

# UNDERSTANDING AND INTUITION IN SCIENCE AND MORALITY

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**Abstract.** My essay starts from an account of scientific understanding given by Regt in his paper “Understanding in science and beyond”. My intention here is not to oppose his thesis, that understanding is also a matter of skill, or to propose another thesis on scientific understanding; rather, my aim is to see if – based on the very clear account of scientific understanding given by Regt – also a similar account of moral understanding could be developed. First, I am going to present, in short, Regt’s account of scientific understanding, then I will present some recent accounts on moral understanding, and then I will draw a parallel between scientific understanding, as proposed by Regt, and moral understanding.

**Keywords:** understanding, intuition, science, morality, scientific understanding, moral understanding.

My essay starts from an account of scientific understanding given by Henk W. de Regt in “Understanding in science and beyond”<sup>1</sup>. My intention is not to oppose his thesis, that understanding is also a matter of skill, or to propose another thesis on scientific understanding. Rather, my aim is to see if – based on the very clear account of scientific understanding given by Regt – also a similar account of moral understanding could be developed.

First, I am going to present, in short, Regt’s account of scientific understanding. In section 2, some recent accounts on moral understanding are presented, and in section 3, I am going to draw a parallel between scientific understanding – as proposed by Regt – and moral understanding.

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<sup>1</sup> Henk W. de Regt, “Understanding in science and beyond”, in Andrei Ionuț Mărășoiu and Mircea Dumitru (eds.), *Understanding and Conscious Experience*, Routledge, 2024, pp. 23–42.

## 1. SCIENTIFIC UNDERSTANDING AND UNDERSTANDING MUSIC

Understanding, as a topic of philosophical discussion, has received two kinds of characterization according to Regt. It is considered to be either a subjective feeling (the “aha” feeling of a scientific discovery<sup>2</sup>):

The first view assumes that understanding is nothing but a *subjective feeling*. Accordingly, it is perhaps of interest to psychologists but not to philosophers, because they typically focus on the objective features of science. Think, for example, of Archimedes, who had his famous “Eureka-experience” when he was taking a bath.<sup>3</sup>

Or a species of knowledge, namely knowledge of the causes of a phenomenon:

On a second, completely opposite view of understanding, the understanding that is produced by scientific explanations is a specific kind of objective knowledge, for example, knowledge of the causes of phenomena.<sup>4</sup>

Regt’s main thesis is that scientific understanding consists, partially in knowledge of the causes but there is also another component at play, namely *skill*. According to his theory about understanding, scientific understanding involves scientific explanation, but the theories involved in giving explanations have to have some degree of intelligibility. In order to achieve intelligibility, the scientist needs the skill of constructing models that are as intuitive as possible.

I conclude that scientific explanations of phenomena do give us understanding but that this requires that the theories used in the explanation are intelligible, where intelligibility is defined as *the value that scientists attribute to the cluster of qualities of the theory that facilitate its use*. Note that intelligibility, defined in this way, is not an intrinsic property of a theory but a context-dependent value, related to the skills of scientists. It does not make sense to say that the theory of evolution or quantum theory or the theory of the Higgs mechanism is intelligible, or unintelligible, in itself. Whether or not these theories are intelligible depends on the context in which they are used. It should be emphasized, though, that this context-relativity does not entail that understanding is subjective: there are still objective ways to test whether a theory is intelligible (to a scientist in a particular context).<sup>5</sup>

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<sup>2</sup> For a more comprehensive account of this kind of feeling, of discovery, see Mircea Dumitru, ““Feeling the proof”: Is there such a thing as a phenomenology of reasoning?”, in *Understanding and Conscious Experience*.

<sup>3</sup> Henk W. de Regt, “Understanding in science and beyond”, in *Understanding and Conscious Experience*, p. 24.

<sup>4</sup> *Ibidem*, p. 25.

<sup>5</sup> *Ibidem*, p. 28.

