

## **Laws and Ideal Unity**

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### **Abstract**

I explore Kant's account of the empirical laws of nature and of the systematic unity they generate. How, if at all, can the particular laws of nature be both necessary and known empirically? And what, if any, is the cognitive function of the regulative idea of systematic unity for our knowledge of the laws? I argue that, on Kant's account, empirical reflection on particular phenomena can give us access to the laws, since this reflection is guided by the a priori laws of nature and the regulative idea of systematic unity. Reflection of this kind can ground not scientific knowledge in the strict sense of the term, but a common form of our knowledge of the laws.

### **1. Introduction**

The lawful unity of nature plays a central role in Kant's philosophy. According to Kant, all natural phenomena are without exception unified by a set of a priori laws. Kant develops this claim first and foremost in the *Critique of Pure Reason*. There, he sets out the fundamental laws of nature in general. They include, for example, the principles that substance persists throughout all change and that every change of the states of a substance has a cause.<sup>1</sup> On Kant's account, these laws do not merely describe the regularities that obtain in the world, but they are

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<sup>1</sup> A182/B224 and A189/B232. All references to Kant are to the volume and page numbers of the Akademie edition (Kant 1900 ff.), except in case of the *Critique of Pure Reason*, which is cited by reference to the A and B pagination of the original 1781 and 1787 editions. Translations are from Kant (1992), (1999), (2000) and (2007), unless indicated otherwise.

necessary principles. The necessity they express is not given independently in the objects themselves, but it is grounded in the nature of the human intellect. As Kant puts it, human understanding “prescribes” the laws to nature, and only things that stand under these laws are proper objects of human cognition.<sup>2</sup> We can thus know a priori that all of nature in general is governed, for example, by the principles of substance and causality Kant spells out in the first two “Analogies of Experience.”<sup>3</sup>

The universal laws of nature in general do not determine fully the particular character of specific phenomena. Kant thus argues that different kinds of substances, and different kinds of causal relations between the states of those substances, are furthermore governed by a set of more specific laws. Kant is most explicit about this second type of law in the Appendix to the Transcendental Dialectic of the first *Critique* and in the introductions to the *Critique of Judgment*. He suggests, for example, that different causal relations are determined by their own “rules”, the “particular (empirical) laws of nature.”<sup>4</sup> These particular laws do not have full generality but determine the different kinds of things that are the objects of the special sciences. By contrast with the a priori laws of nature, the more specific laws cannot therefore be known by a priori reflection on the conditions of the objects of experience in general. Instead, knowledge of these laws requires experience of the particularities of specific phenomena.

According to Kant, natural phenomena are thus determined by the fundamental a priori laws as well as the particular and empirical laws of nature. Kant’s arguments for the a priori laws have received ample coverage in the secondary literature since their inception. But his further claims about the empirical laws raise special questions, which have been the concern of commentators in the more recent literature. As is well established, Kant agrees with Hume that

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<sup>2</sup> *Prolegomena*, 4:320.

<sup>3</sup> A176/B218.

<sup>4</sup> *Critique of Judgment (CJ)*, 5:183.

experience cannot ground knowledge of necessity. How, then, are we to construe these empirical laws? How, in particular, can they be both necessary and known empirically?

Further questions arise for the conception of unity that Kant associates with this second set of laws. In the Appendix to the *Transcendental Dialectic*, he contrasts the “collective unity” of cognition under the empirical laws with the “distributive unity” of cognition under the a priori laws.<sup>5</sup> A distributive unity extends to any possible instance of a given unifying principle. The unity of cognition made possible by the a priori laws is of this kind; all empirical cognitions are united as the indefinitely many possible instances of these laws.<sup>6</sup> By contrast, the empirical laws of nature cannot unify the natural phenomena in this way. Instead, they generate what Kant characterizes as a collective unity. The collective unity, as he puts it, is “not merely a contingent aggregate, but a system interconnected in accordance with necessary laws.”<sup>7</sup> It includes a plurality of diverse cognitions, determined by a plurality of diverse laws, that stand in a determinate relation to one another in a single and complete whole.

The notion of a collective, or systematic, unity of cognition in accordance with empirical laws is problematic primarily because of the epistemic status Kant ascribes to it. Although both types of unity, distributive and collective, play important roles in our cognition of nature, they perform these roles in very different ways. On one side, we can know with full certainty that all empirical cognitions are unified by the a priori laws of the understanding. On the other side, we have no insight whatsoever into the collective unity of our cognitions of the phenomena under the more specific, empirical laws. The notion of a systematic unity is not “the concept of an object,” as Kant puts it, but “a mere idea” without determinate application to the

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<sup>5</sup> A582/B610 and A644/B672.

<sup>6</sup> It is worth noting here that the a priori laws generate a distributive unity both of cognition and of the objects of cognition. For each cognition it is true that it is determined by the fundamental laws of the understanding; all cognition is of enduring substances and the causal relation between the states of these substances. Since, on Kant’s account, the a priori laws of the understanding are, furthermore, constitutive of cognition as well as of the objects of cognition, the same holds true for these objects.

