features, what makes the difference in numerical identity and congruence is whether the explanatory framework changes at the highest explanatory level.⁵⁷ But this boundary is probably fuzzy. There might be edge cases in which it is not clear whether the same nature or basic explanatory framework is attributed. There might also be edge cases in which there seems to be a difference in attributed nature but the conceptions still seem identical or congruent. I will focus on paradigm cases of development and transformation, so these details, though important, are not central to this project.

A final comment on numerical identity of conceptions. In section 1.1.e I mentioned that minds which have the capacity for conceptual thought but lack the capacity for metacognition probably do not represent natures of objects to themselves. In this section, I have claimed that numerical identity of conception tracks identity of represented nature. It might seem that an implied consequence of this view is that minds without metacognition cannot have numerically identical conceptions over time. However, I hold the opposite view. The reason numerical identity matters is

⁵⁶ Rawls (1971), pp. 5-6.

⁵⁷ I will precisify this account in chapter 4, section 5.

because minds like ours are capable of transforming our conceptions. Minds without metacognition probably cannot transform their conceptions. Hence, for them, a conception of an object probably remains numerically identical over time. The capacity to represent natures as explaining observed features and to reconsider or change that representation introduces the possibility of conception transformation and so necessitates a criterion for numerical identity.

1.3. Conceptions and explanations

I have said that theoretical understanding, roughly, is explaining features of objects to oneself by grasping representations that get at the nature of those objects. It might seem awkward that I have landed on conceptions as the unit of representation for theoretical understanding, since explanations are such an obvious choice. So, I will close my discussion of conceptions with a few comments on that choice.

The term ‘explanation’ already has a prominent usage in the philosophy of science literature in which explanations are treated as mind-independent facts.⁵⁸ On this usage, we pursue the correct explanations for events we observe in the world. The explanation itself is taken as a feature of the world, whether a mathematical regularity, a causal mechanism, a statistical likelihood, or some other such feature. I set this usage aside.

However, the term ‘explanation’ can also name the mental representations by which we explain these events to ourselves. We might even draw a distinction: subjective explanations rather than objective explanations. This would closely match my interest, so long as a subjective

⁵⁸ This literature is large, but Hempel (1965), Salmon (1971, 1984), Kitcher (1989), and Woodward (2003) are prominent examples.

explanation is normed by its proximity to the objective explanation. Some epistemologists use the term ‘explanation’ this just way.⁵⁹

Yet even subjective explanations are still too narrow a representational category for the questions I am after. Any explanation for any phenomenon corresponds to the questions we ask about that phenomenon, whether we realize we are asking them or not. This is a distinctive form of understanding characterized by goals formulable in terms of questions.⁶⁰ While explanations frequently appear in mind without a prompting question, the question-answer structure reveals the representational scale of an explanation. Explanations, like beliefs, seem to be much more focused in their content than conceptions. For example, one might seek an explanation for why onions make your eyes tear when you cut them. The explanation for this phenomenon involves only very specific aspects of the nature of onions and eyes: cut onions release syn-Propanethial-S-oxide, which irritates the lachrymal glands in the eyes, which then release tears to sooth the irritation. The explanation itself does not attempt to make sense of onions and eyes as objects. It is not relevant to the explanation that eyes function to sense light or that onions are root vegetables. An explanation, then, seems to represent a small number of relationships between objects. These relationships get at the ways the powers of the objects interact, but they need not get at unified representations of the objects. Moreover, this kind of explanation is often expressible as a proposition, whereas a conception is not. Explanations, in short, do not function to represent objects; rather, they function to represent explanatory relations between features of objects. These relations do flow from the nature of the objects: the explanation for why cut onions make you cry depends on the natures of

⁵⁹ Including, for example, Baumberger (2014) and Hazlett (2018).

⁶⁰ Baumberger (2014) calls it “interrogative” understanding. Other epistemologists call it “understanding why”. See, for example, Kvanvig (2003), Pritchard (2010), and Hills (2016).

onions and eyes. But the explanation itself draws on those natures only to get at the explanatory relation.

The expressibility of explanations through propositions suggests that the explanation just is a relatively small number of propositions that express how the nature of an object produces the powers we observe an object to have.⁶¹ However, an explanation, such as the above explanation for why cut onions make the cutter's eyes water, is not merely the propositions that express the explanation. The explanation also includes the relation that connects the explanans to the explanandum. This relation can be named by a proposition that uses the EXPLAINS relation, but the explanation itself is a psychological relation in the mind of the one representing the explanation, in just the same way that 'therefore' is not the inference itself, but names a psychological process in which an individual makes an inference.⁶²

If this is what is meant by an explanation, then conceptions are more basic than explanations in multiple ways. In the first place, they are more primitive. I've said that forming explanations requires the capacity to represent an object's nature.⁶³ Representing an object's nature, in turn, requires a capacity for abstract, stimulus-independent thought. This capacity is not necessary for forming conceptions. Consider a cat trying to open a door. While the cat's attempts to open the door provoke a curiosity in the creature about how to achieve that goal, curiosity about an explanation for the door's power to open does not serve the goal immediately on hand, since the creature cannot know what potential uses that explanation will admit once it is acquired. It won't help the cat to understand how doorknobs work if it cannot use them anyway. Moreover, if the cat

⁶¹ Baumberger (2014) and Beisbart, Baumberger and Brun (2016) hold a similar view.

⁶² I owe this analogy between 'explains' and 'therefore' to Jon Garthoff. Note that this description of the explanation relation makes it an instance of the broader category of grasping relations. I will turn to a discussion of grasping relations in Chapter 3.

⁶³ See section 1.1.e.

has the ability to open the door, it will land upon the method through experimentation.

Explanations are not necessary. A creature that pursues an explanation for a phenomenon would need to do so out of curiosity about the hidden nature of the phenomenon, not out of curiosity about the powers of the objects involved. Additionally, since an explanation will not reveal itself all in a moment of curiosity, the creature will also need to be able to engage in stimulus-independent thinking about the phenomenon to form an accurate explanation. Conceptions, on the other hand, do not require either abstract consideration of the hidden natures of objects or stimulus-independent thought. Acquiring the concept enables the accumulation of content about the object in the creature's memory, while the tendency to represent objects holistically as unities against a background of other objects encourages the creature to integrate this content together into a conception that is relatively unified in virtue of the phenomenal gestalt of the object, the representational gestalt patterns, and attributed behavior and powers.

Second, explanations are probably always embedded within and not separable from conceptions. Any explanation that I might pursue concerning the relationships between objects will inevitably both draw on and become a part of my conceptions of those objects. According to the above account of conceptions, explanations are an important part of conceptions, since they get at the nature of the objects involved and organize the object's features into explanatory relations. A good explanation of some phenomenon often makes the difference in judging whether I understand the phenomenon. Yet an explanation of the phenomenon which is sufficient for understanding just is either a conception of the phenomenon, a contribution to one's conceptions of the objects involved, or both. Despite the illumination that might come from a propositional expression of an explanation, it is very difficult to separate an explanation from the conceptions in which it is embedded in the mind of the understander. That is, the capacity for explanation seems to be layered

atop the capacity for conception, which would make explanations unthinkable in the absence of conceptions.

For the above reasons, I consider conceptions the primary unit of theoretical understanding. However, *one can only have theoretical understanding when one's conceptions are organized into explanatory relations*. For this reason, much of my project will revolve around the explanatory unit which *is* commensurate with (but still dependent upon) conceptions: an *explanatory framework*. Here is a definition, for clarity:

Explanatory Framework – a network of explanatory relations which (approximately) unify the features of a conception into hierarchically nested dependency relations, with an attributed nature composed of essential features at the top of the hierarchy.

Note, however, that although explanatory frameworks function to unify a conception under an attributed nature that explains the features of the conception, explanatory frameworks commonly fail to unify in the ways they promise. Many of the frameworks we commonly use and depend on are awkward, pluralistic concatenations of explanatory modules that merely aspire to unity.

1.4. The resonance mechanism

Now that I have developed the notion of a conception, I can give a more detailed account of resonance, which I hope will reveal why I find its existence as an epistemically relevant psychological state plausible. Here is the definition I gave at the beginning of this chapter:

Resonance – A psychological state in which there is a good fit between the conscious and unconscious parts of a conception.

The first specification I will add to this definition is to narrow it to an epistemic use. The above definition is applicable to aesthetic resonance, say when a rug ties the room together. In such

a case, one has a characterization of the room in which the rug is somehow fitting, but that fittingness is not a matter of anything that the rug explains.⁶⁴ Conceptions are a subclass of such characterizations, so a resonating conception is a subclass of resonating characterizations. When a conception resonates epistemically, there is a *high level of coherence* between the conscious and unconscious parts.

This definition emphasizes that resonance is not merely a feeling, though we identify it through feelings, as when we say “that resonates,” or “that feels right.” A conception that resonates feels correct in a way that, by hypothesis, is additional to any consciously available evidence or judgment about the conception. The idea here is that the feeling is what carries information about the state of resonance between the conscious and unconscious parts of a conception and makes the fact of a psychological condition of resonance consciously available. The feeling is not an inert bit of phenomenology that merely attends consciously available evidence and judgments. If this is right, then we have indirect, conscious access to the unconscious content of our minds through the feelings resonance produces.

I have posited resonance as a mechanism that connects conscious and unconscious mental resources. Assessing the value and viability of such a mechanism will require a more precise description of this mechanism. I will now introduce some distinctions to enable this precision, some of which should be familiar from other philosophical or even nonacademic contexts.

Mental resources come in at least three broad varieties: contents, processes, and dispositions. A mental content is a psychological state in which something is presented to the mind. Contents can be representational, phenomenal, or (perhaps) both. Mental processes are psychological events that can be either self-directed (active) or not (passive). A mental process can also be inferential,

⁶⁴ See Camp (2006, 2008) for a discussion of aesthetic characterizations.

associative (or non-inferential), or a hybrid of the two. Dispositions are tendencies to be presented with mental contents and to undergo mental processes. Dispositions, unlike contents and processes, are never consciously accessible; rather, we can only infer their existence by noticing patterns in our own cognition and behavior. So, I set dispositions aside.⁶⁵

Phenomenal consciousness is the experiential what-it's-likeness of (or for) a mind.⁶⁶ Phenomenal contents include sensations, feelings, and affect (these categories overlap). Phenomenal consciousness also includes consciousness of associative, phenomenal processes, as in the cases of daydreaming or mind-wandering.⁶⁷ However, many creatures can also be conscious of rational processes, especially when these processes are self-directed. A cat that struggles with a door until it opens might be consciously self-directing a process of elimination in which it experiments with different methods for opening the door. Following Burge, I will call this form of consciousness *rational-access consciousness*.⁶⁸ Note that neither of these forms of consciousness requires meta-representation: a rational process can be conscious and self-directed without the creature ever representing itself as engaging in that process. Additionally, a process can be metacognitive without being meta-representational if the process carries information about representations, but does not carry that information via higher-order representations.

Occurrent consciousness—whether phenomenal or rational-access—can be either *focal* or *peripheral*. Attention is probably graded in its structure, with focus at the center, a periphery at the fringe, and a field between.⁶⁹ I will call a content or process ‘focal’ if it is at or near the focus of

⁶⁵ I will discuss dispositions in detail in chapter 4.

⁶⁶ See Nagel (1974).

⁶⁷ These might be instances of rational-associative hybrid processes.

⁶⁸ See Block (1995) and Burge (1997, 2007) on the distinction between phenomenal consciousness and rational-access consciousness.

⁶⁹ See Watzl (2017), p. 194. Watzl draws heavily on James (1980) for these distinctions. For a helpful discussion of this aspect of William James’ psychology, see Mangan (2001), pp. 11-18.

attention. I will call a content ‘peripheral’ if it is at or near the periphery of attention.⁷⁰ When a content or process is neither focal nor peripheral, it is *unconscious*. There probably cannot be unconscious (or non-occurrent) rational-access consciousness, since occurrent consciousness of rational processes is how we determine whether we are rational-access conscious of a process. But there might be unconscious (or non-occurrent) phenomenal content and processes, since phenomenal content, though typed by sensation, feeling, and affect, does not necessarily require occurrent presentation of this phenomenology.⁷¹ Repressed anger is plausibly a paradigm case.

Contents and processes can be either *accessible* or *inaccessible*, depending on whether that content or process can easily become focal. Accessible content or processes that become focal are thereby *accessed*. Access, which is itself a mental process, can be either active or passive. For example, one passively accesses a memory when it comes to mind without being intentionally retrieved. Currently inaccessible content might become accessible through engaging in the right kind of mental process, as, for example, many psychotherapy techniques are designed to do. When a process renders previously inaccessible mental content accessible, I will say this content is *unlocked*.

These distinctions can be used to give definition to a common distinction among psychologists: the explicit-implicit distinction. A process is explicit when it is focally accessed, as in the case of solving a complex calculus problem. A process is implicit when only the resulting mental content is accessible. I will not make much use of this distinction because it is not exhaustive, but it still bears mentioning.

When I say that conceptions straddle conscious and unconscious mental resources, I mean that some of the mental content that constitutes a conception is accessible and some is not. However, the holistic psychological networks that generate and maintain conceptions *also* straddle

⁷⁰ What I am calling ‘peripheral consciousness’ is commonly referred to as ‘subconscious’.

⁷¹ See Burge (2007) for a helpful exploration of the possibility of unconscious phenomenal content.

this divide. Some of the processes by which we form conceptions are accessible and some are not. Moreover, dispositions to be presented with content and to undergo processes, though themselves inaccessible (and perhaps sub-personal), can often be occurrently guided and reshaped through accessible, active mental processes.⁷²

Finally, while resonance broadly signals coherence between the accessible and inaccessible parts of a conception, for specific instances of resonance that I will focus on signal coherence between an individual's reflectively endorsed explanatory framework for a conception and the inaccessible features of that conception.

Now I can further specify the resonance mechanism. The resonance mechanism is jointly constituted by a state, a process, and mental content resulting from the process. The psychological process is, by hypothesis, an inaccessible metacognitive monitoring mechanism that assesses the level of coherence between an occurrently accessed explanatory framework and the inaccessible content of the conception the framework organizes.⁷³ The result of this process is a feeling which is itself accessible and often arises passively to occurrent (but not necessarily focal) consciousness. Note that this entails that the process is 'implicit,' according to the usual use of this term.

The process assesses a psychological state which obtains regardless of whether the process has occurred. This is the state of relative coherence between inaccessible mental content and an occurrently considered explanatory framework (or attributed nature) for organizing one's conception of the object. This psychological state, however, is inaccessible and thus depends for its discovery on the resonance process to assess the state and then signal the condition of resonance.

⁷² I will turn to these features of holistic psychological networks in chapter 4.

⁷³ It may be that the explanatory framework must be not only occurrently accessed, but *focally* accessed for feelings of resonance to arise.

The feelings that partly constitute resonance are sometimes called feelings of rightness and wrongness. Note that resonance is the positive end of a valenced spectrum. At the negative end is *muteness*. Relative resonance or muteness, then, is a psychological fact that, through an inaccessible process, generates occurrent feelings of relative resonance and muteness concerning the occurrently considered framework for one's conception of the object.

For clarity, here are explicit definitions of all three constitutive parts of the entire epistemic resonance mechanism:

Epistemic Resonance – A psychological state in which there is a relatively high level of coherence between an explanatory framework and the inaccessible contents of the conception the framework organizes.

The Epistemic Resonance Process – An inaccessible metacognitive process which monitors inaccessible content in long-term memory and assesses the epistemic resonance between that content and an occurrently accessed explanatory framework.

The Feeling of Resonance – An occurrent, conscious, affective feeling generated by the resonance process, whose affective intensity and valence is a function of the degree of resonance.⁷⁴

1.5. Should we think a resonance mechanism really exists?

Why should there be such a psychological mechanism? The evidence available for occurrent reasoning about one's conceptions will be only accessible content. However, since we tend to record and remember so much content through inaccessible processes that encode inaccessible content, it

⁷⁴ Affective intensity and valence, it will turn out, are primarily sensitive to *changes* in resonance rather than *absolute values*. This is a general feature of affective feelings that even Plato noticed, see Shaw (2015), pp. 148-151. It has also been demonstrated in experimental psychology. See Hsee et al (1991, 1994). I will discuss these features of the feeling of resonance in chapter 5.

would be epistemically better if the individual could indirectly consult this inaccessible content through an accessible process. I posit that feelings of resonance and muteness signal the relative resonances or mutenesses between an occurrently considered explanatory framework for an object and one's inaccessible content about the object. Thus, when we say, "that resonates," we mean that it feels correct for reasons that are currently inaccessible, but that the fact of its resonance is itself accessible.

This account of the resonance mechanism and its constituent feelings might seem implausible. What is unconscious is inaccessible, so how could we even know whether there is a route to indirect access? I use the remainder of this chapter to offer four distinct reasons why we should think there is a resonance mechanism. First, the normal use of the term 'resonance,' even by experts, entails their reliance of a resonance mechanism. Second, the nature of conceptions makes the existence of such a mechanism plausible. Third, common attitudes about emotions already presuppose an analogous mechanism for emotions. And fourth, evidence from experimental psychologists implies the existence of a resonance mechanism.

1.5.a. The common epistemic use of 'resonance'

What do we mean when, in normal discourse, we say that an explanation 'resonates'? Typically, a person who says this finds the explanation promising. The value of an explanation being promising is that this promise can *epistemically* motivate further articulation and perhaps testing of the explanation. An epistemic motivation, other things equal, is better for epistemic pursuits than a pragmatic motivation.⁷⁵

⁷⁵ I will discuss the forms and value of motivation in chapters 4 and 5.

Well, what is it for an explanation to be promising? If the expert is careful, mere promise won't be sufficient to believe that the explanation is correct. An individual's tendency to believe an explanation is true, then, is not what makes the explanation promising.⁷⁶ The initial promise of an explanation seems to have nothing at all to do with the usual measures for establishing the quality of explanation because it happens so very early in the process of assessing the quality of that explanation.⁷⁷ While the initial promise of an explanation is more temporally extended than a sudden feeling of inspiration, it does not seem to admit an occurrently accessible inferential pattern. On the contrary, scientists and philosophers must often push past the initial *implausibility* of an explanation that strikes them as promising, so they can develop it into something plausible and perhaps even compelling.

Promising explanations, however, do not appear in a vacuum. The appeal of a new explanation for a phenomenon contrasts with the burgeoning problems in the existing explanatory framework for that phenomenon. Part of the promise is that a new explanation might offer what does not yet exist and perhaps could not exist under the current framework.⁷⁸ The promise of a promising explanation, then, is aspirational; it is a vector for launching one's imagination. The imaginary vista, once glimpsed, can be brought back as a motivating force to push through the implausibility of the promising explanation and construct a version of it that is more satisfying than the apparently broken status quo.

⁷⁶ Likewise, contra Salmon (1967), the prior probability of a claim is not what makes it promising.

⁷⁷ Kordig (1978), for example, distinguishes the "initial thinking" phase of a hypothesis from both the plausibility and the acceptability phases.

⁷⁸ Kuhn (1996), pp. 52-62, for example, illustrates the motivating nature of the explanatory state of affairs by detailing the histories of the discoveries of oxygen, x-rays, and the Leyden jar. Dissatisfaction with the status quo magnifies when a new *theory* comes on the scene: suddenly the failures of the old become salient in ways they had not previously. See Kuhn (1996), pp. 66-70.

When we—careful lay thinkers and experts alike—meet with an explanation that is promising in this way, the metaphor of resonance is an appealing description. Resonance, at the literal level, is a sympathetic vibration between two objects which produces a holistic vibratory result that neither would have manifested had it been vibrating alone. For example, striking a taut string produces a certain vibration, as does striking a hollow chamber. But playing a note on a guitar is a distinct vibration from both because there is sympathetic resonance between the string and chamber. On Hartmut Rosa's (2019) application of the metaphor, "[r]esonance is possible only between two bodies or entities that are at once open enough to enter into a relationship and stable or closed enough to develop their own particular frequency."⁷⁹ The two resonating objects must be *made for* one another in the sense that (a) the vibration of one does not overwhelm that of the other and (b) the vibration of each can still affect that of the other.

Let's apply this metaphor. An expert's growing discomfort with existing explanations may not ever rise to the level of occurrent thought: it may simply be an increasing frustration with the difficulty of advancing one's research. This was surely the situation in the late days of phlogiston theory prior to the discovery of oxygen. Thus, the existing explanation increasingly feels mute, like a depressed piano key whose hammer fails to strike the string: where resonance is expected, none appears. The theory affects the scientist less and less until it leaves her cold altogether. Yet, when a promising alternative explanation—even one that is initially implausible—produces a feeling of excitement, novelty, and possibility, the resonance expected from the previous theory manifests in the new. The new theory promises to change the researcher by opening her mind to a new imaginative vista and the research project it promises; additionally, the theory itself is responsive to the researcher's work, since is currently embryonic and amorphous.

⁷⁹ Rosa (2019), pp. 112-113. See also Rosa (2019), pp. 160-174 for a detailed sociological account using this literal vibratory relationship as a metaphor for social interaction.

Yet, in this resonant relationship, the theory exists as an explanatory framework occurrently considered in the mind of the researcher. The resonance, then, is not between some external object and the researcher, but between the researcher's occurrent representational content and something else in the researcher's mind, something inaccessible. The new explanatory framework offers her a way of rendering her occurrent thinking coherent with whatever inaccessible content in her mind produced the feelings of muteness in response to the status quo.

This metaphorical use of the term 'resonance' to describe the appeal of a promising explanatory framework should, I think, be taken at face value. Even in the most rigorous of disciplines, it still effectively characterizes the experiences researchers have in relation to a promising new project. The apparent indispensability of the metaphor suggests that it expresses something true about the psychological reality it represents. Moreover, we should probably presume that scientists and philosophers at least sometimes successfully describe a psychological fact about themselves when they claim resonance with an explanation or an explanatory framework.

1.5.b. Resonance as an expected feature of conceptions

The nature of conceptions as units of representation implies that resonance is real and plausibly signaled through affective feelings. Ontogenetically, conceptions come online before critical reason does. We represent a world of objects around ourselves; we remember these objects and their attributes as repeatable parts of the world and thus form concepts referring to them and attributing features to them. Once concepts and memory are online, we integrate the features of these objects together into conceptions, and we also integrate our conceptions of these objects into nested hierarchies of conceptions. I have described this feature of conception formation as

analogous to gravitation.⁸⁰ The relevance of the object to our lives attracts mental content into our conception of the object, without our having to attend to the process.⁸¹ That is, it often occurs through non-occurrent and perhaps even inaccessible processes. Much of that mental content will never have appeared in our occurrent thinking, but it still gets integrated into the conception. Thus, conceptions straddle our conscious and unconscious mental resources.⁸² Conceptions, however, are embedded within a holistic psychological network that functions to establish a holistic representation of the object: we interact with a world we represent as populated by whole objects with unified natures, even when those objects lack unified natures.⁸³ Yet even at the purely representational level, the unity of the conception—that is the unity of the object it represents as well as the unity of the concept around which the conception clusters—already establishes a link between conscious and unconscious mental content. A psychological resonance mechanism does not postulate this link *ad hoc*; rather, it asserts that when we consciously engage in changes to the conception, the occurrent work we do to change or refine the conception might fit well or badly with the non-occurrent and often inaccessible content that is already part of the conception. If it fits well, it is resonant. If it fits poorly, it is mute. If affective feelings of resonance and muteness are at all epistemically relevant, then they should be functionally connected to these psychological states. In short: the unity of conceptions which straddle our conscious and unconscious resources implies an implicit psychological reaction to occurrent changes in the conception. That reaction, as I have suggested in the previous section, is what we are describing when we use the term ‘resonance’ in an epistemic context.

⁸⁰ See sections 1.1.c and 1.1.i.

⁸¹ See section 1.1.h.

⁸² See section 1.1.g.

⁸³ See section 1.1.e.

It is worth mentioning here that the resonance mechanism I have described is at its most plausible in its application to representations that, like conceptions, straddle one's inaccessible and accessible mental resources. It would be strange to say that a proposition seems correct because it resonates. Resonates with what? The answer, I think, has to be that it resonates with some larger network of representational content. That is, the proposition resonates in its connection to other information within a larger representational whole. A belief cannot itself be resonant; it must be resonant in relation to something else. But a conception can be resonant in relation to itself. I do not deny the possibility of the resonance mechanism's effectiveness in assessing the fit of particular propositions with inaccessible content. Rather, I want to emphasize that resonance is probably both stronger and more noticeable when what is at stake is the internal coherence of a conception.

1.5.c. Self-understanding through emotions as an instance of the resonance mechanism

In this section, I will argue that the resonance mechanism, as I have described it, bears a deep functional similarity to that of paradigmatic instances of emotions. There are at least three possible relationships resonance might have to emotions. These relationships are, in increasing order of the strength of the claim: resonance might be *merely analogous to emotions*; resonance might be *an emotion itself*; or resonance might be *partly constitutive of paradigmatic emotions*. I suspect that resonance is partly constitutive of all emotions. However, I am not committed to this claim, nor does anything in this dissertation depend on it. For this argument to succeed, I only need to defend the weakest of the three relationships.

Affective emotions influence our attention to our environment, especially relating to the target or object of the emotion. Moreover, the valence of the affect produces variable effects in how our attention alters, even in relation to objects entirely unrelated to the emotion and in response to

apparently objectless emotions. That is, emotions influence the way attention functions. Studies consistently show that unpleasant emotions constrict attention and pleasant emotions broaden attention.⁸⁴ This feature of emotions suggests that when an emotion *has* a target, unpleasant emotions function to direct attention toward the target of the emotion. Pleasant emotions, on the other hand, function to relax attentional focus to make us more receptive to incoming information.⁸⁵

These features of emotionally influenced attention indicate a general epistemic function for emotions: emotions, both pleasant and unpleasant, motivate an inquiry into the reasons for those emotions (for example, “why am I angry?” or “why am I depressed?”). This is because emotions seem to be either dependent on or partly constituted by our evaluative attributions to objects in the world.⁸⁶ Hence, the attentional and motivational features of emotions seem to be functionally connected: emotions motivate inquiry, and this motivation directs attention to the subject of inquiry. If the emotion fades, motivation for inquiry into the reasons for the emotion also fades, because it is no longer as easy to maintain focused attention. Additionally, when an emotion fades, the object of the emotion will no longer seem as evaluatively important as it did when the emotion was affectively intense. Briefly: when an object seems evaluatively important, it tends to capture our attention, and affective emotions about the object enhance this effect.⁸⁷

Emotions, however, sometimes seem out of proportion to their immediate objects. Sudden fear might seem unwarranted; fondness too quickly felt for a stranger; felt rage too explosive a response to a social slight. The evaluative judgments suggested by the emotion do not seem to

⁸⁴ This result has been found in experimental psychology many times. Frederickson and Branigan (2005), for example, found that positively valenced, targetless emotions (like contentment) led subjects to focus on broader patterns in geometric images. Whereas, negatively valenced, targetless emotions (like depression) led subjects to focus on narrower patterns in geometric images. Likewise, Derryberry and Tucker (1994) found that participants feeling anxiety took longer to notice peripheral objects; their attention tended toward greater focus.

⁸⁵ This line of thought comes from Brady (2013), pp. 158-169 and Brady (2014).

⁸⁶ See Brady (2013), pp. 83-117. See also Tappolet (2012).

⁸⁷ See Brady (2013), pp. 147-148.

match the evaluative judgments one might come to in a cooler moment. In these instances, we might judge our emotional capacities to be either malfunctioning or imprecise. There does not seem to be a good reason to feel as we do and so to make the evaluative judgments we do. Yet, emotions are not always about what they seem to be about. Unwarranted fear might be a response to the similarity between the current situation and a past situation in which one was unexpectedly attacked. Becoming overly fond of a stranger might be a response to one's long-term condition of being affection-starved. And explosive rage at a small social slight might be the result of a slowly building resentment to a long pattern of social mistreatment. Emotions do not merely express or emerge from values; they also *reveal* values one did not realize one had.⁸⁸ Taking the time to work out the etiology of an emotion can unlock inaccessible content: what was previously hidden from my conscious thinking becomes apparent. The unfitting emotion signals a mismatch between my occurrent representation of my concerns and values on the one hand, and my currently inaccessible concerns and values on the other. These emotions are epistemically relevant to a project of self-understanding, since the affective feeling itself provides indirect access to currently inaccessible mental content. And when the feeling is explored, it can unlock *direct* access to the previously inaccessible content.

The above account of the potential for self-understanding in emotions is a perfect analogy to the resonance mechanism. The epistemic function of the resonance mechanism is, in the first instance, the achievement of *self-understanding*. That is, feelings of resonance and muteness reveal the relative fit or coherence between the occurrently considered part of a conception and the inaccessible part of the conception. The feeling, then, signals the existence of features of the individual's mind that she might not otherwise be aware of. Yet, insofar as the inaccessible contents

⁸⁸ See Brady (2013), pp. 150-155. See also Stocker and Hegeman (1996), pp. 56-57.

of our minds are accurate—as they often are concerning *nonevaluative* representations—the resonance mechanism can also function, in the second instance, as a guide to understanding of the world.

It might seem that the resonance mechanism is not very helpful because it is too coarse-grained. Conceptions are complex: a part of a conception can be very accurate while another part is wholly incorrect. With such variable and graded accuracy, resonance does not seem capable of helping us identify which parts of our conceptions are well-suited to the object represented. I think this worry is misplaced. Notice that emotions which carry information about our inaccessible resources can be reflected upon to identify the specific unconscious evaluation that is making us feel as we do. The same applies to feelings of resonance and muteness. Resonance need not be a coarse-grained affair—and it probably is not. When something feels wrong or incorrect, usually it is something specific, though we often do not know yet what it is. We must poke around at different hypotheses before something more specific comes to the fore. When it does, the feeling is responsive to that discovery. Likewise, through reflection on anger, I might conclude that I was not really angry about a social slight, but frustrated about an ongoing rift between myself and a family member. In so reflecting, the anger I feel shifts; the object of anger sharpens, leading to a change in the way outward events provoke my anger. No longer am I angry at the hurried driver who cut me off; now I'm angry with my family member, who was the true cause of the feeling all along. Just so, careful, conscious exploration of an explanatory framework that resonates can reveal variability in the resonances and mutenesses of that framework: some parts will feel right and others won't. Through exploring the object of the feeling, under the motivation and attentional benefits that the feeling provides, I can sharpen the feeling and so discover its proper target.

Paradigmatic instances of emotion seem to constitutively straddle conscious and unconscious resources. Through their valences, they offer indirect access to the inaccessible content.

And through a conscious effort to precisify the emotion, they can unlock some of that content. So, it appears that a common feature of the nature of emotions suggests that they, too, are instances of the resonance mechanism in action.

1.5.d. Resonance in experimental psychology

The most contentious feature of my claim that there is a resonance mechanism is that a resonance process exists. This process, I have supposed, is a form of implicit metacognitive monitoring of long-term memory which is responsive to changes in both relevance to occurrent contents and coherence with occurrent contents. Direct empirical studies on such a process are few and, to my knowledge, limited to the discourse comprehension literature. Cook, Halleran and O'Brien (1998) found that readers of narrative vignettes read more slowly in response to inconsistencies in the narrative, but only when inconsistencies were relevant to the narrative sequence. Inconsistencies were far enough removed from one another to be encoded in long-term memory rather than working memory. Isabelle Tapiero (2007) replicated and extended this finding to include inconsistencies regarding emotional content. Tapiero concluded that these findings imply the existence of a passive resonance process which monitors long-term memory for coherence with the contents of working memory, provided that the coherence or incoherence is relevant to the current understanding project.⁸⁹

Not all long-term memory, however, is created equal. The vignettes in those studies were still relatively short, so the inconsistent content was probably still accessible. Even so, that content was probably not actually accessed due to the conditions of the experiments: participants were required to read aloud, quickly and without stopping. These findings alone might not warrant the

⁸⁹ See Tapiero (2007), pp. 94-112. See also Rossetti (2005).

claim that there exists a more robust version of the resonance process, one which scans all of long-term memory. The issue is not whether implicit processes affect occurrent thinking. That is uncontroversial. The major issue is whether the required process must be either too complex or too carefully reasoned to be an implicit process. A secondary issue is whether the resonance signal, the affective feeling of resonance, is too unreliable for such a process to have been complex enough or reasoned enough to yield an accurate coherence assessment.

Dijksterhuis and Nordgren (2006) found that when participants are flooded with information about a decision in a short time and then distracted from thinking about the decision, they make a better decision than if they had been afforded time to deliberate. However, those findings were not replicated, and the method used has since come under serious methodological criticism.⁹⁰ A later study by Mikels, Maglio, Reed and Kaplowitz (2011), however, separated the conscious-unconscious dimension from the deliberative-affective dimension. When briefly shown information about options and then prompted to make a decision, subjects who decided based on affect (gut feelings) chose significantly better according to both subjective and objective measures than did those who deliberated instead. This phenomenon only appeared, however, when decisions were complex. Deliberation tended to be better for simple decisions. Additionally, deliberating first and then deciding based on affect led to significantly worse choices than being distracted and then deciding based on affect: deliberating disturbed the gut feeling.⁹¹ Yet, when subjects were exposed to large quantities of information in rapid succession (following the Dijksterhuis and Nordgren method), there was little evidence that affective decisions were better than deliberative decisions. These results suggest that there is an implicit process that coordinates and organizes complex, inaccessible information, and that the result of this process is signaled by an affective feeling.

⁹⁰ See Newell and Shanks (2012).

⁹¹ This result replicated and extended previous findings by Wilson and Schooler (1991) and Wilson et al (1993).

However, the process is probably not purely implicit, but involves some coordination between conscious and unconscious cognition. And that coordination probably involves rapid-updating of information in working memory before committing the information to long-term memory.⁹² If so, this would explain why the rapid exposure to large quantities of information do not produce reliably good decisions: it happens a bit too fast.

More generally, intuitive thinking has been found to be skillful and successful, despite being somewhat error-prone.⁹³ And it is often superior to deliberative reasoning, so long as the heuristic rule is intentionally adapted to the environment and type of decision to be made.⁹⁴ The implicit processes by which we form rapid assessments signaled by a consciously felt affect can also apparently be complex and reasoned: specialists can make judgments based on rich information more accurately than generalists, even if the specialists do not have time to analyze that information.⁹⁵

This evidence does not resolve the details of the resonance process: is it an implicit version of an inference to the best explanation? Or is it a complex network of relatively simple law-like transformations whose interlocking functions coordinate into a complex, apparently intelligent high-level process?⁹⁶ My project need not settle this question. What matters is that the empirical evidence supports the claim that there is a passive resonance process which functions to signal the relative coherence between accessible and inaccessible content through affective feelings. How the coherence is assessed can remain a mystery.

⁹² Lassiter et al (2009) found that the effect of apparently deliberating without attention is the product of a brief period of on-line updating of a judgment as new information comes in, followed by immediate storage in long-term memory. The result of deliberation is remembered, but not the on-line process of getting there.

⁹³ See Kahneman (2003).

⁹⁴ See Todd and Gigerenzer (2007) and Gigerenzer (2008).

⁹⁵ See Reyna and Lloyd (2006).

⁹⁶ This is how perceptual constancies seem to work. See Palmer (2002).

The above evidence also does not settle the crucial question of whether feelings of resonance are epistemically valuable. That is, it is not yet clear that they are sufficiently reliable in guiding us toward accurate judgments. Under certain controlled conditions, some similar feelings have been shown to be reliable. And even these feelings still face systematic sources of error that undermine their reliability. I consider the problem of reliability to be the major objection to my view that resonance is epistemically valuable. I will turn to this problem in chapter 5. My purpose here is only to motivate the existence of the resonance process. I hope the four arguments above suffice.

1.6. Summary

In this chapter, I have offered a detailed description of the features of conceptions as a representational kind and how these forms of representation differ from and relate to both explanations and beliefs. Conceptions are complex, structured mental representations of objects that straddle both conscious (or accessible) and unconscious (or inaccessible) mental content and processes. We form conceptions passively, often in response to concept acquisition, which invites a gravitation metaphor for their growth. In creatures who are capable of explanations, conceptions are normed by their explanatory power because they are organized around the natures we attribute to the objects about which we form conceptions. Explanations, then, are embedded in our conceptions. Moreover, because conceptions straddle conscious and unconscious resources, they are also suitably subject to a psychological mechanism that I call ‘resonance,’ which functions to carry information about inaccessible mental content in the same way that emotions do. Indeed, resonance might just be an emotion. Conceptions, then, can be resonating or mute (or somewhere between) depending on how well an occurrently considered framework for the conception fits with one’s inaccessible or just non-occurrent mental content about that object.

Chapter 2. The Accuracy Norm for Theoretical Understanding

An epistemic pathway is a psychological method for achieving an epistemic success. The significance of an epistemic pathway is that it can be reliably reused to achieve such successes in a range of different applications. ‘Reliability,’ as I am using the term, tracks its normal epistemic use. It means at least that the results of using the pathway in appropriate conditions are accurate more often than inaccurate.⁹⁷ For example, perception is an epistemic pathway that can be reliably reused to achieve perceptual knowledge. More generally, an epistemic pathway for knowledge (of any kind) plausibly requires that I am *warranted* (or *justified*, as the literature usually has it) in forming beliefs using the particular psychological method in question, that the beliefs I form along this pathway are reliably *accurate*, that I am appropriately *committed* to them, and that their accuracy is *apt*—that is, it is attributable to my using this pathway under conditions suitable for the well-functioning of that pathway.⁹⁸ Understanding—plausibly a distinct epistemic achievement from knowledge—probably has similar features. So, a pathway to understanding requires that there must exist normal conditions under which my use of the pathway would reliably succeed in producing understanding by meeting conditions analogous to those of knowledge. The question of this dissertation might be parsed as follows: are there pathways to theoretical understanding which depend on resonance, and if so, how heavily do they depend on it?

In chapter 1, I described the features of conceptions and motivated the view that they are an appropriate representational unit for an account of theoretical understanding. Briefly, conceptions are holistic mental representations of objects, centering on the nature we represent objects as having.⁹⁹ They are constituted by a complex network of beliefs and explanations and onto which

⁹⁷ I suspect the success rate should be higher than 51%; perhaps closer to 80%. I will not attempt to settle this question.

⁹⁸ Or some other anti-luck condition. Aptness is Sosa’s (2007) anti-luck condition, which I endorse. In Sosa’s words, aptness is “when [a belief’s] correctness is attributable to a competence exercised in appropriate conditions,” p. 92.

⁹⁹ See sections 1.1.a, 1.1.b, and 1.1.e.

phenomenal content is mapped.¹⁰⁰ Conceptions also grow organically in our minds, often passively, which entails that both their content and the psychological processes that generate, maintain, and develop them straddle our conscious and unconscious resources.¹⁰¹ I also described a psychological mechanism which I take to roughly correspond to a common epistemic use of the word ‘resonance.’ Resonance, briefly, is an implicit process which assesses the coherence between the conscious and unconscious parts of a conception and results in an occurrent feeling of resonance or muteness about the consciously considered part of the conception.¹⁰²

I take theoretical understanding to have two basic norms: other things equal, we understand better when (a) our conceptions are more accurate and (b) we have a better grasp of our conceptions. In this chapter, I will give an account of the accuracy norm through an examination of the minimal commitment, accuracy and warrant conditions. I will develop the minimal success conditions on understanding by reference to their ideal end-state: mastery of a subject. I will also show that the warrant and doxastic commitment conditions are secondary norms that support the more basic norm of accuracy. These interconnections will reveal that resonance can contribute to meeting the accuracy condition on understanding by warranting changes in doxastic commitment.

In section 1, I give a basic account of the evaluative features of theoretical understanding, starting with the two basic norms: accuracy and grasping. These norms can be thought of as either graded or binary, where one important relation between the two is that achieving a binary success is dependent on (though not reducible to) a reaching a threshold along the graded norm. I give four minimal success conditions for theoretical understanding by adding a doxastic commitment condition and a warrant condition to the accuracy and grasping conditions. Then I complexify these

¹⁰⁰ See sections 1.1.d and 1.1.f.

¹⁰¹ See sections 1.1.g and 1.1.k.

¹⁰² See section 1.4.

features by drawing a distinction between the two related types of goal in theoretical understanding: short-term milestone goals, and long-term mastery goals. I close the section by briefly responding to accounts of understanding that conflict with my account.

In sections 2-4, I examine the doxastic commitment, accuracy, and warrant conditions individually. Section 2 takes up doxastic commitment. Doxastic commitment can be thought of as either graded or binary. There is a dependency between these forms of commitment: for a binary form of commitment to switch, my confidence in the conception must cross a threshold. But this threshold depends on where one is on the path to one's understanding goal. I argue that the most important form of binary doxastic commitment is whether or not one *defaults* to the conception. This might seem too easy a condition to meet, but I argue that it is not.

In section 3, I turn to the accuracy condition. Accuracy in conceptions has multiple evaluable dimensions which make assessing along a single axis from inaccurate to accurate difficult and imprecise. The most important features to represent accurately if one is to meet the minimal success condition on understanding are the features at the highest explanatory levels of the conception (the essential features). Meeting this condition will vary widely depending on one's epistemic goals, yet the aspirational goal of mastery still offers an objective scale by which accuracy can be (very) roughly assessed.

The warrant condition, to which I turn in section 4, is the internal condition which corresponds to accuracy as an external condition. Like the other conditions, meeting the warrant condition is variable depending on context, but is typically assessed in comparison with the ultimate goal of mastery. Warrant for a conception, I argue, following Catherine Elgin (1996), tracks the process of working toward reflective equilibrium. I describe the interlocking features of this process, focusing on the concept of coherence and the establishment of a stable epistemic support structure.

Then I turn to the interrelationships between doxastic commitment, accuracy, and warrant to motivate the view that, despite accuracy being a basic norm for *achieving* successful understanding, warrant is the basic norm for *attributing* successful understanding. I conclude that the minimal warrant necessary for successful understanding is just whatever stabilizes one's epistemic support structure.

Finally, in section 5, I raise the question whether resonance can offer enough warrant to appropriately change one's doxastic commitment. To do so, resonance's warrant must not be defeated, which can happen in at least three ways: (a) the resonance draws on inaccurate inaccessible representations, (b) some other feeling is confused for a feeling of resonance, or (c) evidence strongly undermines the coherence of a resonating conception. I conclude by describing the two ways resonance can warrant: it can add stability to an epistemic support structure, and it can produce a default switch from one conception to another.