According to Regt, then, intelligibility involves building models and constructing explanations. But in order to do that, the scientist needs to have a special kind of familiarity with the theory to be understood, a familiarity that leads to what Regt calls “intuitive insight” or simply “intuition”:

I have argued that scientific understanding can be achieved only if the skills of scientists accord with the qualities of the theories they use, to build models and construct explanations. This requires that scientists are in some sense familiar with the theory, that they have developed what may be called “intuitive insight” into the theory and its implications. Such insight shows, for example, when scientists can recognize qualitative consequences of the theory, without doing exact calculations. The relevant intuitions can be developed: scientists learn the skills to work with new theories during their university education and in scientific practice. Usually this is a gradual process, but in some situations – like in the case of quantum mechanics – radically new intuitions have to be developed, and this may require more effort.<sup>6</sup>

To recapitulate, Regt thinks that both specialists and non-specialists can have an intuitive understanding of a theory and they both rely on a process of familiarization for that. Specialists can use this intuitive understanding (i.e., “when scientists can recognize qualitative consequences of the theory, without doing exact calculations”<sup>7</sup>) of their theory to make it more intelligible. Non-specialists have intuitive understanding of a theory when they interact repeatedly with some consequences of the theory and they learn to adjust, i.e., they learn some regularities or some laws by trial and error. Regt gives the example of an experiment where players of a computer game could acquire an intuitive understanding of quantum mechanics because the game was modeled after the quantum theory:

Although the results are still tentative, they suggest that non-expert players can develop heuristics and intuitions that outperform randomly seeded numerical strategies and that may therefore be used as input for expert optimization strategies. These results are in line with my analysis of scientific understanding: intuitions are important, and they can be trained and developed. Such intuitive understanding is partly a question of familiarization. But it is not just passive familiarization that occurs after-the-fact: understanding has an active role in scientific research. The thesis that one may come to understand something when one becomes familiar with it does not sound implausible.<sup>8</sup>

Regt compares this kind of intuitive *scientific* understanding with intuitive *musical* understanding and finds them quite similar: they both seem to occur through familiarization – with new music, or with the rules of the game. Regt does

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<sup>6</sup> *Ibidem*, p. 31.

<sup>7</sup> *Ibidem*, p. 31.

<sup>8</sup> *Ibidem*, p. 34.

not say this, but one plausible explanation for this resemblance is that both kinds of non-specialists (in science or in music) acquire intuitive understanding probably by observing some re-occurring patterns (he says “structure”) that they learn to apply in similar future circumstances, too.

These analyses suggest a parallel between, on the one hand, musical understanding of experts and non-experts, and, on the other hand, the understanding of quantum phenomena by expert scientists and citizen scientists discussed above. Understanding a particular piece of music has to do, in part, with recognizing its structure. An expert in musicology can analyze and describe this structure, but ordinary listeners without such expertise can still *observe* structure. After having heard works by Mozart and other composers from the classical era, one will become familiar with the structure of this kind of music, and this will make it easier to understand new music that is composed in the same style. In this way, listeners can develop “intuitive insight” with respect to music in a particular style, and this intuition can be used actively in order to understand new, unknown pieces of music.<sup>9</sup>

At this point, it might be useful to list the main points about intuitive understanding from Regt's paper. First, intuitive insight into a scientific theory is required in order to achieve scientific understanding. Second, the intuitive insight is gained through a familiarization process with the theory and its consequences. There are different kinds of intuitive insight. There are intuitive insights for experts and intuitive insights for non-experts. For example, the intuition for experts resembles in both music and science and the non-expert intuition is also similar for the two domains compared by Regt. The difference between experts and non-experts is that experts can explain and describe the structure they have an intuition of:

In the previous section, I argued that laypeople can acquire an “intuitive” understanding of phenomena in unfamiliar domains, be it in nature or in music. Such intuitive understanding is fundamentally different from the expert understanding that scientists or musicologists possess. The latter kind of understanding may seem to be beyond the reach of laypeople, especially with respect to science: current scientific understanding is often so advanced that it appears to be accessible only to specialists in the field.<sup>10</sup>

Regt states clearly that there is an intuition for experts and an intuition for non-experts. One of the questions discussed in the third section is if we can claim something similar for morality. But until that point, some recent accounts of moral understanding are in order.

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<sup>9</sup> *Ibidem*, pp. 33–34.

<sup>10</sup> *Ibidem*, p. 34.

## 2. MORAL UNDERSTANDING

The purpose of this paper is not to criticize Regts' view, but to take the plausible, intuitive elements of his account and to see if a parallel can be developed between scientific and moral understanding. Regt himself draws a parallel between scientific and musical understanding, so one may be curious about how this might work for another domain, namely for morality, especially since in recent theories about moral understanding, the definitions given and the disputed positions follow closely the ones for scientific understanding.