<sup>7</sup> A645/B673.

phenomena.<sup>8</sup> Kant nevertheless claims that the idea of the collective unity of nature has “an excellent and indispensably necessary regulative use.”<sup>9</sup> It serves as a heuristic that guides research into the phenomena and the laws that govern them.<sup>10</sup>

The further questions Kant’s idea of the systematic unity of cognition raises thus concern the relation of this idea to the empirical laws. Why must we presuppose the idea of systematic unity in the search for these laws? What, in particular, is the cognitive function of the idea for our knowledge of the laws given that we cannot achieve the systematic unity of cognition itself?

My aim in this chapter is to sketch an interpretation of Kant’s conception of empirical laws that accounts for the centrality Kant ascribes to the idea of systematic unity. I specifically explore the epistemological question of how we can know empirical laws, given that such laws are construed as having genuine necessity. I argue that, in most cases, we cannot know such laws by derivation from the a priori laws of nature in general, but we can discover the empirical laws by reflection on particular phenomena. And it is this reflection, which relies on the regulative idea of the collective unity of nature. I argue that although unifying reflection of this kind cannot ground scientific knowledge in the strict sense of the term, it can lead to more or less unified cognition of the empirical laws of nature.

I argue for this reading of empirical laws in three main steps. I begin, in the next section, by reviewing three recent interpretations, which differ significantly in their accounts of the necessity of the laws and our knowledge thereof. I show that while all three readings enjoy some textual support, neither is without problems. I develop my proposal in the subsequent two

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<sup>8</sup> A645/B673 and A647/B675.

<sup>9</sup> A644/B672.

<sup>10</sup> As in the case of distributive unity, the collective unity pertains to cognition as well as to nature. Kant at first sets out this idea as a “logical principle” (A650/B678), or “methodological device” (A661/B689). The idea instructs us how to go about extending cognitions, and advancing our understanding of the objects of cognition. Kant also points out, however, that the idea of systematic unity has at the same time a “transcendental” character (A651/B682).<sup>10</sup> If the methodological principle is reasonably to be employed in the search for unified cognition, we must presuppose that the objects are such that they can be cognized by this method. Otherwise, Kant claims, reason would “set as its goal an idea that entirely contradicts the arrangement of nature” (*ibid.*).

sections. In Section 3, I sketch an account of empirical reflection, which relies on the idea of systematic unity as a means for discovering particular instantiations of the a priori laws of nature. In Section 4, I draw out some of its implications. I show that empirical reflection restricts the possibility of scientific knowledge in the strict sense, but makes possible a kind of cognition which allows for hope in the progress towards knowledge. I argue, moreover, that the resulting conception of the laws suggests a non-reductive conception of unity, which allows for a non-homogeneous plurality of laws. I conclude that Kant's conception of the lawful unity of nature is thus interestingly different from other conceptions of unity more commonly associated with Kant.

## **2. Three interpretations revisited**

Interpretations of Kant's conception of empirical law that have dominated the recent literature may be divided into three broad camps, following James Messina's helpful classification. I refocus Messina's survey for the purpose of this paper by considering the role that the idea of systematic unity plays in these accounts of empirical law.<sup>12</sup>

First, the Best System Interpretation (BSI), proposed by Philip Kitcher among others, places the idea of systematic, or collective, unity center stage.<sup>13</sup> According to BSI, the particular laws of nature are those empirical generalizations that would figure in the best systematization of the empirical data at the ideal end of inquiry. The best system, or in Kantian terms the systematic unity of our cognitions of nature, is what confers the status of a necessary law on empirical regularities. There can be no genuine empirical law independent of such a system,

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<sup>12</sup> Messina (2017). As this refocusing will make clear, I believe that Messina's own account and others he sides with unduly downplay the relevance of the idea of unity. This is why, beyond the three camps mentioned here, there is another literature relevant for the questions of this paper, focused more explicitly on the idea of systematic unity and less centrally on the nature of empirical laws. See, e.g., Geiger (2003) and Ginsborg (2017).

<sup>13</sup> Kitcher develops his interpretation in a series of papers (see, e.g., 1986 and 1994). Buchdahl (1969 and 1992), Brittan (1978) and Allison (1996) are also often associated with this interpretation.

and we can know the laws only insofar as they form part of our best systematization of the empirical data. According to BSI, systematic unity is thus constitutive of both the necessity and our knowledge of the laws.

On a second and competing interpretation, defended most prominently by Michael Friedman, the systematization of empirical data provides a method for a first approximation to knowledge of particular laws.<sup>14</sup> Systematic unification can guide empirical inquiry into exceptionless generalizations. However, it cannot, on its own, guarantee cognitive access to their lawfulness. For genuine knowledge of particular laws, we must derive those laws from the a priori laws of nature together with the relevant empirical content. On this Derivation Account (DA), particular generalizations are necessary laws, and can be known as such, only if they can be derived in this way. The systematic unity of nature, by contrast, is an idea that offers only a preliminary guide to empirical laws.

A third interpretive approach has most recently been developed by a growing number of authors.<sup>15</sup> The key proposal is that, according to Kant, empirical laws are necessary governing principles that obtain by virtue of the particular natures of things.<sup>17</sup> According to this Necessitation Account (NA), empirical laws are necessary independently of our ability to derive these laws from the a priori principles of nature in general—or, indeed, to include the laws in our best systematization of the empirical data. In this respect, NA downplays the role of the idea of systematic unity. Some proponents of NA have argued that we may nevertheless attempt to systematize empirical phenomena with the aim of discovering particular laws. But such

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<sup>14</sup> Friedman (1992, 2013 and 2014).