2.1. Theoretical understanding

This section will provide an overview of the evaluative features of theoretical understanding. I will develop the relationships between the norms, success conditions and goals for theoretical understanding. Then I will close this section with a brief response to views that conflict with my account.

2.1.a. Norms

Epistemologists often define theoretical understanding as a conjunction of two normed relations: (a) the individual's psychological relation to the representation and (b) the representation's

relation to reality.¹⁰³ These two relations can be interpreted as a grasping norm and an accuracy norm.¹⁰⁴ Such a definition might look like this:

S has greater theoretical understanding of an object *O*

1. the better *S* grasps a conception *C* of *O*, and
2. the more accurate *C* is as a representation of *O*.

In theorizing the accuracy and grasping norms, additional norms are inevitably involved. For example, doxastic commitment to a conception and warrant for a conception might both be relevant to accuracy and grasping, but in distinctive ways. However, when things go well, warrant and grasping jointly increase commitment. That is, when I feel like I grasp a conception and it seems well-supported, I will, as a matter of course, find myself correspondingly confident in that conception. Grasping, then, seems to be a distinct norm from warrant. While increasing warrant does increase my commitment, the value of warrant as a condition on understanding is that it ensures reliable accuracy. Hence, my doxastic commitment increases the more I grasp the conception and the more I judge it to be accurate. And if my understanding faculties are functioning virtuously, my commitment to a conception should correspond to my understanding of the object the conception represents. So, grasping and accuracy seem to be the basic norms for understanding.¹⁰⁵

¹⁰³ See, for example, deRegt (2009, 2017), Grimm (2010a), Strevens (2013), Baumberger (2014), Baumberger and Brun (2016), Hills (2016), Wilkenfeld (2017), and Hazlett (2018).

¹⁰⁴ Some theorists would object to the view that the correct psychological relation is grasping. Kelp (2015), Riaz (2015), and Hazlett (2018) take this view, arguing that understanding is merely a species of knowledge. I will discuss these views in section 2.1.d. Similarly, theorists are divided about whether the relation to reality is a truth norm or an accuracy norm. Rejection of an accuracy norm altogether results in pragmatist accounts of understanding in which accuracy constraints still enter but are subordinated to grasping. Wilkenfeld (2013) defends such a view but retracts it in Wilkenfeld (2017). De Regt (2015) and Elgin (2004, 2017) argue that understanding and truth can come apart, yet they both assert the importance of the overlap between accuracy and relevance to the understander's aims. Kelp (2015), Riaz (2015) and Hazlett argue for a truth norm. I will discuss these views in section 2.3.

¹⁰⁵ Baumberger (2019) suggests that warrant might be an independent evaluative dimension from accuracy. However, I find this view implausible, since it is motivated by the swamping problem for knowledge, which (implausibly) presupposes that the value of knowledge is mind-independent. Briefly, the swamping problem for knowledge is that we only care about warrant as a means to true belief. But then this entails that true belief is just as valuable as knowledge. By

2.1.b. Success conditions

Basic norms (or evaluative dimensions) are not minimal success conditions. The basic norms for understanding are axiological: I can do better or worse along a graded axis. The minimal success conditions for understanding are deontic: I either succeed or fail. This suggests an initial contrast between knowledge and understanding. Although my warrant for a belief might admit an axiological expression, my knowledge itself is deontically normed. Either I know a proposition or I do not. Hence, knowledge can fruitfully be considered only under success conditions. Understanding, like knowledge, can either succeed or fail; but, unlike knowledge, it admits of degrees.

How might we state the minimal success conditions on understanding? Since doxastic commitment and warrant are both conditions on knowledge, we might add them to threshold expressions of the two basic norms to produce four necessary conditions: *commitment*, *warrant*, *accuracy*, and *grasping*.¹⁰⁶ As I noted above, commitment, accuracy, warrant, and aptness (or a different anti-luck condition) are common conditions on knowledge. Epistemologists disagree about whether understanding needs an anti-luck condition.¹⁰⁷ I find an anti-luck condition plausible, though I will not explore it in this dissertation. Epistemologists tend to agree that understanding has a grasping condition that knowledge apparently lacks.¹⁰⁸ But this difference is not straightforward, since the

analogy, we might only care about getting a good cup of coffee, so even if the coffee maker doesn't make the coffee in a good way, we don't care as long as the coffee is good. If one finds this worry compelling, it might lead to an attempt to locate independent epistemic value in warrant, thus securing the value of knowledge over mere true belief. See Pritchard (2010), pp. 113-116 for a more detailed account. However, a disanalogy between warrant and the coffeemaker reveals the error in the worry: one cannot register the truth of a belief just by thinking it the way one can register the goodness of coffee just by tasting it. The value of warrant is that it offers an internal way to assess an external (and hence not directly accessible) accuracy condition. Knowledge is more valuable to the knower than true belief because the knower thereby has good reason to think the belief is true. All this applies equally to understanding.

¹⁰⁶ Baumberger (2014, 2019) and Baumberger and Brun (2016) do just this.

¹⁰⁷ Kvanvig (2003, 2009) argues understanding can be lucky. Hills (2016) and Pritchard (2009, 2010) argue that only certain kinds of luck undermine understanding. Grimm (2006), Khalifa (2016), and Kelp (2021) hold that luck broadly undermines understanding.

¹⁰⁸ See Kvanvig (2003), Riggs (2003), de Regt and Dieks (2005), Grimm (2006, 2016), Elgin (2007, 2017), de Regt (2009), Gardiner (2012), Newman (2012), Khalifa (2013), Greco (2014), Kelp (2015), Baumberger and Brun (2016), Hills (2016), and Strevens (2016).

belief condition on knowledge is plausibly constituted by doxastic commitment and grasping.¹⁰⁹ If the minimal conditions on knowledge and understanding really do parallel one another, the primary difference between knowledge and understanding comes down to the nature of the basic unit of representation: commitment, accuracy, warrant, and grasping all seem to function differently for conceptions than for beliefs. For this reason, epistemic pathways to understanding will function differently from pathways to knowledge, even if they admit the same types of success conditions.

Here is a template for the minimal success conditions for (partial) understanding. Because I leave out an anti-luck condition, I leave it open whether these conditions are jointly sufficient for understanding. I take these expressions to be relatively uncontroversial due to their being so underspecified:

If *S* has partial theoretical understanding of an object *O* via conception *C*, then:

1. *S* grasps *C* minimally,
2. *C* accurately represents *O* minimally and in the right way,
3. *S* is sufficiently doxastically committed to *C*, and
4. *S*'s warrant for *C* is sufficient.

2.1.c. *Goals*

This way of expressing the necessary conditions for partial understanding, however, presupposes that the success conditions on understanding are a time-slice phenomenon. That is, at any time *t* we can determine whether *S* understands *O* by assessing *S* and *C* according to some specification of the above conditions. But conceptions are not like beliefs. A proposition, once believed, does not change; it either remains believed or becomes disbelieved. Conceptions, on the

¹⁰⁹ I owe this point to Jon Garthoff. The idea is that we cannot believe a claim if we do not have some minimal grasp on the constituent concepts and what the claim asserts about them.

other hand, grow and change organically as we take in information.¹¹⁰ Because conceptions are not static in their content the way beliefs are, a time-slice approach to the conditions for theoretical understanding is an incomplete treatment. It might tell us whether *S* meets some minimum criteria for understanding, it but cannot indicate whether *S* is on a trajectory toward increasing understanding. It also cannot indicate whether *S* can or will maintain what understanding she currently has.

It might seem that what we need are criteria for the *stability* of understanding. However, successful theoretical understanding is widely known to be stable, provided the individual continues to use and develop that understanding. So, I think what we need is an account of understanding as an *ongoing project*. The differences between conceptions and beliefs entail that understanding is not separable from the act of attempting to understand in the way knowledge is separable from the act of attempting to know. Doxastic commitment is probably not voluntary.¹¹¹ Understanding projects (both large and small), on the other hand, are voluntary. If we are concerned with achieving ever greater theoretical understanding, then, what we need is an account of the various pathways that reliably lead in the direction of full understanding, even if that goal is not achievable. Understanding builds on itself. An epistemic pathway to understanding functions to guide us not merely to partial understanding, but toward full understanding. Its norms include the purely aspirational. Minimal success conditions indicate whether the current time-slice counts as a success, but evaluative dimensions reveal directions of growth both toward and beyond minimal understanding. Note that this relationship entails two departures from a theory of knowledge: the minimal success conditions for understanding are much less demanding than those of knowledge, while the aspirational goals of understanding are much more ambitious than those of knowledge.

¹¹⁰ See sections 1.1.k and 1.1.l.

¹¹¹ This is the dominant view among both philosophers and psychologists.

This difference in the evaluative criteria for knowledge and understanding is due to the differing natures of their goals. An epistemic pathway to propositional knowledge has a distinct, achievable endpoint: a known proposition. An epistemic pathway to theoretical understanding, however, will not typically have such a distinct, achievable endpoint; rather, it is marked by achievements along the way. There are, then, at least two kinds of goals for a pathway to understanding. A pathway might lead to a partial, but successful understanding, or a pathway might lead to a full understanding that lies forever on the horizon. I will call the first kind of goal a *milestone goal* and the second kind of goal a *mastery goal*. Here, I propose that milestones are achieved when (a) an individual's conception changes into a version that is numerically distinct (that is, it transforms), and (b) the new version of the conception moves the individual forward along a path toward mastery.¹¹² For a mastery goal, on the other hand, the pathway to understanding is unending and essentially aspirational: except in the simplest of cases, there will always be a better understanding to be had. An aspirational understanding project, then, is more like an epistemic lifestyle than an achievement.

The relationship between these two kinds of goals for understanding reveals that a time-slice approach to the criteria for minimal success will not be helpful for assessing the value resonance contributes to an ongoing understanding project. The question is not: did this one instance of acquiescing to a feeling of resonance afford me understanding? The question is: did instances of resonance at moments throughout my project help bring me to the understanding I now have, and if so, how? To answer this question, the minimal conditions for partial understanding need to evaluate stages in a larger understanding project. That is, they need to answer whether, in this instance, I have achieved a milestone along the way to mastery.

¹¹² Recall from section 1.2 that a conception is numerically distinct when it has a distinct explanatory framework organized around a distinct, attributed nature.

2.1.d. *Reductions to knowledge*

The understanding literature offers a number of “knowledge-based accounts” of theoretical or explanatory understanding. Some are generally consistent with my account above.¹¹³ Other accounts take the view that understanding is knowledge plus something else. While these accounts strike me as oversimple, they do not necessarily conflict with my own: I think understanding is knowledge plus a great many other things.¹¹⁴ The most diametrically opposed accounts to my own have three related features: (a) the representational unit of understanding is propositions (b) understanding a phenomenon is just knowing the correct explanation for that phenomenon and (c) there is no grasping condition on understanding that is distinct from having normal beliefs.¹¹⁵ These accounts strike me as reductions to propositional knowledge. They conflict with my view insofar as they reduce conceptions to propositions, eliminate the grasping condition, and the reduce the significance of the mastery goal for understanding.

The major obstacle to a reductive account is to show that there is nothing more than standard belief involved in understanding. The problem with such a view is that understanding seems to involve a form of structure and grasping not required by knowledge, and these features are precisely what make understanding more valuable than knowledge.¹¹⁶ That is, there is a kind of interconnection or integration among beliefs in virtue of which parts hang together in an individual’s mind as a coherent whole.¹¹⁷ This structure involves both explanatory relations and epistemic

¹¹³ Grimm (2006, 2014), for example, argues that understanding is a species of knowledge, but he does so not by treating understanding reductively, but by suggesting we think about knowledge expansively.

¹¹⁴ Kelp (2015, 2021), for example, argues that understanding is knowledge that is “maximally well-connected” by basing relations.

¹¹⁵ Trout (2002), Woodward (2003), Raiz (2015) and Hazlett (2018) broadly share this kind of view. Hazlett admits that understanding might be knowledge-plus, yet his account matches the above schema. Trout argues that understanding is nothing more than an epistemically valueless feeling and that real epistemic value is only found in knowledge of explanations. Woodward and Riaz, on the other hand, straightforwardly defend a reduction to knowledge. I consider these differences insignificant.

¹¹⁶ See Kvanvig (2009) and Grimm (2012).

¹¹⁷ See Gardiner (2012).

support (or basing) relations.¹¹⁸ To get past this problem, a knowledge reduction needs to show that these features require only normal belief. This reduction might be possible with basing relations since propositional knowledge requires justificational networks. However, reducing explanatory relations is more challenging.

Amber Riaz (2015), proposes a reduction on which understanding why B is the explanation for A is reducible to a proposition of the form <A because B>. The BECAUSE relation can be interpreted as either a basing relation or an explanatory relation. These, however, are not reducible to one another.¹¹⁹ If we interpret the BECAUSE relation as basing, then the individual might not actually know the correct explanation, since the proposition will be true even if B does not explain A. If we interpret the BECAUSE relation as explanatory, then a problem of reference arises. In section 1.3, I noted that although a proposition that expresses an explanatory relation does successfully refer to that relation, it is not identical to the relation. Rather, the EXPLAINS relation refers to an inferential connection in the mind of the individual who posits the explanatory relation. Although the individual need not believe A because she believes B, she does believe that B offers a good explanatory account of A and she believes this because she has conducted an inference to the best explanation—even if that inference is not her justificational basis for accepting the claim that B explains A. For example, I think manipulating others is wrong based on my experience that it felt wrong on the occasions when I did it. But I explain that wrongness in terms of dignity because I think this is the best explanation for the moral situation. Hence, understanding requires a psychological network of both explanatory relations which are constituted by inferences (not beliefs), and an epistemic support structure which warrants the view that these explanatory relations

¹¹⁸ See sections 1.1.d and 1.3 for a review of these features. See also section 2.4.c, below.

¹¹⁹ See Gardiner's (2020) objection to Hills (2016) apparent conflation of the two: the reasons one accepts a claim as true are often not the same as the reasons the claim is true.

hold. Since reductions to knowledge struggle to account for explanatory relations as mere beliefs, I set them aside.

2.2. Doxastic commitment

I will begin with the commitment condition for theoretical understanding. Here's the plan. I draw some distinctions between the various forms of commitment, which will enable me to describe the special features of doxastic commitment to conceptions. I then defend the view that the necessary minimal form of doxastic commitment to a conception required for understanding is that one defaults to the conception as a representation of the object. I close the section by raising and responding to two objections.

There are two broad types of commitment which are necessary to maintain an ongoing theoretical understanding project: doxastic commitment and conative commitment. At minimum, doxastic commitment requires psychologically “coming down” on one way of representing as opposed to the alternatives.¹²⁰ The dominant view, which I follow, is that doxastic commitment is *involuntary* and *reasons-responsive*.¹²¹ I will call refer to the broad category of doxastic commitment as ‘assent’. Conative commitment, on the other hand, requires a willingness to act as if a representation is at least potentially accurate.¹²² But this willingness to act requires a motivation to action: one must consider a representation worth investigating and thus consider it worthwhile to commit one’s cognitive and material resources. I will call this form of commitment ‘investment’. In this chapter, I set aside investment to focus on assent.¹²³

¹²⁰ See Horgan and Timmons (2006), pp. 263-265.

¹²¹ Doxastic commitment, however, is sensitive to deliberation, which is voluntary. See Feldman (2000) and Shah (2002) for a detailed treatment of the arguments against direct doxastic voluntariness and for indirect doxastic voluntariness via deliberation.

¹²² Audi (2008), p. 92, calls this “behavioral commitment”.

¹²³ I will return to investment in section 4.4.

2.2.a. *Binary and graded assent*

Assent can be either binary or graded. For propositions, philosophers often articulate this distinction with the terms ‘belief’ and ‘credence’. It seems one can either believe a proposition or not, and that these options are exhaustive.¹²⁴ However, it also seems one can lend varying degrees of credence to a proposition. Assent seems to come in different strengths, and these seem to correspond to the various binary doxastic attitudes. One might, for example, accept a claim merely because it seems plausible. One might be wholly convinced that a claim is true because one has repeatedly failed to undermine it. One might consider a claim valuable to presuppose, but not yet believe it. One might find a claim implausible and yet not disbelieve it. And so on. The relation between binary and graded assent is not clear, though it is generally thought that some level of credence is necessary for belief.¹²⁵ I take it the following is an uncontroversial guiding principle concerning the relationship between binary and graded assent:

Threshold Dependency – If an individual is to acquire any form of binary assent, it is necessary (though perhaps not sufficient) that she meets some threshold of graded assent. Note that threshold dependency is a weak claim: it does not require a single, standard threshold for all forms of binary assent, nor does it reduce binary assent to graded assent. It only asserts a threshold requirement for the switch from one binary state to the other. For the very weakest forms of binary assent, that threshold might approach a credence of 0. Note that when an individual has crossed the threshold, I will call her credence assignment her ‘level of confidence.’

¹²⁴ Moon (2017), for example, argues that belief cannot possibly be graded and is only binary. However, the reference of ‘belief’ is disputed, as cognitive psychologists, for example, commonly use the term to refer to graded assent. I will not weigh in on the proper use of the term.

¹²⁵ Many philosophers have even drawn up various reductive accounts of belief in terms of credence. Some consider belief to be maximal credence, such as Wedgwood (2012), Clarke (2013), and Greco (2015). Others consider belief to be some non-maximal level of credence, such as Foley (1992), Sturgeon (2008), and Pettigrew (2015). I set these reduction projects aside.

Binary assent is also sensitive to critical reflection. One might *unreflectively* represent a proposition as true or one might *reflectively* endorse a proposition as true.¹²⁶ This distinction, it turns out, is of central epistemic significance. Doxastic deliberation (deliberation over what to believe) is a paradigm instance of reflective effort that leads to either reflective endorsement, reflective rejection, or some other form of binary representation that is different from belief, such as ‘acceptance’.¹²⁷ Moreover, during this reflective activity, accuracy norms are always prioritized over pragmatic norms. This reveals that binary assent regulates for (or, as I will say, *is basically normed by*) truth.¹²⁸ However, unreflective binary belief is not only heavily influenced by pragmatic norms; it is also surprisingly credulous.¹²⁹ This feature of unreflective binary representation is striking and worrisome. It has even led some philosophers to conclude that merely entertaining a proposition inevitably produces beliefs that can only be undone through reflective deliberation.¹³⁰

2.2.b. *Assenting to a conception*

Conceptions are not reducible to propositions, though they are partly constituted by a large network of propositions.¹³¹ Much of the content of a conception will be unreflectively endorsed

¹²⁶ Buckwalter et al (2013), p. 2, call these “thin” and “thick” beliefs, respectively.

¹²⁷ Audi (2008), for example, argues that acceptance is distinct from belief because it is *voluntary*. That is, the evidence is not strong enough to cognitively generate a belief, yet one endorses the claim anyway, presumably because there are other considerations that favor doing so. Typically, a person who accepts but does not believe is reflectively aware that her representation is not sufficiently epistemically supported to generate a reflectively endorsed belief.

¹²⁸ Shah and Velleman (2005), pp. 500-501. Crucially binary belief is not *regulated by* truth, for if it were then pragmatically motivated beliefs (such as wishful thinking) would be impossible.

¹²⁹ Individuals placed under cognitive load consistently represent claims as true, even if later told they are false. See for example, Gilbert et al (1990, 1993). The cognitive load prevents them from engaging their critical faculties, though it plausibly also inhibits meta-representational encoding. Thus, when presented first-order propositions, they encode these as true, but fail to correct these encoded propositions after being given the meta-level information that those propositions are actually false. The key idea here is that meta-level information is more difficult to encode, but object-level information is encoded as accurate by default.

¹³⁰ See Mandelbaum (2014).

¹³¹ This depends on what the term ‘propositional’ is supposed to mean. Three possible meanings present themselves. Camp (2003) takes ‘propositional’ to mean sentential and hence linguistic. On this account, I follow Camp in the judgment that there is no requirement at all that a conception should be propositional, though a person might include sentential thoughts in her framework. Burge (2010) takes ‘propositional’ to mean requiring the capacity for conceptual

beliefs, formed largely from perception and testimony.¹³² These beliefs are usually credulously formed (because unreflectively endorsed) and do not typically come up for review unless an individual has a reason to question their accuracy. Some of these beliefs will also be inaccessible to occurrent, focal cognition.¹³³ When these beliefs come up for review, it is typically in response to some incoherence in the conception that has caught the individual's attention. The incoherence might be a mere dispute of the evidential basis for an attributed feature. But it might also arise in response to the individual's effort to unify the conception through explanatory relations. Moreover, binary assent to one conception over another is ultimately a matter of binary assent to one explanatory framework over another, since numerical identity of conceptions seems to supervene on identity of explanatory frameworks.¹³⁴ Hence, explanatory frameworks are the site of the action of doxastic deliberation over whether to represent a conception as accurate. Or, as a philosopher of science might put it, we deliberate over whether to assent to a theory, not whether to accept a data set.

Another difference between conceptions and propositions is that any form of binary assent to a conception is unevenly distributed; whereas, binary assent to a proposition is uniform across the whole of the proposition. Conceptions are partly constituted by propositions, but we will be less confident in some propositions. Depending on confidence and circumstance, we will also take up different forms of binary assent for different propositions. Additionally, our interests guide our development of conceptions, so we will have considered the various parts of conceptions to

thought. On this account, conceptions *must* be propositional, since they are constitutively conceptual. Though she does not say so, I take Zagzebski's (2001) description of understanding as 'non-propositional' to mean that the representation is not constituted purely and exclusively by conceptual content. On this use of the term, conceptions are certainly not propositional, though explanatory frameworks probably are.

¹³² We are deeply epistemically dependent on testimony, not only in normal life, but even in the sciences. See Hardwig (1985).

¹³³ See section 1.1.g.

¹³⁴ See section 1.2. Recall that explanatory frameworks are structured accounts of the essences we attribute to the objects we represent.

differing depths and with differing rigor. Our conceptions often have pockets of rich and perhaps even rigorous elaboration suspended in less rigorous networks that join these articulated pockets with hazily represented and fluctuating parts that we know to be relevant to the object but have never thought much about. So, an individual will often be more confident in the parts of her explanatory framework she has long reflected on than other parts. However, she might also have unreflectively imbibed an explanatory relation that becomes rigidly fixed in her mind until challenged.

2.2.c. *Mere defaults*

Let me return to the original question: what is the minimal form of assent necessary for successful achievement of an understanding milestone? The answer to this question depends on one's position on the long pathway to understanding. A new understanding project can get off the ground with the weakest form of binary commitment to an attributed nature. That is, to understand an object via a numerically distinct conception, the nature I attribute to the object needs only to be the one I actually represent the object as having. At its most minimal, my assent is a mere *default*. Suppose I have only one explanatory framework for frogs: that they are living, amphibious organisms. This framework was given to me when I was young by an adult. Since I have no alternative and no reason to distrust the adult, the confidence threshold for defaulting to this framework is very low. If it sounds initially plausible, I will accept it. Often, the default is set by an individual's initial representation of an object's nature: what I first take it to be is how I represent it hereafter unless the default is challenged by a compelling alternative.¹³⁵

¹³⁵ The tendency to commit to an initial representation is analogous to the tendency to form a belief on the testimony of the first person I come across who takes a stand on a proposition on which I had no prior opinion. Stubenvoll and Mathes (2022) found that even explicit retractions of misinformation do not return individuals to their prior credences. Defaults, once set, seem to have a dispositional inertia.

Now suppose an ungrounded friend suggests an alternative explanatory framework: frogs are surveillance robots designed to appear as amphibious, living organisms. Switching my default to the alternative explanatory framework would require that my confidence in the alternative is higher than my confidence in the original. Either I reject the framework out of hand because it does not match my current default, or I reflectively weigh the evidence to assess which framework is more plausible. The result of this deliberation might change my default, but only if my confidence in the alternative framework is higher than my confidence in the original. So, the confidence threshold for taking default status increases the further one has advanced along an understanding path.

Default status as a form of binary assent is well-suited to understanding in the same way that belief is well-suited to knowledge. Beliefs only become dislodged when the evidence is compelling and we are willing to let them go. Belief is well-suited to knowledge because a known proposition should not need revision: a known proposition remains true, though its truth might be indexed to a time and place. Hence, if I have good reasons to think I know a proposition, then belief in that proposition is well-suited to knowledge since it will tend to make that proposition stick in my mind. Conceptions, on the other hand, change organically as we gain more information about the objects in our world, and this growth is not limited to the reflective or even conscious connections we form between the features we either observe or infer objects to have. The tendency of conceptions to organically gain and lose features is well-suited to understanding because understanding is almost always partial. An explanatory framework for a conception needs to be sensitive to these changes; it needs to allow parts of the framework to be added or removed when they do not fit with changes to the other contents of the conception. Hence, binary assent to an entire explanatory framework should be much weaker than belief. Mere default status for explanatory frameworks enables this kind of sensitivity to change.

Moreover, unless the framework enjoys default status, it cannot effectively organize the conception. Except in unusual cases of objects that can be fully understood (such as simple artifacts), an individual's conceptions of objects will continue to develop over the course of her life, though this development will probably undergo bursts and fallow periods. An individual's understanding can deepen and expand because her conception of an object can develop. But an explanatory framework that does not enjoy default status in her mind will probably not be connected to the information she takes in about the object in a way that allows that information to deepen and expand the conception. Whatever I learn about frogs is plugged into my explanatory framework for frogs as amphibious organisms. When I interact with a frog, my conception of frogs as surveillance robots will not develop unless I intentionally bring it to mind and start thinking of the frog as a robot and not an organism. If the robot conception were my default, however, the reverse would be true.¹³⁶

Commitment to explanatory frameworks as default is unavoidable because (a) a conception must structurally organize the features of an object and (b) that structure will be informed by the essential nature I take the object to have.¹³⁷ It is probably impossible for me to abandon *all* conceptions of frogs, because I take them to have multiple features, and I take these features to be part of a structurally organized whole with an essential nature. In this way, defaulting to a framework, once I acquire it and find it minimally plausible, is unavoidable. I cannot give up the amphibious organism conception unless an alternative presents itself. Consider a duck-rabbit image. It might be possible for me to see neither a duck nor a rabbit in the image, but then I will struggle to

¹³⁶ I will defend and develop this line of thought in section 3.5.

¹³⁷ I defended these claims in sections 1.1.d and 1.1.e.

find a framework that unifies the image. But once I see the duck, I cannot go back to seeing no framework at all; I can only abandon the duck framework by switching to the rabbit.¹³⁸

Since my default explanatory frameworks are in fact how I structure the features of objects and represent their essential natures in my thinking, I am committed enough to understand through them. Whatever confidence I must have in my attribution of a nature to the object is *very* minimal: a mere judgment of plausibility is enough for me to let a represented nature structure my conception of an object, provided the alternatives are implausible (or unimagined).

The following, then, is a revised minimal commitment condition:

Assent Condition – The explanatory framework F by which S organizes C is S 's default way of representing the nature of O , where default status requires meeting a threshold of confidence in F , and that threshold increases as S 's understanding of O increases.

2.2.d. *Objections*

Such a weak binary assent condition might seem too flimsy for an epistemic state as robust as understanding. I do not think it is. In the first place, even when considered as a mere time-slice phenomenon, understanding seems to have a less stringent binary assent requirement than knowledge.¹³⁹ The active nature of understanding projects, however, also requires reduced assent. Understanding must be sensitive to ongoing development as well as to the possibility of radical revisions to a conception, and a weak, provisional form of binary assent is well-suited to this

¹³⁸ Note the analogy between defaulting to a concept and defaulting to an explanatory framework. When I see a frog, I cannot avoid representing it as a frog. The only way to see the “blooming, buzzing confusion” is through nurturing a carefully constrained, dissociative state. In the normal case, I will default to representing the frog under the concept FROG. Likewise, when I gain a plausible representation of the frog's nature, it will take root in my conception of the frog in virtue of its tendency to organize the features that are constituent of my conception of frogs.

¹³⁹ See, for example, Wilkenfeld (2017c), who argues that one can understand even if one's credence is less than .5. See also Baumberger (2019), pp. 384-385, who argues that reduced doxastic commitment is necessary to accommodate idealized models which we do not consider to be fully accurate. See also Elgin (2004, 2017) on idealized models.

function. My first exposure to a plausible explanatory framework for an object sets the default for my conception, but this default is unlikely to remain suitable for organizing my conception. Eventually, I will grow out of it, and the mechanism for that growth will often be exposure to an alternative. Competition among explanatory frameworks for default status (other things equal) improves my understanding because it forces a reflective consideration of the relative virtues of different structuring natures for the object. When a candidate representation of the object's nature survives this competition, it will gain my confidence. Hence, default status is the kind of binary assent necessary for partial understanding, but confidence in a conception (in the virtuous case) grows over time as that explanatory framework is tested through development and competition with alternatives.

I have proposed that the doxastic commitment condition for theoretical understanding is that one defaults to an explanatory framework for the object, where default status requires increasing confidence in the explanatory framework the more one's understanding increases. Yet context seems to matter. Often, transition from one environment or community to another will change my default representations, as when a scientist's thinking might become more technical in scientific settings and then simplify in family settings. Even in these cases, however, it seems unlikely that the nature the scientist attributes to objects will change from one context to the next, nor do the features of the object that are no longer salient to her when she is with family drop out of her conception altogether. The difference, in such a case, is the way the scientist deploys her conception, not its content or structure. Our conceptions do change, but that change is usually a gradual formation and development of the conception. Conceptions snowball. Hence, transition between contexts is more likely to change which parts of the conception come readily to mind than it is to change the explanatory framework itself in any fundamental way.

2.3. Accuracy

Propositional knowledge is amenable to a time-slice treatment because, in general, once one knows one continues to know in roughly the same way unless one forgets. Theoretical understanding, on the other hand, is a growing, adapting, and even transforming affair.¹⁴⁰ In this section, I will focus on the complexities of assessing the accuracy of conceptions, the most important features in a conception to represent accurately, and the way pragmatic and objective understanding goals affect the accuracy condition.

First, I will describe some of the features and complications that arise in converting talk about true belief to talk about accurate conceptions. Then I will construct an accuracy condition that I think not only responds to those features and complications, but also captures what consensus there is in the literature on an accuracy condition. Specifically, the features of a conception that must be accurate on pain of misunderstanding are the ‘central’ features. In paradigmatic cases, central features are those that are essential to an object in virtue of its nature. Next, I offer a reformulation of the accuracy condition on understanding in light of the above. I conclude by distinguishing two kinds of success: pragmatic and objective. Talk about success, I argue, is ambiguous between (a) an objective norm of mastery or full understanding, by which all intermediate successes are normed, and (b) a relative norm of individual goals, by which success counts as meeting one’s understanding goal, however the individual constrains it.

2.3.a. *Accurate conceptions*

Epistemologists usually discuss the accuracy condition for understanding in terms of whether understanding is ‘factive’.¹⁴¹ Propositional knowledge is generally considered factive: one

¹⁴⁰ See sections 1.1.k and 2.1.

¹⁴¹ For example, Elgin (2004, 2007, 2017b), Wilkenfeld (2015), Carter and Gordon (2016), and Hazlett (2018).

cannot know a proposition unless it is true. But this accuracy standard is difficult to apply to conceptions. While it is true that success conditions encourage us to think about understanding in a binary way, the accuracy of conceptions is simply not binary in the way that the accuracy of propositions is. Conceptions, roughly speaking, are supposed to *match* the objects they represent.¹⁴² Their constituting beliefs (or acceptances or working hypotheses, as the case may be) can be individually true or false, but whole conceptions cannot be true or false. One might think a conception is true whenever the conjunction of all its constituting beliefs is true. But this is probably an impossible standard to meet, both because it is impracticable and because not all elements of a conception are beliefs. Conceptions can only be more or less accurate. Even explanatory frameworks, which are parts of conceptions, do not admit of straightforward truth or falsity; they get things more or less right, in more or less granular ways, and with more or less approximation and idealization.

When competing conceptions are roughly equivalent in their accuracy, they can be more or less *apposite*, depending on their suitability for the explanatory purpose to which they are put. For example, an explanatory framework that is meant to explain the driving controls for a car is not apposite to explanations of its inner mechanism. The framework can be a fully accurate and highly detailed representation of what a car is for and how it is to be used and yet silent about how the car's engine, transmission and circuitry functioning.

¹⁴² How they match is unclear. For example, the match is often not an isomorphism, as van Fraassen (1980) has it. Isomorphism precludes idealizations and approximations which do not necessarily admit a precise structural analogy between physical objects and events and theoretical models. Elgin's (2006, 2017a) account of matching via exemplification is less rigid than van Fraassen's. Elgin argues that the power of scientific models often comes from their ability to capture a central feature of an object through a relatively simple analogical structure. However, exemplification is only one way among many that the structure of a conception can match an object.

Here we run into a complication. As Georgi Gardiner puts it, “there is more than one way to be an understander, and the different ways might not be wholly mutually consistent.”¹⁴³ The yogi and the cross-fit trainer, to use her example, might have different and mutually inconsistent conceptions of physical fitness. Relatively accurate conceptions can be formed about the same object and each prove apposite to certain kinds of explanation, but still not fit together naturally into a larger whole. Conceptions automatically and gravitationally attract content about their objects, and it is up to us to organize it. The work of unifying conceptions under an explanatory framework is not guaranteed to succeed, so we often end up with disunified theoretical structures.¹⁴⁴

A second complication is that our conceptions—including even their most fundamental parts—are almost always capable of further development. For example, theoretical mechanics features a powerful mathematical tool called the ‘Hamiltonian’. My conception of a Hamiltonian is based on decades-old knowledge of physics, much of which I have forgotten. To me, a Hamiltonian is a formal tool for using the energy states of a system to describe other features of that system. Here, I have expressed the nature I take the object to have, but the structure of the object’s features is almost entirely lost to me: all I remember is that it is an equation that involves the standard kinetic energy formula: $mv^2/2$. Suppose my memory is accurate. Is at least this accuracy necessary for me to understand Hamiltonians? I do not consider myself to have any more than the most partial understanding of Hamiltonians, but I would expect anyone who minimally understands Hamiltonians to accurately represent their nature to at least the granularity that I do. But perhaps one need not even know that $mv^2/2$ is part of the formulation of a Hamiltonian to partially understand.

¹⁴³ Gardiner (2018), p. 9.

¹⁴⁴ Consider the mutual incompatibilities in physics between general relativity and quantum mechanics. Or the incompatibilities in the philosophy of disability between the medical model and the social model.

Here is a third complication: what counts as successful understanding depends on context. In the context of a casual chat among non-physicists, my conception of a Hamiltonian might be sufficient for understanding, especially if the contextual explanatory purpose my conception is to be used for is only an answer to the question *what* a Hamiltonian is. But no physicist would consider my conception sufficiently accurate for understanding. Even if it is wholly accurate, it is not precise enough.

2.3.b. The centrality of essential features

Consider my conception of my spouse's career ambitions. Insofar as I grasp this conception, it must have a certain granularity. But it seems I can understand my spouse's career ambitions without either getting everything right or knowing the minute details. Suppose I describe my conception of my spouse's career ambitions to someone else and that my spouse overheard, judged my description inaccurate, and then corrected me. If my error was only misrepresenting the company she wants to work for or the city she wants to live in, I wouldn't have misunderstood her; I would have misremembered a detail. But if my error was the type of work she wanted to do, then her correction would reveal a misunderstanding. What makes the difference?

Contemporary epistemologists generally agree that understanding does not require every belief a person holds about the object of understanding to be true. They also agree that there is still an accuracy requirement.¹⁴⁵ Theorists dispute the specification of this requirement. One view is that understanding is restricted to specific features of objects about which one is well researched, so the beliefs that must be true are only the ones relevant to the specific area of the field one

¹⁴⁵ Even Zagzebski (2001), who is often described as rejecting factivity altogether, still holds that understanding must make "cognitive contact with reality." Her rejection of factivity is, I think, a rejection of the binary form of accuracy that norms belief.

understands.¹⁴⁶ This kind of view usually centers on the understanding of experts rather than nonexperts, so it might disallow nonexpert understanding. For example, supposing I am incorrect that $mv^2/2$ is part of the standard form of a Hamiltonian in mechanics, I would not count as understanding Hamiltonians. Yet it seems I still at least partly understand Hamiltonians if I have gotten their basic nature correct. False beliefs about the purpose of a Hamiltonian or even that it is a mathematical tool in mechanics, on the other hand, suggest that I do not even partly understand them.

Another view might allow cases of nonexpert understanding, but with the provision that a certain class of relevant beliefs must be true. On this view, some beliefs are *central* to understanding an object and others are not.¹⁴⁷ My beliefs about the nature and form of the Hamiltonian, for example, would count as central. This view is underspecified: how are we to distinguish the threshold between central and non-central features? While it seems natural to say that my representations of the nature of an object and the explanatory framework must be accurate for me to understand the object, problems still arise with partial understanding.¹⁴⁸ It is not clear how detailed the framework needs to be for one to successfully understand. It might seem that only the features that are most essential to the object's nature must be correctly placed in the framework to meet the accuracy condition. Yet, distinguishing more and less essential features only reintroduces a concept of centrality without demarcating the threshold needed. Suppose that threshold is clear,

¹⁴⁶ Hazlett (2018) and Khalifa (2020) both endorse such a restricted, strong view about factivity. Hazlett (2018) argues that only one's beliefs about the aspect of the object one claims to understand must be true. Khalifa (2020) argues that one must correctly represent the answers to relevant questions about the object of understanding. Irrelevant questions, however, need not have their answers correctly represented for an individual to still have understanding.

¹⁴⁷ Kvanvig (2003), Wilkenfeld (2015), Carter and Gordon (2016), and Bengson (2018) all endorse this view. Moreover, Camp (2003, 2006, 2019b) considers centrality to be the most significant structural dimension for cognitive connection among features in a conception, though she does not commit to epistemic claims about centrality relations.

¹⁴⁸ This view is distinct from Hills (2016) requirement that in understanding why p , the reason I believe p must be the actual reason for p . However, as Gardiner (2020) observes, this approach is ambiguous between explanatory relations and epistemic support (or basing) relations.

though. Even then, surely an explanatory framework need not contain *all* of the most essential features before one can understanding through it. It is difficult to say just how accurate a representation must be when partial understanding is permitted to count as success. These considerations reveal that a fully specified, formal account of the accuracy conditions for successful understanding would be very complex, difficult to state, and even more difficult to defend.

There is something artificial about attempting to specify the accuracy condition by separating beliefs or features into the central and noncentral. Part of the problem is that centrality is a continuous scale rather than a binary. But a more significant problem is that the accuracy of a conception often depends on what the individual is attempting to get right—that is, whether her conception is apposite.¹⁴⁹ The literal falsehood of the ideal gas law as a representation of actual particles is only a problem if my conception of gases as following the law represents the law as correctly describing the individual molecules that make up the gas. The accuracy of this law lies in its power to approximate higher order properties of gases through a simplified model of particle interactions, not in its matching reality in every detail.¹⁵⁰ If one is concerned with the temperature, pressure, and volume of most gases under normal conditions on Earth, the law is very accurate. Yet it describes molecules as dimensionless, massless, and perfectly elastic in their interactions, which seems to be a wholly inadequate explanatory framework for molecules. Conceptions are our way of recording a particular perspective on an object, one at which our interests and the nature of the

¹⁴⁹ This is Elgin's (2004, 2007, 2017b) view.

¹⁵⁰ Conversely, de-idealizations, which function to complexify a readily intelligible idealized system so that it can better answer to the observed data, offer greater accuracy at the price of reduced intelligibility. Here, we run into the divergence between claims about what an individual understands and claims about what “we” (either as a society or as a scientific community) understand.

object intersect.¹⁵¹ The minimal accuracy of a conception necessary for success, then, is relative to the epistemic aims of the individual who constructs it.¹⁵²

Finally, the explanatory purposes to which we put conceptions need not be reflected upon to exist. We often seek explanations without realizing it, and these sought explanations will generally serve our goals, whatever those might be. The accuracy condition for successful understanding, then, is relativized to our explanatory purposes, but these purposes need not be known to us.

Given the above considerations, a revised accuracy condition might look like this:

Accuracy Condition – The explanatory framework F by which S organizes C to represent O must be sufficiently accurate for S 's explanatory purpose in using C to represent O , and F must also be sufficiently precise for S 's explanatory purpose in using C to represent O .

Frankly, this condition is not helpful, but we will see that this is not a problem for my view.

2.3.c. Pragmatic goals versus objective goals

To recapitulate: understanding seems to drive at different and competing aims, and minimal accuracy seems very easy to come by, yet whether one's conception is accurate enough to count as understanding seems to be contextually sensitive. The part of a conception that must be accurate on pain of misunderstanding is the *central* part; that is, the major, high-level features of the explanatory framework, which flow directly from the nature and individual attributes to the object. However, because success is contextually sensitive, it is not possible to state a single threshold of accuracy. Even worse, it might not even be possible to reduce the many distinct dimensions along which accuracy is assessable to a single dimension with a variable threshold.

¹⁵¹ See sections 1.1.h, 4.2 and 4.3.

¹⁵² See Elgin (2017b) for an extended defense of this claim.

Fortunately, identifying a universal threshold for sufficient accuracy is not necessary to my project. The features that are most important for my purpose are: (a) the most important part of the conception to represent accurately (however measured, whatever the threshold), (b) the correspondences between variations in accuracy and variations in both commitment and warrant, and (c) the goals that determine what counts as success. I have discussed (a) above. I will discuss (b) in section 2.4.d. I turn to (c) now.

As Catherine Elgin emphasizes, success is always relative to both our goals and our progress.¹⁵³ Suppose you want to understand why a friend never locks her car doors. She might say, “there’s nothing valuable in my car, including the car,” and her answer may satisfy you. In this case, your goal is not very penetrating, nor is it difficult to reach. Your understanding is successful because you’ve reached your goal. Every static instance of understanding can be thought of as part of an understanding project. But because time is limited, many understanding projects will have modest, achievable goals. An understanding project that sets mastery as the goal, however, is much longer. In the case of especially complex subjects, it is lifelong.

There are two ways to interpret my revised (unhelpful) success condition. These interpretations affect what counts as misunderstanding. One is pragmatic: misunderstanding is merely a matter of having the wrong conception for the job. However, a physicist would say that I do not *really* understand Hamiltonians, even if I am not attempting to understand Hamiltonians as a scientist does. In speaking to my friends casually, I do not have the wrong conception for the job. I understand well enough to communicate with them what I had in mind. Yet I still fail in understanding by the physicist’s lights. The physicist is assessing the accuracy of my understanding

¹⁵³ Elgin (2017b), p. 91-121.

by a more objective standard: the expert's mastery. This standard is not sensitive to the individual's goals.