Christoph Kelp<sup>11</sup>, in his article "Moral Understanding", gives an account of recent theories proposing a theory and a definition of moral understanding. He notices that

While a lot of work on understanding can indeed be found in the philosophy of science literature, ethicists have taken a growing interest in the nature of moral understanding in recent times. In view of the centrality of moral understanding to good moral action, this will not come as much of a surprise. It will also not be particularly surprising that both of the main camps in the philosophy of science literature are represented in the literature on moral understanding as well.<sup>12</sup>

For example, one definition of moral understanding known as "the cognitive control account" is the following:

that q is why p and in the right sort of circumstances you can successfully:  
 i follow some explanation of why p given by someone else.  
 ii explain why p in your own words.  
 iii draw the conclusion that p (or that probably p) from the information that q.  
 iv draw the conclusion that p' (or that probably p') from the information that q'  
 (where p' and q' are similar to but not identical to p and q).  
 v given the information that p, give the right explanation, q.  
 vi given the information that p', give the right explanation, q'.<sup>13</sup>

One may notice that both this account and the rival account<sup>14</sup> rely almost exclusively on epistemic notions and there is nothing in them to account for the specificity of the moral domain. Another reason for our uneasiness with the cognitive control account of moral understanding might be that it seems to suppose

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<sup>11</sup> Christoph Kelp, "Moral Understanding", in *Understanding and Conscious Experience*, pp. 225–242.

<sup>12</sup> *Ibidem*, p. 225.

<sup>13</sup> A. Hills, "Understanding Why", in *Noûs* 50, 2016, pp. 661–688, p. 663.

<sup>14</sup> P. Sliwa, "Moral Understanding as Knowing Right from Wrong", in *Ethics*, nr. 127, 2017, pp. 521–552.

that everything is clear, explicitly stated, brought to a visible, controllable surface. And our experience of moral life does not seem to fit this picture. Many processes in moral understanding can be described as taking a lot of time and effort, and when a resolution is reached and understanding achieved, this does not necessarily involve an explanation. This why, I think, it might be useful to list some of the major difficulties in making moral understanding analogous to scientific understanding.

### 3. PARALLEL BETWEEN MORAL AND SCIENTIFIC UNDERSTANDING

In the moral domain, obviously, we are evaluating actions, not assertions about the world. So when we say that we understand a moral action, are we saying merely that we know the explanation for a moral truth? Of course, we usually say that we understand why *x* is the wrong moral action in these circumstances or that we understand why *z* is the right moral action in these circumstances, where "X is the wrong moral action." can be seen as a true statement. But we also say that we understand why someone does something morally right, that is, we understand her *action*. Is the moral understanding of an action always reducible to the moral understanding of a statement about actions? This is the first kind of difficulty. A second one is that *actions have purposes and reasons*, while *scientific phenomena have causes*. Therefore, the answer to the question "why" might presuppose very different kinds of explanations for the two domains of understanding.

A third difficulty will regard mainly what has been called the *direction of fit*. Within the scientific domain, our theories, our explanations, and our understanding have to fit the way the world is. By contrast, in the moral domain, the direction of fit changes: the moral agent has to make the world fit judgments about what is right or wrong. The moral action will transform a state of affairs from how it is to how it is supposed to be, so that the world is supposed to fit our prior understanding of the moral normative realm. This difference might also complicate the picture of given explanations.

A fourth difficulty may be seen in respect to *roles of agents*. In the moral domain it might be relevant to specify whose understanding one is talking about. One can talk about the agent's understanding of what she does, or one can talk about an observer's (i.e. bystander witnessing a moral deed) point of view. For example, when we are witnessing a good deed or a bad action we might say that we have or do not have a moral understanding of it – one needs not to be always an agent to have moral understanding. Therefore, in morals, the moral position of the agent might be quite different from the moral position of an observer. It might be the case that in most situations, both the agent and the observers can agree about what is right or wrong to do in a certain situations. However, this is not always the