<sup>15</sup> This third class includes a variety of interpretations such as Watkins (2005), Kreines (2009 and 2017), Massimi (2014 and 2017), Messina (2017) and Patton (2017).

<sup>17</sup> Proponents of the third approach sometimes contrast their “bottom up” account with “top down” models. According to the latter, the necessity of particular laws is generated by derivation from the a priori laws, that is, from above. The former construe necessity as grounded in the particular natures of things, that is, from below. A similar distinction was previously associated with the debate between BSI and DA. By contrast with the more recent metaphysical distinction, however, the earlier contrast was primarily associated with the epistemological question of our knowledge of the laws. For a classification of Early Modern conceptions of law into bottom-up and top down accounts, see Ott (2009).

systematization will account neither for the necessity nor for our knowledge of the laws. Since the necessity of particular laws is grounded in the essential natures of things, which are inaccessible to cognizers like us, they have concluded that empirical laws are for us in principle unknowable.<sup>18</sup>

All three readings have textual support. Proponents of BSI can primarily point to passages in the Appendix to the Transcendental Dialectic and the introductions to the *Critique of Judgment*. There, Kant stresses the role of reason and reflecting judgment that, in the search for cognition of empirical laws, necessarily follow principles of systematic unity.<sup>19</sup> DA finds specific support in texts of the Transcendental Deduction of the Categories and the *Metaphysical Foundations of Natural Science*. There, Kant argues that necessity and strict universality can be grounded not in empirical generalizations but only in the a priori principles of the understanding.<sup>20</sup> NA, finally, can rely on passages in the first and third *Critiques* and on Kant's pre-Critical texts. Particularly in the *Critique of Judgment* Kant argues that different natures have causal powers acting in accordance with many different rules into whose necessary status, however, we have no insight.<sup>21</sup>

All three interpretations also face a number of problems. The difficulty with BSI is that it seems unclear how inclusion in a system can confer anything but a weak form of necessity on generalizations that would otherwise be contingent. According to BSI, to be a law is to belong to an ideal systematization of empirical generalizations. But how could systematized generalizations be said to determine or govern the phenomena? Moreover, as critics have

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<sup>18</sup> Kreines (2009). See also Messina (2017). By contrast, Massimi (2017) has argued that we can come to know the necessity of the laws even if their grounds are inscrutable to us. In this paper I agree with Massimi's conclusion that cognition of the laws is possible. However, as I argue below, my reasons are rather different from her dispositional essentialist reading of Kant's account of laws.

<sup>19</sup> E.g. A680/B708ff.

<sup>20</sup> E.g. A91/B124.

<sup>21</sup> E.g. *Critique of Judgment* (CJ), 5:183. On support for NA in the pre-Critical Kant, see Watkins (2005, chapter 2), Massimi (2014) and Messina (2017).

noted, BSI does not account for the explanatory role of the laws of nature.<sup>22</sup> Generalizations, even if part of an ideal system, would not explain why the observed regularities obtain. They would fail to elucidate the necessary conditions that determine the phenomena.

According to DA, by contrast, particular laws have the same strong necessity as the a priori laws. They are necessary governing principles that can play the required explanatory role. They can provide not only a description of regular occurrences but elucidate the necessary conditions of particular phenomena. As critics have noted, however, the problem with DA is that few generalizations we ordinarily count as laws seem actually derivable from the a priori laws of the understanding.<sup>24</sup> Friedman elaborates on the case of Newton's laws of motion.<sup>25</sup> But other generalizations, Bernoulli's principle of fluid dynamics or Hauksbee's law of gases, for example, present unpromising candidates for successful derivation in this way. One might reply that this may not be a problem in and of itself, since there might simply be very few empirical laws. But a more general question nevertheless arises for DA. For why should we expect the results of our systematizing activities to converge with the principles derivable from the a priori laws? In other words, why should we have "the well-founded hope," as Friedman puts it, that our attempts at systematizing the empirical data will progress towards the kind of derivation necessary for grounding genuine lawfulness?<sup>26</sup>

Compared with DA, proponents of NA have offered a neat account of how Kant can hold that empirical laws are necessary, while also accounting for the epistemic restrictions that stand in the way of our deriving those laws from a priori principles. But the proposal raises further questions. If the empirical laws of nature are necessitated by the particular natures of

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<sup>22</sup> See Kreines (2009) and Messina (2017).

<sup>24</sup> See Kitcher (1994).

<sup>25</sup> See Friedman (2013). The laws of matter, spelt out in *Metaphysical Foundations of Natural Science* (MFNS), are a special case. Since nature is as a matter of fact material, they are valid for every possible natural phenomenon. This is why, on Kant's account, they can be derived from the a priori laws together with the empirical concept of matter. It is unclear, however, why we should hope that other, more specific laws are derivable in the same way. On the laws of the MFNS, see also Stang (2016), ch. 8.