When we assess accuracy by the standard of mastery, degrees of understanding correspond to stages along the way to mastery. That we do not always aim for mastery does not change the functional orientation of the psychological capacity for theoretical understanding. Understanding is normed by its limit case: full understanding. So, each success that does not approximate the limit case is only a partial success. Expert understanding is better than casual understanding. Casual understanding is better than cursory understanding. When I aim for casual understanding, I succeed, though I still do not have expert understanding. Misunderstanding, then, is a matter of thinking one's understanding is better or more accurate than it is. And not 'really' understanding (if it is not mere misunderstanding) is a matter of someone measuring my understanding according to the limit case, even if the limit case is not my goal.

In describing the accuracy required for successful understanding, we need two different treatments of success: I can be successful in approximating mastery, or I can be successful in achieving some milestone along the way to mastery. In the case of success as mastery, my explanatory framework must be very accurate, fairly precise (depending on how complex the object is) and it might also need to capture all essential features of the object of my understanding. However, in the case of success as a milestone, my explanatory framework needs only to have improved over its last iteration. I will not attempt to embed these considerations into the above accuracy condition, because that would make it obnoxiously complex. Instead, I emphasize that the condition above is ambiguous, not just in the meanings of 'sufficiently accurate' and 'sufficiently precise,' but also 'S's explanatory purpose.'

2.4. Warrant

An epistemic pathway must be a reliable means to an epistemic achievement. That is, it must succeed at least more often than not—probably significantly more often. Epistemic pathways to knowledge require our being warranted in our beliefs, because warrant ensures reliability of true belief formation.¹⁵⁴ Warrant is an internal condition that links one’s doxastic commitment to the external condition of accuracy, though that link is typically imperfect. If accuracy is an evaluative dimension for theoretical understanding, as I maintain it is, then an epistemic pathway to understanding must at least ensure reliability of accurate conception formation. A warrant condition for commitment to a conception, then, seems to be in order.

2.4.a. *Reflective equilibrium*

In the case of propositional knowledge, warrant is usually treated as a threshold phenomenon. That is, one’s warrant is sufficient for knowledge or it is not. This treatment is sensible, since belief and knowledge are binary. Such a treatment won’t do for theoretical understanding, however.

How does warrant function in a conception? In the first place, many of the object-level features in the conception have independent warrant and are initially tenable before any theorizing.¹⁵⁵ Some of those features are warranted enough to count as knowledge. At the least sophisticated level, we passively form doxastic commitments that are warranted by perception and/or testimony, and we passively cluster those commitments into our conceptions.¹⁵⁶ These

¹⁵⁴ Here, I am using ‘warrant’ in its common, broad sense. I do not intend the technical definition of ‘warrant,’ on which it is whatever must be added to true belief to get knowledge.

¹⁵⁵ Elgin (1996), p. 102.

¹⁵⁶ See sections 1.1.i and 1.1.k.

initially tenable commitments will tend to remain in place unless their tenability is somehow threatened.¹⁵⁷

Numerically distinct conceptions, however, have distinct explanatory frameworks.¹⁵⁸ Features that explain other features often do not gain warrant independently from their function as explanations. Rather, their explanatory power warrants their acceptance. Roughly, an explanation will account for the object's features in terms of the object's nature, its history, or both.¹⁵⁹ These explanatory relations unify the many disparate features in our conceptions into a whole with a nature and (often) a history. Metaphysically, an object's history can change its nature, as in the evolution of species. Representationally, we often adjust our representation of an object's nature and history in light of what that nature and history can explain. For example, an individual might tell a just-so story that explains her mother's sudden, unpredictable temper and tendency to get absorbed into cult-like communities, despite having little access to her mother's nature and little information about her history. In such a story, known features of the mother both explain and are explained by the individual's interlocking representations of the causal history of her personality and the in-born features of that personality.

While warranted propositions about an object stabilize a conception of that object, they can still be dislodged by the explanatory structure in which they are suspended.¹⁶⁰ This happens when an explanatory framework offers an explanation so compelling that it defeats the warrant I had for some of the features that were part of my conception, but which conflict with the explanation. An initially tenable epistemic commitment can lose its tenability by failing to fit into a tenable

¹⁵⁷ Elgin (1996), pp. 111-119.

¹⁵⁸ See section 1.2.

¹⁵⁹ See section 1.3.

¹⁶⁰ Elgin (1996), pp. 102-109.

explanatory framework.¹⁶¹ For example, it seemed plausible and even likely to phlogiston theorists that flammable objects shared a common material component that would explain their flammability, but which would escape into the air when the object had finished burning. However, when experiments showed that some materials gain mass after burning, the proposition that all flammable objects share a common material component began to lose tenability.¹⁶² Or, consider a non-scientific context: suppose one friend tells you that another friend is depressed and isolated. But when you speak to the second friend, she seems to find her life and family meaningful. Testimony from the first friend warranted your thinking the second friend was depressed, but this claim falters in the face of your experience with her. Your favored explanation defeats a claim for which you had some warrant: the first friend must have been mistaken. But if the second friend later commits herself to a psychiatric ward, then your favored explanation will, in turn, defeat the warrant you had for thinking she was not depressed: she must have been masking.

Warrant for a conception is warrant for the explanatory framework, however partial the framework might be.¹⁶³ Broadly, explanatory power is a function of an explanation's internal coherence, coalescence with background knowledge, breadth of explanation for relevant observed features, predictive power, and need for ad hoc claims.¹⁶⁴ Simply put: I am warranted in my commitment to a representation of an object's nature to the degree that it unifies, organizes and explains the other features of my conception of the object and to the degree that it enables explanatory relations in underdeveloped parts of my conception. Arriving at this form of warrant requires an individual to engage in a fallible but self-correcting process of adjusting the explanatory framework, the object-level features in the conception, and the method by which these two are

¹⁶¹ Elgin (1996), p.108.

¹⁶² The common component, it turns out, is in the air, not in the flammable object.

¹⁶³ See section 1.2.

¹⁶⁴ See Kuhn (1977), Laudan (2004), and Douglas (2013) for taxonomies of these standards.

brought into coherence with one another. That is, increasing warrant for an explanatory framework requires advancing toward wide reflective equilibrium through alternating iterations of explanation-building and reevaluation of the tenability of one's various epistemic commitments.¹⁶⁵

2.4.b. Coherence

Coherence is a central feature of reflective equilibrium., though reflective equilibrium is not a coherence theory of warrant.¹⁶⁶ As a rule, increasing understanding moves in the direction of increasing coherence.¹⁶⁷ There are competing accounts of what coherence is, but most accounts involve three features: (a) consistency, both within the conception and across conceptions, (b) internal coalescence among the parts of the conception, and (c) external coalescence across conceptions.¹⁶⁸ I will briefly discuss each of these elements of coherence.

Many theorists treat consistency as a rigid, formal requirement, without which coherence is impossible.¹⁶⁹ In the limit-case of full understanding, consistency is probably a necessary feature, but some coherence is possible without perfect consistency. Typically, inconsistencies in an explanatory framework exist because the framework itself is fragmented between at least two overlapping but mutually inconsistent explanatory modules and so lacking a satisfactory unifying level of explanation.¹⁷⁰

¹⁶⁵ See Elgin (1996), pp. 117-119 and Rawls (1999). See also section 3.5.

¹⁶⁶ Reflective equilibrium must begin with initially tenable (that is, independently warranted) commitments. See Elgin (1996), p. 107.

¹⁶⁷ I will develop this thought further in sections 3.6. and 3.7.

¹⁶⁸ See, for example, Thagard (1989), Douglas (2013), Baumberger and Brun (2017), Bengson (2018), and Baumberger (2019).

¹⁶⁹ For example, Laudan (2004), Douglas (2013), and Baumberger and Brun (2017).

¹⁷⁰ For example, the social and medical models of disability tend to be inconsistent with one another. Yet, these models are still important structural accounts that help explain what disability is. See Wendell (1996), pp. 35-56. Similarly, physics admits inconsistencies between general relativity and quantum mechanics. Yet, no one doubts that these count as paradigmatic instances of successful theories.

Internal coalescence is distinct from internal consistency. A string of unrelated propositions can be consistent with one another, but that consistency does not make them a single theory. Rather, they must *belong together*, so to speak. Full internal coalescence of a conception requires a hierarchical explanatory framework under which all the significant features and relations of the object are explained by the object's nature. It is as it is because of what it is. At the far end of ideal internal coalescence, the object-level features might be inferable from the explanatory framework itself (together with the object's history).¹⁷¹ This, however, is almost never the reality. The unifying explanatory power of internal coalescence is what makes completeness, wide scope, simplicity, and fruitfulness helpful values for adjudicating between competing explanatory frameworks.¹⁷²

The concept of external coalescence gets at the compatibility between the explanatory framework for the conception in question, and the explanatory frameworks for other, relevant conceptions. External coalescence, however, is not in principle different from internal coalescence. It is merely the internal coalescence of a higher-level explanatory framework, one which includes both the conception in question and the other conceptions relevant to it. For example, a conception of moral obligation should coalesce with a conception of moral status, but both are subordinate units of conception of morality in general.

2.4.c. The epistemic support structure

The foregoing discussion enables a more detailed distinction between the explanatory structure of a conception and the epistemic support structure of a conception.¹⁷³ The epistemic support structure is the complex arrangement of basing relations that support the explanatory

¹⁷¹ As Baumberger and Brun (2017) have it.

¹⁷² See Kuhn (1977) and Douglas (2013), p. 800.

¹⁷³ I introduced this distinction in section 1.1.d.

framework. The support structure cannot be reduced to the independent warrant for each individual element of the explanatory framework because explanatory relations often derive their epistemic support from their explanatory power. But this explanatory power is a function of the relation's position within the explanatory framework. The base-level of epistemic support is constituted by the independent warrant of features, warrant that usually derives from observation, trustworthy testimony, or apriori reasoning.¹⁷⁴ This foundation is fairly stable, but not rigidly fixed, since initially tenable claims in the base-level might later be jettisoned in virtue of their lack of either consistency or coalescence with a well-supported explanatory framework.

Features that are not epistemically supported at the base-level draw their support from their function as part of a well-supported explanatory framework. Thus, purely theoretical features of a conception are often tenable only because they explain other features that have base-level support. I will call this form of support *secondary-level support*. If the framework would require extensive restructuring were the feature to be removed, then the feature is relatively central (possibly even essential) to the framework.¹⁷⁵ The more central a feature is to an explanatory framework the more *load-bearing* it is. By 'load-bearing,' I mean that a tenable explanatory structure depends on the accuracy of that feature or relation. Often highly load-bearing features at the most central positions derive most of their epistemic support from their explanatory power. An epistemic support structure is more stable the more stable the various lines of support from the base-level to the secondary-level are. These lines of support can be eroded by base-level anomalies to a central, explanatory feature.

¹⁷⁴ By apriori reasoning, I do not mean 'intuitions'. Rather, I mean careful reasoning about the features of a concept. Contra Bealer (1996) and following Brun (2014), I doubt there are many intuitions that are purely non-inferential in their origin. Rather, as Elgin (1996) and Rawls (1999) suggest, 'intuitions' are just considered judgments: views we have gradually taken on as we go about our lives unreflectively adjusting our various doxastic commitments in response to the information we take in. Because much of this adjustment happens outside the focus of attention, we do not notice the inferences we make to arrive at the conclusions we arrive at. The conclusions themselves simply become salient in our minds, as if there were mere intuitions. This view of intuitions is consistent with experiments done by Lassiter et al (2009).

¹⁷⁵ This principle comes from Camp (2019b).

Hence, the more central a feature is in the explanatory framework, the more its stability contributes to the total stability of the epistemic support structure. In other words, an epistemic support structure is *designed for* the explanatory structure. Whenever the explanatory structure changes, the epistemic support structure will need to be adjusted to handle the changes in epistemic load that are placed on the various parts of the explanatory structure.

When a feature or relation has as much epistemic support as it needs to warrant its position in the explanatory structure, it is *load-stable*. If it enjoys more epistemic support (whether base-level or secondary-level) than is needed for its position in the explanatory structure, it is *load-capable*. Conversely, if a feature or relation lacks the epistemic support it needs to warrant its position in the explanatory structure, it is *load-unstable*. Warrant for an explanatory framework, then, tracks at least two dimensions: relative centrality of its features and load-stability of its features. The more central the feature, the more important it is that the feature is load-stable.

This discussion shows that the iterative project of working toward reflective equilibrium usually involves identifying relatively load-unstable features that are relatively central. Bringing the framework closer to reflective equilibrium requires either jettisoning (and replacing) these load-unstable features, adjusting the explanatory relations at the secondary-level to make them more load-stable, or shifting the load on those features so that they are less central and thus less load-bearing.

2.4.d. Connections between warrant, assent, and accuracy

Recall the distinction between a milestone goal and a mastery goal. A pathway to understanding is primarily normed by its leading to mastery, even if one never arrives at mastery. Yet we still achieve understanding successes. These successes, then, are the transformations in our explanatory frameworks that serve as milestones along the way to mastery. Are different degrees of

warrant required for milestone goals than for mastery goals? In one sense, certainly. Approximating mastery in one's understanding of an object requires approximating wide reflective equilibrium. This is a tall order. One cannot expect to achieve this level of warrant in meeting an early milestone.

Yet, in another sense, the warrant required is the same for both milestones and mastery: milestones lie on the path toward mastery. This point is obvious, but it is more consequential than it seems. Consider an individual who is making a sincere effort to improve her understanding of ecosystems. At the earliest stages, her conception of ecosystems is organized around the basic features she might have picked up in her general education. Her explanatory framework will be coarse and inaccurate in many ways, and so will the features that framework organizes. But her basic representation of an ecosystem's nature might be accurate: ecosystems are deeply interdependent communities of living organisms. As she commits to her course of study, she might come to appreciate the importance of microorganisms in the soil, weather patterns, and nutrient densities. With each discovery, her conception is reshaped through refinements to her explanatory framework for an ecosystem. As her study continues, she moves from the bigger picture to studies of the finer-grained features of ecosystems, fleshing out her conception by developing her representation of the natures of the common parts of ecosystems. At various points along the way, she will probably discover that she had been mistaken about certain aspects, and some of these mistakes might be surprisingly fundamental. But her mistaken representation of the nature of ecosystems only becomes apparent after her understanding has developed despite those mistakes. The most important commitment for her continued progress toward mastery is that she continually adjusts her explanatory framework and its epistemic support structure in response to changes in information and stability of epistemic loads.

Movement toward mastery characteristically requires that we develop and maintain inaccurate conceptions of the objects we are attempting to understand, both in the object-level features to be organized and explained, and in the explanatory framework that organizes and explains these features. Our frameworks need only be warranted insofar as they aid us in developing explanatory relations between the parts of our conceptions of objects. That is, a pathway for understanding is normed by accuracy insofar as that pathway reliably leads to accurate understanding. Understanding, however, is an ongoing affair that is oriented toward a rarely achieved mastery.

The pathway one uses to reach understanding is not sensitive to one's particular interests. I might decide that I have no desire to develop my understanding of Donald Trump any more than I already have. Yet the conception I do have (hopefully) followed the normal course of understanding. My interests only determine *when* I stop moving forward along that pathway and which parts of my conception I choose to develop. If my effort is not stymied by interests other than an accurate representation, then any inaccuracies in my conception of Trump are necessary for the development of explanatory relations within my representation of his nature. Should I attempt to understand him better, I would surely discover and correct inaccuracies along the way. The accuracy necessary for a conception is only whatever accuracy is necessary to reach the next milestone.

There is a corresponding point about warrant. An epistemic pathway functions to reliably produce an epistemic success. Understanding pathways, however, are often unending. So, the epistemic success a pathway functions to achieve lies on the unreachable horizon. The key to remaining on the pathway, then, is to be able to reliably move from milestone to milestone in the direction of ultimate success, though one never achieves that success. The milestones themselves become the achievable successes. Yet those milestones can only be successes if they advance us

toward the unreachable goal at the horizon. Just as the accuracy necessary for success is only the accuracy required for the next milestone, so the warrant necessary for success is only the warrant required for the next milestone.

How much explanatory power does an explanatory framework need to advance one to the next milestone on the path to mastery? More than it needed for the previous one. Our initial conceptions are shot through with errors and incoherencies. We begin with only a handful of explanatory relations, some of which are mistaken, others of which coalesce poorly with each other. What at first seems like a warranted explanatory relation is later displaced when one has one's bearings a little better. The epistemic instability of the starting point reveals itself gradually.

Keeping to an epistemic pathway for understanding is not exactly a matter of having the right kind of warrant or achieving the right kind of accuracy in one's conception. Rather, it is a matter of maintaining the right kind of relationship between one's assent and one's warrant, so that one can reliably move toward an ever-increasing accuracy that does not reveal itself except in retrospect. This entails that, in a time-slice of successful understanding, assent is relativized to warrant. Assent only needs to be as a default. As the conception develops, assent increases, but we need a corresponding increase of warrant or else we run afoul of the path. I will unpack this thought.

I've said that the minimal assent necessary for understanding is that one defaults to a particular explanatory framework.¹⁷⁶ This minimal condition enables an individual to have theoretical understanding without instantiating any reflection about the conception. But as an individual's conception develops and transforms, her assent involuntarily increases: she becomes more confident in the conception. In general, the more an individual attempts to work out the details of an object's

¹⁷⁶ See section 2.2.c.

nature, the more explanatory relations form in her mind. As explanatory relations interconnect and unify, she will begin to feel she grasps the object more and more. In response to a felt increase of her grasp, she will commit more strongly to that representation. This sequence can be interrupted, of course. She might never reflect on her framework; she might attempt to do so but fail to develop more explanatory relations; or she might form explanatory relations but still feel she does not grasp very well. However, these interruptions are instances in which her assent will not increase in response to her increased understanding. This possibility is why I think there is no requirement that one's assent should increase as one's conception develops; only that warrant increases as assent increases. To put this requirement in actionable terms: one must be honest with oneself about the actual state of one's warrant, or else risk overcommitting. Note, before I move on from this point, that what it means for one's warrant to increase with one's assent or for it to be commensurate with assent is a complicated and important question that I do not have the space to tackle.

Warrant, recall, ensures the reliable accuracy of the results of an epistemic pathway. Since the result of the pathway is an aspirational accuracy goal (mastery), the accuracy required of a milestone along the way is subordinated to the aspirational goal. The question is: is my current explanatory framework accurate enough for me to deepen my understanding further? Since errors—even egregious errors—are allowable and even beneficial along the way, the framework only needs to be as accurate as my warrant suggests, for my warrant will determine my degree of confidence. Warrant is, after all, how we assess accuracy. Hence, the requirements for degree of accuracy and warrant, as conditions for successful theoretical understanding, supervene on degree of assent. The stronger my opinion, the better my warrant needs to be.

Here is a revised warrant condition:

Warrant – S 's warrant for F must be proportional to S 's doxastic confidence in F , and S 's current warrant for F must be a plausible stage in a potential project of achieving reflective equilibrium.

One might think the above account makes successful understanding too easy to come by. If I keep my confidence very low, I can help myself to any explanatory framework I like without the need for much in the way of either accuracy or warrant. Moreover, it seems to write misunderstanding completely out of the picture. However, I think these two worries are misplaced.

Consider a case in which assent never changes much, whether because I have intentionally stifled it or not.¹⁷⁷ Suppose my assent to an explanatory framework remains low, and reflectively so. I toy with various ideas about what makes the object what it is, defaulting now to one and later to another. At no point, though, am I very confident that I have it right. In this case, I never attribute much understanding to myself. Recall from the beginning of this chapter that understanding increases as accuracy and grasping increase (these are the basic norms of theoretical understanding). So, since my conception probably does not develop much in the direction of accuracy, I probably do not increase my understanding much. At no point do I either understand very deeply or believe I understand very deeply: my understanding is extremely partial, and reflectively so. I do not think this is a problem. The limitation in assent imposes a limitation on understanding.

What about misunderstanding? In the above case, despite the limitations of my understanding and despite the inaccuracy of my conception, I do not seem to misunderstand. Misunderstanding, I think, is a matter of my assent outstripping my warrant in a way that produces a mismatch between assent and accuracy: I am overconfident in an inaccurate explanatory framework. And my overconfidence would have been apparent if I had been attentive to the relation between

¹⁷⁷ I will set aside whether intentional stifling of assent is even possible.

the explanatory framework and its epistemic support structure. Misunderstanding is distinct from not understanding very well. One who misunderstands probably also does not understand very well, but what makes the difference is that the one who misunderstands believes she understands better than she does. The difference, again, is that assent has outstripped warrant and hence, probably, accuracy.

2.5. Can resonance warrant?

Recall from section 1.4 that resonance, as I am precisifying the concept, is a psychological mechanism constituted by a state, a process, and a resulting content. A conception *resonates* when one's inaccessible mental content about an object coheres with the features of an occurrently considered explanatory framework for one's conception of that object. A conception is *mute* when inaccessible mental content fails to cohere with the explanatory framework. As section 2.4.b shows, coherence is a graded phenomenon, so an explanatory framework will typically be more or less resonant or more or less mute, often complexly so. That is, parts will resonate to differing degrees and parts will be mute to differing degrees. The distinction between resonance and muteness is a matter of how appealing or tolerable the form of coherence or incoherence is. The *passive resonance process* sub-personally assesses coherence between inaccessible mental content and the occurrently considered explanatory framework. The passive resonance process then produces *feelings of resonance and muteness* about the occurrently considered explanatory framework. These feelings will be relatively intense, depending on how much of a change in resonance or muteness the occurrently considered explanatory framework offers from the previous iteration of the conception.

I have spent the bulk of this chapter accounting for the accuracy norm on understanding in terms of its relationship to assent and warrant. I have concluded that the way we secure an increase

in the accuracy of a conception is through an increase in our warrant for the conception's explanatory framework.¹⁷⁸ The broad question of the dissertation, recall, is what the epistemic value of resonance is. If resonance is to have value for meeting the accuracy condition on understanding, then feelings of resonance and muteness must count as a form of warrant. Plausibly, they do. But increases in warrant enable (or perhaps induce) increases in assent. So, what changes in assent can resonance warrant? And what changes does it in fact produce?

Frequently, an ineffable feeling of promise attracts us to a transformed conception or a feeling that something went wrong averts us from our current explanatory framework. Yet, in these cases, there is often additional warrant attending the feeling. For example, suppose I recall moments when a friend was inconsiderate which suddenly make salient a general feeling of uneasiness about either their moral character or their commitment to our friendship. The feeling might have been there the whole time, but it became motivating in changing my default conception of the friend only in light of clear, accessible evidence favoring the change. The case I am interested in is when the only warrant I have for a change to my explanatory framework is that it resonates. In such a case, additional warrant favoring the new framework might only come after the transformation is under way. In this section, I will first carve out the kind of warrant resonance provides. Then I will discuss the defeaters that can inhibit warrant from these feelings. Finally, I will turn to the changes in assent that are warranted in the absence of these defeaters.

2.5.a. *Resonance as an entitlement*

The assent change supported by a warrant depends on the type of warrant: *pro tanto* or all-things-considered. What makes this difference is whether the warrant is an *entitlement* or a *justification*

¹⁷⁸ Note that this often involves both a change in structure and an increase in base-level evidence.

(respectively).¹⁷⁹ An entitlement needs no reflection or even metacognition before we can appropriately depend on it for reliable representation formation. An entitlement pathway is an epistemic process whose results we are warranted in accepting by default, provided the capacity is being used within its normal parameters. Hence, any reflective skepticism about epistemic entitlements bears the burden of argument. For example, we are entitled to our perceptions provided they are within the normal parameters of our sensory organs, such as not being too close or too far from an object to see it clearly. These features of entitlement, however, also make it a merely *pro tanto* form of warrant and thus susceptible to defeat. Some classic philosophical questions, such as the existence of other minds, might even have entitlement pathways and so not require any arguments in their defense.¹⁸⁰

By contrast, justification is self-aware engagement with and balancing of the reasons for and against a view. Here, I take a reason to be a claim that figures in the individual's mind as part of an inference supporting or undermining the view. In a justification process, I must reflectively consider the reasons available to me and weigh them against one another to come to a holistic inference about which view those reasons lend most support to. Justification is paradigmatically an all-things-considered form of warrant. While a justification process might fail to account for all the evidence, it still issues an all-things-considered judgment. Failing to consider all available evidence produces an error rather than a *pro tanto* judgment.

Resonance can only justify in the sense that its attendant feelings figure as a reason among other reasons. But the process itself does not justify. That is, my occurrent feeling of resonance or muteness about an explanatory framework does not justify a judgment that the explanatory framework is (approximately) accurate or inaccurate. This is because the process producing the

¹⁷⁹ This distinction comes from Burge (2003).

¹⁸⁰ See Burge (2000).

feeling is inaccessible and so cannot be subjected to reflective evaluation. This would be so even if the resonance process in fact operates by forming inferences to the best explanation. Justification requires access to the inference by which assent to the conception is justified.

The feelings of resonance and muteness, then, can only entitle. But what exactly might it entitle me to? On my account of resonance, feelings of resonance and muteness signal the existence of a body of inaccessible evidence which coheres in some otherwise unrecognized way with an explanatory framework under occurrent consideration. It seems that, through resonance, we intuit the explanatory power of an explanatory framework before we occurrently cognize it.¹⁸¹ If these inaccessible contents of my mind would in fact afford me additional and compelling reasons to favor the explanatory framework and the resonance process is also reliably accurate, then feelings of resonance entitle me to *pro tanto* confidence in that framework.¹⁸² If this is right, then resonance entitles me to confidence in the explanatory framework, confidence that is additional to any other evidence that might be accessible to me at the moment. That is, resonance, if it functions as I have described and things go well, seems to entitle increased assent to an explanatory framework.

2.5.b. Sources of defeat

A resonance entitlement can be defeated in two ways. I will call them *internal* and *external* defeat. Internal defeat is when an individual discovers that the mechanism has gone wrong. This can happen in at least two ways. The first is when the inaccessible content that produces resonance is, itself, inaccurate. This pitfall is common. I have probably unconsciously adopted false beliefs implicit in my cultural environment, such as that men should be fearless. As a child I have probably trusted testimony from liars and charlatans, and have still never corrected all the errors. Traumatic

¹⁸¹ See section 1.5.a.

¹⁸² The requirement for reliable accuracy is a major proviso. I will return to it in chapter 5.

experiences have probably also left me with overcompensating or defensive beliefs about myself, others, and the features of the world. If I start to suspect that any of these are causing the resonance, then the resonance can be defeated as evidence. I will return to this form of defeat in section 5.7.

The second form of internal defeat is when other feelings are confused for resonance. For example, an individual might get excited about discovering a cherry-picked study that supports her pet theory. In this case, the feeling is primarily about the convenience of the explanatory framework to her motivations. It does not signal mere resonance between inaccessible content and a considered framework (though it might have some resonance). Rather, the feeling signals a motivated defense of her pet theory against a threat. She is inoculating herself against troublesome counterevidence rather than opening herself to as much evidence as she can. I will return to this form of defeat in section 5.5.

External defeat is when an individual forms an all-things-considered judgment that contravenes the pro tanto warrant resonance offered. I might simply learn that an explanatory framework that resonates can't be right. Perhaps there is a devastating internal inconsistency. Perhaps it implies manifest falsehoods. Perhaps it doesn't do the explanatory work it was supposed to do. In any of these cases, the evidence against the explanatory framework can undermine the support lent by its resonance. And this can happen even if the inaccessible content the resonance mechanism draws upon is perfectly accurate. Often, external defeat occurs when one adds new information to the conception, which forces a reckoning with a resonating explanatory framework. And, just as often, this process leads to a loss of resonance. What had previously seemed correct now seems incorrect.

Resonance is just one form of evidence that must be weighed against other forms. When a defeater is discovered, we should then actively investigate the source of our feelings of resonance

and muteness. An internal defeater should lead me to question the accuracy of the inaccessible content resonance was drawing upon. An external defeater should lead me to question the sufficiency of that content for warranting the explanatory framework. In the first case, the evidence is faulty; in the second case, the evidence is inadequate. More broadly, when resonance is defeated, whether internally or externally, it is an opportunity to examine the feelings of resonance or muteness in the same way as I might examine an emotion. It would be better for me as an understander if I could minimize misfires of resonance in the future.

2.5.c. What resonance can warrant

When the central features of an explanatory framework resonate, this increases the *pro tanto* warrant for the explanatory framework as a whole. The way this happens is by increasing the anticipated coherence potential of the explanatory framework. When an entire explanatory framework resonates, it resonates as a good explanatory structure for the conception in question. This increases one's confidence in the entire explanatory framework primarily by augmenting one's assignment of the framework's likely fruitfulness.¹⁸³ I will unpack this claim.

An explanatory framework remains numerically identical to itself as long as it remains unchanged at the highest explanatory level: the level of essential features organized to express the object's basic nature.¹⁸⁴ Changes at explanatory levels beneath the essence-level will not constitute a transformation of the framework, but a development.¹⁸⁵ For each numerically distinct explanatory framework, there is a limit to the possibility of its coherence with the base-level features it organizes. Supposing we could express coherence along a single dimension (which I doubt), we might say that

¹⁸³ In section 1.5.a, I argued that part of the nature of resonance is to signify anticipated potential coherence (or anticipated fruitfulness) of an explanatory framework.

¹⁸⁴ See section 1.1.e.

¹⁸⁵ This is a simplification. I will develop further complexities in section 4.5.

each framework has a coherence potential from 0 to 1. At 0, the framework is wholly inadequate to its conception and will always be unintelligible no matter how well developed. At 1, the framework is a perfect fit for all possible evidence about the object of the conception, but that fit is not manifest until the framework is fully developed at the lower levels. As a rule, frameworks will have a coherence potential between these extremes.

In the process of working toward wide reflective equilibrium, we develop and revise explanatory frameworks in response to changes in evidence and coherence. These changes mutually affect one another within a single epistemic support structure.¹⁸⁶ Working toward wide reflective equilibrium, then, involves the following steps: First, one chooses an explanatory framework whose coherence potential seems higher than competing frameworks. Next, one develops the framework to come closer to its potential coherence. This development will involve alternating, iterative changes to the framework and its epistemic support structure to maximize explanatory power, coherence and stability. Then, once the framework is epistemically stable, one reviews the whole and compares it to alternatives once again. The shortcomings of the explanatory framework are more apparent now that it is developed.¹⁸⁷ One can now make an educated judgment about whether it is wise to change the explanatory framework at the highest level. If one does so, the reason for the choice is that the change to the explanatory framework seems to offer a higher coherence potential than the previous. The process then begins anew. Resonance aids this process by offering a quick method for assessing the potential coherence of an explanatory framework that is not yet developed. For without such a method, we would favor the familiar over the unfamiliar framework, primarily because the coherence potential of the unfamiliar framework is not known and so may not be worth the effort of discovering it.

¹⁸⁶ See section 2.4.c.

¹⁸⁷ Or, as Kuhn (1996) has it, the framework admits inexplicable anomalies.

Sometimes, however, what resonates is not the central features of an explanatory framework, but some lower-level feature or explanatory cluster within that framework. In such a case, the above process is replicated at a lower level, remaining within a single, numerically identical explanatory framework. The warrant that resonance adds to such a feature or cluster of features increases one's doxastic confidence in that feature, thus also increasing the epistemic load-capacity of the feature. There are two possible consequences to this increase of load-capacity. If the feature would be load-unstable without resonance, then resonance increases its load-stability, which increases the stability of the entire explanatory framework. If, on the other hand, the feature would be load-stable within the epistemic support system even without resonance, then resonance frees up the feature to do even more explanatory work within the system as a whole. It can bear more explanatory weight. This invites a research program into the explanatory potential of the resonating feature or cluster.¹⁸⁸

Resonance can apparently motivate a reconsideration one's explanatory framework possibly in favor of another. And it can also increase the stability of one's current framework. But the most significant doxastic change for an understanding project is to switch defaults, since this switch redirects all new information to the new explanatory framework.¹⁸⁹ Can resonance warrant a default switch? As I've argued, the initial default is the easiest to set, since it replaces the absence of an explanatory framework. After this initial default is set, any default switch has a significantly higher required threshold of confidence.¹⁹⁰ However, a prospective explanatory framework has a higher threshold of confidence for becoming the new default than a current framework has for remaining the default.¹⁹¹ Because my current default explanatory framework is already familiar to me and readily available for deployment, switching my default to another explanatory framework requires

¹⁸⁸ I will return to the motivating aspects of resonance in chapter 4.

¹⁸⁹ See section 2.2.d.

¹⁹⁰ See section 2.2.c.

¹⁹¹ This is analogous to the higher friction coefficient for a static object than a moving object.

more than just slightly increased confidence in the accuracy of the prospective explanatory framework.¹⁹² A default switch to a prospective explanatory framework cannot be motivated only by its explanatory power given the evidence on hand, since the individual probably does not grasp the prospective explanatory framework very well.¹⁹³ Rather, an individual must judge that the entire understanding project that will follow from a default switch is more likely to be fruitful than the current understanding project. She must base this judgment on the accessible evidence, the limitations of the current explanatory framework, her cursory understanding of the prospective explanatory framework, and her resonances and mutenesses.¹⁹⁴ From these ingredients, she must come to an all-things-considered judgment about likely fruitfulness of the prospective understanding project. If she concludes the new framework will be more fruitful, a default switch is more likely (though not inevitable).¹⁹⁵

Because resonance introduces an assessment of coherence between a prospective explanatory framework and inaccessible content, it is well-suited for contributing to an all-things-considered judgment of the fruitfulness of a prospective explanatory framework. This discussion suggests that feelings of resonance and muteness can warrant (a) reconsideration at the highest level of an explanatory framework, (b) changes in the epistemic support structure that can increase or decrease the stability of the explanatory framework, and (c) a default switch from one explanatory framework to another.

¹⁹² This suggests a mutual dependency between doxastic commitment and conative commitment.

¹⁹³ I will offer an account of grasping in chapter 3.

¹⁹⁴ The usual proportionality principles for the warrant-assent relationship tend to focus only on evidence. For example, “Doxastic attitude *D* toward proposition *p* is epistemically justified for *S* at *t* if and only if having *D* toward *p* fits the evidence *S* has at *t*.” This principle comes from Conee and Feldman (2004), p. 83.

¹⁹⁵ See chapters 3 and 4 for an extended discussion of complex the process by which an explanatory default switches.

2.6. Summary

Theoretical understanding has two basic, graded norms: accuracy and grasping. We assess partial gains in these norms by deciding whether a change to one's conception moves in the direction of the ideal of mastery. The kind of accuracy that matters most for understanding is accuracy at the level of essential features, but this accuracy is difficult to assess. We assess a conception's degree of accuracy by determining whether the epistemic support structure for its explanatory framework is stable once all the various inputs to the conception are considered. When a framework is more stable than competing alternatives, we are warranted in defaulting to that conception as a representation of the nature of the object. But our warrants frequently shift, so our conceptions change, which can lead to switching to another conception as default. Resonance serves as a *pro tanto* form of warrant that can increase or decrease the stability of a conception. It is also especially well-suited to motivating a default switch in virtue of the anticipated explanatory power of a not-yet-well-grasped explanatory framework. However, these warrants presume the absence of defeaters, such as resonance that springs from false inaccessible content, or non-epistemic feelings that an individual has confused for feelings of resonance and muteness.

Chapter 3. The Grasping Norm for Theoretical Understanding

In chapter 2, I began with the proposal that understanding has two primary dimensions of evaluation: accuracy and grasping. That is, the degree of one's understanding is proportional to the degree of accuracy of one's conception and the degree to which one grasps that conception. These two norms track the two primary relationships involved in representational capacities more generally: the representation's relation to reality and the individual's relation to her representation (respectively). In the previous chapter, I discussed the accuracy norm, focusing on maximal accuracy as an aspirational norm, rather than a particular threshold of accuracy which might norm attributions of understanding in particular contexts. I developed the features of understanding that are associated with accuracy: the degree of one's assent to an explanatory framework and the degree of one's warrant for that framework. Assent is typically responsive to warrant (unless something has gone wrong), and warrant is diagnostic of accuracy (other things equal).

In this chapter, I will focus on the other basic norm: grasping. Pre-theoretical intuitions about epistemic grasping suggest it is a truism that when an explanatory framework resonates it is thereby easier to grasp. In the previous chapter, my question was whether it was even possible for resonance to warrant assent. In this chapter, I take it as obviously true that resonance can make an explanatory framework (and hence a conception) easier to grasp. I hope to move beyond the obvious to locate just when and how resonance can or even must be a part of the process of grasping a conception.

Like warrant, assent, and accuracy, grasping also comes in degrees. But unlike these others, there are clear and principled thresholds between levels of grasping, though the space between those thresholds is continuous. In this chapter, I will examine the nature of epistemic grasping, identify the level of grasping necessary for the aspirational goal of theoretical understanding, and then focus on

two primary questions: (a) is resonance necessary for grasping? and (b) can resonance inhibit grasping? I will argue that resonance is indeed necessary for grasping, but that there are risks of it inhibiting grasping, though these risks are not as great as it might seem.

In section 1, I describe the dominant view of the grasping requirement for theoretical understanding. On this view, the condition is fulfilled when an individual can manipulate her conception to accommodate the potential contingencies the object might manifest. For example, grasping the Bernoulli principle (a formula used for engineering airplanes) requires that I can predict the different ways that contingencies in wind and airplane shape will affect movement. I argue that this account of grasping is satisfactory as a diagnostic criterion for grasping, but it is not an adequate account of the nature of grasping. A grasping condition should explain what enables an individual to manipulate her conceptions in this way.

In sections 2 through 5, I build the capacities necessary for achieving representation manipulability. I begin with the capacity for self-comprehension, or transparently understanding one's own thoughts. All other grasping capacities presuppose this one. In addition to self-comprehension, an individual must have the capacity for explanation. This capacity, however, has at least three different levels. The first level of explanatory grasping is the unreflective use of an explanation. Such use does enable some manipulability of one's conception, but not the level of competence epistemologists usually want from a grasping condition. The second level of explanatory grasping is the reflective comprehension of an explanatory framework. This level of grasping is also insufficient for a condition on theoretical understanding, since epistemologists are concerned with aspirational understanding, or understanding-as-mastery. Mere reflective, occurrent comprehension of an explanatory framework does not ensure that the framework will stick in one's mind. Moreover, the limits of human cognitive load require that mastery is achieved piecemeal, through iterative

cycles of comprehension and development. The third and highest level of grasping is the reflective encoding of an explanatory framework into long-term memory in a way that regulates ongoing occurrent thought about the object. This is typically achieved through both ongoing interest and disciplined effort.

In sections 6 and 7, I argue that resonance is more necessary for grasping the deeper one's grasp is. Since resonance is a form of coherence, any incoherencies in a conception will limit the individual's ability to deepen her grasp of the conception. I then respond to three objections to this view. The first is that grasping a false theory requires the absence of resonance. This objection, however, is mistaken. Attempting to understand a theory one knows to be false is not attempting to understand the object the false theory purports to explain. Rather, it is an attempt to understand the theory itself. That is, the theory is the object of understanding. This entails that grasping a false theory is a historical project rather than a scientific project. Thus, the relevant resonances concern the coherence between one's occurrent framework for the theory and the inaccessible details about the theory's historical features.

The second objection is that one can grasp an explanatory framework without ever having a feeling of resonance. If that is the case, then it seems resonance is not necessary for grasping. However, resonance is not fundamentally a feeling; rather, it is a psychological state which is typically signaled by a feeling. When one becomes only gradually comfortable with an explanatory framework, a feeling of resonance may never arise. In such a case, the absence of a feeling of muteness signals the resonance of the explanatory framework.

The third objection is that, far from being necessary, resonance might even inhibit grasping, since an unintelligible explanatory framework might resonate. I reply by showing that when an unintelligible explanatory framework resonates, the features of the framework that make it

unintelligible produce a ripple effect throughout the individual's related and overlapping conceptions. Thus, the resonance of an unintelligible framework comes at the cost of mutenesses that arise in other conceptions. It is probably the case, then, that the necessity of resonance for grasping is a global phenomenon across conceptions rather than isolated to a single conception.

3.1. Representation manipulability

What is grasping? Epistemologists generally agree that understanding requires an individual to have an appreciation for how the features of the object of understanding hang together, and that this is somehow what the word 'grasp' is getting at when we say understanding requires grasping.¹⁹⁶ Specifically, grasping seems to require that the individual has the right kind of psychological integration of explanatory and coherence relations among the features of the conception that the explanatory framework organizes.¹⁹⁷

It is notoriously difficult to specify what it means to grasp explanatory and coherence relations. The most common strategy for stating this condition on understanding is to construe it as a requirement that the individual can manipulate her representation of the object in the right way.¹⁹⁸ The idea is that we should be able to do two things with our explanatory frameworks. First, where they represent kinds, we should be able to apply them to distinct instances of the kind.¹⁹⁹ Second, we should be able to make predictions and counterfactual judgments about the object that will be accurate provided the framework is accurate.²⁰⁰ For manipulability theorists, grasping an explanatory

¹⁹⁶ Zagzebski (2001), p. 242, Riggs (2003), p. 217, Kvanvig (2003), pp. 192-202, Gardiner (2012), Lynch (2018), p. 196.

¹⁹⁷ Kvanvig (2003, 192; 2009), Gardiner (2012), Newman (2012), Strevens (2016), p. 41-42, Bengson (2018), p. 18, Lynch (2018), p. 199.

¹⁹⁸ See de Regt (2004, 2009, 2017), de Regt and Dieks (2005), Grimm (2006, 2010a, 2010b), Wilkenfeld (2013, 2017), Baumberger (2014, 2019), and Hills (2016).

¹⁹⁹ Hills (2016), p. 663 is most explicit about this requirement, though it is implied in other accounts.

²⁰⁰ Grimm (2010b), p. 89, Wilkenfeld (2013), p. 1003, and de Regt (2017), p. 102 all defend versions of this claim.

framework must enable us to efficaciously augment our conception of the object in ways that are sensitive to contingencies.