case. For example, the supererogatory<sup>15</sup> deed of a hero could appear as “a duty” to the agent (i.e. the hero), but not as a duty (i.e. a mere permission) to an observer. This is a classical conundrum regarding supererogatory actions – that their status looks different from different perspectives. The observers might think that there is no obligation to sacrifice health or life for the good of others, but the hero will often times say that she sees it as a duty (“I had to”). In this case, the agent cannot be said to be exactly wrong, therefore a case could be made that each – from their perspective – was correct in assessing the moral situation. This is, I think, a situation that does not appear in science. Even if we try to identify similar roles in science, for example the scientist engaged in scientific research and a mere observer, still the situation cannot be said to be parallel to the one in the moral domain. If the observer and the scientist have different understandings of the same scientific phenomenon, we shall not say that both may be right, according to their own perspective.

There is another distribution of roles in morality that could be relevant to understanding. If understanding is based on explanation, then there is an asymmetry present in any explanation, namely that someone is doing the explaining and someone is receiving an explanation (of course, there might be cases where we explain things to ourselves, which just means that one person can play a double role). Now, of course, the one providing the explanation needs first to have an understanding of the thing explained: this is one of the most commonly used signs that someone has understood something. Also, the person receiving the explanation is engaged in understanding, at least partially. Ideally, if the explanation is scientific, then the knowledge of the explanation should pass from provider to recipient and they both should share the same knowledge in order for the explanation to be considered successful. In other words, they cannot disagree about the understood phenomenon, if the explanation is correct and successful.

It might be quite different in a moral situation. Let us suppose that we explain to someone why a certain action is wrong, for example, not to help one’s neighbor in a rather small matter. One might say that we *understand* why they say it is wrong, but we still disagree about it (for example, we might consider that we have some urgent matter to attend, and this takes precedence over helping this time, even if we understand why helping is important both in general and in this circumstance). Moreover, even if our accuser is informed about why we think we are not wrong by not helping (i.e., the urgent matter), he might not agree with us either. Maybe he judges that it is not that urgent or important. Therefore, it might happen that even if you both understand each other’s position and know each other’s explanation, you still disagree about right or wrong in that situation. This is

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<sup>15</sup> For a detailed account of supererogatory deeds, see J.O. Urmson’s seminal article “Saints and Heroes”, in A. Melden (ed.), *Essays in Moral Philosophy*, Seattle, University of Washington Press, 1958, pp. 198–216.

rarely the case in science. One rare circumstance where this kind of disagreement might appear in science is when rival explanations belong to clearly different and rival paradigms used for explaining the same phenomenon.

In short, disagreements in the moral domain are usually not a sign of error or falsity, as it is the case for science.

### 3.1. Scientific and moral intuitions

Regt draws two parallels between kinds of intuitions associated with understanding. First, there is a parallel between experts' intuition and non-experts intuition: they both can grasp certain structures by gradual familiarization. Then there is a parallel between intuitions in science and intuitions in music: in both domains familiarization that leads to recognizing structures (i.e. intuitions) constitutes a certain degree of understanding:

These analyses suggest a parallel between, on the one hand, musical understanding of experts and non-experts, and, on the other hand, the understanding of quantum phenomena by expert scientists and citizen scientists discussed above. Understanding a particular piece of music has to do, in part, with recognizing its structure. An expert in musicology can analyze and describe this structure, but ordinary listeners without such expertise can still *observe* structure.<sup>16</sup>

Of course, there are differences between expert and non-expert intuition. The expert can offer analysis and description in addition to intuition, while the non-expert will only have a recognition of structure, i.e. an intuition. This is quite an intuitive account of what one might say about expert and non-expert understanding of both science and music. However, this account raises several questions. First I will discuss what I think is both interesting and problematic in Regt's account of intuition and then I will attempt my own parallel with moral intuition leading to moral understanding.

I think that in Regt's account, the notion of "intuition" might cover (and in some ways, obscure) several experiences of understanding. First, there is the intuition on the non-expert, which is just detection of patterns or structures through familiarization in time. Then, there is the expert intuition, which is supposed to be also a detection of structures through familiarization with a scientific theory. One may notice that they can look similar, but one is familiarization with practical or visible aspects of a theory (with strings of sounds in case of music, or with simulated effects of a scientific theory in Regt's example), and the other one is familiarization with the theory itself. This is why the expert is supposed to also be able to analyze and describe the structure observed. This is a first difference

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<sup>16</sup> Henk W. de Regt, "Understanding in science and beyond", p. 33.

between notions covered by “intuition”. Then, there is another kind of intuition, the “radically new intuition” that Regt speaks about, one that is plausible, but it is only being mentioned, not really explained.