<sup>26</sup> Friedman (2014: 553).



things, yet those natures are in principle inaccessible to us, then how can we ever come to know any empirical laws as genuinely necessary? Kreines' and Messina's answer is that we cannot. On their account, there are—or, perhaps, may be—particular necessities that we cannot ever come to know.<sup>27</sup> However, given Kant's extensive discussion of empirical laws in the context of his account of cognition, it would be somewhat surprising if our principled ignorance of particular laws were his last word on the matter. More specifically, NA would be open to a similar criticism as DA. It would leave unclear how any scientific inquiry, in particular attempts at systematizing empirical phenomena, could reasonably be regarded as aiming at, or “approaching,” knowledge of empirical laws.<sup>28</sup>

In their accounts of particular laws, the three interpretations have thus taken different routes through the difficulty of explaining how laws can be necessary and knowable by experience. Proponents of DA and NA have given good arguments for the necessary status of particular laws. They have shown that empirical laws of nature are not simply generalizations that describe what actually happens, but necessary principles that explain why something has to happen. But they have thereby downgraded the centrality of the idea of systematic unity and, with it, the possibility of our knowledge of the laws. For DA, knowledge is effectively restricted to only a few laws; and, according to some proponents of NA, knowledge is impossible altogether. BSI, by contrast, has upheld the possibility of our knowledge of empirical laws, achieved through the systematization of empirical generalizations. But it has done so only at the cost of downgrading the necessity of these laws. The laws we can know, according to BSI, are necessary in a weaker sense than the a priori principles.

The survey of these three interpretations lays bare a tension between attempts to account for the necessity and knowability of the empirical laws of nature. In the following I

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<sup>27</sup> According to Kreines (2009: 542) it is an open question whether Kant asserts knowledge that *there are laws* governing specifically distinct natures, even if he denies knowledge of what those laws might be.

<sup>28</sup> Kreines (2009: 537). Having denied knowledge of empirical laws, Kreines wants to preserve “progress without knowledge of natural laws” (534).

explore whether we can do more to alleviate this tension on Kant's account. I suggest that we can take seriously the claim, shared by DA and NA, that the necessity of particular laws is grounded in conditions that lie beyond any possible experience, while also offering a more satisfactory account of our cognition of these laws.

### **3. Empirical reflection and the search for laws**

Proponents of DA and NA have rightly pointed out that the necessity of empirical laws cannot be grounded in empirical regularities but only in conditions that, to us, are either accessible a priori or not accessible at all. As Kant puts it in the Transcendental Deduction, “appearances may well offer cases from which a rule is possible in accordance with which something usually happens, but never a rule in accordance with which the succession is *necessary*.” Such a necessary rule “must either be grounded in the understanding completely *a priori* or else be entirely surrendered as a mere fantasy of the brain.”<sup>29</sup> Kant also often speaks as if we were acquainted with the particular laws of nature. For example, he describes the delight we feel when we encounter “systematic unity among merely empirical laws.”<sup>30</sup> He seems to take it as a given that we have some cognitive access to these laws. But how is such access possible on the assumption that empirical laws have genuine necessity?

According to Kant's account of the fundamental laws of nature, we know a priori that all phenomena are governed by necessary principles. For example, we know a priori that every change of the states of a substance has a cause and stands under some necessary causal law. By contrast, we do not know a priori which cause brings about which effect or which empirical regularity is a genuine law. Such further insight cannot be had a priori. I argue that it can be achieved empirically insofar as empirical inquiry fulfils two conditions. First, empirical inquiry

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<sup>29</sup> A91/B123f.

<sup>30</sup> CJ, 5:183.

is guided by the a priori laws and thus constitutes the investigation into particular instantiations of these laws. Second, empirical inquiry is guided by the idea of systematic unity and, if this idea could be fully realized, would result in knowledge of the particular laws. I suggest that through this type of empirical reflection, guided both by the a priori laws and the idea of systematic unity, we can achieve cognition of empirical laws. The right model for our cognitive access to these laws is not derivation from a priori principles but reflection on the phenomena.

In fleshing out this reflection model as an account of our cognition of particular laws, we thus need to pay attention to both of these aspects, guidance by the a priori laws and presupposition of the regulative idea of unity. First, consider the guiding function of the a priori principles for empirical reflection. I focus here on the principles of relation, Kant's so-called Analogies of Experience.<sup>31</sup> They determine that any appearance stands to some other appearance in relations of substance-accident, cause-effect and the interaction of agent and patient. On Kant's account, these principles are constitutive of empirical cognition and of the objects of cognition. However, they do not automatically churn out particular substance-accidence, cause-effect, or agent-patient relations when fed empirical input. They do not determine *which* appearances stand to each other in these three types of relation. By contrast, the Analogies are constitutive of empirical cognition indirectly. They guide us in reflecting on the phenomena with the aim of identifying the relevant relata in experience, and of discovering the empirical laws that govern these relata.<sup>32</sup>

The Second Analogy, for example, does not specify the cause of the increasing temperature of a stone in the sun. But it states that there must be *some* appearance that caused the temperature to change. It thereby tells us that there is some particular causal law in

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<sup>31</sup> The story will be different for how the mathematical principles are applied in experience. Since these principles do not on their own imply an account of necessity, however, I shall set these principles aside here. More will have to be said at another occasion about the principle of modality, which play a special role in the constitution of empirical cognition for Kant.