These counterfactual augmentations need not be mathematically precise. Henk de Regt, for example, consistently defends the view that scientific understanding only requires that one can “recognize qualitatively characteristic consequences of [a theory] without performing exact calculations.”²⁰¹ The idea is that grasping isn’t a matter of algorithmic accuracy in calculations; it is a matter of having a sense for how an explanatory framework will characterize an object in all the many permutations the object usually admits. For example, grasping the Bernoulli principle will enable me to predict (roughly) how an airplane will move depending on its (rough) speed and shape.

I think this view is correct so far as it goes, but it is only an expression of one of the major cognitive abilities that both results from and reinforces grasping; it is not an account of what grasping is. Representation manipulability is a consciously accessible mark of understanding: if I notice that I have increased facility with an explanatory framework, I can conclude that I grasp it better. Similarly, we might attribute understanding to others when they demonstrate their facility in applying the explanatory framework in novel conditions. However, attributions of understanding (like attributions of knowledge) track diagnostic criteria, which might not fully characterize the phenomenon itself. For example, we often assess another’s understanding based on how well they can give an account in their own words.²⁰² Yet, the ability to give an account is not necessary for understanding, since an individual might merely struggle with communication, not understanding.²⁰³ Representation manipulability is a diagnostic criterion that the individual can use to attribute

²⁰¹ This formulation appears in de Regt and Dieks (2005), p. 151, de Regt (2009), p. 33 and de Regt (2017), p. 102.

²⁰² Psychologists standardly use this criterion to determine quality of comprehension.

²⁰³ Alison Hills, who includes the ability to give an account as a necessary condition, admits this problem. See Hills (2016), p. 667.

understanding to herself but it, too, does not get at the constituting psychological processes, since many of those processes are not consciously accessible.²⁰⁴

3.2. Self-comprehension

What, then, is the nature of grasping that it begets manipulability? Since grasping admits of distinct levels, I want to begin at the simplest. A creature that has thoughts must have minimal, transparent access to the content expressed by those thoughts. By transparent access, I mean Tyler Burge's three conditions on minimal comprehension: access that is "epistemically immediate, unreasoned, and non-inferential."²⁰⁵ The creature's access must be immediate because otherwise the medium of thought would only express another medium of thought, which implies regress. It must be unreasoned because otherwise the comprehending creature would need to actively engage in attempts to access its own thoughts, which is manifestly false. And it must be non-inferential because otherwise the creature would need meta-representation of its thoughts so that it can then infer about the contents of those thoughts. In other words, there are some thoughts we think whose mode of expression needs no attention, effort, examination, or interpretation for the thoughts to be mentally accessible. Minimal comprehension of one's own thoughts is characteristically a privileged and hence transparent affair: we cannot fail to access the content of our own first-order (or object-level) thoughts.²⁰⁶

²⁰⁴ Wilkenfeld (2019) proposes that theoretical understanding is constituted by having a relatively "compressed" representation of an object from which additional accurate information about the object can be extracted. This proposal, however, faces the same worry as representation manipulability: it is a diagnostic criterion, not a constituting feature. As we will see, an individual will have this diagnostic ability when she meets the grasping condition as I describe it.

²⁰⁵ Burge (2013), p. 350.

²⁰⁶ I doubt, however, that *full* understanding of our own thoughts is privileged in this way. But that is because I take full understanding to involve networks of representations and not individual thoughts.

Minimal comprehension has at least two distinctive marks: fluency and orientation.

Thoughts that are not transparent interrupt the normal flow of thinking. A serious brain injury, for example, might disrupt the transparency of one's own thinking, rendering cognition broadly disfluent. *Fluency*, or the smooth flow of episodes of thinking, is an experiential mark of comprehension.²⁰⁷ *Orientation*, or awareness of one's position within a directed episode of thinking, is also an experiential mark of comprehension. But not all episodes of thinking are directed: mere mind-wandering is an undirected episode. In undirected episodes, fluency is the most prominent feature of comprehension, since one is not attempting a specific task. It is analogous to wandering down unfamiliar streets: being oriented is not important. In directed episodes, both fluency and orientation are important features, since there is a goal of the episode, even if the individual does not represent the goal to herself. The individual engages the episode of thought to achieve the goal, but if her thought becomes disfluent at some point, she may be unsure where the error occurred and whether she is still on the right cognitive path to her goal. In meta-representing creatures, the usual response to disorientation is to resort to meta-level thinking: to figure out what went wrong or to recover the intended purpose and structure of thinking. Disfluency and disorientation can also occur when the individual's conception is not internally coherent or when it is not adequate to the current use to which it is being put. That is, disfluency and disorientation are marks of confusion.

Minimal, transparent comprehension is necessary for conception building. As a creature goes about its business, it acquires information about the objects and events in the world around it. This information can be indexed to these objects as features which might become salient later.²⁰⁸ Assume, for example, that some birds have the capacity for thought, but not meta-psychology. When such a

²⁰⁷ Proust (2013), p. 129 offers a more technical definition of fluency: fluency “is the property, for a stimulus, of being processed more or less quickly and adequately, with respect to what is expected, in a kind of task.”

²⁰⁸ See section 1.1.h.

bird remembers a location as a regular source of food, it attributes that location as having the property of being a regular source of food. Conceptions, like thoughts, must be minimally transparent: the bird sees the location as a regular source of food without needing to engage in any inferences or further mediation. The location, then, takes on a particular character in virtue of the various features the bird has noticed.

3.3. Explanation formation

Self-comprehension is the base-level of grasping. Atop this base-level of grasping, I will describe three distinct levels of *explanatory* grasping. The first level of explanatory grasping is simple, unreflective formation of explanatory relations between features in a conception. But this capacity requires the ability to recognize and correct incoherencies between features. Hence, it involves a few other capacities in addition to self-comprehension. Namely, it requires the capacity to *appreciate* an object as worth attempting to understand, the capacity to *interpret* or investigate an object's features, and the capacity for *meta-representation*.

A creature that can improve the coherence of its conceptions must be able to attune to the object the conception represents long enough to develop the conception's features. Conceptions are complex and poised for development, so a creature will develop parts of that conception by attuning to the object in ways that are relevant to its interests. This can take the form of curiosity; but it can also be a purely practical concern for better understanding how to navigate obstacles in an environment. One of the primary mechanisms by which a conscious creature's attention is sensitive to its interests is through emotions. Simple emotions arise in response to events that the creature represents as having evaluative features. Fear, for example, is a response to a creature's evaluation of

something as fearsome.²⁰⁹ Moreover, emotions direct the creature's attention through this link between the creature's environment and its interests.²¹⁰ In the case of conception formation and development, the creature must become attuned to the object in a way that connects with its interests, thereby motivating development of a conception. Generally, a creature will not develop its conceptions toward improved coherence unless it is motivated to do so. This does not necessarily require the creature to ask itself questions about the object; it only requires that the creature can *appreciate* the object as a thing to be better understood.²¹¹

A creature with the capacity for conceptions and appreciation can guide conception formation even if it is not able to transform its conceptions. The conception simply grows in response to the information the creature notices. However, a creature that is curious about an object can test it for additional features. A cat might play with a door to see if it can be opened. We can call this first-order (that is, not meta-level) capacity to investigate an object's features 'interpretation'.²¹² Through interpretation, a creature can augment its conceptions in response to intentional experimentation. Its conceptions, then, do not merely grow wild; they are curated to the creature's interests, and this curation is guided by the creature's ability to make inferences about the object.

Interest-curated inferences about an object are not yet explanations. A squirrel can be motivated by its interest in food and can curate its conception of the bird feeder through inferences about how the food can be accessed without yet forming any explanations for why the bird feeder works as it does or why it is there at all. Explanation formation requires at least that (a) the creature can represent the object's nature and history, and (b) the creature can use these representations to explain why it has the features it has. But representations of an object's nature and inferences about

²⁰⁹ See Tappolet (2012).

²¹⁰ See Brady (2014).

²¹¹ Here, I follow Jon Garthoff's notion of appreciation, as explained to me in conversation.

²¹² Here, I follow Jon Garthoff's notion of basic interpretation, as explained to me in conversation.

its probable history require abstract thinking, and probably also meta-psychology. In forming these representations, the individual must attribute features to the object which fill inferential gaps, but it is unlikely that these inferential gaps are salient to the individual unless she can represent inferences to herself. And that requires meta-representation.

The simplest form of explanation is the unreflective, contextually occurring formation of explanatory relations between two features in a conception or cluster of conceptions. For example, I might notice that the cat is outside and think to myself, “someone must have let him out.” In doing so, I construct a representation of a plausible causal history in which the cat’s being outside can have happened even though I had closed all the doors and windows. This is not the only possible explanation, and it might be defeated by other features of the house that do not come to mind in the moment (like a door the cat can open). In my explanation, I hold fixed that the cat could not have gotten out unless someone let him out. His being outside requires, as a matter of coherence, that someone had let him out. But I might have forgotten that the feature I’m holding fixed is inaccurate. Mere formation and use of an explanatory relation does not require coherence among all the features of the conceptions in which the explanation is embedded. It only requires coherence among the features that are contextually relevant to the individual while forming the explanation.

Meta-representation probably first manifests as the ability to represent the thoughts of others.²¹³ In doing so, the individual must be able to distinguish first-personal thoughts attributed to the self from third-personal thoughts attributed to others. Comprehension of others’ thoughts is not privileged with baseline transparency the way comprehension of my own thoughts is. If the medium

²¹³ Pronin et al (2007) show that individuals come to more reliable behavioral judgments about others than themselves because they privilege introspection as evidence in their own case. Meta-representation, then, seems more basically other-directed and also more reliable in being so applied. Carruthers (2011) argues from similar studies that the only way we get self-knowledge is by developing warranted conceptions of ourselves the same way we develop warranted conceptions of others.

through which a thought is communicated to me is similar to the medium of my own thoughts, I will probably have a fluent experience of comprehending the communicated thought. However, because I do not have privileged access to the thoughts expressed, even if the medium is the same, the content expressed through that medium is open to interpretation in a way that the content of my own thoughts is not. For example, when I think, “It’s a great day,” I know whether it is sincere or ironic. When another says “It’s a great day” to me, my judgment of sincerity or irony is open to interpretation. Engaging in interpretation of another’s thoughts is also an act of explanation, since it requires that one fill out explanatory gaps by rendering features coherent with one another and consistent with the evidence on hand (what they say and the context of their saying it). Not every instance of comprehension of another’s thoughts requires that one engages in explanatory efforts. When my partner says, “there’s a check for you on the counter,” it might register as transparent in the same way my own thoughts do. Yet, it is still subject to explanatory examination if evidence should arise that my first interpretation was incorrect.

Meta-representation probably also enables an individual to use explanatory frameworks to structure her conceptions of objects. But using meta-representation does not entail engaging in reflective evaluation.²¹⁴ An individual can form explanatory relations and possibly even a rudimentary framework without noticing she is doing so and thus without asking herself whether those relations are either accurate or mutually consistent.

3.4. Explanatory comprehension

The second level of explanatory grasping is the intentional, reflective synthesis of explanations into a unified framework. I will call it *explanatory comprehension*. This form of grasping

²¹⁴ I remain agnostic about whether a creature can have the capacity for meta-representation without the capacity for reflective evaluation.

requires the capacity for reflective evaluation, or ‘critical reason’, as Burge has it.²¹⁵ Experimental psychologists have developed a substantial body of research on explanatory framework formation under the headings of ‘discourse comprehension’ and ‘problem-solving’. This literature focuses on comprehension of third-personal thoughts expressed in a natural language. It requires reflective evaluation, since the reader’s (or listener’s) comprehension depends on her consciously and intentionally building and modifying her explanatory framework as she reads (or listens). While there are still multiple competing models of the processes and representational constructs involved in discourse comprehension, some consensuses among psychologists have emerged.

In an individual’s effort to comprehend a text, there are at least three levels of representation that layer upon one another in her constructed representation of the meaning communicated. The base layer is a felicitous representation of the sentences themselves, which is akin to verbalizing the words in one’s mind, but it is committed to working memory. From this layer, the individual constructs what psychologists call a ‘textbase,’ which is a propositional expression of the content that abstracts from the specific sentences of the communication.²¹⁶ Then the individual uses this textbase, along with her relevant background knowledge, to construct a mental model of the content communicated, in which objects, their properties, and their relations are populated in a mental space that is structurally analogous to the content the author is discussing.²¹⁷ This mental model is a structured, holistic, multi-modal representation of the content communicated. The core organizing

²¹⁵ “Critical reason is a capacity to recognize and effectively employ reasonable criticism of or support for propositional attitudes and for propositional reasoning, guided by an appreciation, use, and assessment of reasons and reasoning as such,” Burge (2011), p. 317.

²¹⁶ Presumably, comprehension of schematics, maps, and other forms of representation would have a schematic or map-like textbase. Experiments on discourse comprehension, however, focus on language. See Camp (2007, 2018) on the distinctive features of a map-like textbase.

²¹⁷ This three-stage proposal for representation construction in discourse comprehension originated with van Dijk and Kintsch (1983), was refined by Kintsch (1998), and has since become dominant. See also Johnson and Seifert (1994) and van Oostendorp and Bonebakker (1996) for experiments that reveal the necessity of a distinction between the textbase and mental model layers, with mental models being the more sophisticated and hence the more cognitively demanding of the two.

elements the individual constructs for herself in such a model are states of affairs, events, and actions performed by agents. That is, she constructs for herself a setting in which events occur and agents interact, which is why psychologists often call this mental construct a ‘situation model’.²¹⁸

Individuals construct mental models from a communication by filling in any inferential gaps required for achieving model coherence.²¹⁹ The individual draws on her background knowledge to inform features of the model’s construction that are not explicit in the communication. Apparent discrepancies in the textbase cause individuals to lose fluency when mapping from the textbase to the mental model. When readers facing apparent discrepancies establish coherence, the inferences they perform to correct discrepancies depend on (a) whether they consider the discrepancy important to the model and (b) which bits of background knowledge they consider relevant.²²⁰

Recall from section 2.4.b that coherence is a matter of consistency and coalescence within and among conceptions. Recall from section 2.4.c that stability within and among conceptions is a matter of the support relations that connect an explanatory framework and an epistemic support structure. A conception (or cluster of conceptions) is more coherent when its epistemic support structure is stable and its explanatory structure is more unified. Changes to the explanatory structure (to increase unification) will require changes to the support structure, since explanatory relations lend support. This in turn, will require revisions of the explanatory structure since features that cannot bear the new epistemic load placed on them must be reconsidered. Hence, the process of establishing coherence is iterative.

²¹⁸ Baudet (1990) and Tapiero (2007), p. 40.

²¹⁹ This is another point of consensus. See Sanford and Garrod (1981) and Gernsbacher (1990) for competing accounts, both of which presuppose coherence as a primary directive in comprehension.

²²⁰ Cook et al (1998) found that individuals only lost fluency (and hence, struggled to establish coherence) when information discrepancies were relevant to the mental model they were constructing. Inconsistencies about ancillary characters in narratives did not slow subjects’ reading; only main characters.

In the dominant model among psychologists, the iterating process of coherence adjustment produces ‘integration’, where integration is achieving intricate psychological connection among the parts of the explanatory framework and the object-level features of the conception. On this view, an individual integrates the mental model by undergoing several cycles of gap-filling and discrepancy correction until her attributions of coherence to the various explanatory relations in the model stabilize.²²¹ Coherence stabilizes by ‘activating’ the settled explanatory links between features of the model to the degree that the individual finds these links relevant, fitting with background knowledge, and mutually consistent. Explanatory links that do not have these features are ‘deactivated’ to the degree they lack them.²²² On this account, the more activated an explanatory link is, the more integrated it is into the mental model.²²³

In summary, third-person comprehension involves constructing a conception of the content communicated by unifying it under an explanatory framework. This conception is updated as the communication continues according to two norms: (a) maintaining felicity to the communicator’s meaning, and (b) maintaining coherence among the features the individual judges relevant.²²⁴ That is, she is actively building an explanatory framework for this conception, by which she ensures that she is following what the author is saying. A mental model, then, is a conception whose features are organized under (or integrated with) a (relatively) unifying explanatory framework. I will call a conception that is organized in this way a *well-integrated conception*.

²²¹ Note this account from psychologists gets at the same phenomenon as philosophers who discuss working toward ‘reflective equilibrium.’ See Elgin (1996), p. 101-109. See also section 2.4.a.

²²² Note that, on this model, activation and deactivation are relative to one another along a scale.

²²³ For a helpful summary of this model, see the Graesser and Whitten (2000) review of Kintsch (1998). For the full account, see Kintsch (1988, 1998).

²²⁴ The felicity (or accuracy) constraint does not exclude the possibility of interpreting the reader uncharitably. One still takes oneself to be felicitous to the communicator’s meaning; one simply does not have much regard for the communicator.

An individual who can repeat the textbase has only comprehended the meaning of the sentences; the individual who can describe a mental model, or well-integrated conception, has comprehended the meaning of the communication as a whole. A well-integrated conception enables the individual to maintain both fluency and orientation as the communication continues, thus rendering her third-personal thoughts similar in their transparency to her first-personal thoughts, provided her conception is accurate. Thus, discourse comprehension involves the *reflective construction* of a new explanatory framework; not merely the unreflective use of an explanatory framework or the unreflective addition of explanatory relations.

3.5. Explanatory competence

Discourse comprehension is a special case of theoretical understanding: a reader of a textbook is attempting to understand the subject matter of the text. In doing so, she takes the author as an authority whose meaning is both fully coherent and fully accurate. She presupposes that accurately understanding the author will produce an accurate understanding of the subject matter. She can then focus on constructing and integrating a conception of the author's meaning and she can infer from this accomplishment that it is thereby an accurate conception of the subject matter of the text. This special feature of discourse comprehension tends to disguise the distinction between explanatory comprehension and the highest level of grasping, *explanatory competence*. The major difference is that explanatory competence requires consistent effort over time to deepen one's understanding.

3.5.a. Problem-solving

Because psychologists tend to study discourse comprehension in conjunction with problem-solving, they often use science and mathematics texts and problems to juxtapose an individual's representations (and the processes by which they are formed) in comprehending a text with her representations (and the processes by which they are formed) in solving problems based on the content of that text. Psychologists thus distinguish the mental model from a 'problem model,' in which the individual uses the mental model to construct a formalized puzzle and then solve that puzzle, based on further communication from the author.²²⁵ In formulating a problem model, the individual must adapt her integrated conception to the particular contingencies stated by the problem and then apply the formal features of the conception (such as an equation) to solve the problem. In doing so, students further integrate their conceptions by establishing explanatory links between formal features and qualitative features through repeated application of the formal features to novel contingencies that fall within the purview of the conception. Solving a range of problems that formalize different contingencies reliably enables the "recognition of qualitatively characteristic consequences" of the conception that de Regt argues is a condition on understanding.

Comprehending an explanatory framework requires only that the individual make the explanatory inferences the author is attempting to communicate, for without those inferences, the objects in the conception will not be accurately established into coherent relations that are relevant to the subject the author is describing. In solving the problems in a science text, however, individuals must build their own problem models by applying the principles integrated into their conceptions to novel situations.

²²⁵ Kintsch (1998), p. 394, insists on a firm distinction between comprehension, which he takes to be bottom up, and problem-solving, which he takes to be top-down. These features of his theory, however, are somewhat controversial.

Deepening the integration of the conception by constructing problem models probably does not require additional capacities besides those needed for explanatory comprehension.²²⁶ In moments of confusion about what an author means, a reader is faced with an interpretive problem that needs resolution apparently using the very same tools by which problem models are constructed, solved and integrated. A reader might flip back a few pages, double check what the author said earlier, compare sentences that seem to conflict, assess which features are most relevant, and eventually judge that she has ironed out the inconsistency well enough to continue organizing her conception. The problems at the end of the chapter only force the student to use these capacities to integrate the formal features of her conceptions, which, due to their abstractness, often cannot be integrated any other way.

Moreover, a reader forms a more accurate textbase when text is explicit about the inferences that link elements in the content, but her explanatory framework becomes better integrated with her conception when a text *omits* these inferential links. This omission requires her to be actively processing the content by supplying her own background knowledge and making the necessary inferences herself.²²⁷ The problems at the end of a chapter are designed to force these very same inferential connections by repeated construction of models with slightly different contingencies. In solving these problems, the student actively performs explanatory inferences that are not explicitly stated in the text, thus further integrating her conception of the object under an explanatory framework.

Recall that in Walter Kintsch's influential construction-integration model, integration is a matter of 'activating' explanatory connections through iterating coherence checks. These explanatory connections must already be part of the conception before they can be activated. In discourse

²²⁶ Contra Kintsch (1998) and Newman (2012, 2017), who both argue that additional capacities are involved.

²²⁷ See McNamara et al (1996).

comprehension, the needed explanatory connections are presented to the reader in a form the author hopes will encourage integration. But the objects we attempt to understand do not always have ready-made explanations laid out before us by a thoughtful author, the way they are in a textbook. When no explanatory framework presents itself, we must do all the construction labor ourselves. This is often a slow process of establishing explanatory connections between features, theorizing additional features that can serve needed explanatory functions within the conception, organizing theorized structures in relation to one another, and iteratively reconnecting, reconceptualizing and jettisoning features in response to internal coherence problems. Textbooks, and pedagogy in general, are designed to reduce the amount of effort and time it takes an individual to develop a well-integrated conception. Yet, in doing so, they also reduce the individual's active participation in the process. The more inferences the individual makes for herself, the more integrated her conception will be. Comprehension of textbooks, then, is a special, expedited case of theoretical understanding: pedagogical worries about removing the reader's active participation in the inferential process reveal that this loss comes at the cost of understanding. It seems doubtful, then, that textbook comprehension and problem-solving require different inferential capacities.

Yet, even supposing there really is a difference in the complexity of cognitive capacities used between textbook comprehension and problem-solving, theoretical understanding is a gradual building process. Mere comprehension of an explanation presented in a textbook is an early milestone on the long path toward mastery. We would normally say that a student who comprehends a logic book but cannot do simple proofs does not understand logic. Part of what makes understanding an interesting philosophical topic is that it is an invaluable part of being an expert, and all of us strive toward expertise of some kind. The student who is satisfied with a cursory read was not terribly interested in the subject. These features, I think, emerge from the connection

between an individual's having a well-integrated conception and her ability to manipulate that conception as de Regt describes.

3.5.b. *Integration*

What is integration? The effort involved in *constructing* an explanatory framework is often explicit: we focally access and actively engage in the process of making the inferences about the explanatory structure of our conceptions, even when the explanations are laid out in a text. However, the process of *integration* itself seems inaccessible, implicit and perhaps even sub-personal. The symptoms of integration gradually appear in our cognition, almost mysteriously: one can fluently access and apply relevant features of a conception when needed; one's orientation to the explanatory framework falters less and less; coherence problems arise less frequently, thus interrupting fluency and orientation less; relevant connections between features come to mind when the particular relation is needed, and effortlessly. For example, when one's integration of a system of first order logic increases, symbolic logic proofs become easier to construct because one is familiar with the methods of proof, the way the rules of inference relate to one another, and the nature and properties of the basic elements (variables, predicates, quantifiers, connectives, etc.).

When an individual is reading a text and attempting to comprehend it, she explicitly constructs a conception organized under an explanatory framework, but she is *simultaneously* undergoing implicit integrative iterations, which makes coherence problems salient to her while she is engaged in the explicit construction process. That is, in psychologists' terminology, integration occurs 'on-line'. When an individual is actively structuring her conception with explanatory relations, she is integrating the features of the object that are currently in her working memory. Since performing inferences that establish accurate explanatory relations integrates the features of an

object in one's working memory, it might seem that simply performing these inferences—integrating the conception—is what constitutes understanding. After all, this is probably all it takes to comprehend what one is reading.²²⁸

However, comprehending what one reads is not the sort of achievement toward which the capacity for theoretical understanding is oriented. Consider a student cramming for a test: she wants to get an A, so she stays up all night going back over material she did not understand very well, she works problems she struggled with, and she memorizes explanatory relations she had trouble holding onto. Perhaps she gets her A. But in a few months, she will have forgotten most of what she crammed. The explanatory relations that she struggled with will still be difficult, problems will be tricky to solve, and much of what she attempted to memorize will be lost. Encoding an easily retrievable, well-integrated conception into long-term memory requires more than developing an integrated conception in working memory.

It might seem that integration in working memory is enough for understanding, but that it's merely not enough to *remember* one's understanding. While this is probably true, such a response downplays the limitations of comprehending an explanation for the first time. Understanding comes in degrees; it builds upon and refines itself. We can only do so much in working memory. As the object of understanding increases in complexity, it becomes more and more unwieldy to deal with merely in working memory. We can only comprehend so much at one time. Integration and accessibility in long-term memory is necessary for deepening one's understanding because it enables the individual to focus working memory resources on features that are not yet integrated in long-term memory.

²²⁸ This Newman's (2012), p. 15 view: understanding is a "cognitive achievement constituted by our having made appropriate referential, causal, logical, as well as coherence inferences on information we encode into memory as knowledge."

Consider an example: understanding rainbows.²²⁹ Naturally occurring rainbows are the result of sunlight refracting and splitting into a spectrum through individual droplets of water suspended in the air. Because of the spherical geometry of these droplets, this refracted light is concentrated at an angle of about 42° . Our eyes are only sensitive to the effect when it is concentrated. Since the origin of light is the sun, the visible spectrum of refracted light will form an arc across the sky, as we will only see the spectrum through the droplets that are positioned to refract at sunlight at 42° . This is probably a simple enough account for a professional philosopher to comprehend all at once. I might add to this account that the angle of refraction follows Snell's law, which is a mathematical relation between features of the air, the droplet and the light. I might also (if I, myself, understood) explain *why* this angle follows Snell's law. At some point, you will get lost, either because you lack some background knowledge necessary for adding the content to your conception or because you simply cannot hold it all in mind at once. For the same reasons, the above account of rainbows might be too complex for an eight-year-old child to comprehend: perhaps she does not yet understand angle measurements or refraction or invisible droplets of water suspended in the air. Her capacity to understand something new all at once extends only just beyond her current understanding. As does anyone's.

In every case, comprehension and on-line integration capitalize on already integrated and easily retrievable content in long-term memory. It builds new understanding from the foundation of old. But it can only happen stepwise. No student can understand a subject deeply all at once. No one can understand another individual deeply all at once. Our conceptions of the objects we attempt to understand must become integrated into the explanatory frameworks we use to unify them, and this

²²⁹ This example comes from Newman (2012), p. 18-20.

process takes time for all the same reasons that encoding anything in long-term memory such that it is easily retrievable takes time.

3.5.c. Regulation

Comprehending someone else's explanation of an object is an achievement along the way to the more valuable kind of grasping: the kind that builds upon itself. I call this form of grasping *explanatory competence*. The ongoing project of deepening one's understanding of an object is marked by successive moments of explanatory comprehension about that object, milestones scattered over time. But to achieve explanatory competence, it is not enough merely to repeatedly succeed in explanatory comprehension about different parts of the object. In addition to having a well-integrated conception encoded in long-term memory, explanatory features of that conception must also be easily retrievable when they are relevant to the individual's current activity.

Or better yet: an expert comes to think about the object of understanding *through* the well-integrated conception in her long-term memory. When the logician sees a negated disjunction, she cognizes it *as* convertible into a conjunction of negations. De Morgan's laws, then, are integrated into her long-term memory not merely in virtue of memorization or even repeated explanatory inferences, but in virtue of the logician's habitually formed way of cognizing objects as having the relevant properties and relations. The kind of success de Regt and the other manipulability theorists have in mind requires that the explanatory framework of an individual's well-integrated conception *regulates* her cognitive interactions with the object she understands.

How does an explanatory framework come to regulate one's cognitive interactions? Conventional wisdom says that one must use what one learns. It is not enough that a conception's features are well-integrated within an explanatory framework because the framework can become

lost to time through disuse. In moments where it is relevant, one must habitually call to mind to the explanatory framework, even if one's conception is poorly integrated with it. In repeatedly doing so, one will develop attentional habits. Observable features of objects that are diagnostic of some contingency explained by the framework must become habitually salient (e.g. the red light is salient because it is diagnostic of a traffic contingency). Explanatory relations within the framework that are relevant to the current context must also become habitually salient (e.g. the function of the green-yellow-red sequence of the traffic light is salient because it enables me to predict contingencies).²³⁰ Repeated use of an explanatory framework as structuring our conception of an object a primary mechanism by which we develop these attentional habits.²³¹

Explanatory competence, then, requires that an individual has developed dispositions to call to mind the contextually relevant features and relations of a well-integrated conception which is encoded in her long-term memory. These interpretive dispositions enable her to deepen her understanding of the object by developing parts of the explanatory framework of her conception in working memory. They are acquired habitually, by repeatedly bringing the explanatory framework to bear on her thinking about the object of the conception.

3.5.d. The minimal grasping condition for successful theoretical understanding

Let's return to the distinction between milestone and mastery goals.²³² Explanatory competence is the mastery goal of grasping. However, it is not merely an ideal on the horizon. Explanatory competence is a goal whose minimal form is achievable by anyone who cares enough to

²³⁰ I consider my view to be an elaboration of Elisabeth Camp's (2019b) view that grasping is constituted by the implementation of a conception in the dynamic structure of one's actual cognitive processes.

²³¹ The other primary mechanism is cultural exposure, which also takes time. I will discuss the relations between these two mechanisms in chapter 4.

²³² See section 2.1.c.

commit the cognitive resources necessary for forming a habit of resorting to a well-integrated conception as a default.²³³ That is, the form of binary doxastic assent that is minimally necessary for theoretical understanding is fundamentally linked to the achievement of minimal explanatory competence. Mere explanatory comprehension is, indeed, a necessary first step to understanding an object through an integrated conception. However, it is not even minimally sufficient for explanatory understanding because a merely comprehended explanatory framework is not one's default explanatory framework. Sometimes mere comprehension produces an instantaneous gestalt switch, through which one suddenly cannot see the object the same way anymore. But this is just an instance of rapid acquisition of the relevant interpretive dispositions and regulative status.²³⁴

Explanatory comprehension, then, is not sufficient even for meeting a milestone goal. Additionally, explanatory competence is not sufficient for achieving mastery. Rather, mastery is the aspirational horizon we asymptotically approach as we engage in more and more iterations of integration and regulative encoding. Even a child with deeply mistaken conceptions of her parents still has a regulative explanatory framework encoded into her long-term memory. For this understanding is the basis on which she predicts how her parents will react to her actions. Here, then, is the resulting minimal grasping condition on theoretical understanding:

Grasping – *S* grasps a conception *C* when she has an explanatory framework *F* which is (a) is well-integrated into *C*, (b) is encoded in *S*'s long-term memory and (c) regulates *S*'s occurrent thinking.

²³³ Recall the discussion of default conceptions in 2.2.c.

²³⁴ I will return to this point in sections 4.4 and 4.5.

3.6. Resonance as necessary for mastery

I now turn to the following question: how important is resonance to grasping? I suspect that one's ability to grasp an explanatory framework is directly proportional to its resonance. However, there are two obvious problems with this kind of view. First, we can grasp explanatory frameworks to which we do not assent.²³⁵ Since muteness is a conflict between features of a conception and the framework that organizes it, it seems that we thus can grasp and then reject an explanatory framework *because* it does not resonate. Second, we often grasp frameworks for which we never have any feelings of resonance.²³⁶ Since feelings of resonance function to signal the psychological state of resonance, it seems we can grasp without resonance. I will conclude that feelings of resonance are not necessary for grasping. Only the psychological state of resonance is necessary for grasping, and even this necessity only applies at the aspirational horizon of mastery.

3.6.a. Grasping a false theory

I can grasp phlogiston theory without assenting to it or even thinking it is a good theory. But what kind of grasp is this? Few have much reason to study phlogiston theory the way they might contemporary chemistry. In its day, this theory was the subject of intensive study. Scientists made careers out of developing it. These scientists had come to see combustion events *as* changes to the phlogiston content of objects. That is, the explanatory framework had become their default and reflectively preferred framework for organizing combustion events. They drew upon its features in their efforts to deepen their understanding of combustion. This framework was well-integrated with their conceptions of combustion; some refused to admit that the theory was false even when the

²³⁵ Some epistemologists have noticed the possibility of understanding a false theory and worry that it undermines accuracy conditions for understanding. See, for example, Carter and Gordon (2016).

²³⁶ Trout (2018) convincingly argues this view. Wittgenstein (2001), §156- §172, can be also be interpreted as a defense of the view.

evidence became overwhelming. Scientists in the heyday of phlogiston theory had explanatory competence.

No one studies phlogiston theory this way today because it is widely considered a dead-end scientific project. The most important insights from the theory have already been harvested and integrated into other theories. In this regard, it is impossible for phlogiston theory to resonate because better theories of combustion have already permeated common discourse (watered down though pop science always is). Today, those who understand the theory best are probably historians of science. Yet their purpose in understanding the theory is not to make sense of combustion through the theory; rather, they want to make sense of historical individuals and scientific progress through the rise and fall of influential theories. There is a sense in which these historians have explanatory competence with phlogiston theory. Indeed, they might even be able to see the world through the eyes of the scientists who accepted the theory.

In these cases, I suspect that historians are attempting to understand historical figures. They seek a felicitous understanding of phlogiston theory, not as an accurate theory of combustion, but as an accurate representation of the minds of historical individuals. In this regard, the historians who attempt to understand phlogiston theory are actually attempting to understand historical individuals who held the view and its prominence in the history of scientific advancement, since this is the only remaining value of the explanatory framework. Interestingly, historians take in an enormous quantity of evidence about the subjects of their study. At any given moment, there is undoubtedly a significant amount of content they have in long-term memory about historical figures but that is not accessible. Wherever some content is inaccessible, the resonance mechanism is a helpful way to assess the epistemic stability of an explanatory framework.²³⁷ We should expect, then, that historians

²³⁷ See section 2.4 on epistemic stability.

attempting to understand phlogiston theory can find that a certain way of framing or thinking about phlogiston theory does or does not resonate *as what people believed at the time*.

Explanatory competence requires that an explanatory framework regulates one's interactions with the objects explained by the framework, but no one has a good reason to develop explanatory competence with phlogiston theory as organizing their conception of combustion. Many people comprehend phlogiston theory from reading descriptions of it. They can even develop some competence with it, out of mere curiosity. But their recognition that it is false and not especially helpful prevents them from deepening their understanding. The only cases in which an individual is motivated to pursue a deeper understanding are cases in which the framework is genuinely helpful for deepening a conception besides the one the framework is intended for—as in the case of the historian. Muteness, then, seems to impose at least a pragmatic limit on the possibility of explanatory competence.

3.6.b. Grasping without a feeling of resonance

Sometimes acquiring an explanatory framework brings with it a sudden feeling of recognition or revelation: an *Aha!* moment. But other times, developing fluency is slow work that never brings a moment of revelation with it. This is especially common when the explanatory framework is not easily visualizable, as is famously the case with quantum mechanics.²³⁸ In these situations, one simply becomes familiar with theoretical techniques through repeated use and that familiarity deepens the explanatory framework's integration with the individual's conception.

Resonance, however, is not identical to its signal feeling. Resonance is a psychological state in which the explanatory framework one occurrently uses as organizing of a conception coheres with

²³⁸ See de Regt (2017), pp. 236-259.

content in that conception that is occurrently inaccessible. A feeling of resonance is the feeling one gets in occurrently working with an explanatory framework that it is fitting for the conception in ways one cannot yet describe but might hope to uncover.

One available response is that, despite arguments to the contrary, feelings of resonance do in fact always attend the psychological state of resonance. Grimm (2010a), for example, argues that while new instances of understanding might not always bring with them a profound *Aha!* moment, each new discovery does bring at least a minimal *Ab* moment. The idea is that feelings of resonance vary in strength. Even in cases of sciences that resist visualization, such *Ab* moments still attend each new development of explanatory framework, despite the absence of a grand feeling that all has now fallen into place.

While I find this view plausible, I don't think it is the best response to the worry that feelings of resonance are neither necessary nor sufficient for understanding. Any conception whose explanatory framework comes into occurrent consideration has a state of resonance. That is, all the parts of the explanatory framework will be resonant or mute to some degree. Resonance itself is multidimensional. One dimension is the degree of resonance or muteness. Another dimension is variable resonance of different parts of an explanatory framework, which is a consequence of the complexity of conceptions and frameworks as well as the modularity of many parts of explanatory frameworks. For these reasons, an explanatory framework typically resonates (or is mute) to some greater or lesser degree, and that within that framework, certain parts are more resonant (or more mute) than others.

Because every occurrently considered explanatory framework is in some state of resonance, the psychological condition itself is not remarkable. Usually, a relatively resonant explanatory framework registers consciously as a way of framing the object to which we have no significant

objections. It does the job. This unremarkable ubiquity parallels sensate consciousness. For example, I am always hearing sounds. Not all those sounds register to me as particularly pleasant or unpleasant, but if I focused on them for a while, I could conjure some minimal pleasure/pain valence that I feel. The pleasantness of the temperature of the room will tend to drop into the background, whereas its unpleasantness might be prominent. Typically, consciousness of pleasure and pain is at its most prominent either when the sensation is intense (as in the case of a piercing headache) or when there is a noticeable shift from one to the other (as in the case of a sudden temperature shift). Since resonance shares with sensation an ever-presence as a psychological state, we should expect it to become prominent in similar ways. Hence, the intense *Aha!* moment (or the equally intense *That can't be right!* moment) that signals the comparative resonance of one framework against another will tend to be the most prominent phenomenology. But even if these are the only moments in which the affective feelings manifest (analogously, we might not want to say that every sound is either pleasant or painful), the underlying condition of resonance is still there, despite the lack of a signal feeling. For these reasons, I think we should not presume that whenever there is some static state of resonance or muteness (as there always will be) there is a signal feeling. Rather, we should expect that *changes* in resonance will be attended by signal feelings. And this is what we should expect if the resonance mechanism functions to bring our attention to better explanatory frameworks. It would be distracting if every conscious state were noticeably painful or pleasant in some way.

These features of the connection between the state and the feeling of resonance introduce worries about distorting contrastive effects. Plato noticed that hedonism faces this problem.²³⁹ It is

²³⁹ See the *Republic*, 583c-585a. Shaw (2015), pp. 148-151 helpfully draws out the details of these distorting contrastive effects. Similarly, Hsee et al (1991, 1994) found that satisfaction with outcomes depends on both position (how positive or negative the outcome is) and velocity (whether and how much the outcome improves over the prior states).

reasonable to suppose that pleasure is a reliable guide to goods in the world. But because a pleasure feels more pleasant when contrasted with a pain, we are often tempted to think that the cause of the pleasure is a greater good than it actually is. For this reason, the hedonist will be chasing highs without correctly attuning to the proper goods in the world around her. Clerk Shaw (2015) argues that while we can still use pleasure and pain as a guide to goods in the world, these distorting contrastive effects entail that it cannot be an independent guide. We need a different way to get onto those goods, a way which can succeed when feelings fail.

A similar worry applies to feelings of resonance. The contrastive intensity of an *Aha!* moment, when compared to one's state of confusion just prior, might lead one to conclude that the newly acquired explanatory framework is more accurate than it is. Fortunately, in the realm of epistemology, we have a great many resources to ground our judgments of accuracy besides conscious feelings. This, recall, is the major objection to the possibility of a resonance pathway: the worry that resonance is not a reliable guide to accuracy. I will postpone this problem yet again until chapter 5.

The above considerations suggest that the psychological condition of resonance (though not the feeling) is a necessary condition on explanatory competence because coherence is a limiting factor that inhibits explanatory competence. But because explanatory competence is not sufficient for mastery, an explanatory framework with which one is competent can tolerate plenty of incoherencies. The psychological state of resonance, then, is probably not necessary for all degrees of explanatory competence. Rather, it becomes more necessary as one's competence increases.

3.7. Resonating with an unintelligible conception

I have argued that integration between a conception and a candidate explanatory framework depends on the individual's iterating coherence checks. Since development of an explanatory framework happens in working memory, these checks are largely confined to (a) the content within working memory, and (b) the salient, accessible, and easily retrievable content brought to bear on working memory from long-term memory. If this content is inconsistent or otherwise impossible to render coherent, these conflicts between the content under consideration also become limitations on the possibility of integrating the conception. The explanatory framework has a low coherence potential.²⁴⁰ In such cases, I will say the explanatory framework is *unintelligible*. In plainer terms: when the parts of an explanatory framework don't seem to fit together no matter how you try to arrange them, you will be left with the feeling that you do not grasp the framework very well, as well as a concern that the framework might just be unintelligible.

One might think, then, that an unintelligible (and therefore incoherent) explanatory framework can resonate, as in cases of conspiracy theories. But, on my account of grasping, coherence is partly constitutive of grasping. This would entail that an unintelligible explanatory framework can resonate, and that this resonance can *inhibit* one's grasp. If so, it would seem odd to say that resonance is a necessary condition on grasping. Resonance with an unintelligible theory is a genuine worry. It reinforces the view I have just defended: that resonance is only necessary for mastery. Or, to put the same thought differently: muteness and unintelligibility both function as limits on the depth to which one can grasp an explanatory framework, and for similar reasons: they are both forms of incoherence.

²⁴⁰ See section 2.5.c.

Grasping at the level of explanatory competence requires repeated exercise of one's explanatory frameworks by applying them to real instances of the objects explained. This enables regulative encoding of the explanatory framework into long-term memory. For this reason, it is difficult to grasp a conception that is grossly inconsistent with the range of evidence one gains through repeated application of the framework to the object of the conception. As in cases of unsubstantiated conspiracy theories, one can cling steadfastly to an explanatory framework in recalcitrant defiance of the signs of mismatch between representation and reality. But such recalcitrance risks severing the link between representation and reality, leaving the conception as an exercise in fantastical thinking with little bearing on reality. Jettisoning or explaining away evidence that does not cohere is the price of clinging to an inaccurate explanatory framework.

Some of the evidence one has is inaccessible. The resonance process, through feelings of resonance and muteness, signals the individual's possession of inaccessible yet relevant evidence. That is, it extends integrative coherence checks to inaccessible content in long-term memory. If the resonance process is reliable and this inaccessible content is accurate, then resonance surely improves the integration of the conception and hence one's explanatory competence with it.