The relevant intuitions can be developed: scientists learn the skills to work with new theories during their university education and in scientific practice. Usually this is a gradual process, but in some situations – like in the case of quantum mechanics – *radically new intuitions* have to be developed, and this may require more effort.<sup>17</sup>

This radically new intuition cannot be said to consist in a better grasping of old structures through familiarization, because it is about inventing something radically new, obviously. So, why is it still “an intuition”? This seems to be the experience of understanding something not through gradual familiarization with an already given structure, but a sudden insight into something completely new. One might reply that the expert familiarization or the non-expert familiarization is also an experience of something new for the agent. But the sudden discovery of a new idea or new theory is the confrontation with something new for everyone, not only for the agent in a domain where there are no patterns or structures yet to be discerned. Therefore, it must be a different kind of intuition or something other than intuition. However, this is not the place to elucidate the difference. What I can do here is to take into account this difference between different uses of “intuition” when taking into account moral intuition.

Our intuitive grasp of the difference between situations is enough to grant a comparison, I think.

### 3.2. Moral intuition

The first, rather obvious question to tackle when doing a comparison with understanding in moral domain is: are there experts in the moral domain? A *prima facie* answer is no. The situation is very different from science. However, we might say that some of us are better persons, have better morals than others. Does this mean that the better person is an expert? A case could be made that they might have better intuition of what is wrong and what is right due to a process of familiarization with the moral domain. To be able to say that there is something analogous to an expert in morality – this might depend on the kind of moral theory one has adopted. It is rather difficult to frame the better person as an expert in morality if one adopts a deontic point of view (I will discuss briefly an example below). However, from a theory of virtue point of view, we might say that the more trained and experienced is someone in detecting relevant features in moral situation, the closer that person is to an expert. Also because there are no general

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<sup>17</sup> *Ibidem*, p. 31.

rules to apply, or algorithms for the moral assessment of each situation, we might plausibly say that what is needed is an *intuition* of the right response in certain moral situations. Famously, in theory of virtue, our intuitions can be trained through familiarization with moral situations and through moral practice. This looks similar to the intuition of experts in science or music discussed by Regt.

There is also another possible parallel between experts in science and what we might call, by a stretch, “experts” in morality. Kant, in *Groundwork of the Metaphysics of Morals*, maintains that common sense is usually right about recognizing right and wrong deeds. However, what common rational people cannot usually do is to justify their verdicts by appeal to a moral theory or by appeal to principles and rules. This is the job of the moral theorist or moral philosopher. This is similar to what Regt describes when he says “the only advantage that expert musicologists have over non-expert listeners is that the former can explain the reasons behind their musical experiences and preferences”<sup>18</sup>. He also says that experts can analyze and describe the structures they identify in science, unlike non-experts. However, this might be only a superficial resemblance between experts in science and experts in morals and differences might be more important.

A second question regarding the parallel between moral understanding and scientific understanding regards moral intuition: is there a special kind of intuition, namely moral intuition? And if there is such a thing (we do seem to speak about moral intuitions), then are they intuitions of the kind that build over time and detect structures or intuitions that are sudden realization of the new, like discoveries in science? This is a complex problem that I do not hope to solve here. I am mentioning the question in order to point at difficulties concerning moral understanding. All I can say here is that in our common moral experience we do seem to have sudden realizations about moral situations, for example, that we were previously wrong, even if we do not have an explanation for why we were wrong. This type of experience sounds like something compatible with “moral intuition”. Can we also, as moral philosophers, have sudden intuitions about a new theoretical moral framework? This would certainly constitute a strong analogy with scientific intuition. Again, this is a complex problem that I do not intend to tackle here. However, I hope that at least some difficulties of drawing a parallel between scientific and moral understanding have been pointed out.

To summarize, I believe that moral understanding has remarkable similarities to scientific understanding, but its special character – as *moral* understanding – is difficult to spell out and is a problem for future research.

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<sup>18</sup> *Ibidem*, p. 33.