<sup>32</sup> As Guyer (1987: 69) puts it, the analogies of experience do not "uniquely determine" a particular object, but only "send one looking in the right direction."

accordance with which the change occurred. Moreover, the Second Analogy guides the search for particular laws by directing us to reflect on appearances in accordance with the a priori concepts of cause and effect. It instructs us to search for an appearance *A* that stands to a given appearance *B* just as a cause stands to its effect. It guides us, as Kant puts it, in “combining appearances ... according to an analogy with the logical and universal unity of concepts”—in this case, the a priori concepts of cause and effect.<sup>33</sup>

The Analogies of Experience thus have both a constitutive and a regulative function.<sup>34</sup> They constitute empirical cognition by determining the form of the particular laws that govern the phenomena as consisting in substance-accident, cause-effect or agent-patient relations. But they can perform this constitutive function only by fulfilling a second, regulative role: they guide empirical inquiry by indicating the types of universal sought in experience as having the forms of substance-accident, cause-effect or agent-patient relations.<sup>35</sup> Reflecting on the phenomena in accordance with the Second Analogy, for example, is thus a means for investigating specific causal relations and the laws that govern them. In this way, the reflective search for empirical laws is a search for the particular instantiations of the a priori principles.

And yet the regulative function performed by the a priori principles is only part of the picture. The reflective search for particular laws also requires guidance by the regulative idea of systematic unity. On Kant’s account, the only way to ascertain whether we have correctly

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<sup>33</sup> A181/B224. In line with this reading, the Analogies of Experience carry their name for good reason. They tell us to construe the relationship between two appearances in analogy with the relationship between the a priori concepts.

<sup>34</sup> See A180/B222f. Also A236/B296 and A664/B692. Buchdahl (1969: 651) has introduced the distinction between “transcendental and empirical levels” of causation. By contrast with this two-levels reading, I believe that the regulative and constitutive dimension of the analogies of experience are more closely inter-dependent than Buchdahl recognizes. This is because the recognition in experience of an order that can legitimately be subsumed under the relational principles requires reflection guided by these principles. The constitutive character of the principles thus presupposes their regulative employment. In this, I agree with the related claims made by Longuenesse (1998) and Ginsborg (2006a and 2006b).

<sup>35</sup> In unpublished work, Boyle has argued that the categories characterize the form that acts of reflection on the sensible manifold can take. In a similar manner, I suggest, the relational principles can be understood as guiding reflection by specifying the universal concept or law at which such reflection aims.

identified a necessary law that governs the change of the states of a substance is to compare the given particular with other similar cases. By comparing and contrasting particulars, we can examine whether same causes have same effects, whether different effects have different causes, and whether we have thus identified a generalization with universal validity for phenomena of a particular kind. However, Kant's account also entails that the empirical data is never complete. Further evidence may always suggest that we have picked out the wrong generalization and have thus identified the wrong cause of some given effect. The empirical inquiry, described so far, might prompt all sorts of skeptical worries.

Kant thus argues that, in order to regard empirical data as evidence for or against a particular law, we must presuppose it as a regulative idea that the evidence we have is part of a complete whole of cognitions. In other words, we must follow the regulative principle that the empirical data we have gathered contributes to completing the totality of what there is to be found out about the phenomena. Only if we assume the unity of cognitions in this sense, can we take particular empirical inquiry as getting us closer to our knowledge of the necessary laws that govern the phenomena. Or, to put the point in the terms of the third *Critique*, regarding empirical data as evidence for a particular law, we must presuppose the regulative principle of the "purposiveness of nature" for our understanding.<sup>36</sup> We have to go about our empirical inquiries as if nature were such that it could be cognized by the epistemic means we have at our disposal. Only if we take nature to be purposive for our understanding in this sense, can we regard reflection on the phenomena as resulting in cognition of the particular laws of nature.<sup>37</sup>

Kant thus suggests that "the systematic unity of the understanding's cognitions ... is the *touchstone of truth* for its rules."<sup>38</sup> By analogy with a tool for assaying the purity of precious metals,

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<sup>36</sup> CJ, 5:181.

<sup>37</sup> The idea of unity should therefore not be mistaken for the belief in the uniformity of nature that Hume famously takes to underlie empirical inquiry. Moreover, the search for particular laws guided by the idea of unity is continuous with the intellectual activity of conceptualizing the relevant data. In both points, I concur with Ginsborg (2017).

<sup>38</sup> A647/B675.

Kant claims that the systematic unity of empirical cognitions functions as a test for the truth of the regularities we have identified as empirical laws. If all cognitions were systematically unified, we would have achieved complete understanding of the phenomena. Under these ideal conditions, we would have cognition of the complete set of conditions of any given occurrence. We would have all the possible evidence relevant for identifying whether a particular generalization is indeed the instantiation of an a priori law. It is this regulative idea of systematic unity, Kant argues, that must be presupposed if we are to take a particular empirical relation as instantiating a necessary law.

The empirical inquiry that is guided by the idea of unity is thus not simply an act of systematizing empirical generalizations according to certain logical principles. It is not, as BSI has it, an attempt to arrange rules, which we had previously formulated on the basis of empirical data, in the best overall system. On the Kantian conception, empirical inquiry should rather be construed as a reflective act, regulated both by the idea of systematic unity and the a priori principles. It is a process in which the idea of unity guides us in comparing and contrasting particulars in the search for general laws, and in which the a priori principles determine the necessary form of the concepts and laws we seek. I suggest that it is because empirical inquiry is informed, in this way, by the a priori principles as well as the idea of systematic unity, that we can regard our systematizing activities as the search for particular necessary laws.