Some inaccessible content will be inaccurate. For example, much of the evidence we have comes in the form of testimony. Since the resonance process performs checks on the coherence of explanatory frameworks, and not on the epistemic support structure, it probably does not signal a mistaken attribution of trust unless one is explicitly considering the source of the testimony. Typically, we judge a source of testimony to be reliable, accept claims from the source, then use the claims in later inferences without reevaluating the judgment that the individual was trustworthy—unless we are given a reason to reevaluate that source. That is, in applying a conception and developing fluency within it, we will tend to call to mind beliefs that might fit well or badly with the

conception, but rarely will the sources of those beliefs arise to explicit thinking unless one has a reason to doubt them. They might not even be accessible in the moment. Thus, while the conception might resonate with one's inaccessible contents, those contents may also be ill-formed through attributing trustworthiness to an untrustworthy source. This produces the perverse result that an accurate explanatory framework can fail to resonate with false claims that I accepted on misplaced trust and so feel incorrect. Hence, a framework that is accurate can be mute and a framework that is inaccurate can resonate.

Yet, even in cases when an explanatory framework resonates with false beliefs, incoherencies will arise in other, previously integrated conceptions. That is, the price of adhering to an inaccurate but resonating framework is to face mutenesses elsewhere in one's total network of conceptions. An example will illuminate this phenomenon. Suppose I endorse a conspiracy theory in which all government officials and corporate executives are Luciferians who regularly commit ritual murders in exchange for continued power. And I do so based on the testimony of a dozen sources whom I trust, who all belong to a community of which I am a member. I also happen to have a friend who recently runs for office. I tell her that she can't win unless she is a Luciferian. When she wins, I conclude she is a Luciferian who has committed ritual murder, despite her seeming to me to be a normal, kind, concerned citizen. The Luciferian conception resonates with many of my accessible and inaccessible judgments, though it is fundamentally inaccurate because there is no Luciferian conspiracy.

It seems I can develop fluency and facility with this conception and, through repeated application of the conception to reality, I come to identify patterns in the world that can signal to me where Luciferians have influenced society and who is a Luciferian. That is, I can develop explanatory competency with the conception. However, deepening my grasp of this conception of the larger

social reality comes at the price of reconfiguring my conceptions of individual human beings. My representation of the goals and activities of Luciferians forces me to abandon a resonant conception of my friend. More than that, it forces me to abandon a resonant conception of people in positions of power, since I must change my representations of their motivations and private lives. It also forces me to abandon a resonant conception of the news media, since my representation of the activities of people in positions of power is in direct conflict with what the media report. Moreover, the motivations I attribute to these people are probably not intelligible to me. That is, I cannot properly conceive of them as pursuing something good; so I must attribute to them a feature that makes them in principle difficult to understand.²⁴¹ In reconfiguring my conceptions of all these individuals and institutions, rendering them maximally resonant will require that I attribute unintelligible motivations to them. But, in this case, rendering my conceptions coherent undermines my grasp of them: I must attribute an essential feature to a broad range of individuals, but I cannot, myself, grasp this essential feature.²⁴²

Grasping a conception does not happen in isolation from one's other conceptions. When I integrate the conception with an explanatory framework, apply the conception to reality, and negotiate its features, I must also adjust any conceptions I have that are affected by these changes.²⁴³ And if I do not, I face coherence and resonance losses in those affected conceptions. When an explanatory framework for one conception forces me to abandon the intelligibility of some of the objects or relations that bear on the conception, my overall grasp of objects via conceptions is loosened. And the lost grip cannot be recovered unless the conception is jettisoned. The Luciferian

²⁴¹ Here I follow Grimm (2016), who argues that understanding other minds requires that we can see as good and worth pursuing what we judge that they find good and worth pursuing. Failure to find the values of others valuable renders those values unintelligible to us.

²⁴² That is, my conception of the feature—the Luciferian drive to power through ritual murder—is not well integrated with an explanatory framework. Nor can it be: it remains a strange mystery with opaque evaluative attributions.

²⁴³ This is implied by the external coalescence requirement on coherence. See section 2.4.b.

conspiracy is a case in which a conception is both resonant and mute. It is resonant in its representation of institutional elites, since I have already implicitly accepted their evil nature. But it is mute in its representation of my newly elected friend, whom I struggle to think of as a Luciferian. Additionally, the possibility of my grasping this conception is limited because it involves features that I do not and cannot grasp.

It might seem that sometimes precisely this situation is necessary for achieving understanding. When the Copernican model of the solar system started gaining popularity, it came at the cost of intelligibility, partly because it was unfamiliar and partly because its predictive power was much worse than the Ptolemaic model. On the other hand, the Copernican model had a greater promise of intelligibility, since it did not require solving problems with arbitrary epicycles. In the cases of both the Ptolemaic model and the Luciferian conspiracy, a feature of the conception enforces a hard limit on the intelligibility of the objects it represents, for the purpose of making the conception fit other features of reality. This, I think, is where the cost of recalcitrant feelings reveals itself in our efforts to grasp conceptions. Yet explanatory frameworks with limited intelligibility can still offer an important milestone on the path to mastery: the Ptolemaic model was a good way to understand the motion of the planets at the time.

Feelings of resonance and muteness are indirect indicators of coherence and incoherence among accessible and inaccessible contents concerning a conception. Insofar as one feels any muteness at all about a conception, that muteness risks becoming an inhibition to grasping the conception. It can either inhibit the intelligibility of the conception or else force adjustments that inflict reduced intelligibility onto other conceptions, thus exporting the muteness to different conceptions. Of course, this outcome is not inevitable. When things go well, ironing out

incoherencies between conceptions leads to greater overall coherence in the interlocking network of conceptions.

The Luciferian conspiracy example draws out the kind of coherence by which grasping is normed: the internal features of a conception must be negotiated against each other and against other conceptions that are affected. The internal features of the Luciferian conception of positions of power affects the features of one's conceptions of individuals in power and of news media sources. In negotiating these conflicts, a conception cannot be stripped of the highest level of explanation without becoming a different conception. But we cannot always achieve consistency among conceptions without either abandoning an appealing conception or giving up the credibility of an appealing source of evidence. Insofar as one's network of conceptions forces such tradeoffs, the network itself admits incoherency. This incoherency inhibits comprehension and often leads individuals to consider abandoning the governing explanatory framework of the network, as we might hope the assenter to the Luciferian conspiracy will do.²⁴⁴ It would be very surprising indeed if all one's inaccurate inaccessible content turned out to be smoothly integrable into a coherent network of explanatory frameworks.

The above considerations reinforce that grasping is partly normed by coherence and that resonance is partly constitutive of coherence. Being in a psychological state of relative resonance, however, does not prevent feelings of resonance from tracking inaccessible false beliefs, nor is there any guarantee that a mute conception will induce an individual to revise those inaccessible false beliefs.

²⁴⁴ This is similar to Kuhn's (1996) view that dramatic shifts in scientific theorizing are presaged by the increasing salience of anomalies in application of the explanatory framework.

3.8. Summary

The form of grasping necessary for theoretical understanding (as a form of mastery) can be diagnostically identified by an individual's ability to manipulate her conception to accommodate the normal contingencies of the object the conception represents. The psychological condition that affords this ability is explanatory competence. An individual has explanatory competence when she has a well-integrated conception that (a) is encoded in her long-term memory and (b) regulates her occurrent thinking. Resonance, it seems, is increasingly necessary as explanatory competence deepens because the integration of a conception under an explanatory framework is limited by coherence between the framework and the conception. Muteness is a lack of coherence across the conscious/unconscious divide, so the closer an individual comes to mastery, the less muteness she will be able to tolerate in her conception. However, the increasing necessity of resonance as one's epistemic mastery over an object increases applies across one's conceptions and not merely within a single conception.

Chapter 4. Resonance in Diachronic Understanding Projects

In chapter 3, I argued that the form of grasping which norms theoretical understanding is explanatory competence. An individual has explanatory competence when her conception of an object is integrated with a satisfying explanatory framework, and this integrated conception is encoded in her long-term memory in a way that regulates her normal interactions with the object of the conception. Yet my account in chapter 3 left unanswered the question of how important resonance is to the process of achieving explanatory competence. In this chapter, I focus on the diachronic features of the long-term understanding projects through which we attempt to achieve explanatory competence. There are two primary questions I wish to answer. The first: How does an explanatory framework come to regulate one's occurrent thinking? The second: How do we use resonance for achieving this regulation?

Here is a summary of this chapter. Explanatory frameworks become regulative for us when we develop a holistic network of supporting interpretive dispositions for that framework which, following Elisabeth Camp, I will call a 'perspective'. We can acquire a perspective in two ways: through exposure to cultural artifacts that communicate it in ways that are psychologically attractive (or 'contractive' as I will call it), or through reflective commitment to understanding through an explanatory framework. Perspectives enable explanatory frameworks to become deeply rooted in our minds, but the perspectives themselves are self-effacing. That is, we do not notice that we are filtering incoming information through a perspective; rather, it seems to us that we are simply getting onto what is important. Perspectives, then, function as a gravity well. Once we begin to use one, it is difficult to stop. They can also be transmitted through propaganda in ways that subvert an individual's reflective resources. For this reason, our epistemic system needs a counterbalancing mechanism that is well-suited to escaping a perspective when it turns out to be perverse. Such a

mechanism needs to be a guiding influence that enables us to transform our explanatory frameworks and thus also to abandon the perspective that supported the old framework. It might seem that trusty touchstones (or landmarks, to use the territory metaphor) are the best way to do this, but touchstones are backward-looking: they only inform us of what worked in the past. They are helpful for avoiding dramatic errors, but touchstones characteristically lose their epistemic value as we come to understand them more deeply. Instead of a touchstone, what we need is a lodestar: a guiding light on the horizon that never moves and always reveals our position with respect to it. I argue that resonance is the best-suited psychological resource available for serving as a lodestar. Moreover, if this is the case, then we should expect two consequences. The first is that understanding is aided by moving rapidly between insecure touchstones, such as evocative metaphors, guided by the resonances and mutenesses of those touchstones. The second is that resonance offers both the needed direction and motivation to escape a perverse perspective. This, then, is the thesis of the chapter: *attunement to resonances and mutenesses not only helps us achieve explanatory competence, it greatly speeds up the process and it also ensures that we do not become trapped in perspectives that prevent understanding.*

Here is a more detailed outline of the chapter. The first three sections lay the conceptual groundwork. I begin section 1 with a few precisifications of terminology for the sake of more clearly articulating what I mean by ‘regulate’. I distinguish critical regulation from uncritical regulation and mere contraction. An integrated conception *critically regulates* my occurrent thinking about an object when (a) I have consciously assented to the conception and (b) I develop habits of dependency on that conception for guiding my occurrent thinking. In section 2, drawing on Elisabeth Camp’s work, I describe the three basic types of habitually formed dispositions necessary for critical regulation: dispositions of attention, conceptual connection, and evaluation. In section 3, following Camp again, I argue that we form holistic networks of these dispositions which coordinate in establishing in our

minds a seamless and unified system of interpretation. Camp calls these holistic networks of interpretive dispositions ‘perspectives’. Perspectives and explanatory frameworks are made for one another. That is, an explanatory framework inclines one toward a proprietary network of interpretive habits, and a network of interpretive habits inclines one toward a proprietary explanatory framework. In cases of critical regulation, the explanatory framework will tend to be the leading phenomenon. In cases of uncritical regulation and mere contraction, the perspective will tend to be the leading phenomenon.

The next three sections lay out the main view I defend in this chapter: there is a motivation gap in crossing the transformative threshold from one iteration of an explanatory framework and its proprietary perspective to the next, and relying on the resonance mechanism seems to be the only undogmatic way to fill that motivation gap. In section 4, I discuss the conative form of commitment necessary for achieving critical regulation. I call this conative form of commitment ‘investment’, distinguishing it primarily from mere contraction. In section 5, I discuss the features of transformations from one iteration to the next. In section 6, I raise and answer the problem of motivation: investing in an explanatory framework and its proprietary perspective requires that I see in that framework an explanatory power that it does not yet possess in my mind. The present condition of my integrated conception is not sufficient for investment; rather, I must have its future version in mind. Yet, the future version will almost certainly require multiple transformations to acquire, so how can I judge its explanatory power based on the present version? I argue that the solution is that continuity between transformations depends on the appeal of a touchstone whose promise as a source of understanding I register through feelings of resonance. The touchstone enables me to invest in a course of study whose promise is apparent from the beginning and whose successive stages are progressively linked in a consistent direction of development. I conclude this

section by arguing that the only way to avoid dogmatic fidelity to a touchstone in a long-term understanding project is by giving priority to resonance and muteness as a lodestar.

In the last two sections, I discuss an important implication of the touchstone-lodestar relationship: it enables us to recruit creative thinking as part of a disciplined understanding project. We do this through what Camp calls ‘aspectual thinking’. One example of aspectual thinking is when we use an evocative metaphor as a touchstone. In section 7, I describe the features of aspectual thinking and establish its value in providing both an easy source of touchstones and a shortcut to explanatory competence. Then, in section 8, I raise the major worry about this mode of thinking: it only goes well when it goes well; otherwise, it tends to go very badly. Multiplying touchstones and shortcuts to explanatory competence seems bound to go wrong unless the epistemic agent is already epistemically virtuous. Using resonance to leapfrog touchstones seem partly responsible for the way we become enmeshed within a perspective, and it offers endless opportunities for propaganda designed to confuse. I do not deny these worries; instead, I maintain that resonance and muteness are still the best lodestar, even for minimally epistemically virtuous agents.

4.1. Critical regulation of occurrent thinking: some distinctions

In this section, I will draw a series of distinctions by which I hope to adapt Camp’s broader theory of perspectives to the notion of explanatory competence I developed in section 3.5. The overarching theory of perspectives is Camp’s, but the distinctly epistemic deployment of that theory is my own.

I will call occurrent thinking about an object *cognitive interaction* with the object. Cognitive interaction with an object is *guided* by a representation when contextually relevant features of the representation arise in one’s mind during the interaction. A guiding representation is a combination

of the habitually formed gestalt patterns in one's conception and the explanatory network that explains and (at least partially) unifies those gestalt patterns.²⁴⁵ Note that gestalt patterns are habitual in a self-effacing way: these patterns are often present to the mind as if innate because one does not realize they are in fact habituated. Unless critically examined, they appear as fixed background features of the world.²⁴⁶ When explanatory links between features are encoded in long-term memory and interlaced with habitual gestalt patterns, they are readily available for retrieval due to the salience of gestalt patterns. For example, my cognitive interaction with a lamp is guided by my guiding representation of the lamp's function as a helpful account of the patterns I notice in interacting with lamps: I use it as a source of light, and if the switch doesn't produce light, I troubleshoot the problem according to the functional features I take the lamp to have in my conception of it. An explanatory framework cannot be guiding on its own because it might not coalesce with the existing gestalt patterns in my conception. I could not, for example, take a magical explanation of the lamp seriously because my gestalt patterns connect electrical and mechanical features. Hence, a guiding representation depends on coalescence between the explanatory framework and the gestalt patterns in a conception.

A guiding representation can be acquired either through *central regulation* or through *contagion*.²⁴⁷ When I have reflectively assented to a guiding representation, I will say it is *centrally regulative* (hereafter, just 'regulative'). We characteristically allow and even depend on regulative representations to continue guiding our cognitive interactions with the object. For example, the nature I take a lamp to have regulates my cognitive interaction with the lamp because I have

²⁴⁵ See section 1.1.d for a review of habitually formed gestalt patterns.

²⁴⁶ I will return to this claim in section 4.4.

²⁴⁷ Thanks to Linh Mac for pressing me on the clarity of this distinction.

assented to this attribution of the lamp's nature in this sense: I am aware that this is the nature I attribute to the lamp and that I could attribute a different nature, but prefer not to.

However, guiding representations are not always acquired through a centrally regulative process. When a guiding representation enters and organizes a conception without one's assent, I will say it is acquired through *contagion*. A contagiously acquired guiding representation is one to which I have not reflectively assented, but which nevertheless reappears unbidden in my cognitive interaction with the object. Sometimes an individual is not aware that she has alternatives for representing the nature of the object. Other times, an individual is aware that she does not assent to the guiding representation, yet it still guides her cognitive interactions. Hence, a contagiously acquired guiding representation often produces unbidden thoughts. For example, a framework in which the Sun moves across the sky coalesces with the gestalt patterns in my perceptual history with the Sun, so I might find myself occasionally thinking that the Sun moves relative to the Earth rather than the reverse, despite my rejection of this thesis at the meta-level.

A regulatively acquired guiding representation can gain one's reflective assent either *critically* or *uncritically*. *Uncritical regulation* is when an individual passively assents to a guiding representation, despite awareness of alternatives, and often through defaulting to the representation. Uncritical regulation is also extremely common. We typically assent to culturally shared representational constructs because we are inducted into them at a young age. They regulate our thinking and behavior without resistance due to the reflective assent they gain from us. We typically acquire these guiding representations through contagion, but retain them through uncritically reflective regulation. Such guiding conceptions typically win our reflective assent through their consistent social reaffirmation, especially when adherence is socially rewarded and violation punished.²⁴⁸ Moreover, a

²⁴⁸ This is a widely studied phenomenon across multiple disciplines. See Christakis and Fowler (2009) for an overview. Note also that the pathogen/immune system metaphor for regulation of cognitive interaction is well-supported by

culturally shared representation cannot even become a subject of critical evaluation unless it occurs to the individual that there might be alternative ways of representing the same phenomena. For example, the unspoken norms of socially appropriate distance between yourself and a stranger will seem intuitively appropriate and relatively fixed, unless you are exposed to a different set of social distance cultural norms.

Critical regulation is when an individual's thinking is consciously and intentionally guided by a critically selected goal, whether in the form of an ideal, a value, or an aspiration. When I critically pursue a goal, my actions will typically be organized into a series of stepwise movements, each of which has some instrumental function with respect to that goal. This includes the critically conscious adoption of a goal that one later pursues through habituation of unconscious thinking. For example, my adoption of the social norms of academia are gradually beginning to regulate my thinking without any conscious effort. However, I can and probably do pursue goals of which I am not critically conscious, and these goals do indeed guide and even limit my activity, but they do not regulate it. The difference is that pursuit of an uncritically (and perhaps inaccessibly) adopted goal is not structured into a uniform plan in which each stepwise movement has a distinct purpose in achieving the ultimate goal. Often, pursuit of an uncritically adopted goal manifests as thwarting my critically adopted goals. For example, I might uncritically adopt the goal of *protecting* my critically regulative self-conception from disconfirming evidence. Conversely, I might uncritically adopt the goal of *undermining* my critically regulative self-conception through compulsive gathering of disconfirming evidence.²⁴⁹ In pursuing uncritically adopted goals, cognitive movement is characteristically stop and go, lacks consistency of resource investment, and is not unidirectional;

empirical psychology. See Mandelbaum (2019) for a detailed review of the empirical data and its comportment with the immune system model.

²⁴⁹ Thanks to Georgi Gardiner for pressing me to clarify this distinction.

moreover, the goal itself is often ambiguous, vague or negative. These features arise in virtue of the characteristic lack of explanatory unity and coalescence in contagiously acquired guiding representations. The goal of being a good wife, for example, when uncritically adopted, can thwart critically adopted education and career goals, and characteristically produces conflicting behaviors in attempting to reach the goal due to the poorly unified nature of the guiding representation that is available through the contagion route.²⁵⁰

To summarize: critically reflective regulation is when my critically endorsed intentions are organizing and guiding my own occurrent thinking. Uncritical regulation is when some external source organizes and guides my occurrent thinking, winning my reflective assent without critical examination. Mere contagion is when some external source organizes and guides my thinking regardless of whether I reflectively assent.

When I critically regulate my thinking according to a guiding representation, I organize my ongoing cognitive use of a conception under the explanatory framework that partly constitutes the guiding representation. When the object of the conception enters my thinking, I call upon the explanatory framework for assistance in making sense of the object and its many possible contingencies. However, occurrently calling upon an explanatory framework is effortful. Occurrently deploying the appropriate features of that framework is also effortful. Because conscious resources are limited, the effort spent calling upon and deploying an explanatory framework will limit the clarity and insight I can achieve thereby.²⁵¹ That is, the experience of using the framework to guide and organize my thinking will not be very fluent and I will have to constantly reassess my orientation within the framework. The goal of critically regulated thinking is not mere guidance and organization

²⁵⁰ Thus, a woman aspiring to be a good wife faces the double-binds that characterize popular notions of womanly virtue. See Frye (1983).

²⁵¹ See section 3.5.

according to occurrent, critically endorsed intention, but *latent* guidance and organization which is directly answerable and responsive to my critically endorsed intentions. That is, the goal of explanatory competence is to recruit implicit processes into the service of critically endorsed epistemic goals. Through repeated cognitive effort, I must develop interpretive habits that issue from, reinforce, and develop the explanatory framework which I critically endorse as regulative of my thinking.

4.2. Interpretive dispositions

There are at least three kinds of interpretive dispositions which partly constitute the habitual, regulated thinking necessary for explanatory competence: dispositions of attention, dispositions of cognitive connection, and dispositions of evaluation and response.²⁵² These dispositions together form a cognitive system for interpreting and integrating new information into already structured conceptions. I will discuss these in order.

First, I will mention a few basic features of dispositions. Dispositions can be *developed* or *innate*. Habits, such as a habit of noticing the color of a person's eyes, are developed dispositions. By contrast, the disposition to see an object as the same color despite different lighting is innate. Developed dispositions can also be *active* or *passive*, depending on whether the developed tendency is toward a self-directed event or not. For example, my habit of brushing my teeth at night is an active developed disposition; whereas, my habit of failing to check the air pressure in my tires is a passive developed disposition. Finally, we probably cannot be conscious of dispositions; rather, we infer their existence by observing our tendencies toward cognition and action.

²⁵² Here, I follow Camp (2013, 2017, 2019a, 2019b, 2021).

4.2.a. *Dispositions of attention*

Insofar as I want to understand and apply an explanatory framework, it will have features I recognize as salient for making sense of the object's contingencies according to that framework. Salience, following Camp and Amos Tversky, is roughly a function of *diagnosticity* and *intensity*.²⁵³ A feature is diagnostic if it registers to me as an outward mark that has explanatory significance within the framework. A badge is diagnostic of being a police officer. Using police jargon is also diagnostic. These features are explanatorily significant insofar as they indicate relatively central features of the nature one attributes to a police officer. Conversely, when a feature is intense, it is not necessarily explanatorily significant; rather, it is a common outward mark shared by instances of the object of the conception. Intense features are salient due to the way they stand out against other features. For example, a well-muscled man with good posture, close-cropped hair, and shades is intense because he stands out in a crowd. These features, however, are also part of the stereotype of a marine. To anyone for whom this stereotype figures as part of their conception of a marine, these features will be salient.

Our conceptions are often poorly or only partially integrated under an explanatory framework, and explanatory frameworks themselves are often weakly unified. In cases of conceptions that are not critically regulated, stereotypes and folk presuppositions will typically guide the explanatory relations that structure the conception. Regardless of the state of integration and regulation, a conception will still be partly constituted by salience attributions. Even a creature that cannot establish explanatory relations will have both instinctive and habitually formed salience attributions embedded in its conceptions of objects because its survival and flourishing will often depend on correctly and efficiently classifying objects. Motion against a still background, for

²⁵³ See Camp (2003) and Tversky (1977).

example, is innately salient to a cat as a feature of prey. And the sound of a can opening might become habitually salient to a dog as a feature of desirable food. The same applies to creatures who have explanation, except that salience patterns also track explanatory relations. A slowdown in traffic on the freeway might be diagnostic of a speed trap ahead, especially if I know that there isn't a wreck on the road. Since salience attributions exist in our conceptions prior to unification under an explanatory framework, unintegrated conceptions will already have many salience attributions which structure the individual's attention to the object of the conception. Salience attributions are part of the gestalt patterns that structure a conception even in the absence of an explanatory framework. A critically regulative explanatory framework, then, must often recalibrate existing salience attributions within the conception. This is a slow process of developing habits of noticing different features than one had before. Often, it requires occurrently reminding oneself to focus attention on something one is not used to noticing.

However, salience attributions can also be acquired through contagion. Explanatory frameworks that coalesce with the gestalt patterns I am likely to develop within my cultural environment circulate in that cultural environment as *frames*. A 'frame', as Camp uses the term, is an external representation that functions to carry and communicate interpretive dispositions by embedding an organizing framework for a conception. The gestalt of that framework, however, is only cognitively available to an individual who uses the interpretive dispositions that connect the framework to the culturally available gestalt patterns.²⁵⁴ Frames are often proprietary to their particular cultures, though they are not limited to cultural artifacts. At the smaller end of the scale, a student's notes on a lecture are a frame for communicating her own past organizing framework for the content of that lecture. This frame is meant to offer her a critically regulative explanatory

²⁵⁴ See Camp (2008, 2017, 2019a, 2019b, 2021).

framework for that content. At the larger end of the scale, the image of Jim Crow carried a contagious explanatory framework for conceptions of Black persons in 19th Century America. It produced salience attributions in individuals without their intentional reinforcement, and sometimes even against their wills, by embedding explanatory links between culturally reinforced gestalt patterns within the shared modes of representation of Black persons. For many, Jim Crow was merely uncritically regulative: people accepted the frame as accurate because everyone else did. When a contagious explanatory framework produces an unbidden interpretive disposition, whether through a transmitting frame or not, I will call that disposition *infectious*: it is contagiously acquired and threatens to corrupt my conception.

4.2.b. Dispositions of cognitive connection

Conceptions are always poised for further development. Objects, as a rule, will present us with surprising contingencies.²⁵⁵ For this reason, a conception will also be guided by dispositions for integrating new information into the conception. Patterns of cognitive connection between an object's features are especially prominent at the level of explanation. The firmness of my indoor ivy's leaves is not salient merely as a diagnostic feature; I consider it diagnostic because it reliably indicates to me whether the plant needs water. It is diagnostic because it is explanatorily significant. But dispositions of cognitive connection can also be the result of inapposite explanatory relations. A student worried about her performance might interpret a range of irrelevant but salient information as explanatorily significant. She might interpret the teacher's criticism of her view as disapproval of her work or a curt response as irritation. The student has come to see the teacher's criticism and

²⁵⁵ See section 1.1.i.

tone of voice not only as salient but as explanatorily significant contingencies within her explanatory framework for the conception she has of that teacher.

Just as features can be more or less salient, they can also be more or less central in the explanatory structure of the conception.²⁵⁶ The relative centrality of a feature can be approximated by how much the explanatory structure would need to change if the feature were removed.²⁵⁷ That is, they bear a heavier epistemic load.²⁵⁸ As in the case of attentional dispositions, we form dispositions to place features in explanatory relations with one another regardless of whether we have a unifying explanatory framework and regardless of whether we critically regulate our cognition according to that framework. That is, we typically form explanatory relations uncritically. And we tend to form the same kinds of explanatory relations repeatedly, especially in our efforts to integrate different contingencies within a single conception. For example, the student might uncritically form the explanation that her teacher gave her a bad grade because they butted heads in class the previous week. If so, she will be more inclined to interpret future butting of heads with the teacher as having had a negative effect on her future grades. Moreover, a frame that communicates a contagious explanatory framework also imparts infectious dispositions to cognitive connection. If someone tells me that a colleague I had thought to be shy was actually aloof and judgmental, I will find myself using these explanatory relations, even if I prefer not to.²⁵⁹

²⁵⁶ Note that dispositions of cognitive connection are probably phylogenetically and ontogenetically prior to explanatory relations. So not all centrality structures in cognitive connection are explanatory relations. In aesthetic conceptions, for example, a feature can be central to the unity of an artwork, but that centrality might not be an explanatory relation the feature bears to the other features of the work. However, in explanatory frameworks, this is the most significant form of centrality structure. I am grateful to Elisabeth Camp for stressing this point to me.

²⁵⁷ This test comes from Camp (2003, 2013, 2019a, 2019b, 2021).

²⁵⁸ Recall from section 2.4.c that a feature's epistemic load is directly proportional to the dependency of the rest of the explanatory framework on that feature. Because of this dependency, the feature must enjoy strong epistemic support for the explanatory framework to be stable.

²⁵⁹ See Camp (2013, 2021).

4.2.c. Dispositions of evaluation

An individual's motivations to act and her evaluative representations of the world around her are intimately connected, and this connection is often mediated through emotions. Emotions plausibly involve representing objects in the world as having evaluative properties (such as a feared object being fearsome), and, in the most basic cases, these evaluations might be nonconceptual.²⁶⁰ Supposing emotions are partly constituted by evaluative representation, they will tend to direct attention to their objects.²⁶¹ That is, the object often becomes suddenly salient precisely because it has registered to the individual as having a particular evaluative property. Attributing evaluative properties to objects in the world tends to produce motivations to action: broadly (though simplistically), we want good things to happen and bad things not to happen. Insofar as we judge ourselves to be practically efficacious in these happenings, we attempt to bring them about.

This link between evaluative representation and motivation to act complexifies for creatures like ourselves who have self-conceptions, hold deep and differing values, pursue long term projects, and can critically revise all of the above. How I will evaluate an event depends on how I am already inclined to represent the features of that event. For example, if I love all forms of wild foliage growth, I will evaluate the further spread of invasive wisteria in my back yard as good, and, other things equal, I will allow it to continue. If, on the other hand, I am worried that the wisteria is strangling trees or displacing native plants, I might take steps to reduce or eliminate the wisteria. Like dispositions of attention and cognitive connection, we usually already have dispositions to evaluate and respond to objects in the world prior to critically endorsing explanatory frameworks for those objects. A framework that comes to regulate my thinking must augment or displace my

²⁶⁰ See Tappolet (2012, 2016) for a compelling defense of this view.

²⁶¹ See Brady (2014, 2015) for a compelling defense of this view.

preexisting dispositions to evaluate and respond. The exception, of course, is the case in which one is learning about a new and unfamiliar object.

When I critically regulate my cognitive interaction with an object through a well-integrated conception of the object, I become responsive to that object in a new way. When I learn that the yellowing of leaves in my ivy indicates overwatering or too little sunlight, I will change how I care for the plant so that it gets the nutrients it needs. When I critically regulate my thinking about race relations with explanatory frameworks that better integrate the social structures that perpetuate the poverty of people of color, such as historical redlining and food deserts, I become more sympathetic to their plights and more supportive of political measures that correct for racial injustice.

Yet, as in the case of the other interpretive dispositions, infectious dispositions to evaluation can also be uncritically injected into a conception's psychological support network by a frame carrying a contagious explanatory framework. The Jim Crow image communicated many different negative evaluations of Black persons through its recruitment of the social norms of the day: through visual cues individuals would have found salient, Jim Crow was framed as lazy, lascivious, and unintelligent. Making sense of the frame as evaluative requires that one thinks of Jim Crow as having these evaluative properties, which thus reinforces these evaluative attributions in the mind of the one who understands the frame. And, again, this can happen against one's will. Merely thinking the thought further entrenches the interpretive disposition.²⁶²

At this point it may help to explicitly describe the infectious disease/immune system metaphor I have been using. A virus has a genetic core that it inserts into a cell to transform the functioning of that cell. The body of the virus functions to protect that genetic information, attach to a cell, and inject the genetic material into the cell. The genetic code, once added to the code of the

²⁶² Camp (2013) makes this point painfully obvious.

cell leads to a change in the cell's production of the proteins which serve various mechanical and chemical functions. On this analogy, the artifactual frame corresponds to the outer shell of the virus: just as a virus must have an appropriate receptor to attach to a cell, a frame must be designed to be readily interpretable within its cultural context. And it does this by embedding culturally available gestalt patterns. The genetic code of the virus corresponds to a perspective. Just as the virus's genetic code changes the functioning of the cell, so the frame's embedded perspective changes the individual's psychological network which functions to support and maintain this particular conception. Just as the frame must be designed to slip past an individual's cognitive protections by incorporating features the individual is likely to already find both salient and significant, so too must the perspective resemble the individual's prior interpretive dispositions. Finally, the resulting functional changes to the cell correspond to the explanatory framework which, once changed, produces lasting and relatively stable changes to the individual's cognitive interaction with the object.

4.3. Holistic unification of interpretive dispositions and explanatory frameworks

In this section, I will show, following Camp, that interpretive dispositions form holistic networks which are generative and supportive of proprietary explanatory frameworks. I will also extend Camp's account to show that the leading phenomenon in the feedback loop between disposition and representation depends on whether one has critically assented to the explanatory framework. If so, then representation leads; if not, then disposition leads. This difference has significance for the cultural artifacts by which explanatory frameworks and interpretive dispositions are propagated: some artifacts function as pedagogy and others as propaganda.

Dispositions of attention, representational connection, and response are foundational mental capacities. Any creature that needs to process activity in its environment and assess changes to

behavior on-line will need to develop dispositions that attune it to the right features, generate the right mental processes, and motivate the right responses. Likewise, we unsystematically develop such dispositions as contingent responses to the events that matter to us. As the above discussion suggests, these dispositions tend to form in mutually reinforcing clusters which constitute a self-reinforcing holistic network of tools for interpreting. As I become familiar with an object, I develop cues for attention, patterns of cognitive connection, and patterns of evaluative assignment which interlock with one another to enable my seamless interpretation of events, which is on-line with my response to those events. Habitual physical and cognitive interaction with an object both reinforces these dispositions and brings them into better coordination with one another.²⁶³ This mutual coordination of dispositions ensures their seamlessness, as they simultaneously become more and more stabilized through repetition.²⁶⁴ Because these networks of dispositions are holistic, stable, and not always voluntary, Camp calls them *perspectives*.²⁶⁵ This is a technical usage of the term, so it needs to be kept distinct from the technical concept of a *point-of-view*, which is the origin of representation in a creature that represents egocentrically.²⁶⁶ On this distinction, a creature can only ever have one point-of-view. But since it is possible for us to switch from one holistic network of interpretive dispositions to another, we can have many different perspectives.

Perspectives which function to explain are typically generative of guiding representations, which, recall, includes both the gestalt patterns in the features of conceptions and the explanatory structures that organize those features into unified wholes. Because our conceptions develop in the direction of our interests, the patterns we notice in the features of objects will usually conform to

²⁶³ See Andrews (2015).

²⁶⁴ Similar to a style. See, for example, Flores (2022) for an account of the features of distinctive epistemic styles.

²⁶⁵ Camp (2017, 2019a, 2019b, 2021).

²⁶⁶ This technical usage comes from Burge (2010). Note that we commonly use both ‘perspective’ and ‘point-of-view’ to communicate both usages. That is, in common discourse, they are synonyms with ambiguous meanings. I separate them for the purpose of distinguishing these two uses.

our dispositions of attention. And the significance we take these patterns to have will usually conform to our prior dispositions of connection and evaluation. A perspective, then, is generative of a distinctive explanatory network which organizes the conception in ways that conform to the perspective.²⁶⁷ For example, someone whose primary interaction with plant life is occasional lawn care might not notice the early signs of autumn in trees, since she is not terribly interested in the trees, but in the grass underneath. To her, autumn seems to begin with the sudden accumulation of leaves on the grass. Her conception of the time frame for autumn conforms to her dispositions of attention to plant life. Another example: suppose an individual notices that water swirls down a drain in the opposite direction than she is accustomed to. And she notices this while traveling. But if she does not know about Coriolis effects, she will not be inclined to connect this phenomenon with gravitation and wind patterns on a rotating planet. Instead, she will think it has something to do with the shape of the drain, water flow patterns before draining, or the direction the water jets in a toilet point. (In fact, this is correct. The Coriolis effect is too weak to affect toilets, sinks and bathtubs.) Her dispositions to connect features govern and constrain the possibilities for her conception about water flow.

However, critically assenting to an explanatory framework is also productive of a perspective that is supportive of the framework.²⁶⁸ An integrated conception will have attributions of salience, patterns of cognitive connection, and evaluative attributes as part of its supportive psychological network. If an individual is told that the Coriolis effect causes water to swirl in one direction or another depending on which hemisphere she is in, this newly acquired explanatory framework instantly generates new salience attributions. Previously, she did not pay any attention to swirl patterns because she did not expect to find a pattern; now she expects a pattern and looks for it

²⁶⁷ Camp (2019a, 2019b, 2021)

²⁶⁸ Psychologists often refer to this phenomenon as ‘cognitive bias’.

when she travels. Likewise, if she does notice differences in swirl patterns, she will (incorrectly) include the Coriolis effect as the primary explanatory mechanism.

Assenting to an explanatory framework with evaluative content will also tend to generate new evaluative dispositions. A religious framework typically includes evaluative attributions (e.g., sins and graces), so conversion to a religion will tend to instantly reconfigure some of these dispositions. But, as the discussion in section 3.5 showed, instant acquisition of new dispositions from an explanatory framework one critically assents to is limited. First, one can only comprehend so much of the new framework at a time, so dispositions associated with a richer understanding of the framework will be inaccessible until a later iteration of integration. Second, the relevant features of the explanatory framework need to arise in one's normal cognitive interaction with the object of the integrated conception, but this response does not always follow critical assent to an explanatory framework: one might forget or just not care. Only so much regulation is possible all at once, since explanatory competence comes only with time and practice.

The above two points—that our interpretive dispositions are productive of explanatory relations and that attributions in our explanatory frameworks are productive of interpretive dispositions—entail that there is a feedback loop between representation and interpretive disposition. This feedback loop is self-reinforcing and self-stabilizing. That is, perspectives are sticky: once we acquire them, they are difficult to dislodge.²⁶⁹

When an explanatory framework is critically regulative, the representation will generally be the leading phenomenon in the feedback loop. If I am attempting to understand electrodynamics by reading a textbook and working through problems, I reflectively use my grasp of the framework to condition and deepen my interpretive dispositions. However, for explanatory networks to which I

²⁶⁹ Camp (2021) discusses this point at length. I will return to it in section 4.8.

have not critically assented, *dispositions* will often be the leading phenomenon. In such cases, we unreflectively pick up interpretive dispositions piecemeal, and their unification under a holistic explanatory framework only arises after the explanatory network forms in response to the dispositions that have infected our cognitive interaction with the object. For example, we are culturally conditioned to interpret certain features as indicative of, essential to, and distinctively evaluative of being a woman. In continuing to use these infectious interpretive dispositions, we generate explanatory structures for conceptions of womanhood, but these structures might not be easily unifiable into a single, coherent explanatory framework. Whether they are capable of such unification depends on whether the culturally propagated perspective for the concept WOMAN will, through further collection and integration of features, ultimately produce a coherent framework.

A perspective, then, in addition to being a holistic network of interpretive dispositions, also functions to be a procedural directive to construct and integrate an explanatory framework. The framework that results will be dependent on and limited by the holistic network of interpretive dispositions that constitute the perspective. In the cases of infection and uncritical assent, an individual is not occurrently attempting to construct a coherent, unified explanatory framework, so there is no reflectively stabilizing element in the process. Instead, stability must come from outside, which is why frames are characteristically the origin of uncritically acquired explanatory frameworks. Thus, frames for explanatory frameworks come in two varieties: pedagogy and propaganda. Pedagogy is a frame that is designed to enable critical regulation. Textbooks are a paradigm instance. Propaganda, on the other hand, is a frame that—whether by design or not—infects us with a particular perspective without the need for critical or even reflective assent, thus encouraging an individual's acceptance of its associated explanatory framework. I will return to the pedagogy/propaganda distinction in section 4.8.

4.4. Conative commitment: contraction and investment

The self-reinforcing nature of perspectives and the effortlessness of following existing dispositions together entail that intentionally changing one's perspective will be effortful. Dispositional competence with a new explanatory framework comes slowly. One can only reflectively acquire interpretive dispositions that follow from what one comprehends, and even these require the individual's ongoing commitment of cognitive resources to develop the comprehended explanatory framework into its associated interpretive dispositions. For example, occurrently defaulting to seeing rainbows as light refracted through water droplets at 42° sometimes requires *conative* commitment to the project of developing a habit of seeing in the rainbow a nature that is not culturally prominent. Conative commitment becomes even more important when the correct explanatory framework is not obvious. When stock markets take a dive, there are many competing and conflicting ways to explain the event, with no guarantee that any explanation is accurate enough for one to actually understand what happened. Each way of explanatorily framing the event would require committing time and cognitive resources to develop my competence. But my time and cognitive resources are limited. Becoming competent with even one available explanatory framework is a pragmatic or conative commitment which might not strike me as worthwhile.

Conative (or pragmatic) commitment is distinct from doxastic commitment. Doxastic commitment, which I have called 'assent', is probably a necessary condition for understanding in its representational sense. If it were not, I could understand an object through a representation I reject. However, conative commitment is probably also a necessary condition for understanding in its aspirational sense because one must commit the time and effort it takes to achieve explanatory competence. Doxastic and conative commitment, however, are closely related and often reinforce one another. There are at least three ways to conatively commit time and resources to an explanatory

framework: *contagious contraction*, *cultural hegemony*, and *intentional investment*. These three ways to commit cognitive resources correspond to the three ways of acquiring a guiding representation: mere contagion, uncritical regulation, and critical regulation (respectively).

An explanatory framework that regulatively recruits one's cognitive resources must at least be *contractive*. I will say an explanatory framework is 'contractive' when it connects seamlessly with the existing gestalt patterns one finds in that content, regardless of whether those patterns are innate or habituated. Note that a framework may be contractive to one person and not another (she is immune). An analogy to perception will help make sense of this idea. In visual systems, there are many lawlike principles or rules according to which sensory patterns are translated into perceptual features.²⁷⁰ For example, nuances in light gradients reflecting from surfaces translate into a perceptual attributions of surface shape, such as a corner, depending on how gradual the light gradient is. A light gradient characteristic of a corner can be produced without the object actually having a corner, but it will still translate in the visual system as a corner. A corner-like light gradient is a pattern in visual sensory information whose natural gestalt, according to inaccessible, sub-personal, lawlike principles in the visual system, is a representation as of a corner.²⁷¹

Conceptions gather representational content about an object, as if gravitationally.²⁷² All content about an object is indexed to that object in my memory, without my needing to consciously index it. Within the content of a conception, features I attribute to the object will form patterns. Some of those patterns will seem more explanatorily significant than others. For example, patterned association between diurnal fluctuations in temperature and light seems like a very explanatorily significant pattern. So, I expect that a good framework will explain the connection between

²⁷⁰ See Tse and Palmer (2012) on perceptual gestalt groupings.

²⁷¹ See Palmer (2002), pp. 122-133 for a brief treatment of visual constancies. See Burge (2010), pp. 351-354 for a discussion of the relevance of these constancies to the perceptual representation system.

²⁷² I introduced this point in 1.1.c.

temperature and light and the regularity of their fluctuation in a single, unified way (in this case, rotation of the earth in relation to a distant source of both light and heat). Patterns that seem explanatorily significant, even in the absence of a framework that gives such an explanation, are gestalt patterns within one's conception. They are not perceptual gestalt patterns, since they do not affect my perception of light, heat, and diurnal cycles. Unlike the visual system, however, the lawlike principles according to which gestalt patterns appear in a conception are probably *not* all inborn and sub-personal. Rather, patterns that seem explanatorily significant come to seem so partly in virtue of the kinds of explanations to which I have become acculturated. That is, they are at least partly dependent on my existing interpretive dispositions. Some gestalt principles in conceptions might well be inborn, such as what psychologists catalogue as cognitive biases.²⁷³

Contractiveness, then, is when an explanatory framework explains the gestalt patterns in an individual's conception, which leads to the sense that the framework presents a *natural* way of explaining the object.²⁷⁴ Contraction, however, does not require assent, conscious commitment of resources, or even effort. A racist slur or trope, for example, might be contractive because it organizes a conception of a racial group according to patterns that one has been acculturated to find explanatorily significant.²⁷⁵ When an explanatory framework is contractive, it is difficult to resist thinking about the object in that way. Recall the immune system metaphor: once a virus has injected genetic material and recruited the cell, the rest of the body must actively destroy infected cells to stop the infection. The contractiveness of the framework ends up recruiting one's cognitive resources and time into the reinforcement of the framework, even against conscious resistance.

²⁷³ See, for example Kahneman (2011).

²⁷⁴ The corresponding claim in aesthetic judgments has empirical support. Reber, Schwartz, and Winkielman (2004), for example, found that the distinctive patterns of an individual's processing fluency influenced their judgments of aesthetical beauty.

²⁷⁵ Camp (2013) shows how slurs can reinforce themselves in our minds without our voluntary participation and even against our active resistance.

Since this phenomenon is an instance of the relationship between representation and disposition, it is strengthened by the feedback loop between the two: contractive frameworks, once acquired through contagion, produce associated infectious interpretive dispositions; while infectious interpretive dispositions produce associated contractive frameworks.

Intentional investment, on the other hand, is reflective, voluntary commitment of time and cognitive resources. Investment often involves contractiveness: if we are interested in understanding the object, we often choose to deepen and develop a conception under an explanatory framework that is already contractive. That is, it offers a good way to structure and facilitate further understanding. But investment does not require contractiveness. I might invest in a wholly alien explanatory framework because an authority whom I trust (such as a physicist) recommends it. Yet the project of achieving explanatory competence will change my gestalt patterns into ones that make the explanatory framework contractive. So, contractiveness is necessary for explanatory competence. Investment, however, is not necessary for explanatory competence. I might acquire both a framework and its perspective through implicit enculturation, if the perspective enjoys *cultural hegemony*. Being a participating member of the culture through which I am exposed to the explanatory framework will tend to deepen my grasp, regardless of whether I critically assent.

However, enculturation tends to subvert voluntary effort. The culture in which I am embedded will tend to gradually affect my conceptions whether I realize it or not. Thus, the motivational source for committing resources in cases of uncritical regulation is typically both contraction and *cultural hegemony*. Conversely, in cases of critical regulation, the capacity for reflective evaluation and revision of my representations enables me to self-direct my comprehension and competence efforts, even against infectious or culturally hegemonic perspectives and their accompanying frameworks. Instead of allowing my time and cognitive resources to be recruited by

whatever framework is merely contractive or is part of my culture, I can commit time and resources to the intentional study, development, and manipulation of a well-integrated conception. *Investment, as I am defining it, is distinctive to critical regulation.* However, unlike deepening my grasp through mere contraction, investment is effortful and so requires motivation. I need a motivating reason to invest in deepening one explanatory framework rather than its rivals, and to deepen it according to one path of development rather than another. It might seem that I would just choose the more contractive explanatory framework to invest in, but contraction is often not a sufficient criterion of choice for investment: sometimes there are competing accessible contractive options, as when one is deciding whether an acquaintance is trustworthy. And there are almost always competing *possible* contractive options, as when one is considering investment in religious frameworks.

This is the motivational gap: attaining critical regulation requires investment of cognitive resources, but we first need a reason to invest. Resonance, I suspect, is what fills this motivational gap. That is, since contractiveness (a) does not control for error and lacuna in the emergent gestalt patterns in the features of a conception and (b) is not sufficient for motivating one contractive explanatory framework over another, we need recourse to some different source of motivation to invest in the framework. We need a basis on which to critically prefer a framework. To see how resonance fills this motivational gap, however, we will need to attend not just to the *development* of a single explanatory framework, but to transitions from one framework to another: that is, transformations of already integrated conceptions.

4.5. Transformations of explanatory frameworks

In the virtuous case, we encode an explanatory framework as critically regulative of our cognitive interaction with an object. In such a case, the leading phenomenon is not the network of

interpretive dispositions (that is, the perspective), but the explanatory framework itself. Investment in a framework will gradually generate the supporting perspective. The question for this section, then, is this: exactly what happens when an explanatory framework transforms through critical reflection? Since one cannot usually comprehend an explanatory framework in its fullness all at once, motivation to invest comes from the promise of a future, more established, more granularly comprehended, and more familiar iteration of the framework. One must somehow prejudge what the explanatory power of a future iteration of the framework will be. Even in the most authoritatively supported cases, such as a well-regarded textbook on electrodynamics, the individual's cognitive interaction with the object of her study cannot be governed by her appreciation for the explanatory framework presented in the text. She will often not understand electrodynamics well enough to know for sure that she will be motivated to complete a course of study on it, nor that she will remain interested in it once she comes to see what the object of her study is.

What draws us to invest in a particular way of understanding an object? In the case of electrodynamics, investment is often instrumental to a larger understanding project: the student wants to study physics, and electrodynamics is an important part of physics. But this just pushes the question back to investment in a framework for understanding physics. Broadly, a person might want to be a physicist either because she is curious about questions that she has come to learn are in the domain of physics or because she wants to participate in some practical project that requires an understanding of physics. Yet, these are motivations to understand a particular *object*; they are not motivations to understand a particular object according to a particular *explanatory framework* (and its proprietary perspective). The vast majority of electrodynamics students adopt their explanatory

frameworks from teachers and textbooks, all of which offer similar ways of organizing the content. That is, the correct way to understand electrodynamics is not disputed except at the margins.

Consider a very different object of understanding: one's colleague. In this case, the boundaries of the object of understanding are already clear, but there is no authoritative source from which to adopt one's explanatory framework. Who knows my colleague best? Perhaps her family, but I am not socially positioned to interview them. Moreover, individuals often (and tragically) hide penetrating truths about themselves from their families, and even from themselves. The one most authoritatively positioned—my colleague herself—might not be able to organize her own self-conception under a coherent explanatory framework.²⁷⁶ These limitations present difficult choices for an explanatory framework right at the beginning: do I interpret my colleague as approximately authentic in her self-expression? The specter of potential inauthenticity looms at every turn. Even a hedging principle, such as that most people are attempting to be authentic but have pockets of inauthenticity, offers no way to decide which personality features I should treat as authentic and which as masks. Moreover, individual behaviors and expressed attitudes commonly admit multiple possible interpretations, many of which it would be inappropriate to directly ask my colleague about.

These two cases, despite all their contrasts, share a distinctive feature. In both cases, I must place my hopes for coming to a deeper understanding of the object of my interest on unstable ground. In the case of electrodynamics, the problem is that I do not yet know what the object of my interest is. My course of study might reveal that I was never interested in electrodynamics after all. In the case of my colleague, I do not yet have a way to stabilize preference for an explanatory framework. My efforts might ultimately produce a grossly inaccurate framework for interpreting my colleague. In both cases, the explanatory framework with which I begin probably will only

²⁷⁶ I will revisit this thought in section 5.7.

approximately resemble the explanatory framework I will have encoded in long-term memory once I achieve explanatory competence. That is, I must, paradoxically, be motivated to invest time and cognitive resources into developing an explanatory framework to which I do not yet have cognitive access.

Except in rare cases, the path to explanatory competence will pass through multiple *transformations* of explanatory frameworks and so also multiple changes to the constituting dispositions of the framework's proprietary perspective. That is, in my effort to work toward understanding-as-mastery, there will be successive stages at which the explanatory framework that organizes my conception is not numerically identical either to what came before or to what comes after.²⁷⁷ Transformation of an explanatory framework is distinct psychological process from development of an explanatory framework.

There are countless ways to organize features into an explanation, but, broadly, explanatory frameworks have levels of granularity. At the highest (least granular, most central) level, the framework connects the largest, most important features of the object into a structural arrangement of the object's proposed unified nature. The features at this level will be the ones the framework presents as most central or most essential to the object. We often have only partial frameworks and use multiple disjointed explanatory structures to explain different parts of objects at this highest level. Even so, developing a framework extends downward from this level. Once I have the larger features stabilized in mind, I can flesh out features at the next level down. Stability at the higher level enables me to experiment and make changes at the next level without threatening the stability of the entire structure. To put the same differently: at lower (more granular, less central) levels of explanatory structure, I will be aware of and sensitive to the limitations that the higher-level features

²⁷⁷ Recall that I introduced the notion of numerical identity of conceptions in 1.2.

impose on the lower, thus enabling me to consider different explanatory relations at lower levels that can be interchanged as modules which do not affect the higher-level structure.

The above account is an idealization. Although the paradigm of conceptions is unification under a single top-level structure, sometimes this level is underdeveloped or entirely absent. This is often the case in our conceptions of other minds. In such cases, we organize lower-level explanatory structures into a loose set of connections that will aspirationally fit into a larger, coherent whole—even if we never construct such a unifying structure.²⁷⁸

Here is an oversimplified example: a theory of the nature of a cardiac cell must be sensitive to a theory of the nature of the heart, but there is plenty of room for variation and exploration in theorization without threatening the gross, well-understood features of the heart and its position within the circulatory system. Developing my conception of the heart requires stabilizing the gross features of the heart and the circulatory system before I tend to the nuances of cardiac cells. What makes this example oversimplified is that the process of learning and development is not typically so linear. I might pursue both lines of inquiry simultaneously. Additionally, changes to my conception of cardiac cells can redound into changes to my conception of the heart, due to the higher-level properties that result from changes to lower-level properties: many lower-level explanatory structures are not and cannot be perfectly modular. In describing these levels of explanatory structure, I am not attempting to account for the order in which our explanations actually develop; rather, I am describing the hierarchical structure formed, and the natural direction of development which does not yet involve a transformation. Typically, when we are actively learning, we flit back and forth between development and transformation.

²⁷⁸ Thanks to Elisabeth Camp for pressing me on this point.

By contrast, an explanatory framework transforms when I replace parts of the explanatory structure rather than merely add to it or extend it downward. Transformations, too, can occur at different levels of granularity. However, the deepest and most thoroughgoing transformations occur at the highest levels. Transformations of an explanatory framework typically require rethinking relations between the features of the object at multiple levels of granularity. They also require reassessing the epistemic support structure, since changes to the explanatory structure will produce changes in the epistemic load that theoretical features attributed to the object must bear. For example, the phlogiston theory placed a heavy epistemic load on its central doctrine: that all combustible materials have a common constituent. The claims that supported the phlogiston doctrine, such as that mass is always lost in combustion, also bore a heavy epistemic load. They needed significant epistemic support for the explanatory structure to be stable. Transforming the framework for combustion to the modern view of combustion chemistry removed these epistemic loads and distributed them to exogenous transfer of heat during a chemical reaction and to oxygen as a fuel source. Oxygen was able to bear this epistemic load because it was found to be ever-present in our atmosphere and hence ubiquitous in instances of combustion. This made the oxygen framework more stable and malleable than the phlogiston framework.

Recall that the project of working toward reflective equilibrium as warrant for a conception simultaneously deepens one's grasp of the explanatory framework and warrants one's increasing confidence in it.²⁷⁹ Now we can see that there are two distinct iterative processes that must occur in the project aspiring to wide reflective equilibrium. The process of deepening one's understanding by integrating a conception with an explanatory framework requires that one iteratively move back and forth between development and transformation phases. However, this iterative process is *additional to*

²⁷⁹ See sections 2.4 and 3.4.

and stacks atop the alternating construction and integration phases that occur during discourse comprehension (or during any intentional effort to form an explanatory framework). Recall from sections 2.4 and 3.4, that in constructing an explanatory framework, an individual first establishes a network of explanatory relations through a series of inferences. Then, to integrate these explanatory relations with the features of her conception, she (usually implicitly) checks the coherence of the explanatory framework against those features and against each other. In doing so, she must adjust the epistemic support structure to accommodate the new epistemic load demands of the explanatory framework. Where she finds incoherencies, she returns to the explanatory framework to transform it. Then she checks again for coherence and adjusts the epistemic support structure again. Once this framework stabilizes, she will need to seat it in her long-term memory through repeated use. Later, she can commence her next effort at comprehension as a developmental effort that builds on the previous, high-level explanatory framework. However, should she discover that she had made errors at higher levels, she will need to return to that original integrated conception to transform the explanatory framework and re-engage the iterative process of construction and integration. So, we see that alternating between transformation and development is a long-term project, and that alternating between construction and integration is part of the transformational phase of this project. Development tends to reveal problems in the broader explanatory structure, which necessitates transformation, which then requires reconfiguring the epistemic support structure, which leads to further development, which reveals new problems, and so on. Through these repeating stages, if all goes well, we work toward increasing both grasping and accuracy, on-line with one another, by approximating wide reflective equilibrium.²⁸⁰

²⁸⁰ See Elgin (1996), chapter 4 for a detailed examination of the epistemic features of reflective equilibrium. See also Rawls (1974) and Goodman (1955).

4.6. Guided transformations

I have chosen the term ‘transformation’ to describe these kinds of changes to an explanatory framework because this phenomenon shares common features with transformative experiences more broadly.²⁸¹ In fact, a transformation of one’s conception either about oneself or about some part of the world typically features as an important part of transformative experiences.²⁸² Transformative experiences involve pursuing values that one does not fully appreciate or does not yet even have until the transformation is complete. In retrospect, one discovers that transformation was justified and that it was the only way to pursue the values one now has. Yet, since the values one will have at the end of the transformation are not accessible prior to transformation, this makes the motivation to transform difficult to explain. It seems to be a rational pursuit, but for what kind of reason does one act if the values that justify the transformation are not yet accessible?

In this section, I will argue that a virtuous understander must learn to progress from epistemic touchstone to epistemic touchstone. However, stringing together these steps from one orienting framework to the next requires that the understander has access to a consistent source of epistemic orientation, or a ‘lodestar’ as I call it. Sensitivity to mutenesses and resonances is the lodestar that appropriately orients us in moving from touchstone to touchstone. It is the mechanism by which we avoid both dogmatic commitment to a touchstone and dogmatic avoidance of a touchstone. And if this is right, then the resonance mechanism can answer the puzzle about how successive paradigms can be incommensurate with one another yet constitute distinct stages in a rationally-motivated and progressive research arc, even at the individual level.²⁸³

²⁸¹ See Ullmann-Margalit (2006) and Paul (2014) on the problems transformative experiences raise for decision theory. Wilkenfeld (2017b) argues that even coming to understand logic can be transformative in ways that parallel becoming a parent.

²⁸² Paul (2014).

²⁸³ See Kuhn (1996), pp. 199-207 for an expression and attempted resolution of this puzzle at the level of a scientific community. Kuhn’s general solution was to expand the notion of rationality to include revolutionary science. My view is

4.6.a. The proleptic promise of an explanatory framework

Agnes Callard (2018) introduces the notion of a ‘proleptic reason’ to explain rational motivation for aspirational pursuits which require transformations along the way. A proleptic reason is one to which an individual only has partial access, but that partial access is sufficient to motivate her toward the transformations which would grant her full access. It is an immature reason which promises a mature version in the future, should the individual act on it. Callard draws on the example of a person who takes a music appreciation course for the purpose of coming to appreciate music. She does not yet appreciate music, for otherwise she would not need the course. But if she were completely indifferent to music, she would not bother attempting to change her appreciation. She values music, but not the way she would like to, and she suspects that valuing music differently will be a good way to be. She cannot foresee the real value that music will hold for her, yet she suspects it is available if she aspires to it.²⁸⁴

Proleptic reasons, or partially accessible reasons, are a necessary form of motivation for rationally aspiring to be morally better than we are.²⁸⁵ For Callard, “[a]spiration is the diachronic process by which an agent effects change on her own ethical point of view. Aspirants aim to direct their own ethical attention in such a way as to more fully appreciate one value or set of values, and to become immune or insensitive to those values which intrinsically conflict with the first set.”²⁸⁶

This notion of aspiration is also applicable to the epistemic values motivating investment in a partially integrated explanatory framework which seems to promise a mature version of itself. The

compatible with Kuhn’s and expresses the mechanism at work, both at the individual level and in non-scientific domains of theoretical understanding.

²⁸⁴ See Callard (2018, 52).

²⁸⁵ Callard methodically shows that common alternatives to proleptic reasons, such as vague reasons, approximating reasons, or pretend reasons, presuppose proleptic reasons when they are used to explain instances of aspiration. See Callard (2018, 45-50).

²⁸⁶ Callard (2018, 77).

individual takes the inaccessible but mature version of the framework to be much more illuminating than her current version, and, if she is wise, she recognizes that the mature version will probably also be radically different from the immature version to which she has access upon investing. The current framework is inadequate, not compelling on its merits alone. Yet it apparently carries within itself a seed of its mature self.²⁸⁷

Applying Callard's account of proleptic reasons and aspiration to the epistemic domain still leaves some questions unanswered. What does it mean to see in a rough and inadequate explanatory framework the promise of a satisfying explanation? Supposing I locate the promising part, how do I follow a path of maturation when I don't know what the mature version will look like or which transformations will get me there?

A conception might face many dramatic transformations of its explanatory framework over the course of its lifetime. My conception of my colleague might begin with the sense that she is authentic but aloof, progress to the sense that she is rigid and judgmental, and land on the sense that she is manipulative and small-minded. As I spend more time with her, I add more content to the conception, all of which I aspire to integrate under an explanatory framework. When the current explanatory framework proves inadequate, I might become open to a new one. Yet, each transformation introduces a numerically different explanatory framework as an organizing structure for the conception. But then it is hard to see how the string of consecutive transformations is a

²⁸⁷ Translating Callard's work from ethics to epistemology brings us very close to Talbot Brewer's (2009) concept of a "dialectical activity," in which one engages in a practice motivated by partially appreciated values. As one continues in the practice, the values native to that practice gradually reveal themselves. Brewer, however, is concerned primarily with the value of practices, not with the accuracy of representations. Investment in an explanatory framework does involve the dialectical practice of coming to understand, but this is a practice whose internal values are available to anyone who has come to understanding something before. My question is not what makes coming to understand valuable; rather, it is what makes investing in a future version of an explanatory framework seem valuable even before one can comprehend it.

progressive process of deepening understanding according to a framework.²⁸⁸ Investment seems to require developing a *specific* framework, and not a somewhat similar, but numerically different framework. Yet, developing that framework reveals its inadequacies and leads to transformation. Must I then reinvest? What makes the progression from one numerically distinct framework to another a distinctive pathway in which I can invest, to the exclusion of other pathways?

One way to respond here is that a perspective does not face the same problems of transformation as its accompanying explanatory framework will. A perspective—that is, an open-ended, holistic network of interpretive dispositions—will tend to be relatively consistent across transformations because it is part of what generates those transformations.²⁸⁹ The increasing and compounding salience of certain features and their apparently appropriate connection to other features drives the transformative progression from one iteration of an explanatory framework to the next. In this way, the seed of the mature explanatory framework is embedded, not in the immature framework, but in the perspective that generates and maintains my grasp of that framework. For example, as property relations become more salient to my social interactions, and such relations become more and more connected in my thinking to the various legal and moral rights I attribute in the social world, my thinking will trend more and more toward American right-libertarianism. A relatively standard libertarian explanatory framework is the likely end-state of this perspective even before I become acquainted with such frameworks.²⁹⁰

Yet this reply only pushes the question back. Suppose a perspective does survive the iterative transformation of its proprietary explanatory framework (as I think it does). If so, we might look to

²⁸⁸ This problem parallels worries in Kuhnian thought in the philosophy of science that moving from paradigm to paradigm is not a progressively building affair, but merely a change between incommensurate theories. See Kuhn (1996) and [cite the worry].

²⁸⁹ Here, again, my view aligns with Camp's. See Camp (2019a, 2019b, 2021).

²⁹⁰ As can be found, for example, in Nozick (1974).

perspectives as the rational source of proleptic reasons for transformations of explanatory frameworks. But this leaves us with two more questions: First, what establishes numerical identity of perspectives? And second, how do we rationally transform our perspectives?

4.6.b. Touchstones

I will begin with the question of the numerical identity of perspectives. My answer, in short, is that numerical identity of perspectives depends on there being some stabilizing feature of that perspective. And different perspectives have different stabilizing features. The list of options for a stabilizing feature is not very long.

Sometimes what is consistent in a perspective is a particular part of the framework, a *doctrine*, usually situated at the highest level of the framework. The active study of phlogiston theory during its heyday, for example, involved the progressive development and transformation of explanatory frameworks which held fixed the doctrine that every instance of combustion involved the release of the same kind of substance into the air. Development and transformation, then, was the process of accommodating the evidence that scientists collected as they attempted to work out the details of the doctrine. Abandoning phlogiston theory altogether as a research project meant abandoning this doctrine.

But there might not always be a single, consistent, high-level explanatory feature whose removal would amount to abandoning the understanding project and the perspective that supports and maintains it. Whatever unifies a distinctive perspective and the collection of potential explanatory frameworks that might emerge from that perspective needs to be a stable, unchanging, guiding resource. That is, it needs to be a touchstone. A touchstone is a fixed point of reference by which one can always recalibrate one's position and trajectory. A touchstone is not a destination,

though it fixes the destination. A touchstone is like a landmark. It is a dependable method for assessing whether one is moving toward one's destination. In phlogiston theory, the touchstone was the presumed truth of the basic doctrine of phlogiston. A well-developed and predictive theory was the destination. Getting there required developments and transformations of explanatory frameworks that still left the basic doctrine intact. But it turned out that this touchstone could not guide researchers to their intended destination.

We also use authorities as touchstones. A well-respected textbook might be the touchstone I use to understand electrodynamics. In using the text this way, I take my end-state explanatory framework to correspond to the one the author was attempting to communicate in the text. Similarly, a well-respected expert might be the touchstone I use to understand the British monarchy or Christian cosmology. Here, my goal would be to understand the British monarchy the way the authority does. Or I might rely on a friend whose moral character I admire as a touchstone for understanding morality. In these cases, I invest in a single, consistent path toward explanatory competence, but no one feature need be held fixed across transformations. The authority against which I measure my understanding is what stabilizes my perspective and ensures that each successive transformation of my explanatory framework is a step toward my epistemic goal. Numerical identity of perspectives and their associated understanding projects is picked out by whatever serves as a touchstone for that perspective or project. When I invest, I invest based on the appeal of the touchstone. For this reason, any external frame, however vague, can also serve as a perspectival touchstone. Sometimes an ageing cliché is all that stabilizes a perspective, as might be the case with whatever wisdom remains in the phrase, 'A bird in the hand is worth two in the bush.'

Unfortunately, this answer also only pushes the question back. A touchstone stabilizes a perspective, which offers a progressive path across transformations of the perspective's explanatory

framework. Yet, understanding projects often also straddle perspectives. The project of understanding oneself will probably involve not only transformations of one's self-conception, but also of the perspective of self by which those transformations are guided. In transforming from one perspective to another, one abandons one stabilizing touchstone for another. Why should a new touchstone appeal? Why should I find a particular authority so trustworthy that I invest in understanding as they do? Why should I find a basic doctrine so compelling that I attempt to construct an elaborate theory from it? That is, what makes a touchstone a touchstone?

Worse still, a touchstone's capacity to guide me diminishes the further I have progressed beyond it. Suppose I no longer find the textbook or the expert helpful, but I want to further deepen my understanding. Suppose I lose my trust in the authority. Suppose I come to question the basic doctrine. A touchstone only stabilizes a distinctive perspective and its proprietary end-state explanatory framework. It does not stabilize the larger project of aspirational understanding. So, it cannot explain the motivation to invest.

4.6.c. The lodestar

What we need is not a touchstone, but a lodestar.²⁹¹ Like a touchstone, a lodestar is stable and unchanging. But unlike a touchstone, it lies always on the horizon and no amount of development or rethinking will make a lodestar irrelevant to one's aspiration to understand. A touchstone keeps one's thinking tethered to an apparently reliable source. A touchstone is limited: one might eventually advance beyond it and kick it away like a ladder ascended on a one-way journey. A lodestar, on the other hand, needs to be permanent because the aspirational project of

²⁹¹ Thanks to Elisabeth Camp for helping me appreciate distinction.

theoretical understanding is unending. But what should be the lodestar for an understanding project, or, better yet, for an epistemic life well-lived?

A candidate lodestar that immediately comes to mind is the set of well-known and well-regarded standards for good reasoning: careful inferences, attention to the breadth and limitations of evidence, awareness of potential errors, acceptance of fallibility, and so on. I take this list of guidelines to be an epistemically *grounding* resource. The problem with treating these standards as a lodestar is that they do not offer a direction of movement that lies ever on the horizon: a tool alone does not indicate the creative output possible through its use. Standard care in reasoning affords safety in treading the epistemic path, but it does not afford either direction or inspiration. And this is what we need from a lodestar.

Each of the above three features of an epistemic project contributes something different to the pursuit of understanding-as-mastery. A touchstone offers an intelligible landmark to first work toward comprehending and to later build upon as a familiar reference point. Standards of reasoning and principles of dialectic offer a reliable set of tools to ensure that one can move safely across unfamiliar territory. And a lodestar offers a constant, orienting reference point by which to identify the next landmark. A lodestar reminds us of the existence of the destination and the incompleteness of the journey.

Resonance is well-suited to being a lodestar. When a partially comprehended explanatory framework resonates, certain of its features will suggest fitting explanations for inaccessible content that is yet part of one's conception. If the individual registers the resonance, this will motivate treating the partially comprehended explanatory framework as a doctrinal touchstone. It can also motivate treating an expert or a text as an authoritative touchstone.

Resonance is not just well-suited; it is *uniquely* suited to being a lodestar. Since feelings of resonance change depending on the inaccessible content we collect and sharpens in response to the ways we develop an explanatory framework, they do not become obsolete and unhelpful the way a touchstone will when it is either fully understood or called into question. Additionally, far from making transitions from one touchstone to the next mysterious and apparently irrational, resonance motivates them. As one's explanatory framework develops and transforms under the guidance of a touchstone, the features of the touchstone that resonated are gradually revealed and incorporated into the framework. These changes to the explanatory framework open new possibilities for resonance and muteness which then guide her to a new touchstone. And this touchstone will hopefully provide the next needed changes to the framework that will bring it further into resonance.

Touchstones themselves can resonate. A doctrinal touchstone is just a resonating feature in an explanatory framework. But just as (part of) an explanatory framework can resonate, so can an authority that serves as a touchstone. An epistemic authority resonates when (a) it offers explanatory relations that resonate and (b) seems to be able to offer a fuller, more integrated account if one only attempts to understand the authority. A book that resonates tends to command the reader's attention to the end; a teacher who resonates tends to win a student's devotion to learning from her. Hence, resonance motivates us to invest in a succession of touchstones for stabilizing development and transformation of our explanatory frameworks in the aspirational direction of understanding-as-mastery. And it seems to be the only thing that can motivate in this way. Resonance, then, will be necessary for achieving explanatory competence whenever a single touchstone is insufficient for understanding.

The relationship between one's lodestar and one's touchstones also reveals the value of resonance in avoiding dogmatism. A touchstone is a source of explanatory relations that one draws upon for stability in developing an explanatory framework. It is a frame that carries a perspective. Some individuals seek only cursory comprehension and so do not need anything more than a single touchstone. However, the project of striving toward explanatory competence and ever greater accuracy in one's explanatory framework will almost guarantee that one will exhaust the epistemic value of any given touchstone. Suppose you are studying electrodynamics and the textbook no longer offers you anything you do not know. What are your options? You can find a more advanced textbook, find a teacher, or begin to develop further features of electrodynamics on your own. In the first two cases, you are simply searching for a new touchstone. If all you want to do is develop further downstream features of the existing framework, then you can use the trusted textbook as a guide to your next choice of touchstone. But the old electrodynamics book loses its value as a touchstone if you are considering a transformation that conflicts with the understanding offered by the textbook. If this possibility arises—and it always might—then you will need a new touchstone without being able to resort to coalescence with the old touchstone as guidance.

Rigidly clinging to a familiar touchstone prevents one from sincerely assessing whether it is time for a transformation. Refusing to transform an explanatory framework, even in the face of ever-multiplying mutenesses within it, is a breakdown of the iterative process by which grasp deepens and accuracy increases. It halts the understanding project in service of sticking to the preferred touchstone and the perspective the touchstone stabilizes. The authority or doctrine that had previously offered free explanatory exploration now becomes ossified as a dogma. Increasing mutenesses, then, reveal the inadequacy of the current touchstone just as resonances reveal the promise of the next appropriate touchstone. The epistemic virtue of open-mindedness, it seems,

requires sensitivity to mutenesses and resonances as a lodestar in moving from touchstone to touchstone. To my knowledge, there is no other psychological resource that can stabilize these transitions as progressive motions in a consistent direction.

4.7. Efficient transformations: aspectual thinking

If I am right and resonance really is the most suitable lodestar, this fact makes it possible to rely upon a third kind of touchstone, one which would otherwise be unstable and unlikely to offer a progressive pathway toward aspirational understanding: an *aspectual* touchstone.²⁹² One of the most notable forms of aspectual touchstones is metaphor. Often, when a satisfying explanatory framework is elusive and an individual can find no authority to trust, she will turn to an evocative metaphor. For example, psychologists in the late 20th Century turned to the computer metaphor for the mind as an evocative source of inspiration for research. The mind-as-computer metaphor is not a doctrine, since there is no one specific claim that stabilizes the perspective. Rather, the perspective adapts and adjusts as researchers learn more about both minds and computers. Just as a central doctrine or an authority can guide development and transformations of an explanatory framework, so too can an evocative metaphor guide these changes. And, as with any touchstone, aspectual touchstones also require motivation. However, whereas one can epistemically justify dependence on an authority or commitment to a doctrine, an evocative, guiding metaphor gains its warrant intuitively.

Aspectual touchstones capitalize on aspectual thinking. Conceptions, and the frameworks that organize them, are typically incompletely systematized. Conceptions generally also do not exhaust the features of the object represented: they are always poised for further development.²⁹³

²⁹² This is Camp's (2003, 2006) term of art.

²⁹³ See section 1.1.i

Additionally, we do not have explanatory competence with all our conceptions; some may even lack a unifying explanatory framework, never mind being integrated with one. The well-integrated conceptions with which we have explanatory competence, then, can be thought of as a *repertoire* of characteristic patterns by which we might readily understand objects. We can draw on this repertoire to make sense of confusing objects by changing our thinking about the confusing object to more closely resemble our thinking about some better understood object. In doing so, we think about one object *under the aspect* of another.

Thinking about an object under the aspect of another involves locating matching features in one's conceptions of both and then rearranging the explanatory relations among those matched features in the less understood object to resemble the explanatory relations of their correlates in the better understood object.²⁹⁴ For example, Shakespeare's metaphor 'Juliet is the sun' suggests that Juliet has the features of warmth, supporting life, and radiance.²⁹⁵ To make sense of the metaphor, these features must be thought of as central to Juliet's very nature, the way they are central to the sun's nature. Moreover, these very features suggested by the metaphor are, themselves, applied to Juliet metaphorically. That is, Juliet has a kind of warmth that is metaphorical to the sun's. So, one must think of the character trait we might call 'warmth' under the aspect of literal warmth. And so on. The recursive nature of this particular metaphor is part of what makes it so evocative.

Aspectual thinking is not limited to metaphors. In fact, we commonly use it to understand individuals as fitting instances of the kinds we take them to belong to. For example, suppose you discover that an acquaintance you had known to be reserved and modest had spent some time in her youth as a groupie for a rock band. Making sense of her membership in this category will involve

²⁹⁴ Feature matching can track identity, scalar similarity, structural analogy, and even metaphor (which entails recursion, but not regress). See Camp (2003), pp. 155-160.

²⁹⁵ This example comes from Camp (2003).

you adjusting your conception of her to fit your conception of the kind GROUPIE. You might entertain a just-so story in which the wilder days of her youth enabled her to exhaust any rebellious streak she had, laying the path for her to become more conservative in her presentation. You might also reduce the centrality of her modesty and reservedness in your conception from an in-born trait to a developed tendency or even down to a ruse she maintains merely to protect her career. You might suspect that she still sometimes escapes for a rambunctious party.

The value of aspectual thinking is that it enables the understander to draw upon subtle and inaccessible similarities between objects, including even *phenomenal* similarities. Recall that for any object with which I associate phenomenal features, those features will be presented to me as holistic unit, or a phenomenal nexus.²⁹⁶ Each feature's location in my attentional structure (that is, relatively focal or peripheral) contributes to the overall experience I have of the object.²⁹⁷ Much of the phenomena will be feelings, which I suspect cannot be remembered *as* phenomenal. Rather, they are remembered representationally. Hence, in remembering a headache I cannot induce the headache.²⁹⁸ However, *familiarity*, which is the most basic form of memory, is strongly affected by phenomenal imprinting.²⁹⁹ An object will feel familiar if its phenomenal nexus is similar to my previous experience with the object. Likewise, an object will remind me of another object when its phenomenal nexus is similar to that of an object I have previously experienced. I cannot recollect

²⁹⁶ I introduced this idea in section 1.1.f.

²⁹⁷ See Watzl (2017), pp. 193-208.

²⁹⁸ Remembered emotions, I suspect, are felt anew in virtue of their representational content. This phenomenon is not well studied. Most empirical work focuses on the descriptive accuracy individuals can provide of emotionally intense events; they do not examine the possibility of imprinting the affect itself, rather than a representation of the affect. See Christianson (1992) for a detailed review of this literature. At the very least, affect seems to be encoded in memory independently of cognition, as Zajonc (1984) shows.

²⁹⁹ This is an intuitively appealing claim, but it also has empirical support. Familiarity is broadly thought to be related to processing fluency, as Yonilinas (2002) outlines. This connection, however, does not explain the origin of processing fluency. Topolinski (2012) shows that sensorimotor interference inhibits familiarity but not recollection, which supports the embodied memory hypothesis. On this hypothesis, memory (especially familiarity) enmeshes representational and sensorimotor stimuli. See also Glenberg (1997).

the phenomenal content with which I have become familiar; I can only experience the familiarity when presented with a similar phenomenal nexus. Hence, the psychological content with which I am familiar is inaccessible. I can only access the familiarity itself. This is a form of resonance.

When we use one conception to structure another, we need motivation to do so. Sometimes an authority will provide a reason, as when a middle school science teacher instructs her students to think about subatomic particles as a tiny solar system. Other times, structural similarities between objects become apparent through study, as is the case between rats and humans. However, when neither trustworthy authorities nor satisfying epistemic support are available, a felt similarity between two objects can motivate recourse to thinking of the less understood object under the aspect of the more understood.

Using aspects as touchstones is often helpful in cases when achieving explanatory unification is important, but one is not positioned to engage in a careful study of the object. This limitation might be either pragmatic (no time) or epistemic (no means of knowing) in its origin. Hence, we typically rely on aspectual thinking in navigating social structures and individual personalities (for example, ‘North Korea is a rabid dog’ or ‘he’s our office’s quarterback’), gaining a cursory understanding of an object for some instrumental purpose (for example, ‘think of it like the DMV’), or organizing our highest-level conceptions, such as a worldview (for example, creation myths).

Through aspectual thinking, we import not only representational content and familiarity with an explanatory framework, but also the interpretive dispositions associated with the aspect. I might, for example, start thinking about close friendships under the aspect of marriages because the metaphor resonates. When I do so, forms of manipulation and betrayal that are salient in a marriage might turn out to have less dramatic correlates in friendships that I had not noticed previously. I might also begin to think of the commitment as more durable and loss of a friendship as something

to be grieved. Aspectual thinking capitalizes on resonance between my conception of the aspect and the object to which I apply the aspect. This resonance is why the aspect is evocative and helpful. And it explains why aspectual thinking is also helpful in careful studies of objects that are inherently difficult to understand. In this very chapter, for example, I have depended heavily on two evocative metaphors as a source of understanding about the nature of understanding: the pathogen/immune system metaphor and the treacherous hike metaphor.

The intuitive appeal of an aspect makes it difficult to fully specify *all* the features that the aspect seems to suggest about the object understood through it. A metaphor—if it is a good one—is striking and evocative, but the similarities between the aspect and the object remain nonspecific until carefully explored. And this is precisely the value of a metaphor. The evocative nature of a good metaphor is how the metaphor recommends itself to our thinking. But the hidden similarities between the two objects are the reason that the metaphor is evocative. These hidden similarities will register at an intuitive level, so the metaphor seems fitting, but the features that make it fitting are not occurrently established in the mind of the one who judges the metaphor to be fitting. These features must be discovered through thinking of the object under the aspect of the metaphor. Metaphors encourage us to think differently about an object or kind, often revealing truths that might not otherwise have occurred to us before applying the metaphor. Thus, while the evocative nature of a metaphor obscures the truths that make it evocative, examining the metaphor also reveals truths that would otherwise have been obscure.³⁰⁰

In progressing toward explanatory competence, a resonant metaphor can be a stabilizing touchstone which enables an individual to transform her explanatory framework without losing sight of the ultimate goals of explanatory competence and ever-increasing accuracy of representation. If

³⁰⁰ This point comes from Camp (2003).

dependence on this form of touchstone is warranted, it allows the individual to circumvent the slow process of forming, integrating and developing an explanatory framework for a conception. Instead, she can import an already integrated framework to which she is oriented and whose deployment in her thinking is fluent. By depending on resonance between inaccessible features of the object she wants to understand and the aspects available to her, she can progress from one aspect to another, following resonance as a lodestar for each new restructuring of her conception of the object. Hence, rapid access to explanatory competence seems possible, as long as the individual already has the needed aspects and faithfully follows the lodestar.

4.8. Perverse perspectives

The previous section offered an optimistic account of the potential value of evocative metaphors and other aspectual touchstones in progressing toward understanding-as-mastery. However, as Camp cautions her readers, aspectual thinking and the perspectives it capitalizes on are a double-edged sword.³⁰¹ Careful reasoning guided by resonance as a lodestar is the optimal scenario for using aspectual touchstones. It enables the possibility of aspectual thinking as a method for more efficient understanding. However, we frequently engage in aspectual thinking as a shortcut for understanding without maintaining these guardrails.

Recall that a ‘frame’, to use Camp’s term, is an external representation that characterizes some object (or kind) by presenting a contractive, holistic way of organizing features the object is known to have and incorporating these features with additional ones that are fitting for the object within this holistic representation. That is, a frame embeds a perspective with its proprietary end-state explanatory framework by organizing features according to patterns that are likely to appear as

³⁰¹ Camp (2021), p. 1.

gestalts for individuals within the culture the frame is made for. The frame, then, touches upon the existing perspectives (or interpretive dispositions) of individuals within its native culture as a way of introducing a new perspective to those individuals. For example, the slogan ‘Black Lives Matter’ is a frame that originated in American culture, and which embeds a perspective on which the differential regard our society has for the lives of Black persons and non-Black persons is made salient. It also offers a restructuring of one’s evaluative dispositions by encouraging individuals to care about the lives of Black persons as much as non-Black persons. In a culture without anti-Black racism, the slogan would not have this effect.

Recall the pedagogy/propaganda distinction from section 4.3. When a frame is designed to inculcate a critically regulative explanatory framework, we call it ‘pedagogy’. Textbooks are a paradigm case. When a frame is designed to spread through contagion or to win uncritical regulative status without the individual recognizing what is happening, we call it ‘propaganda’. And when the frame does not function to embed an explanatory framework, we call it ‘art’.³⁰² Naturally, many frames function to carry explanatory frameworks yet are not designed to do so, as when a new metaphor seems to suggest itself as if from nowhere and one simply mentions it to others as interesting. However, undesigned frames tend to function the same way as propaganda, since they rarely contain the features that make for good pedagogy.

Typically, propaganda disseminates an infectious perspective (and its proprietary end-state explanatory framework) by appeal to one or more contractive aspects. As suggested by the virus metaphor in section 4.3, an infectious perspective introduces a holistic interpretive approach, in which one’s already existing interpretive dispositions are recruited in the service of constructing and

³⁰² This is not meant to be a controversial claim. Art can, of course, embed explanatory frameworks, but unless it is also propaganda or pedagogy, it does not function to do so. These categories have fuzzy boundaries and probably manifest as graded spectra. Art can be more or less propagandistic; pedagogy can be borderline propaganda; etc.

integrating an explanatory framework in the mind of the individual, and *involuntarily*. Because interpretive dispositions are formed and reinforced habitually, the mere *use* of a perspective further embeds it in the mind of the individual, regardless whether one assents to the attendant explanatory framework. This way of cognitively interacting with an object becomes more accessible and more likely to take on default status in the individual's mind, simply because she used the perspective, even if only to make sense of the frame through which it was communicated. It infects the mind of the individual merely through recognizing the perspective on offer and minimally comprehending an immature version of its end-state explanatory framework. One contracts the framework just as one might contract a disease induced by a virus.

The enticing nature of propaganda paired with the inherent stickiness of perspectives suggests that aspectual thinking only makes it all the easier for an individual to get trapped within an inaccurate or even unintelligible explanatory framework. As Camp puts it, perspectives “are self-effacing, lurking in the background beneath the level of propositional attitudes we usually articulate and argue over.”³⁰³ It is not merely that reasoning has gone wrong, it's that we often do not recognize we are limited by the perspective according to which we judge what the evidence and terms of debate are (and ought to be). Because interpretive dispositions are cognitive tools through which we construct and integrate explanatory frameworks, they are often too close to see. For all these reasons, perspectives will arise in us unbidden and will become entrenched in ways that distort our cognitive interactions with the objects we attempt to understand.