#### **4. Ideal unity and our knowledge of laws**

I have argued that we can regard empirical reflection as the search for particular laws insofar as such reflection is guided both by the a priori principles and the idea of systematic unity. But the foregoing discussion raises an important question about the possibility of our knowledge of the laws. If our search for knowledge of particular laws presupposes the idea of unity, yet the full realization of this idea can never actually be achieved, is not the knowledge of empirical

laws, too, unachievable? Should we conclude, as proponents of NA have done, that knowledge of particular laws is in principle impossible? As Kant argues, knowledge requires not only sufficiently articulated empirical cognition, but also assent to a judgment and justification of its truth.<sup>40</sup> As he puts it, when “taking something to be true is both subjectively and objectively sufficient it is called *knowing*.”<sup>41</sup> Full justification, however, would require the unity of cognition which, as Kant is keen to stress, cannot in principle achieve. Kant’s conception of our knowledge of the laws thus appears exceedingly demanding and, ultimately, impossible to attain.<sup>43</sup>

To this extent, then, I agree with the conclusion reached by some proponents of NA.<sup>44</sup> But this is not all Kant has to say on the matter. Despite his important limitation to our knowledge of empirical laws, Kant is keen to stress the contrast between knowledge in the strict sense and “common cognition.” As he points out, in many cases where we take ourselves to know, what we have is an “aggregate of cognitions” and, perhaps, sufficiently unified cognition relative to a given purpose.<sup>45</sup> In the introduction to the *Metaphysical Foundations*, Kant furthermore contrasts knowledge required for “proper science [which] is only that whose certainty is apodictic” with “improper” knowledge, the kind of cognition “that can merely contain empirical certainty.”<sup>46</sup>

In addition to the strict notion of scientific knowledge, Kant thus makes room for knowledge in a more inclusive sense. This “improper” knowledge, or common cognition,

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<sup>40</sup> A822/B850. On Kant’s conception of knowledge, and its relation to cognition, see Chignell (2014a) and Watkins and Willaschek (forthcoming).

<sup>41</sup> A822/B850.

<sup>43</sup> This is why in the MFNS, Kant focuses on laws that can be constructed a priori given the empirical concept of matter. Our knowledge of these laws does not, therefore, face the same problems as the more specific empirical laws. And this is also why he makes his famous claim that “in any special doctrine of nature there can be only as much proper science as there is mathematics therein” (4:470).

<sup>44</sup> By contrast, Chignell (2014a: 592) presents a more inclusive conception of the knowledge of laws, claiming that “our shared background knowledge of nature and its laws” that plays the crucial role in grounding knowledge claims.

<sup>45</sup> See Kant’s account of the perfection of cognition in the *Jäsche Logic* (JL), 9:72.

<sup>46</sup> MFNS, 4:468, my translation.

requires conscious representation of what is given in sensibility by means of concepts “that pertain to objects.”<sup>47</sup> Common cognition may be more or less unified. It may have more or less content, and may include more or less information about the conditions of the phenomena. It can be improved in this regard by the unification of cognitions.<sup>48</sup> Moreover, common cognition does not require any further justification of its truth. It is thus never entirely beyond doubt, and we must always be ready to accept that even cognition that is sufficiently detailed for our purposes will have to be revised. Nonetheless, common cognition is all we often have when we take ourselves to know, and it may reasonably be regarded as a form of knowledge in the loose sense of the term.<sup>49</sup>

With his account of common cognition in place, Kant can thus regard empirical laws as lying within our cognitive reach and as making empirical explanations possible. He can claim that we can cognize the empirical generalizations we have discovered through our systematizing inquiry “as laws (i.e., as necessary),” even though we cannot know them in the strict sense.<sup>50</sup> Moreover, the relation between common cognition and strict knowledge also accounts for the possibility of “progress” or “approximation to knowledge” of empirical laws.<sup>51</sup> The search for more and more unified cognition is guided by the very idea whose realization would ground scientific knowledge. Improving, or unifying cognition through empirical inquiry, thus asymptotically approaches knowledge of the laws.<sup>52</sup> The systematizing search for cognition both advances our “improper” knowledge of the empirical laws and would—if it could be completed—be a positive test of their truth. It is because of this intrinsic connection of achievable cognition, or low-grade knowledge, and unattainable knowledge in the strict

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<sup>47</sup> A78f./B104f.

<sup>48</sup> See JL, 9:64.

<sup>49</sup> In Breitenbach (2011) I have shown how Kant characterizes this lower form of knowledge as “applied rational cognition.”

<sup>50</sup> CJ, 5:184.

<sup>51</sup> Kreines (2009: 534 and 537).

<sup>52</sup> See A663/B691.



sense, that we can speak of epistemic progress. Moreover, because of this intrinsic connection we also have rational grounds for “hope” that the generalizations resulting from our systematizing inquiry will be the laws known under ideal conditions.<sup>53</sup> Ordinary knowledge, epistemic progress, and rational hope all have a place in Kant’s account of empirical laws.

The reading I have proposed shows that the strict limitations on our knowledge of the laws, put forward by proponents of NA, needs some qualification. Although we can never be absolutely certain that our empirical regularities are necessary, we can have more or less unified cognition of particular laws, or knowledge in the loose sense of the term. The idea of unity thus performs a key role in Kant’s account of our knowledge of the laws and proponents of BSI are right in ascribing the idea of unity prominence. But this does not entail that the systematic unity of our cognitions also confers necessity upon empirical generalizations. As I have suggested, the idea of systematic unity is not constitutive of the necessity of particular laws but only regulative for our cognition thereof.