If there is to be a responsible use for aspectual thinking, it needs to come equipped with a psychological mechanism by which we can escape a sticky perspective. Or, to recall the pathogen metaphor, the possibility of contagious infection with a perverse perspective requires that we have a

³⁰³ Camp (2021), p. 12.

healthy immune system that can identify and eliminate the invasive threat. Without an immune system equal to the task, evocative metaphors and other contagious frames should be seen as epistemic traps best avoided. Camp herself argues that one of our best immune defenses is the virtue of open-mindedness.³⁰⁴ We must be prepared always to entertain new, rival perspectives, both to reveal to ourselves the features of our default perspectives and to challenge those features. However, with open-mindedness comes the possibility of perversion. Exposure to a perspective entrenches it in one's mind, so a pernicious perspective (Red Pill ideology, for example) is a dangerous thing to be open to.³⁰⁵ The "erosion of our reflectively endorsed perspectival habits through immersion in an environment dominated by a perspective we reject" threatens to transform our default interpretive dispositions and even loosen the guardrail standards of good reasoning.³⁰⁶

Camp argues that we should practice open-mindedness to avoid complacency in our perspectives, but that we should also tamp down on standards for good reasoning to shield ourselves from perversion through exposure to pernicious, infectious perspectives. We should ensure the categories our attentional dispositions "accurately reflect robust, stable differences in the world," and we should be sensitive to updating the baseline statistical distributions that influence our assignments of intensity and diagnosticity.³⁰⁷ That is, we should be double-checking that our interpretive dispositions are tracking real features of the world, or else we risk reading patterns into the world that are not there: *gestalts ex nihilo*.

³⁰⁴ Camp (2021), p. 16-18.

³⁰⁵ Red Pill ideology originated as a holistic approach to sexual relationships, a central pillar of which is that women instinctively but unjustly seek high-status men. The biological determinism at the basis of the view often leads those who accept the ideology to endorse radically misogynistic legal policies, such as forced monogamy or legalized rape. For a detailed explanation of Red Pill ideology, see Anti-Defamation League (2018).

³⁰⁶ Camp (2021), p. 18.

³⁰⁷ Camp (2021), p. 22.

Notice, however, that Camp's proposal captures only two of the three needed features of a reliable epistemic pathway to understanding. In section 4.6, I argued that we need to be on the lookout for landmarks (open-mindedness), we need the requisite tools to travel safely (epistemic standards), and we also need a lodestar to avoid getting lost (resonance). In addition to the guardrails Camp proposes, I suggest that inoculation from perversion depends on treating feelings of resonance as a lodestar, since this mechanism is well-suited to avoiding rigid commitment to a touchstone, whether perverse or not. In today's world, our epistemic journeys take us not merely through the wild, but through a hostile terrain replete with landmarks designed to draw travelers away from their intended destinations and toward some other end. A lodestar corrects for this problem, and the resonance mechanism, I have argued, is the best contender.

However, one might object at this point that it is all too easy to feel contractiveness and judge it to be resonance; to feel the need to protect one's glistening self-image and then call negation of that self-image muteness. In other words, the very idea that resonance might serve as a lodestar depends entirely on its function as a reliable indicator of some deep truth about the features of the conception as it really exists in one's mind. But since, by my definition, resonance is signaled by a feeling, it seems that this mechanism, too, can be perverted through propaganda designed to confuse. This would, after all, explain why so many are willing to devote their entire lives to mere conspiracy theories. So, in the final chapter, I will at last take up the main objection to the epistemic value of resonance: the worry that it is not and cannot be made to be reliably accurate.

4.9. Summary

Explanatory competence requires that an individual's integrated conception critically regulates her cognitive interaction with the object of that conception. However, critical regulation is

partly constituted by a holistic, open-ended network of interpretive dispositions (that is, a ‘perspective’) which maintains the regulating explanatory framework. Acquiring these dispositions and the end-state integrated conception they generate is an effortful process that will not come about unless an individual is sufficiently motivated. I distinguish three ways this motivation can arise: mere contagion, cultural hegemony, and intentional investment. Only investment is supportive of critical regulation, since only investment is the result of critical endorsement. Investment not only enables further integration of an explanatory framework; it also enables coherent, progressive transformation from one explanatory framework to another. This process of transformation is stabilized by the perspectives that lead to the end-state explanatory framework, yet long-term understanding projects also involve transition from one perspective to another. Perspectival shifts, I argue, must be stabilized not by touchstones (which stabilize individual perspectives), but by a lodestar which will never become irrelevant regardless of one’s position on the understanding project. Resonance, I argue, is best suited to this role and thus is also best suited to preventing dogmatic entrapment within either a perspective or its proprietary end-state explanatory framework. The capacity of the resonance mechanism to stabilize a long-term understanding project enables us to rely on intuitive thinking (as in the case of evocative metaphors) to transition between explanatory frameworks and even perspectives without losing sight of the goal of the understanding project. However, taking on a perspective can be motivated not by investment but by mere contagion or cultural hegemony. In such cases, we risk becoming entrenched within self-reinforcing perspectives, especially if we lack the capacity to distinguish between resonance and mere contraction.

Chapter 5. Feelings as Potential Epistemic Traps

In chapter 2, I defended the view that resonance can warrant. In chapters 3 and 4, I defended the view that resonance is helpful and sometimes even necessary for grasping. The details of those chapters address the main features that characterize the relation between intuition and understanding. I have deferred until now the primary objection to this defense of the epistemic value of intuition. That objection is this: however helpful resonance might be as a source of inspiration, it is ultimately unreliable and frequently misleading. Specifically, the resonance mechanism seems to have three weaknesses: First, the psychological condition of resonance is signaled by a feeling, but feelings are unreliable and probably neither necessary nor sufficient for understanding. Second, the feeling of resonance is very pleasant, so one might begin to seek that pleasure for itself rather than for any epistemic value it has. Third, even if the feeling that signals resonance were reliable, the inaccessible beliefs resonance is based on need not be true and there does not seem to be a way to determine whether they are. So, it appears we have no good reason to rely on resonance for either warrant or guidance.

In this chapter, I will address these three problems. I do not hope to allay them entirely, since I think these worries are at least partly justified. The results of this discussion will be optimistic, if somewhat inconclusive. The thesis I will ultimately land on is that feelings of resonance and muteness are more epistemically stabilizing the more epistemically mature an individual is. That is, when one is minimally epistemically virtuous and aware of one's own non-epistemic motivations, being attuned to feelings of resonance and muteness becomes a condition of virtuosity. However, the pitfalls faced by epistemic reliance on feelings are magnified when an individual is not especially virtuous.

This chapter is divided into two parts. Sections 1-4 identify the relevant feelings, functionalize them, and then clarify the relationships between them. With these distinctions, functions, and relations established, sections 5-7 answer the three objections listed above.

I begin section 1 by laying out the received view about the phenomenology of understanding: that there is basically a unitary feeling—call the ‘feeling of understanding’—characterized by the well-known *Aha!* moment. In section 2, I disambiguate the cognitive feelings that often partly constitute the *Aha!* moment. These include feelings of fluency, orientation, and resonance. I include in this discussion a brief consideration of their unpleasant correlates: feelings of disfluency, disorientation, and muteness. All these feelings can come apart from the rest, and each has a distinctive function.

In sections 3 and 4, I introduce the further complication that agential feelings of success, frustration, and failure introduce. I disambiguate agential feelings from cognitive feelings and then discuss the various interactions between them, focusing on the ways they can either compound or offset one another. The primary accuracy-inhibiting factor in feelings of fluency and orientation is not the cognitive feelings themselves, but the goals and values that produce the agential feelings accompanying them. These agential feelings, then, are primarily responsible for motivating the further entrenchment of an inaccurate explanatory framework. In section 4, I argue that feelings of resonance are not typically compounded by agential feelings, so they are not subject to the same accuracy-inhibiting problems as feelings of fluency and orientation. Instead, the primary accuracy-inhibiting problems resonance might face are internal to the resonance mechanism.

In section 5, I take up the first of the three objections: the worry that there is no reliable way for an individual to distinguish between feelings of resonance and other, non-epistemically motivated feelings. I begin with a discussion of epistemic and non-epistemic motivations. I argue

that epistemically motivated agential feelings have a distinct phenomenological profile from non-epistemically motivated agential feelings. Next, I argue that because resonance does not have a direct relationship to agential feelings, feelings of resonance and muteness have a distinct phenomenological profile from agential feelings of any motivational origin. However, their profile is closer to epistemically motivated agential feelings than not. Since feelings of resonance and muteness have a distinct phenomenological profile and are only at risk of conflation with epistemically motivated agential feelings, an attuned individual should be able to distinguish them from impostor feelings.

In section 6, I take up the second of the three objections: the worry that resonance, like other pleasant feelings, tempts us to overindulge the resonant explanatory framework and to avoid the unpleasant feelings that might lead us to notice its weaknesses. I respond to this worry by observing that a compliment of pleasant and unpleasant feelings is a standard feature of any form of learning—theoretical understanding included. This contextualizes the worry as one that is not specific to resonance or even epistemology, but applies to anything one might have feelings about. Then, as a more substantive response, I argue that the distinctive nature of feelings of resonance and muteness tends to undermine the accuracy-inhibiting appeal of pleasant feelings. Resonance cannot be pursued the way other goals can be, and muteness cannot be pushed out of mind lest it produce even more muteness.

Finally, in section 7, I turn to the last and largest object: the worry that an explanatory framework might resonate in virtue of false yet inaccessible beliefs, thus hopelessly entrenching the inaccurate explanatory framework through self-reinforcing interpretive dispositions and non-epistemic motivations. I answer this worry by admitting the deeply fallible nature of human epistemic efforts. However, the likelihood of feeling resonance in virtue of false beliefs decreases the

more honest one becomes with oneself. Although I accept this worry about the possibility of being misled, I argue that the danger decreases as the epistemic agent matures. Hence, following feelings of resonance is probably best thought of as a character trait that becomes more epistemically virtuous the more the agent becomes otherwise epistemically virtuous.

5.1. The received view

There are at least three psychological states in my account of theoretical understanding which have associated feelings that plausibly function to signal whether the state obtains: fluency, orientation, and resonance. Unfortunately, I do not have better names for these feelings than ‘fluency,’ ‘orientation,’ and ‘resonance.’ To avoid confusion, I will be mindful to use the modifier ‘feeling of’ to indicate that I am speaking of a feeling rather than the psychological state the feeling signals.

Phenomenologically, philosophers tend to associate understanding with the so-called *Aha!* moment.³⁰⁸ They describe it variously as the ‘sense of understanding,’ ‘feeling of insight,’ or ‘feeling of understanding.’ As far as epistemic feelings go, the *Aha!* moment is prominent: it is a pleasant, sometimes even euphoric feeling that occurs when an individual acquires an explanatory framework which seems to adequately capture the features of an object or event in a way that the individual hadn’t cognized before (or, in the case of what we might call an *Oh, of course!* moment, had forgotten, or should have been obvious). Yet the function of the feeling is a subject of some debate among philosophers. Many philosophers think the cognitive function of the *Aha!* moment is to motivate the closure of investigation.³⁰⁹ On this view, the sudden feeling of illumination about a phenomenon

³⁰⁸ Gopnik (1998, 2000), Trout (2002, 2005, 2007), Camp (2003, 2019), de Regt (2004), Grimm (2009, 2010), Arango-Muñoz (2014), Arango-Muñoz and Michaelian (2014), Gardiner (2021), and Nguyen (2021).

³⁰⁹ See, for example, Trout (2002, 213), Kvanvig (2011, 88), and Nguyen (2021, 228).

is so satisfying that it seems to us there is nothing left to investigate about that phenomenon, so we move on to some other task. Alison Gopnik (1998, 2000) likens the *Aha!* moment to an orgasm, a paradigm case of a feeling of completion. On Gopnik's view, the evolutionary function of the sense of understanding is to encourage us to seek out satisfying explanations of the events we witness in the world and thereby form a mental map of causal relations between objects. The feeling of understanding, then, motivates us to form these maps the same way orgasms motivate us to reproduce. Other philosophers functionalize the feeling of understanding as a metacognitive post-evaluation of one's performance in attempting a cognitive task.³¹⁰

The consistent feature among the above views is that the *Aha!* moment is associated with closure of inquiry. We close inquiry when we reach a threshold of confidence that our answer is correct, where this threshold is dependent on our motivations.³¹¹ And in cases of theoretical understanding, the question is whether the explanatory framework can adequately explain the target object.³¹² Hence, if the *Aha!* moment closes inquiry, it must also be associated with the judgment that the framework one now has adequately explains the object relative to the motives of the individual.

There are two problems with this view. The first is that speaking of the *Aha!* moment as unitary risks conflating the three distinct feelings of fluency, orientation and resonance. The second is none of these feelings is obviously productive of the judgment that an explanation is adequate. Hence, motivating the closure of inquiry is probably not the function of these feelings. Rather, agential feelings relating to judgments of success and failure seem to motivate closure of inquiry, but

³¹⁰ For example, Arango-Muñoz (2014).

³¹¹ See Chen, Duckworth, and Chaiken (1999). See also section 2.2 above on the threshold of confidence.

³¹² Perkins, Farady, and Bushey (1991) call this the "makes sense stopping rule".

these feelings only *follow* on the judgments that initiate them. I will take up the first of these problems in section 5.2 and the second in sections 5.3 and 5.4.

5.2. Disambiguating the *Aha!* moment

The *Aha!* moment is often constituted by multiple distinct feelings that need disambiguation. This section is devoted to that task. I will begin with a common scenario that captures the *Aha!* moment. Suppose you walk into a room and a colleague immediately starts speaking. Only the two of you are in the room. She says, “Hey, how are you?” and you answer with a brief reply about traffic and feeling hurried, but before you finish, your colleague begins speaking again as if you had finished. She says, in an earnest tone of voice, “Oh, congratulations!” These two incongruities leave you feeling confused. Then you notice her right hand is held to her ear: she’s on the phone with someone else. *Ah right, of course*, you think. Now you understand what is going on.

5.2.a. *The feeling of orientation*

Your initial explanatory framework for the scenario was centered on the belief that she was greeting you. But incongruities in the events that followed left you feeling disoriented and unsure what was happening. These events did not fit the pattern of your explanatory framework. So, you began to look for clues that would explain the strange conversation, which brought your attention to her right hand. Acquiring a new explanatory framework that better fits the features that are occurrently salient is a fundamentally orienting experience, and this is true even if the framework is incorrect. You felt oriented in the initial explanatory framework until new, unexpected features of the event became salient. Then, switching frameworks reoriented you to the situation. The *Aha!* moment seems partly constituted by a feeling of orientation because the characteristic orienting

feeling of the *Aha!* moment only occurs at the instant of acquiring a new explanatory framework in occurrent thinking, and in response to the capacity of the new framework to organize, unify and explain features that previously seemed disjoint, but somehow part of a whole. The framework seems like a better explanation than what had come before.

The explanatory framework also needs to be *contractive* in the sense I described in section 4.4: it must group occurrently salient features according to existing gestalt patterns in your conception of the object. It apparently cuts the object at its conceptual joints, even if these joints are merely derivative of your interpretive dispositions. When an explanatory framework is not contractive, it will strike you as a bad explanation, even if it is in fact roughly accurate. You do not contract the framework when exposed. Contractiveness, recall, is not a feeling; it is a match between the structure of an explanatory framework and the individual's current interpretive dispositions. The feeling of orientation, then, typically arises when three criteria are met: (1) the individual is interested in acquiring a better structure for her representation, (2) the structure is somehow novel to the individual, and (3) the structure is contractive to the individual.

The phenomena of understanding, however, are not necessary conditions for having the psychological states these phenomena signal.³¹³ Orientation can be acquired gradually over time without ever having a feeling of orientation. This is especially common in cases in which the representational framework is very abstract, such as tensor math. Instead of feeling suddenly illuminated, one gradually becomes familiar with the territory. The confusion falls away without one noticing. One is oriented without knowing exactly when it happened. The psychological condition of orientation in these cases is affectively accessible as the *absence* of a feeling of disorientation. Feelings of orientation and disorientation, then, are best treated as a gradient, and more rapid changes in one

³¹³ See section 3.6.b for a similar line of reasoning.

direction or another along this gradient are more productive of feelings of orientation and disorientation. That is, you will feel oriented when you suddenly become relatively more oriented than you were. Conversely, you will feel disoriented when you suddenly become relatively less oriented than you were. In the above example, you did not have a feeling of orientation when your coworker initially greeted you, but you did have a feeling of disorientation when her reply interrupted you. Then you had a feeling of orientation when you noticed her right hand at her ear.

5.2.b. The feeling of fluency

When the feeling of orientation does happen, it happens only in a moment and then subsides. Merely having a satisfying explanatory framework is not yet sufficient for feeling that one understands in an ongoing way, since one might only have the framework in a bookish, unlived-in way, as a person reading about Einsteinian relativity for the first time might feel. When a framework is lived-in, one will have a feeling of fluency using it. Of the three broad categories of fluency (perceptual, memorial, and cognitive), the relevant form of fluency to theoretical understanding is cognitive.³¹⁴ The feeling of cognitive fluency (hereafter, just ‘fluency’) can be and often is inaugurated by the pleasant *Aha!* moment of orientation but it need not be, since its characteristic mark is ease and clarity in one’s thinking: a subjective fluidity in movement from one step in a cognitive process to the next.³¹⁵ When an individual has achieved competence with a unifying explanatory framework, we should expect her to have this felt ease of cognitive processing while operating within and applying the framework. When one is fluent, the steps necessary for using the framework are so well-travelled that one no longer needs either reminding or conscious justification for the steps; they arise in succession in the mind by second nature. We tend to feel fluent when we

³¹⁴ Alter and Oppenheimer (2009) further divide these three categories into eight types of fluency.

³¹⁵ Feelings of cognitive fluency are also a characteristic feature of flow states. See Csikszentmihalyi (1990).

can easily skip steps in occurrent use of the framework, or when the steps involved arise in mind in proper sequence without prompting. One simply floats through the process. What was once effortful is now rote, like driving the route to work.

Like feelings of orientation and disorientation, feelings of fluency and disfluency occur along a gradient and rise in phenomenal intensity the greater the change in fluency. Disfluency is often consequent on the absence of a satisfying framework. In this regard, disfluency is disorientation writ small. Disfluency, however, is not *constituted* by the absence of a unifying explanatory framework; rather, it is constituted by a struggle to engage in an intended cognitive process.³¹⁶ The absence of an expected explanatory framework can indeed cause disfluency, but so can brain damage or drowsiness. Fluency in deploying one's conception of an object requires familiarity with the features of the conception, the relationships of features to one another, and the appropriate ways to apply the conception in interacting with the object. This familiarity is typically acquired gradually through repeated use of an integrated conception.³¹⁷

It might seem that fluency can be acquired all at once when you acquire the right explanatory framework. In the case of the conversation with your coworker, switching to a framework in which she is speaking to someone else instantly restores both orientation and fluency. You know now to wait until the call is over and nothing about the interaction feels difficult or confusing anymore. Yet this fluency is owed to your prior familiarity with people taking phone calls. Suppose she isn't taking a call. A third coworker walks in and informs you that she is 'korgoning' and that this is a normal activity for her. The coworker says you should just wait until she is finished. This is the same protocol as the phone call, yet until the interaction returns to the range of familiar experiences, you will probably feel awkward and question whether actions you would normally not think about are

³¹⁶ Also known as a 'feeling of difficulty'. See [Efklides et al \(1999\)](#).

³¹⁷ See section 3.5.

appropriate. This framing for the scenario is not fluent to you. When fluency suddenly comes online with the acquisition of an explanatory framework, that fluency is parasitic on the features of the framework that were already familiar to you. This phenomenon is why aspectual thinking affords rapid increases in understanding: it capitalizes on your existing fluency in an explanatory framework for a different but relevantly similar conception to bootstrap fluency in the present conception through a familiar framework.³¹⁸

5.2.c. *The feeling of resonance*

Resonance, as I have defined it, is the psychological state in which inaccessible mental content in a conception coheres with an occurrently considered explanatory framework for that conception.³¹⁹ One might resonate with a particular explanatory relation that has a central place in the framework, a network of such explanatory relations, or with the entire framework. As I argued in section 4.6.a, resonance with a framework is often proleptic: what coheres with the inaccessible content is an anticipated, numerically distinct, further developed version of the framework one occurrently has in mind. The explanatory framework strikes one as having a particular holistic character, many of whose rough features are approximately discernible even before comprehending the future iteration of the explanatory framework. The rough shape of the whole matches inaccessible content in ways that will not become apparent until the framework is further developed and some of the inaccessible content is unlocked.

The feeling of resonance might equally well be described as a feeling of *correctness* or *rightness*.³²⁰ Whenever a prospective explanation or framework seems right or correct but one cannot

³¹⁸ See section 4.7.

³¹⁹ See section 1.4 for the full definition.

³²⁰ Mangan (2001) classifies the feeling of rightness as a broad category that includes the feeling of orientation. This is not my view.

put a finger on exactly why or exactly what evidence is driving this suspicion about the framework, one is experiencing a feeling of resonance. Conversely, when a prospective explanation or framework organizes and unifies all the evidence occurrently accessible to the individual, yet one cannot shake the feeling that something is wrong with it, one is experiencing a feeling of muteness.

As is the case for both orientation and fluency, feelings of resonance occur along an affective gradient of intensity that is primarily sensitive to changes of resonance rather than absolute degree of resonance (or muteness).³²¹ Just as you might not notice how cold a room is until you move to a warmer room, you might not notice how resonant or mute an explanatory framework is until you have an alternative for comparison.

*5.2.d. The *Aha!* moment disambiguated*

Resonance can come apart from both orientation and fluency. When an explanatory framework resonates, it might only be some crucial part of the framework that resonates, not the entire framework. The framework promises a satisfying account, but the individual might not yet comprehend it well enough to feel oriented. She probably comprehends the resonating part of the framework and appreciates that this part might not be extricable from the whole, but the whole still eludes as an orienting structure for her conception of the object. This is especially common when what resonates is a metaphor. For example, a friend's characterization of my colleague as a snake might resonate, but not in the normal ways the metaphor suggests. Perhaps her suggestion that my colleague is a snake resonated merely in its negative register, leading me to question the positive light in which I see my colleague. Similarly, an explanatory framework can resonate long before one can fluently draw on it to anticipate and explain contingencies in the object explained.

³²¹ I defended this claim in section 3.6.b.

The feeling of orientation is probably a necessary constituent of the *Aha!* moment, but feelings of fluency and resonance may or may not attend the experience. Consider the crossword puzzle: finally thinking of a word that fits is characteristically orienting, but fluency within the framework comes only later as one revisits the crossing hints. Similarly, one might become oriented to the word in this position but immediately suspect that it won't work due to a feeling of muteness.

Prominent cases of *Aha!* moments involve all three feelings. Imagine a researcher's breakthrough moment in which the proper framework for her study finally comes into view. She is instantly fluent in this new framework and it resonates so fully that she wonders how she did not see it sooner. Yet the phenomenon is a compound of three different, though related, cognitive feelings, each of which contributes a component to the euphoria of the experience. However, as I will show in the next two sections, closure of inquiry, when it occurs, is not due to one's *cognitive* feelings, but to the way the one's prior values and goals produce *agential* feelings which attend these cognitive feelings. Moreover, *opening of inquiry* is just as common a response to this cocktail of feelings.

5.3. Interactions between fluency, orientation, and agential feelings

In this section, I focus on interactions between feelings of orientation and fluency, and agential feelings. The details of these relationships will reveal where the epistemic pitfalls are and what can be done about them. These pitfalls, I argue, originate in the agent's goals, which produce feelings of confidence, success, frustration and failure in relation to those goals. These agential feelings arise in response to cognitive successes and can halt inquiry before a good explanation is reached, if the explanation satisfies the agent's goals. This phenomenon can occur in multiple combinations of feeling valences. When valences of cognitive and agential feelings dovetail, I call this *constructive interference*. When they offset one another, I call this *destructive interference*. In either case,

however, if our goals are inimical to the norms of understanding, then the resulting feelings will not tend to make epistemic goals salient. Hence, if a propagandistic influence commandeers our goals, it can then commandeer our agential and cognitive feelings as well. This leads to both constructive and destructive effects. I will unpack these claims below.

5.3.a. *Cognitive and agential feelings*

Feelings of orientation and fluency are positively valenced metacognitive feelings. While creatures who lack conceptual thinking almost certainly have feelings of orientation and fluency, creatures who have meta-representation can interpret these feelings as indicative of their psychological states.³²² These feelings carry information about our psychological states and the capacity for meta-representation plausibly recruits them in service of forming judgments about our cognitive efforts.³²³ Note that fluency and orientation are probably not *epistemic* feelings, since they are not normed by accuracy; rather, they are normed by success of their respective cognitive functions, both of which can come apart from accuracy.³²⁴

³²² Here, I distinguish conceptual metacognition from nonconceptual metacognition. On Proust's (2013), pp. 121-130 account, epistemic feelings are constitutively metacognitive, but their representational component need not be conceptual. Hence, creatures' epistemic feelings carry information about their cognitive states, but that information is not conceptually accessible; rather, it is contextually-bound to this particular instance of cognition and does not require the creature to have concepts of thoughts or memories. Her view draws on Cussins' (1992) account of nonconceptual contents, though it also bears many of the features of Burge's (2010) account of merely perceptual attributives.

³²³ While I suspect, contra Proust (2013), that the most basic versions of these feelings do not function metacognitively, my view does not depend on this claim.

³²⁴ This phenomenon is well studied. For example, Unkelbach (2007) found that frequent exposure to claims increased both fluency and the tendency to judge those claims true—even if they were not true. However, Reber and Unkelbach (2010) later showed that fluency is a reliable cue to truth, provided the individual has mostly been exposed to true claims. Fluency, then, is consistent with but not normed by accuracy.

Feelings of orientation, however, are a different story. Plausibly, orientation is more closely related to accuracy, though I have argued in 5.2.b that they come apart. Studies do not focus specifically on this feeling, but on the *Aha!* moment more broadly. On one hand, Webb et al (2016) found that *Aha!* feelings strongly correlate with accuracy when they arise in response to puzzles that are not designed to mislead. Yet, on the other hand, Laukkonen et al (2020, 2022) have shown that the positive feeling of an explanation sliding into place influences temporally proximate but conceptually irrelevant judgments about the truth of a claim that the subject is not likely to be certain about off the top of her head. This, however, is a feeling-state proximity effect. I will return to these results in section 5.5.

The most basic forms of orientation and fluency are feelings associated merely with cognitive success. A creature without meta-representation probably will not respond to them with further agential feelings because it does not have judgments about the value of these cognitive successes. Rather, a creature without meta-representation will have agential feelings only about object-level successes and frustrations. Hence, the basic forms of these feelings are responsive only to the cognitive function they are associated with, and they probably only motivate further use of the cognitive resources whose successful acquisition they signal.

Feelings of fluency and orientation, as purely cognitive feelings, are also pleasant. However, these feelings alone do not account for the relative pleasantness of the *Aha!* moment: I might, for example, find a cognitive activity fluent but boring. An *Aha!* moment after acquiring a new explanatory framework might produce a reaction to acquiring the new framework. Seeing things a new way is cognitively satisfying, but it can also have repercussions on an individual's relationship to her own goals. Perhaps this was a framework she had long sought; or perhaps this new way of cognizing things confirms her fears. The project of attempting to understand self and world is a voluntary project with achievements and obstacles along the way. It is characteristically agential. Because we are agents pursuing our own understanding projects according to our own goals, agential feelings attend cognitive ones.

Agential feelings are distinct from cognitive success feelings in that (a) their affect is responsive to one's goals and (b) they motivate further action (or inaction) in relation to one's goals. The feeling of orientation is only about my successful acquisition of a contractive framework; it is not about the value of that framework to my projects. The feeling of orientation alone is probably not an especially intense feeling, though its intensity likely depends on how large-scale the new framework is. The intensity of an agential feeling, on the other hand, depends on how important to

the individual the goals at stake are.³²⁵ A name at the tip of one's tongue that one simply cannot retrieve will usually be much more frustrating if one is on *Jeopardy!* than if one is in casual conversation. The intensity of satisfaction that attends the feeling of orientation will likewise tend to be directly proportional to the importance of the explanatory power of the framework within one's existing system of values. The early 20th Century scientist puzzling over the orbit of Mercury will feel an intense euphoria after applying Einsteinian general relativity because this framework offers the very explanation she has been seeking for so long. An interested layperson will not feel anything nearly so intense upon hearing (and comprehending) the same explanation.

Because agential feelings represent the agent's current progress in relation to her goals, the way they motivate depends on the details of the agent's position with respect to her goals. If she is frustrated but believes her goal to be in reach, her frustration might intensify her motivation to persist. If she has successfully completed many steps toward a goal but does not care much about the goal anymore, her indifference might reduce her motivation to persist, even if she is pleased at having completed the steps she has completed. If repeated frustration leads her to believe she is not adequate to the cognitive demands of the task, she might give up. A task that involves frequent frustration with few successes will also produce a broadly unpleasant experience, which might lead the agent to decide that achieving the goal is not worth the discomfort. Agential motivation, then, seems to be a complex function of at least three factors: (a) how much the agent values a goal, (b) how achievable she judges that goal to be, and (c) how much she enjoys pursuing that goal.³²⁶ Most

³²⁵ Games seem like a notable exception, since the goals internal to a game trivial, but pursuit of those goals is a necessary part of pursuit of the goals that extend beyond the game itself and for which one played the game in the first place. And, in fact, one cannot be properly motivated to play the game unless one can successfully, though temporarily, take on the win conditions of the game as valuable goals. See Nguyen (2019) for a developed account along these lines.

³²⁶ Hsee et al (1991, 1994) show that satisfaction with an outcome depends on both static and dynamic features of that outcome. Other things equal, we are motivated to pursue a course of action whose outcome we project as good and as increasingly better over time. Paired with my claim in section 3.6.b that valenced feelings are more responsive to state changes rather than absolute value of a state, these studies suggest that, indeed, we are more motivated when expect to enjoy both the experience and the result.

of our goals are at least partly instrumental to more fundamental goals, so a good strategy for maintaining one's motivation in pursuit of a distant goal is to pursue smaller, instrumental goals that bring us closer stepwise to the more fundamental goal. Feelings of satisfaction in accomplishing a proximate goal contribute to sustained motivation to pursue more fundamental goals.

5.3.b. *Constructive interference*

Consider the pleasant feeling of finally coming up with a word that will fit the crossword puzzle hint. This is a combination of the feeling of orientation and the feeling of satisfaction at acquiring a helpful clue for the crossing hints. Here, coming up with the word provided greater orientation to the crossword puzzle. Even if you find crossword puzzles boring, the feeling of orientation still arises, probably with some minimal positive affect. But if you are actively trying to solve the puzzle, coming up with the word is more significant to you: it relieves your frustration. In this case, the pleasant feeling of agential success magnifies the pleasant feeling of orientation. Because both feelings motivate further application of the framework, this small achievement keeps you enthusiastic about the crossword puzzle. We might call this phenomenon *constructive interference* between cognitive and agential feelings.

Goals can be *epistemic* or *non-epistemic*. An activity has an epistemic goal if its ultimate purpose is accuracy of representation. Note that one can have conflicting epistemic goals, as when accuracy of one representation entails tradeoffs with accuracy of another. Non-epistemic goals, by contrast, do not have accuracy of representation as the ultimate end; they subordinate it to other ends. While the relevant cognitive feelings might be driven by epistemic goals, agential feelings are responsive to all the agent's goals. The repercussions of epistemic events on non-epistemic goals often generate

and intensify agential feelings. That is, when I discover a new truth that is relevant to one of my projects, I am likely to get more excited about it than if it were merely a fun fact.

When one's goal is epistemic, constructive interference often leads to the discovery that the framework is incorrect. Solving a crossword puzzle, for example, is normed by accuracy: the puzzle isn't solved unless you have the right answers. In working through the crossword puzzle, you might be confident it is the right word, but you still have the rest of the crossword puzzle to go. If the letters you've written in don't match your best guesses for the crossing hints, then you'll conclude that you were wrong after all—despite having had the feeling of orientation and the feeling of agential success that attended it. This mismatch will then probably produce a cognitive feeling of disorientation, attended by an agential feeling of frustration. You are less oriented to the puzzle than you thought, and it's frustrating to discover you are further from your goal than you thought. If you do not give up on the crossword puzzle, these feelings will, again, constructively interfere: they both have negative valences. They also motivate in the same direction. Instead of being motivated to build on the framework, you are now motivated to restructure it. Disorientation spurs you to reorient and frustration amid persistence motivates redoubling your efforts. Even if your frustration and disorientation lead you to give up on the puzzle, the constructive interference does not produce divergent motivations.

There are typically many more steps yet to take after acquiring a new framework. When we acquire a new unifying framework, we cannot yet see through to the granular details of its future fruition. Rather, our judgment that this framework unifies the phenomena corresponds to the gross features that strike us as relevant in the moment we acquire the framework. The framework is yet to be applied at a more granular level, and there are inevitable transformations yet to come.³²⁷ The *Aha!*

³²⁷ See also sections 1.5.a and 4.6.a.

moment, then, does not necessarily conclude with a smug sense of satisfaction. Rather, closure of inquiry occurs when one's *agential* goals have been met. If one adopts accuracy as an agential goal, then inquiry might never close. Once one acquires the promising new framework, one might become excited about its explanatory power. That excitement tends to trigger a rumination over the various details that can be fitted into the new framework. Or, in the case of the crossword puzzle, figuring out one word helps us figure out other words and each next step is exciting and fun. Drilling into the granular details of a framework, however, offers an opportunity for disconfirmation. In fact, this is how faulty explanations often die. The excitement wears off when, while ruminating over applications of the framework, one discovers an unworkable feature. Then it's back to the drawing board.

Fluency and disfluency follow this same pattern. As agents, we usually persist in a difficult task only if we value something about that task besides the mere achievement of fluency.³²⁸ If a cognitive process is important to my goals, then the feeling of accomplishment at achieving fluency will constructively interfere with the feeling of fluency, thus increasing my motivation to further use that cognitive process. Likewise, the feeling of disfluency will constructively interfere with the agential feeling of frustration and, provided I do not give up on the goal, I will be motivated to commit effortful attention to the steps of the process in the hopes of achieving greater fluency. Moreover, when my agential goals align with my drive toward accuracy, I will be motivated to achieve fluency in cognitive processes that contribute to more accurate representations.

³²⁸ Rawls (1971) suggests an "Aristotelian Principle," by which we find ourselves motivated to become skilled at doing difficult things because we enjoy the process. I do not deny this principle, but there are countless difficult things we might do and the principle does not suggest a criterion of choice between them. Commitment to a difficult task probably requires something more than mere difficulty, since we are not usually lacking in other, stronger forms of motivation.

5.3.c. *Destructive interference*

It seems equally possible that cognitive feelings and agential feelings can *destructively interfere* with one another: their respective affects and motivations to action offset one another. Indeed, mixed feelings are common in other domains. For example, an individual might express her epistemic pleasure at knowing the truth as coexisting with her moral displeasure at the content of the truth when she says, “I’m glad I you told me, but I’m disappointed.” The fluency of driving the route to work can turn to frustration when one takes a wrong turn as if to go to the grocery store. It is satisfying to not need to think about where one is going, but it is also irritating to have to turn around because one lost track of which familiar destination was the goal. Similarly, acquiring yet another racist framework after learning the meaning of a new dog-whistle can be frustrating because one wishes to cognize others in a less racist way but, as in the case of any other gestalt-switch, the framework cannot be unseen. Yet because the framework is contractive, due to one’s prior interpretive dispositions, it is difficult to resist. Feeling oriented to the explanatory frameworks at play in cultural expressions is satisfying, but sometimes one wishes those frameworks were not structuring one’s thinking.³²⁹ These destructively interfering feelings also produce conflicting motivations. I do not want to give up the fluency of driving a familiar route, but I also do not want to take a wrong turn. I do not want to relinquish understanding the symbols in the world around me, but I also do not want to think in racist patterns.

Because the intensity of satisfaction at the feeling of orientation depends on how important the explanation is within one’s existing system of values and commitments, the pleasantness of the feeling is not itself the primary motivating factor for our epistemic efforts. That pleasure, whether over orientation or fluency, is a *success* signal. Pleasantness *does* motivate repetition, but the pleasure

³²⁹ See Camp (2013) for a detailed examination of this phenomenon. See also sections 4.3 and 4.8.

we feel in an epistemic pursuit overlays our deeper epistemic goals. Pleasure enables motivation toward a goal; though it does not alone sustain motivation. Enjoying a certain game often cannot alone sustain my commitment to repeated play with the same people. When doing so contributes to my project of deepening friendships, my motivation to persist becomes more durable. Similarly, acquiring a new explanatory framework and becoming fluent with it is often a pleasant experience, but I will not make much effort to deepen my grasp of the framework unless it serves a greater goal.

A success signal only occurs to the extent that one represents the event *as* a success. Consider the QAnon conspiracy theory. QAnon, briefly, is a family of views in which political and corporate elites in the American Democratic Party are conspiring to consolidate social control and reinforce that control through rituals such as child sacrifice.³³⁰ I can come to understand how the QAnon perspective explains a wide array of phenomena without feeling that acquiring this explanation counts as a success. This is partly because I was not searching for the *kind* of explanation that the QAnon perspective offers. Of course, another reason my understanding of the QAnon perspective as applied to reality does not feel like an epistemic success is that the epistemic methods endorsed internally to the framework are unsound. Commitment far outstrips evidence, which is what makes it so surprising that anyone would find the framework plausible as an explanation.

The satisfaction the QAnon adherent feels does in fact confirm the successful completion of a task, though the task itself requires certain false claims to be held fixed. If one's existing value attributions require, whatever the explanatory framework, that Democrats must turn out to be evil actors, then the task is to locate an explanatory framework that can make sense of the observable inequities and inefficiencies in contemporary social structures, while holding fixed that Democrats in

³³⁰ See Berkowitz (2020) for a compelling account of the nature and appeal of the QAnon family of conspiracy theories.

power have hidden, evil intentions. The valence of the resultant combination of orientation with agential feelings, then, depends on whether this is the kind of framework that one was looking for. And if that is the case, then the notion that one can become misled by the feeling of success blames the trailing phenomenon. The problem is not the feeling of having succeeded; the problem is the parameters of success.

5.4. Interactions between resonance and agential feelings

In the previous section, I argued that the primary source of epistemic error is where agential and cognitive feelings intersect, and that this error is rooted in the goals that drive the agent and thus intensify feelings through constructive interference. In this section, I will argue that resonance has a distinctive relationship to agential feelings in virtue of its distinctive relationship to our goals. For this reason, it is not as susceptible to propagandistic distortions of one's explanatory frameworks as fluency, orientation, and the agential feelings associated with them.

Resonance does not have the same relation to agential feelings as orientation and fluency do, because it lacks a stability of content that fluency and orientation both have. Fluency is a form of familiarity.³³¹ Once acquired, it can decay through disuse, but the processes that one has fluently mastered are stable. Other things equal, what is familiar remains familiar in the same way, except that the familiarity can fade. Orientation, likewise, has stable content. When one becomes oriented to a framework, the content that the framework organizes is relatively stable. We usually extend and deepen frameworks to incorporate more of the features of a conception, but unless it is transformed, the features it organizes and orients us to do not fall away. Or, more simply, the overall gestalt the framework brings out is stable in its orienting function.

³³¹ This seems to be a conceptual necessity, but Whittlesea and Williams (2000) show that familiarity and fluency sometimes come apart.

Resonance, however, is not a stable condition that builds on itself. If developing the explanatory framework unlocks the inaccessible content with which the framework initially resonated, that content becomes accessible and the resonance gives way to the usual affective appeal of good accessible evidence. When relevant content remains inaccessible, developing the framework will sharpen the feeling of resonance toward particular features of the framework. Conversely, developing a framework can also reveal mutenesses that one did not previously feel. As the implications of the framework become apparent, it might begin to feel more and more disjoint in its fit with inaccessible content, potentially leading to transformation or even jettisoning of the whole framework.³³² In short, feelings of resonance and muteness shift as the conception develops.

Fluency and orientation persist and even intensify in developing an explanatory framework, displacing disfluency and disorientation through investment in the framework. Disorientation can reappear in the process of developing a framework, but typically only in response to incoherencies in the framework or anomalous evidence. When disorientation appears, though, it endures until the incoherency or anomaly is resolved. Resonance and muteness, on the other hand, are variable and seemingly impossible to predict. They appear, disappear and even switch places over the course of the cognitive lifespan of an explanatory framework.

The second distinctive feature of feelings of resonance and muteness is that they can even arise in relation to one's goals. My goal of being an academic has felt resonant sometimes and mute other times. Relationships and personal projects can all be resonant or mute, and these feelings can fluctuate in all the same ways as resonance with an explanatory framework.³³³ This occurs because of the unique nature of self-conceptions. Whereas my conceptions of any other object may or may not have relevant inaccessible content with which my organizing framework can resonate, my self-

³³² See section 1.5.c.

³³³ See Rosa (2019) for a broad and detailed account of the sociological features of resonance in all its forms.

conception will invariably contain inaccessible content that is relevant to the occurrent explanations I use to organize my self-conception. I have much more object-level information about myself than anything else, but much of that information will be inaccessible. Some of it might even be both privileged and inaccessible. My desires, for example, are not necessarily what I think they are. But privileged access to my desires can be unlocked, while privileged access to the desires of others cannot. Hence, projects and goals can be resonant or mute depending on whether my occurrent framing of the goal fits the inaccessible content in my self-conception concerning that goal. My fluctuating relationship to my goal of being an academic is probably related to the overlap between my inaccessible goals and my own fluctuating conception of what it means to be an academic. Conversely, fluency and orientation do not extend to the goals that motivate and produce agential feelings. I cannot be fluent in or oriented to my goal of being an academic, though I can be fluent in and oriented to the social features of pursuing it.

These two distinctive features of resonance and muteness affect the way these feelings combine with agential feelings. Since resonance comes and goes in surprising ways, it cannot register as an achievement. One might be grateful to find an explanatory framework that resonates. One might even have sought out the resonance. But the fluctuating variability of the content that resonates undermines the possibility of conceiving of resonance as an accomplishment. Resonance and muteness, in other words, seem to be both involuntary and unpredictable. They are not psychological conditions that can be consistently worked toward or away from. So, the agential feelings one might have in response to it are passive: feelings of *relief* or *gratitude* in response to resonance, and feelings of *uncanniness* or *despair* in response to muteness.

Feelings of resonance and muteness can destructively interfere with agential feelings. I can, for example, feel muteness toward an explanatory framework that I am motivated to pursue as part

of a project. Suppose I had planned to be a Catholic priest but began to find the Catholic framework more and more mute. This interference is likely to undermine my motivation to continue.

Resonance, then, can offset agential feelings. In this case, it might be that, through an uncritical cognitive inertia, I am conveniently persisting in a commitment that is becoming more and more mute. Or I might continue to resonate with the kind of work I represent a priest as doing, but feel a growing muteness toward the religion. My commitment to a particular kind of work can still motivate me, even as my conception of that commitment becomes mute. If I persist in the project despite growing feelings of muteness, my motivations are at odds with resonance. Often, destructive interference between resonance and agential feelings indicates that my motivations for representing myself as I do are emerging from the wrong places. I will turn to such wayward motivations in section 5.5.a.

I argued above that goals and projects themselves can resonate. By this I mean that, in our goals and projects are probably at least an inaccessible part of our self-conceptions, but that our meta-level representations might be at variance with inaccessible object-level goals and projects in our self-conceptions.³³⁴ We're not always working toward what we think we're working toward. Thus, we can also ask whether resonance can interfere with itself. In the above example, perhaps the project of becoming a Catholic priest resonates for me, but the Catholic religion itself is mute. The inner workings of the resonance mechanism are and will likely remain mysterious. As outlined in section 1.4, I take resonance to be a metacognitive mechanism that monitors inaccessible mental

³³⁴ Carruthers (2011) argues that we learn about ourselves the same way we learn about others, suggesting we do not have privileged access to the properties of the self. Similarly, Pronin et al (2007) show that we mistakenly believe we have privileged access to the properties of self, even when accessible evidence suggests otherwise. Yet, lack of privileged access does not entail lack of privileged incorporation of inaccessible features into one's self-conception. On the contrary, inclusion of the properties of self within the inaccessible part of my self-conception at the object-level seems to be constitutively necessary both for having desires and goals, and for feeling insecure about my unacknowledged weaknesses. These object-level representations of self find a way into my thinking, even if they never capture my occurrent, meta-level attention.

content for coherence with occurrent thinking. I have not presupposed that the resonance mechanism monitors *all* inaccessible content. I find it plausible that the only content which activates the resonance mechanism is the content one is psychologically ready to incorporate into occurrent thinking. This suggests an association between epistemic development and psychological maturity—and association that I take also to be plausible. I will develop the concept of psychological readiness in section 5.7.a. For now, the key point is that resonance might not recruit all inaccessible mental content; it might only recruit some. If that is so, then it seems feelings of resonance with an explanatory framework can destructively interfere with feelings of resonance with a goal. My internal conflict about becoming a priest might be a consequence of the priest's role feeling resonant and the Catholic religion feeling mute. Thus, I will be motivated through feelings of resonance to represent myself as both wanting and not wanting to be a priest. This could indeed produce an abrupt closure of inquiry. I assent to the explanatory framework because it resonates, but I do not develop it further because it also does not resonate.

An even more worrisome possibility is that the unconscious mental content the resonance mechanism monitors might simply be internally inconsistent. That is, an explanatory framework might be both resonant and mute in the same way and at the same time because I inaccessiblely both believe and disbelieve some claim. However, if the resonance mechanism filters the inaccessible content monitored as a function of psychological readiness, then this probably does not happen. Such inconsistencies are probably defensive, and thus psychologically quarantined from one another.³³⁵ I suspect that the most common form of conflicting feelings of resonance and muteness is when one part of a framework resonates and another is mute. This is not a problem of the consistency of object-level features in the conception, though, and can be resolved through

³³⁵ See section 5.5.a on defense motivations.

developing the framework, unlocking inaccessible content, and sharpening the feelings of resonance and muteness thereby.

5.5. Identifying impostor feelings

Now that I have discussed the relevant feelings and their interactions, I can finally turn to the first of the three major objections to the epistemic value of resonance: the problem of confusing feelings of resonance with feelings that are not produced by epistemic values. Such impostor feelings spring from the non-epistemic goals (or motivations) that drive intuitive thinking.

5.5.a. *A taxonomy of motivations for intuitive thinking*

Shelly Chaiken and her colleagues divide the possible motivations to intuitive thinking into three groups: *accuracy* motivations, *defense* motivations, and *impression* motivations.³³⁶ Accuracy-motivated inaccessible processes adhere closely to the basic epistemic norm of representation: getting things right. Even when conditions limit resources for making a judgment, once placed in conditions that isolate accuracy motivations, individuals consistently use heuristics that maximize accuracy, given the evidence on hand.³³⁷ An individual will continue to investigate until either she runs out of time or she is sufficiently confident in her judgment of accuracy to close her inquiry.³³⁸ If the resonance mechanism is to be reliable, we must learn to consistently isolate accuracy motivations even in circumstances when such isolation is uncommon.

Defense motivations are organized around either maximizing one's material self-interest or preserving one's self-conception. One's self-conception is partly constituted by values, social

³³⁶ Chen, Duckworth, and Chaiken (1999).

³³⁷ See Chaiken (1980, 1987) and Chaiken, Giner-Sorolla, and Chen (1996).

³³⁸ Chaiken (1980, 1987) calls this the 'sufficiency principle'.

identities, and personal attributes that one affirms at the meta-level. Once constructed, we apparently defend the meta-level features of our self-conceptions from transformation.³³⁹ In unconsciously defending either material interests or a self-conception, we selectively rely on heuristics which offer an intuitively appealing way to affirm the belief that we were already motivated to affirm. That is, the motivation to self-defense supplies the conclusion and intuitive thinking finds a sufficiently plausible cognitive path from the evidence to that conclusion. For example, individuals will prefer evidence supporting their prior stance on abortion, whatever that stance is.³⁴⁰ As in the case of accuracy-motivated thinking, defense-motivated thinking will continue until the individual is sufficiently confident that the evidence supports the conclusion. Once her actual confidence matches her desired confidence, she will close her inquiry.³⁴¹

An impression motivation is a motivation to satisfy a social goal. Typically, impression-motivations are at their most compelling amid an ongoing social interaction in which the individual desires that the social interaction should go a certain way. Just as there is variety among the possible contents of self-conceptions, so there is variety among the possible social motivations: some wish to minimize conflict, others to create it, and still others wish to coordinate the social interaction toward a particular outcome, such as changing an interlocutor's view. Once again, inquiry closes when the individual is sufficiently confident that her judgments will satisfy her social goals.³⁴²

Motivations are variable in their intensity and different kinds of motivations can coexist concerning the same cognitive process. In philosophical thinking, I might be motivated by both accuracy and defense: I want to get things right, but I also have my self-conception as a competent philosopher to defend. The intensity of a motivation will guide my selective assessment of evidence

³³⁹ See Chaiken, Giner-Sorolla, and Chen (1996).

³⁴⁰ Lord, Ross, and Lepper (1979).

³⁴¹ See Giner-Sorolla and Chaiken (1997).

³⁴² Chen, Shechter, and Chaiken (1996).

via inaccessible processes. That is, certain forms of evidence will strike me as more relevant and more convincing, depending on whether they corroborate the meta-level of my self-conception. And this phenomenon will intensify the stronger my defense motivation is. Fortunately, the same is true of accuracy motivations. Thus, quarantining defense and impression motivations to isolate accuracy motivations should lead to a good-faith, self-reinforcing research project.

5.5.b. The distinct affective profiles of different motivations

The above taxonomy of motivations to implicit inferential and heuristic processes is broad, and captures perhaps the most common forms of motivation, though it might not be exhaustive.³⁴³ Because these are the kinds of motivations that affect unconscious information processing, they are also the kinds of motivations that produce in us feelings which might mislead in the ways epistemologists worry about. Recall that the first objection to the epistemic value of resonance is that the feeling of resonance might be practically indistinguishable from feelings whose evaluative component is not epistemic. Such feelings would be driven by values of self-defense and values of social impression. Resonance is plausibly normed by accuracy: conceptions function to be accurate and global coherence is the primary internal measure of accuracy. Since feelings of resonance function to signal coherence, they plausibly function to signal accuracy and inaccuracy in explanatory frameworks. Just as motives of accuracy produce feelings of resonance, so do motives of defense and impression produce in us their own associated feelings. It seems, then, that these feelings threaten the reliability of the resonance mechanism because they can impersonate resonance. Or, more colloquially: how do you know whether it's a gut feeling or just wishful thinking?

³⁴³ For example, one's intuitive thinking might be motivated by concerns of justice. This is still a kind of defense, but plausibly not of the self.

All three kinds of motivation are characteristically agential, so they will be productive of constructively interfering pleasant feelings of orientation and fluency in response to motivated explanatory successes. However, defense and impression motivations will produce a distinctive feeling in response to the possibility of explanatory failure. I will show this by starting with the accuracy motivation. Suppose that, in forging an explanatory framework—say of combustion—I am primarily motivated by accuracy. Positive steps toward further organizing the features I know combustion has produce pleasant feelings in me, and these pleasant feelings encourage further development. However, I stumble upon a problem: I am working within the phlogiston framework and I am struggling to identify a substance that partly constitutes every flammable object. I can't seem to find the phlogiston itself. My research project depends on my investment in the framework, but as the evidence builds I slowly start to consider the worst: maybe there is no phlogiston.

At this point, defensive motivations might enter. My entire career as a physicist has been built around this theory and I am starting to lose hope that it is workable. If the defensive motivation takes precedence over the accuracy motivation, I will push this thought away, double down on my research, reaffirm my commitment, and vociferously raise objections to alternative theories that have begun pulling other scientists away from the project. In defense, I will feel that I am part of a noble crusade which coexists with an unshakeable feeling of anxiety over the very real doubts I have but continue to put out of mind. If, on the other hand, my accuracy motivation takes precedence over my defensive motivation, I will eventually come around to facing reality: I must give up on phlogiston theory. In relation to my epistemic goal, the failure of the project is not a personal failure in relation to my self-conception; rather, it is a failure of understanding. I thought I understood better than I did. No doubt, my self-conception will take a hit. I will feel some shame in response to the failure, since I had been so convinced of the value of my life's work and now that

work will be remembered as a blind alley. The accuracy motivation produces pleasant and unpleasant feelings purely in relation to the global coherence of the explanatory framework. Failure, under the accuracy motivation, produces feelings of resignation, disappointment, bewilderment, and the like. These feelings do not speak badly of me, since they are not about me; they are about the project. The defense motivation, on the other hand, responds to failure with feelings about me: shame, self-loathing, feeling foolish, and the like.

The above example shows that the feelings associated with failure are noticeably different between accuracy and defense motivations. The worry about feelings leading us astray, however, concerns positive feelings. Yet there are differences here, as well. Motivated unconscious thinking accounts for the possibility of failure. The threat of feelings of shame and self-loathing are part of the reason I am so insistent on protecting my self-conception. Just beneath the positive feelings I might have about defense and impression motivated successes is a slow-burning anxiety. I am anxious over the integrity of my self-conception and I am anxious over my reputation. The explanatory frameworks I take up in response to these motivations may indeed produce a euphoric *Aha!* moment, but that feeling had to displace another feeling. Prior to acquiring the explanatory framework I sought out, I was anxious over finding the right framework. Without it, how could I uphold my self-conception and be seen as socially commendable?

Accuracy motivations are not felt in the same way. Accuracy motivations do not generate any anxiety to be displaced. Someone motivated by accuracy might be anxious that the reality of her field of study is repugnant, but she is not anxious that the truth will be a threat to her. Defense and impression motivations treat failure as a threat. Thus, the positive feelings associated with these motivations are felt as successes for one's team. Accuracy motivations treat failure as a disappointment, so the positive feelings associated with these motivations are felt as a hopeful

optimism rather than a win scored against a foe. Agential feelings about accuracy are much more affectively similar to the passive agential feelings about resonance and muteness (e.g. gratitude and uncanniness) than they are to non-epistemically motivated agential feelings. But since accuracy motivations and resonance motivations are both produced by positive and negative developments in warrant, there is no epistemic problem with conflating them.³⁴⁴

Resonance, as I have shown, is not a goal that can be directly pursued, even though one might hope to pursue resonance and avoid muteness. The feeling of resonance does not signal successful completion of a goal. Feelings of resonance, then, are distinct even from accuracy-motivated agential feelings. The feeling of resonance is not necessarily accompanied by anxiety, though one might feel some defensive anxiety over the implications of what resonates. The feeling of resonance also does not feel like a win for one's team, though it can lead one to incorporate team membership into one's self-conception. The feeling of muteness is not a feeling of failure, though it might produce a feeling of loss if what feels mute was once part of one's self-conception. Agential feelings can only appear in response to one's judgment that resonance or muteness is epistemically significant. If one is feeling anxious, that feeling is not muteness. If one is feeling victorious, that feeling is not resonance.

So, it appears that resonance is phenomenologically distinct from agential feelings. Additionally, epistemically motivated feelings are also distinct from non-epistemically motivated feelings. An attuned individual, then, should be able to distinguish these feelings from one another. She should be able to recognize when resistance to or persistence in an explanatory framework is motivated by anxiety over threats to her material wellbeing, self-conception, or reputation. To be sure, such an individual will be emotionally mature and have virtues of attention.³⁴⁵ I am not

³⁴⁴ See section 2.4.d for a discussion of the relation between accuracy and warrant.

³⁴⁵ See Gardiner (2022) on the virtues of attention.

proposing that just anyone will be able to sort these feelings out. I only claim that these feelings are distinct and that this distinctness is discoverable to an individual who is willing to develop epistemic virtues. When epistemologists like Trout (2002, 2018) worry that a ‘feels right’ standard has no place in serious research, they do not distinguish between mature and immature understanders, nor do they acknowledge the many pressing epistemic dimensions of our lives that cannot wait for serious research.

Far from contributing to the potential sources of error to which we are normally subject, resonance might offer an opportunity to escape these sources of error. When one persists in an explanatory framework out of either defense or impression motivations, there is no reason to expect that the framework also resonates. In fact, conflicts between resonance and non-epistemic motivation are common. This kind of conflict is probably at play in cases of apparent self-sabotage: one initiates a project from a resonant motivation, but one later undermines that project from a defense or impression motive (or vice-versa). Similarly, a friend’s actions might resonate as honest and caring, but one still defensively resorts to explaining the friend’s actions as deceitful and manipulative (or vice-versa). Attention to the difference between feelings of resonance and non-epistemically motivated agential feelings offers a way out of self-sabotaging actions, since one might then more clearly recognize which motives coalesce with the rest of one’s psychology. I will return to this thought in section 5.7.

5.6. The temptation of pleasant feelings

The second worry about relying on resonance as a source of epistemic reasons and motivation is that the pleasant affect of resonance is appealing, perhaps even *addictive*. We have a natural inclination to seek out pleasant feelings and to avoid unpleasant feelings. It seems this

inclination can then lead us to judge that an explanatory framework is more accurate than it is. Many philosophers have expressed this worry.³⁴⁶

Alison Gopnik likens the *Aha!* moment to an orgasm. On her model, seeking out the pleasure of the ‘orgasm’ is the point: in doing so, we gradually develop causal maps of the reality we inhabit.³⁴⁷ Just as orgasms function to encourage us to reproduce, so the *Aha!* moment encourages us to develop explanatory frameworks. I have already argued both that the *Aha!* moment is not a unitary phenomenon and that feelings of resonance cannot be reliably sought after, but now I want to show that even if the pleasantness of the feelings of understanding attracts us to those feelings, that feature still does not undermine their epistemic value.

Agential feelings of success, as I have argued above, confirm the completion of a task: they are retrospective and do not assign new value to the task, but follow from the value one had already assigned to it. Hence, when I become oriented to and more fluent in an explanatory framework, the pleasure of the feeling is dependent on the prior investment I had in acquiring the framework or deepening my grasp of it. These pleasant feelings do encourage persistence within the framework, but they do not emerge as if from nowhere and then marshal my assent on their appearance. Rather, my prior motivations are the initial origin of the feelings; the change in orientation or fluency is the occasion that provokes a feeling I was already primed for. Hence, the real worry, where agential feelings are concerned, is the motivations that produce the feelings, not the feelings themselves. Notice that such agential feelings of success seem to match Gopnik’s orgasm analogy: I wanted the framework, achieved it, and then felt an intense pleasure upon doing so. That is, the orgasm metaphor suggests the prior existence of a correlate to sexual desire. Fluency and orientation are

³⁴⁶ For example, Trout (2002, 2018), Grimm (2009), Gardiner (2021), and Nguyen (2021).

³⁴⁷ Gopnik (1998, 2000).

attractive, but the real draw is success over failure. And we can easily be led away from accuracy through defense and impression motivations to avoid failure.

Feelings of resonance seem even more susceptible to worries about the tempting appeal of pleasantness. The feeling of resonance is not pleasant in virtue of prior commitments, nor is it a success feeling that merely confirms the completion of an intended task. Rather, the feeling signals fit between conscious and unconscious features of a conception. I might be mistaken about some of the unconscious parts of that conception, so the pleasantness of the feeling of resonance might tempt me to think an explanatory framework is better than it is. J. D. Trout (2002) argues that this phenomenon is a combination of hindsight bias and overconfidence. Hindsight bias is the tendency to judge that my prior experience pointed to my current explanation. Hindsight bias leads me to think I had sufficient evidence right there the whole time. Overconfidence, as Trout characterizes it, is an unearned judgment that my meandering memories and beliefs accurately reflect reality. Thus, when an explanatory framework feels resonant, it may very well turn out that, within my inaccessible resources, I have ascribed causal patterns where none exist and felt overconfident in these ascriptions. Since this content is inaccessible, I will be none the wiser. Yet the pleasant feeling seduces me. As Trout has it, “the sense of understanding feels good. We rush to get the feeling, and we are hooked on it. But it is a tragic addiction.”³⁴⁸

Consider the cautionary tale of Johannes Kepler. In the later years of his life, he tried over and over to use Platonic solids to describe the structure of the universe. And he did so because he had a feeling that these shapes were somehow important and fundamental. Presumably, he could see their ratios and relationships appearing and reappearing in his experience. Whenever he first found himself captivated by them, they surely struck him as profound in virtue of his own prior

³⁴⁸ Trout (2018), p. 245.

observations as a scientist. He probably had a feeling that he had already noticed such ratios many times over and that the task before him was to find a measurable regularity that could be communicated to others and was not merely locked within his own psyche. But, just as Trout's account suggests, these patterns he had observed were probably phantasms, artifacts of his own meandering experience and his idiosyncratic disposition to find certain features of the world salient and others not. The pleasant attraction of his explanatory framework seems to have motivated him long after he ought to have given up. The question, for my purposes, is this: Was Kepler's capacity to give the appropriate level of assent to this explanatory framework distorted by the pleasantness of the experience?

I think two considerations allay this worry about being tempted by the pleasantness of the feeling of resonance. The first is that the appeal of pleasant feelings is a standard feature of all learning. The neurological mechanisms involved, even in tragic addiction, are the very same mechanisms at play in paradigm cases of learning. Pleasure responses to rewarding actions encourage us to persist in those rewarding actions, which is how we can be internally motivated to learn.³⁴⁹ In normal cases of learning, the rewarding feeling matches the value of the action and reinforces future action of a similar kind. The most tragic cases of addiction, however, involve a disconnect between pleasure and the motivation to action. In these instances of addiction, addicts report that they do not even feel pleasure anymore; rather, over time the goal becomes mere reduction of pain.³⁵⁰ Hence, normal cases of pursuing what is pleasant seem so normal as to be not worth mentioning, and tragic cases of addiction gradually become relationships which exclude pleasure altogether.

³⁴⁹ Foddy and Savulescu (2010), p. 6.

³⁵⁰ Kennett et al (2013), p. 9.

Addiction, then, is probably the wrong way to frame the issue. However, even in normal cases of learning, psychological reward mechanisms might not track any actual value. Contemporary, popular smartphone games are designed to provoke psychological reward responses which do not track any real value for the individual except the pleasant feeling itself. Perhaps feelings of resonance do the same. This worry, however, can be at least somewhat mollified by the second consideration: feelings of muteness are not any less psychologically salient than feelings of resonance.

Games and gamification ‘capture’ our real values by replacing them with quantifiable data which we can then maximize.³⁵¹ Smartphone games are designed to prevent feelings that might lead a person to become bored with the game. Each feature of game design strings the user along with yet more rewards until hours have passed and the recognition that one is wasting too much time sets in. Nothing internal to the game itself feels unpleasant; the user must rise to the meta-level to discover unpleasant feelings that motivate her to stop playing. This same phenomenon appears in the agential feelings that accompany feelings of orientation and fluency. When non-epistemic motivations generate agential success feelings, these motivations encourage persistence in the explanatory framework. We persist partly because of the familiar and orienting features of the framework, but mostly because the non-epistemic motivations that generated the agential success feelings continue to motivate us. These motivations function similarly to the smartphone game-creators: they associate pleasant, rewarding features with the favored explanatory framework and carefully sift out the unpleasant feelings we might otherwise feel were we to recognize that the framework might be incorrect. We unconsciously push away worries about accuracy because they feel bad.

³⁵¹ See Nguyen (2019, 2021).

Yet those very worries become inaccessible content to which resonance and muteness are sensitive. Resonance and muteness cannot be engineered by non-epistemic motivations in the way the agential success feelings can, since attempting to engage in such engineering only makes the feelings that oppose engineering efforts more likely to arise. Contrary to the worry that resonance might tempt us away from accuracy through its pleasant affect, I think we should worry that distrust of feelings of resonance might tempt us to ignore feelings of muteness which are best-suited in confusing situations to guide us *toward* accuracy.³⁵²

Think of a moment when you've listened to someone tell a story, give an account, or make an argument that left you with a feeling that something was very wrong with the picture the person painted, yet you could not specify what was wrong with it. Through the feeling of muteness, you become aware that there are implications you inchoately intuit about the way a framework organizes features and that these implications are subtly mismatched to content that is stored in your memory but that might never have arisen to the focus of your attention. I suspect that these processes do not neatly track logical inferences or even normal conscious reasoning. Even so, tracing the feeling of muteness can, like a beacon, eventually lead to the aspect of the framework that is so jarringly mismatched to experience.

As epistemic tools, feelings of resonance and muteness work in tandem with one another. Resonance indicates a direction in which to move one's epistemic project while muteness indicates which features of one's existing explanatory frameworks may need to be abandoned. The value of muteness is that it can arise long before a suitable replacement comes on the scene. I can begin to suspect that my religious framework does not fit with deeper features of my mind long before I have a suitable replacement for that framework. Moreover, the feeling of muteness might lead me to

³⁵² I initially developed this point in section 4.6.

discover what exactly fit so badly with the religious framework. If I find that the problem is its mismatch with my sexual orientation, then a suitable replacement might simply be more sexually liberal. If I cannot accept the existence of a Hell, then a suitable replacement will be more merciful.

Trout overstates the tempting nature of pleasant feelings, though his case is not without merit. However, the feelings most susceptible to such temptation are agential feelings formed from non-epistemic motivations. It turns out that feelings of resonance and muteness offer an epistemic counterbalance to the tendency to indulge too much in pleasant feelings and unconsciously push away the unpleasant feelings. Attunement to feelings of resonance and muteness enables us to avoid the epistemic trap.³⁵³ Yet, this defense of the guiding potential of resonance and muteness does not explain what we are to make of the cautionary tale of Kepler. It seems that the Platonic solids resonated with him as cosmically significant and that over the entire course of his lifetime, nothing undermined that resonance. What are we to make of this error? My best answer introduces the final two features I will consider in this chapter: psychological readiness and the worry that resonance and muteness can be produced by inaccurate inaccessible content.

5.7. Barriers to accurate inaccessible representations: psychological readiness

The third and final objection to which I will reply is as follows: I have admitted that an explanatory framework might resonate with inaccurate but inaccessible content.³⁵⁴ But if that is the case, then how could we ever rely on resonance to reliably guide us in the direction of accuracy? It seems we cannot.

³⁵³ This point generalizes. See Gardiner (2022) on the virtues of attention and attunement.

³⁵⁴ And for many reasons. Sometimes resonance might be a product of social factors, as when we unconsciously mimic behaviors of interlocutors. See Chartrand and Bargh (1999). Or it might be the product of unconsciously adopted goals from unrecognized social cues. See Fitzsimons and Bargh (2003). That is, these things resonate because they are part of the culture or community within which we are embedded and the community itself resonates.

The first way to respond here is that the resonance mechanism does not need to be reliable in the short term. Resonance, when appropriately used, only offers a small epistemic step in some direction. In chapter 2, I argued that when resonance warrants assent, it does not warrant much more assent than one had before. If I am resonating with a new explanatory framework, resonance might only warrant that I allow it to be my default framework for the relevant conception. But this is the most minimal form of binary assent. If I am deepening my understanding of an explanatory framework, resonance becomes more granular and so might warrant assent to distinctive parts of the framework, but even then, the assent it warrants might still only be as a default. Resonance serves the unusual role of producing a strong feeling of attraction—strong enough to motivate long-term investment, as I argued in chapter 4—without also providing a strong source of evidence. Stronger assent awaits more evidence. Fortunately, investment in an explanatory framework enables an individual to deepen her grasp and to further articulate the features of that framework. In this process, the features that resonated will become clear, and in so clarifying the conscious side of resonance, one might hope to unlock the inaccessible content that resonated. Some of this inaccessible content might turn out to be inaccurate, but the inaccuracy can be revealed once unlocked.

Unlocking inaccessible content, however, is not itself a reliable phenomenon. Fortunately, inaccessible content is rich and detailed, though deeply contextual. Where an inaccuracy appears in my inaccessible content, an inconsistency often accompanies it. My once inaccessible belief that my sister's childhood boyfriend (whom I once looked up to) was a trustworthy person was accompanied by inaccessible (because immediately dismissed) memories of noticing untruths he had told me. Since inconsistencies between an explanatory framework and inaccessible content produce

mutenesses, inconsistencies among inaccessible contents should also produce mutenesses when a prospective explanatory framework would organize that content.

Yet this reply also seems too optimistic. I have already noted that the resonance process might not range across all inaccessible content. In cases of motivated self-deception, for example, the resonance process might fail to report the muteness of an explanatory framework that only fits my fragile self-conception but does not fit the reality that self-conception represents. It might even perversely report resonance.³⁵⁵ In such cases, the process might be limited by psychological readiness.

5.7.a. Psychological readiness

Psychological readiness to unlock a hidden truth is partly constitutive of psychological readiness for a transformation of one's explanatory framework with respect to that truth. One might be psychologically unready to accept one's sexual orientation, one's faltering faith, one's waning commitment to a romantic relationship, the ignobility of a public figure one adores, one's personal struggles, etc. In each of these cases, the explanatory changes these hidden truths would necessitate are inhibited because accepting the explanatory change would force acceptance of the hidden, rejected truth. Or, to put it the other way around, one maintains explanatory frameworks which preserve the relevant self-deception until one is psychologically ready to accept the hidden truth.

Psychological readiness occurs in at least three ways. The first is through sudden crisis. In the United States, for my generation at least, the 2008 financial crisis tended to provoke complete explanatory reconfigurations of the social system that we all live in and depend upon. An entire

³⁵⁵ Does it? This is hard to say. I affirmed my identity as male many times over when I was younger, yet these affirmations were always accompanied by telling qualifications that might have betrayed my transness had I paid attention to them. But then perhaps I speak from hindsight.

economic order that had previously seemed secure and predictable afterward seemed inherently unstable. That every official source of information (parents, teachers, political leaders, religious leaders, journalists, etc.) treated our financial system as if it were dependable in ways that it turned out not to be often provoked in individuals deep doubts over the ideas (a) that there exist economic experts at all and (b) that official sources of information can be counted on to tell the truth when lies are profitable in the short term. This form of psychological readiness occurs because a previously resonant framework is shattered by consciously available information which forces a reconsideration. Events like this, even at the scale of the individual, are unpredictable.

The second way psychological readiness can come about is through gradual loss of resonance. Sometimes a person gradually realizes that a particular way of thinking is no longer helpful. A formerly religious person might, after years away from churches, tradition and prayer, decide that a religious framework is simply no longer important to her. Sloughing off that framework leaves a glaring explanatory gap: What is the deeper nature of the world? What grounds morality? What is the purpose of my existence? These questions still demand answers even after the loss of a religious framework for answering them. She is ready for and desires a new explanatory framework that can provide such answers, however provisional those answers might be.

The third way psychological readiness can come about is through a gradual increase in muteness that does not become apparent until it crosses a threshold of uncanniness. A person might gradually become more and more distant from her spouse, culminating in the intrusive thought that the person she is married to is a stranger. This kind of event is not so much a *sudden* crisis as a snowballing crisis that can suddenly switch from latent to occurrent in the moment of recognition that her understanding of her spouse has been hollowed out over time to become a representation

only of the spouse's superficial features, offering little to substantively characterize the robust individual she knows must exist.

Just as the trajectory of an individual's life can bring about her psychological readiness for a transformation, so too can that same trajectory prevent her from accepting a hidden truth. The trauma of being assaulted by an individual years ago might develop into a psychological protection from accepting as part of her conception of that person that the assailant now, finally, respects others' boundaries. She might be fully aware that people change and sometimes even repent, but accepting this change is just a bridge too far. It need not be that the evidence underdetermines such judgments; rather, the risk of future assault might make the threshold of evidence much higher than usual. This is an instance of what epistemologists sometimes call 'pragmatic encroachment', but I do not think that a weighing of pragmatic considerations is at the center of this resistance to the truth. Rather, she has a psychological barrier to allowing the evidence to lead her to trust someone who has earned her mistrust.

Here's another example: an individual is raised in a deeply religious environment in which moral evaluations are closely tied to unsubstantiated metaphysical claims. Such an individual may have no way of representing morality outside of the metaphysical/theological framework of the religion, so abandoning the religion may seem to her like abandoning morality altogether. Asking after the foundation of morality outside the religious framework may be considered a moral failing within that religious framework, thus preventing her from ever feeling that it is permitted to question religious doctrine.

In such cases, individuals seem to have psychological barriers to certain explanatory frameworks. We probably all have similar psychological hang-ups which obstruct our efforts to develop more accurate explanatory frameworks for our various conceptions. While the history of

epistemology tends to treat these idiosyncratic barriers as defects; perhaps they should instead be thought of as constitutive features of human psychology around which an epistemic scaffolding must be constructed.³⁵⁶ Theorizing about humans who lack such barriers unnecessarily idealizes the human psyche and in doing so invites us to imagine that we who engage in critical reflection on epistemology do not have such idiosyncrasies.

5.7.b. An epistemic life well-lived

Readiness to transform is a matter of an individual's particular stage of life experience. This is not to say that we will all walk through the same stages; rather, I mean that each of us leads an epistemic life that, if all goes well, progressively matures as we age. We each embark on an epistemic journey, to risk a cliché. At some stages in the journey, we stop and become familiar with the territory: our conceptions are relatively stable and increasing understanding is a matter of deepening our grasp of the frameworks that organize them. But at other stages of the journey, we become ready to move on to something else. Sometimes the catalyst to such readiness is an exogenous event that produces a crisis. Other times, it is a building feeling of muteness or a fading feeling of resonance: our explanatory frameworks have become drab and ossified, absent the organic growth that we should expect to characterize a healthy epistemic life. Where we go depends on where we've been, in just the same way that the next step of a professional career might take into consideration the previous stages.

If the analogy to professional development holds, then it seems almost a truism to say that such a process of epistemic development is agent-guided. If my own professional career is not agent-guided, then what is? Yet my professional development is bound by constraints very similar to

³⁵⁶ Or as Jon Garthoff (2015) has it, using Rawls's (1971) idiom, worldview adoption might be a "special psychology".

those that bind my epistemic development. I did not choose my early education; I did not even choose my interests. These things just seem to find me. Pursuing my interests might be a matter of doing what I find valuable, just as adhering to a religion might be a matter of committing to a way of seeing the world that best preserves those same values. Life presents professional crossroads for me: moments when it feels like I have what William James called a “genuine” choice between two options.³⁵⁷ In these moments, it seems, I am most empowered to deliberate over and carefully choose who I will become. Yet, once all the information is finally on the table, the conclusion might seem to me foregone. And the same is true of a moment in which one is ready for an epistemic transformation. Even though we should not assume that there is a Best Way that all the evidence fits together, it can feel like the new explanatory framework was already there waiting for me to find it. I will characterize the world in the way that seems best to me at the time, whatever that way is. In a transformational stage, I am likely to spend far more time deliberating over that choice, but that does not mean that the options available to me were always endless. The options are usually very few, often resolving down to just two: keep things the way they are or change them. If change is chosen, then my personal history will heavily influence the direction of change.

Well-ingrained dispositions do not fade away lightly. And few if any dispositions are as ingrained in a person’s mind as those of attention, explanatory connection, and evaluation. The dispositions I have developed, then, will serve as limiting factors to the directions in which my explanatory frameworks can transform. Anyone can acquire new dispositions of any of these three kinds, but they must be either motivated to do so or coerced into it. An open-minded person happens to also have a disposition toward valuing different ways of thinking. A person exposed to consistent propaganda (as in fact all of us are) will develop the interpretive dispositions encoded in

³⁵⁷ James (1897).

that propaganda. Such dispositions can only be agent-guided when an agent recognizes the existence of a disposition and decides whether to further entrench it or develop a new one. But on what basis might I make a decision either for or against some interpretive disposition that I already have? I suspect this decision is a function of (a) whether I value open-mindedness and (b) whether my conceptions still resonate as they currently are.

These limitations suggest that the most reliable epistemic use for resonance is as a lodestar for a long-term understanding project. Through such a project, resonant features will unlock, new resonances and mutenesses will emerge, and one has time to become gradually ready for the needed transformations to occur. I do not think there can be an honest argument for the reliable accuracy of any one instance of feelings of resonance or muteness. Nor do I think that there is even any guarantee that an individual who follows feelings of resonance for her entire life will have achieved both accuracy and explanatory competence in all her conceptions. Rather, this study of the epistemic value of resonance suggests that it is at its most reliable in individuals who are already committed to accuracy, so much so that they are willing to face their own demons, to discover the truths they were hiding from. Thereby, such individuals might hope to lessen the influence of their non-epistemic motives to form explanations. As I argued in chapter 4, without resonance to serve as a lodestar, we might be doomed to dogma. Yet, without the epistemic virtues to ground us, we might be doomed to mere flights of fancy.

But even flights of fancy grounded in epistemic virtue are not so bad. Consider Kepler again. What makes his story tragic? That he was wrong? He invested in an old and enduring mathematical fascination, and his effort revealed to everyone that it was, in fact, a dead-end. That it resonated with him to his dying day is a startling feature of the resonance mechanism, one that reinforces the importance of remembering that assent and investment are distinct kinds of commitment. Yet his

motivations for persisting in his model of the orbital relations between planets are also revealing: Kepler's theory was a way of unifying astronomy and Biblical exegesis. Kepler apparently never surrendered Biblical accuracy as a touchstone in scientific work. Resonance, then, was subsidiary to his fixed commitment to Biblical accuracy. Doubting the scientific accuracy of the Bible was probably a common psychological barrier at the time. So, Kepler followed his feelings of resonance within the boundaries of his own psychological unreadiness to transform and in as epistemically virtuous a way as he could. If no more could be asked of an epistemic agent, then perhaps we should not construe Kepler as a cautionary tale. He did his best.

If an epistemic life well-lived is achievable, then it does not require that we ever arrive at mastery, or even that we one day break through our all our psychological defenses. It only requires enduring commitments to open-mindedness, attunement to resonances and mutenesses, self-honesty, and the standards of good reasoning. Attunement to resonances and mutenesses is one epistemic virtue among many which together form a holistic pathway toward ever-increasing understanding. These virtues, and the well-functioning mental capacities we instantiate when we have them, form an interlocking network by which creatures like ourselves can best pursue genuine epistemic goals.

5.8. Summary

Our affective feelings come in pairs. Exciting, pleasant feelings are counterbalanced by sobering, unpleasant feelings. These pairs of feelings work together in our epistemic system as well. Feelings of fluency and orientation enable us to identify whether we grasp our explanatory frameworks, while disfluency and disorientation reveal to us where our confusions lie. Similarly, feelings of resonance indicate to us what the most promising direction of explanatory development

is, while feelings of muteness reveal that even this promising development has its own inadequacies. When propaganda commandeers our goals, our cognitive feelings can be manipulated to fail to register confusion even when we should. Similarly, feelings of resonance and muteness can be selectively activated when we are not psychologically ready for an explanatory change that hinges on a hidden truth. However, feelings of resonance and muteness are not as susceptible to manipulation by propaganda because they also indicate when we have taken on goals that are not really our own. Feelings of resonance and muteness, then, are still the best lodestar for long-term understanding projects, provided these feelings are grounded by the epistemic virtues.

Conclusion

It is not surprising that resonance can warrant a moderate increase in one's assent to an explanatory framework. This dissertation has attempted to work out why this intuitively appealing claim might be true. However, this phenomenon becomes most striking in cases when (a) the threshold for warranting default status is low and (b) resonance is what makes the difference in crossing that threshold. Such cases include religious conversions, new long-term research projects, shattered self-conceptions, and political realignments. It seems paradoxical that some of the very most significant explanatory frameworks in our mental lives are decided by a form of warrant that is so sensitive to non-epistemic values.

The well-integrated conceptions by which we explain ourselves, our social world, and the larger reality within which that social world operates stabilize the values which motivate our long-term goals and projects. Upsetting these conceptions upends the long-term goals and projects built atop them. Sustaining a project, then, depends on the persistently stable values that come from a perspective that remains numerically identical to itself. Commitment to a project of Christian ministry depends on the stability of one's continued assent to Christianity as a representation of reality. The potential loss of value of this project of Christian ministry can activate defensive motivations that protect the minister's religious framework from being upset by growing mutenesses. It might even shield the minister's mind from feeling those mutenesses at all. What was once resonant can always become mute, but this does not always stop us from shielding ourselves from that change.

Yet, despite these risks, the minister might still be warranted in defaulting to a Christian explanatory framework. There is simply not much evidence that might warrant a religious (or non-religious) explanation of humanity's position within the universe and so elevate it above the others.

And each of us judges our own view to be the most warranted of the bunch—perhaps on account of resonance, or perhaps on account of the self-reinforcing nature of perspectives. Regardless, we will each almost certainly default to *some* view. And the values associated with that view will inform our projects.

Yet, in cases where the threshold of confidence for default status is low, one's assent ought to *remain* low despite the framework enjoying default status. For this reason, we should be wary of projects that are fully dependent on values that emerge only from such a framework. Suppose, for example, that my conception of the nature of reality involves a series of reincarnations whose end goal is not justice, but enlightenment for all. Within such a worldview, justice is a secondary consideration, while guiding others to enlightenment (however conceived) becomes primary. Moreover, if the value of my enlightenment spreading projects cannot be ratified by an independent and better warranted explanation, then the ultimate value of that project depends entirely on the reincarnative framework. As a mere default, a conception that gives reincarnation a central place in the grand scheme might be harmless. But as the sole conception grounding the value of a major project in my life, it is dangerous in at least two ways. First, I might in fact be acting contrary to the real values of human life and social interaction. Second, I will be more likely to protect this conception from change for fear of learning that what I am doing lacks value altogether.

Yet, rarely will the transformation of a conception result in a complete loss of the previous iteration. An explanatory framework that resonates does so because it gets something right, provided one's inaccessible content is generally accurate. That it also gets something wrong is an occasion for evolution, not complete rejection. So, not only is it morally appropriate to ground our projects in values that spring from multiple conceptions of varying levels of warrant; it is also epistemically appropriate. A weakly warranted, value-laden conception that has no overlap with other value-laden

conceptions is probably so inaccurate as to prevent understanding altogether. This being the case, it is not surprising that the religious traditions that have endured the longest maintain deep ties to projects that are grounded in much more warranted value-laden conceptions. A good Christian ministry, for example, will include material support for the poor. A sensible enlightenment-spreading project will overlap with psychological therapies secularly known to be effective.

But this approach applies well beyond the realm of the religious and religious-adjacent. Competing economic theories, for example, often do not enjoy a great deal of warrant relative to one another. Favoring one over another might be as much a matter of familiarity as anything, though that familiarity produces and reinforces an interpretive perspective. Yet we so often structure our society based on confidence in an economic theory. Defaulting to a particular economic theory is probably harmless in itself, but establishing social projects grounded only in values exclusive to that theory faces the same moral and epistemic dangers as the case of religion. Persistent attunement to feelings of resonance and muteness can be a suitable guide even in economic policy, since these feelings enable one to discover the weaknesses of the familiar and the strengths of the unfamiliar.

This approach applies also to one's self-conception. Consider, for example, our self-conceptions as sexual and gendered individuals. Often, the greatest pressure that keeps a queer person within a self-conception as straight and cisgender is doxastic overcommitment to a weakly warranted self-conception and the interpretive perspective that maintains it. Again, attunement to resonance and muteness enables escape from the self-reinforcing feedback loop by which one's interpretive dispositions reinforce one's self-conception. Identifying what is mute even within one's own self-conception enables one to attune to features that might undermine that conception and thus revise one's interpretive dispositions.

While over-assenting to a particular explanatory framework on resonance alone is dangerous, the remedy for this danger is to treat feelings of resonance and muteness themselves as a lodestar, thus relegating resonating frameworks to the status of touchstone. As long as we do not allow our non-epistemic motivations to lead us too deeply into doxastic overcommitment, resonance can safely guide the development and transformation of our conceptions through investment in the winding journey of a long-term understanding project.

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Vita

Claire Dartez was born in Metairie, Louisiana in 1984. She attended Catholic schools, was homeschooled for her secondary education, and eventually received her BA in philosophy (2006) from the University of Dallas, also Catholic school. She did her level best throughout those years to be a good boy, like she was told to. She also found herself simultaneously fascinated by and disappointed in totalizing philosophical systems. She was confident, after all, that the universe operated systematically, but noticed that the existing systems were oversimple. She went on to receive her MA in philosophy (2009) from Louisiana State University, and her thesis was a study on the ontology of fictional entities. During that time, her illusions about herself and the world she lived in all began to collapse. She spent six years reconsidering her religion, career, and identity. At that time, she was also fortunate enough to find a loving partner and friend in Catherine Dartez. She eventually returned to academic philosophy, first to teach in 2015 and then to finish her education in 2017. She received her PhD from the University of Tennessee in 2023, during which time she finally gave up trying to be a boy at all. She now specializes in epistemology and philosophical psychology.