The interpretation I have proposed has further implications for the idea of unity presupposed in our search of empirical laws. The special character of Kant’s position, on my reading, can be brought out by contrasting it with DA. The conception of the collective unity associated with DA is that of a whole in which the particular laws can be derived from the most general laws together with particular empirical data. It is natural, I think, to link this conception with a reductionist notion of unity. On this conception, our cognition of nature is unified by a hierarchy of laws. More specific laws determine our cognition of more complex phenomena on the lower levels of the hierarchy, and stand under more general laws, which determine our cognition of phenomena on higher levels. The unity of these laws is ultimately fixed at the top by the highest, a priori, laws of nature. More specific laws are thus ultimately derivable from the most general laws.

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<sup>53</sup> Friedman (2014: 553). On Kant’s conception of rational hope see Chignell (2014b).

The reading I have proposed in this paper shows, I believe, that Kant's conception of unity does not entail a reductionist conception of unity. On my reading, the particular laws must be thought of as forming part of a collective, or systematic, unity. That is, the laws cannot be regarded as a plurality of entirely independent necessities,<sup>56</sup> but they must be construed as standing in determinate relations to each other that are in principle understandable to us. This unity of cognition under the empirical laws is not fixed by the a priori laws at the top. It is rather informed by these laws from within.<sup>57</sup> It therefore does not imply a single hierarchical form but may, instead, consist of a plurality of hierarchies, ordered according to a plurality of general governing principles. As Kant's claim that the study of biology is necessarily guided by teleological principles suggests, for example, different areas of inquiry may be carved out by irreducibly different regulative principles.<sup>58</sup>

The idea of the collective unity of nature implied by my reading may thus make room for a plurality of irreducible laws. Although Kant suggests that "sameness of kind is necessarily presupposed in the manifold of a possible experience," he immediately adds that "we cannot determine its degree a priori."<sup>59</sup> We must search for more and more general laws of nature, on Kant's account, but we cannot know in advance how far our unifying activities will reach. Moreover, Kant stresses that we need not only look for more and more general laws but also for the more specific principles that determine the differences between the phenomena. In

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<sup>56</sup> Although to my knowledge no proponent of NA has argued for such a conception of lawful disunity, NA would nevertheless seem best placed to justify such a conception. For, on this conception, an irreducible plurality of independent laws could be grounded in an irreducible plurality of independent natures of things. Particular laws would be minimally, or distributively, unified insofar as they are all governed by the form of the a priori laws. But beyond this common character, the laws would have no further cohesion.

<sup>57</sup> In a similar vein, Longuenesse (1998: 108) has described the universality of, e.g., causal relations as "immanent to empirical objects themselves."

<sup>58</sup> This is suggested, moreover, by Kant's conception of biology as informed by teleological principles. On laws in biology, see Breitenbach (2017). I believe that this non-reductive notion of unity leaves room for the conception, prevalent among a number of 19<sup>th</sup> Century scientists, that empirical generalizations are ultimately grounded on fundamental a priori principles. What it rules out is the further thought that all empirical laws are, in the end, reducible to one and the same set of principles.

<sup>59</sup> A654/B682.

addition to the principle of homogeneity, the principles of specification and affinity are equally valid. They direct us to search not only for more general principles but also for more specific laws and for the connections between them.<sup>60</sup> Only by investigating the laws that govern the common as well as the diverse features of the phenomena can we fill in the system of cognitions, and thus approximate to knowledge of the whole.

Ultimately, Kant thinks that this unity cannot be construed hierarchically, but must be understood as having teleological and organic structure. As Kant puts it in the *Critique of Judgment*, “by means of the example that nature gives in its organic products, one is justified, indeed called upon to expect nothing in nature and its laws but what is purposive in the whole.”<sup>61</sup> While an analysis of this further thought lies beyond the scope of this paper, this second implication of my reading indicates that Kant’s notion of the lawful unity of nature is crucially distinct from any hierarchical or reductionist conception of the unity of nature.

## 5. Conclusion

In this paper, I have been concerned with Kant’s conception of empirical laws and with the unity of nature these laws generate. In particular, I have asked how on Kant’s account we can have knowledge empirical laws, if the necessity of such laws is grounded in conditions that lie beyond our experience. On the reading I have suggested, in most cases we cannot know the empirical laws by derivation from these a priori principles, but have to discover them by reflection on the phenomena. Such reflection is an intellectual activity that centrally relies on the regulative idea of unity. Reflection of this kind cannot ground scientific knowledge in the strict sense of the term, but it can lead to a common form of knowledge, that is, more or less

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<sup>60</sup> See A657f./B685f.

<sup>61</sup> Kant presents an organicist conception of the unity of nature in CJ, 5:379. I argue for such a non-reductionist conception in Breitenbach (2009, chapter 6, and 2017).

unified cognition. Although, on Kant's account, the lawful unity of nature is thus ultimately inaccessible to us, it is nevertheless a proper aim of empirical inquiry.<sup>62</sup>

### **Bibliography**

- Allison, Henry 1996. *Idealism and Freedom*. Cambridge University Press
- Breitenbach, Angela 2009. *Die Analogie von Vernunft und Natur*, Walter der Gruyter: New York/Berlin
- Breitenbach, Angela 2011. "Kant on Causal Knowledge: Causality, Mechanism and Reflective Judgment," in K. Allen and T. Stoneham (eds.), *Causation and Modern Philosophy*, London: Routledge, 201-19
- Breitenbach, Angela 2017. "Laws in biology and the unity of nature," in M. Massimi and A. Breitenbach (eds.), *Kant and the Laws of Nature*. Cambridge University Press
- Brittan, Gordon 1978. *Kant's Theory of Science*. Princeton University Press
- Buchdahl, Gerd 1969. *Metaphysics and the Philosophy of Science*. Oxford: Blackwell
- Buchdahl, Gerd 1992. *Kant and the Dynamics of Reason*, Oxford: Blackwell
- Chignell, A. 2014a. 'Modal Motivations for Noumenal Ignorance: Knowledge, Cognition and Coherence', *Kant-Studien* 105: 573-597
- Chignell, A. 2014b. "Rational Hope, Possibility, and Divine Action," in G. Michalson (ed.), *Cambridge Guide to Kant's Religion*, Cambridge: Cambridge University Press.
- Friedman, Michael 1992. "Causal Laws and the Foundations of Natural Science," in P. Guyer, (ed.) *The Cambridge Companion to Kant*. Cambridge: Cambridge University Press. 161-199
- Friedman, Michael 2013. *Kant's Construction of Nature: A Reading of the Metaphysical Foundations of Natural Science*. Cambridge University Press

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- Friedman, Michael 2014. "Law of Nature and Causal Necessity," *Kant-Studien*, 105: 531-53
- Geiger, Ido. 2003. "Is the Assumption of a Systematic Whole of Empirical Concepts a Necessary Condition of Knowledge?," *Kant-Studien* 94: 273-98
- Ginsborg, Hannah. 2006a. 'Empirical Concepts and the Content of Experience', *European Journal of Philosophy* 3, 349-72
- Ginsborg, Hannah. 2006b. 'Kant and the Problem of Experience', *Philosophical Topics* 34, 59-106
- Ginsborg, Hannah 2017. "Why Must we Presuppose the Systematicity of Nature?," in M. Massimi and A. Breitenbach (eds.), *Kant and the Laws of Nature*. Cambridge University Press
- Guyer, Paul 1987. *Kant and the Claims of Knowledge*, Cambridge: Cambridge University Press
- Kant, I., *Kants Werke*, Berlin: Preußische Akademie der Wissenschaften, 1900ff.
- Kant, I., *Lectures on Logic*, trans. J. M. Young, Cambridge: Cambridge University Press, 1992
- Kant, I., *Critique of Pure Reason*, trans. P. Guyer and Allen Wood, Cambridge: Cambridge University Press, 1999
- Kant, I., *Critique of the Power of Judgment*, trans. P. Guyer and E. Matthews, Cambridge: Cambridge University Press, 2000
- Kant, I., *Anthropology, History and Education*, trans. G. Zöllner and R. Louden, Cambridge: Cambridge University Press, 2007
- Kitcher, Philip 1986. "Projecting the Order of Nature," in Robert Butts (ed.). *Kant's Philosophy of Material Nature*. Boston: D. Reidel. 201-235
- Kitcher, Philip 1994. "The Unity of Science and the Unity of Nature," in Paolo Parrini (ed.). *Kant and Contemporary Epistemology*. Dordrecht: Kluwer. 253-272
- Kreines, James 2009. "Kant on the Laws of Nature and the Limitation of our Knowledge," *European Journal of Philosophy*, 17: 527-58

- Kreines, James 2017. Kant on the Laws of Nature: Restrictive Inflationism and its Philosophical Advantages. *The Monist* 100(3)
- Löw, Reinhard 1980. *Die Philosophie des Lebendigen*. Frankfurt a. M.: Surhkamp
- Longuenesse, Béatrice 1998. *Kant and the Capacity to Judge: Sensibility and Discursivity in the Transcendental Analytic of the Critique of Pure Reason*. Princeton University Press
- Longuenesse, Béatrice 2005. *Kant on the Human Standpoint*, Cambridge: Cambridge University Press
- Massimi, Michela 2014. “Prescribing Laws to Nature. Part I. Newton, the pre-Critical Kant, and Three Problems about the Lawfulness of Nature,” *Kant-Studien*, 105(4): 491-508
- Massimi, Michela 2017. “Grounds, modality, and nomic necessity in the Critical Kant,” in M. Massimi and A. Breitenbach (eds.), *Kant and the Laws of Nature*. Cambridge University Press
- Messina, James 2017. “Kant’s necessitation account of laws and the nature of natures,” in M. Massimi and A. Breitenbach (eds.), *Kant and the Laws of Nature*. Cambridge University Press
- Ott, Walter 2009. *Causation and Laws of Nature in Early Modern Philosophy*. New York: Oxford University Press
- Patton, Lydia 2017. “Kantian Essentialism in the *Metaphysical Foundations*,” *The Monist* 100(3)
- Stang, Nick 2016. *Kant’s Modal Metaphysics*. New York: Oxford University Press
- Watkins, Eric 2005. *Kant and the Metaphysics of Causality*. Cambridge University Press
- Watkins, Eric 2017. “Kant on the unity and diversity of laws,” in M. Massimi and A. Breitenbach (eds.), *Kant and the Laws of Nature*. Cambridge University Press
- Watkins Eric and Marcus Willaschek, “Kant on Knowledge and Cognition,” *Journal of the History of Philosophy* (forthcoming)