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## KUHN THE CONTEXTUALIST?

Iñaki Xavier Larrauri Pertierra

### 1. Introduction

In *The Structure of Scientific Revolutions*, Kuhn gives us an account of knowledge particular to scientific practice that is at odds even with contemporary science pedagogy; in his account, Kuhn interprets the progression of scientific paradigms not only as not clearly evincing a directionally clear augmentation of communal knowledge concerning reality, but also as a process whose structure inexorably invites doubt and anomaly. Ostensibly paradoxical, though, is his concomitant claim that, despite all this, wherever there are instantiations of paradigms guiding research, knowledge is to be found. In other words, scientific knowledge does not seem to be beholden to any external standard. To manage Kuhn's claims, we employ some explanatory resources from epistemological contextualism; first, however, to guide our argumentation, we must lay out Kuhn's account of scientific knowledge.

### 2. Kuhn on Scientific Knowledge and Paradigms

#### 2.1 *The Relation between Paradigm and Knowledge*

For Kuhn, scientific paradigms are 'universally recognized scientific achievements that for a time provide model problems and solutions'.<sup>1</sup> This initial methodological interpretation is somewhat misleading, for Kuhn does not even consider methodology as sufficient in dictating 'unique substantive conclusion[s] to many sorts of scientific questions.'<sup>2</sup> What seems relevant for Kuhn here is how the "model problems and solutions" consist of methodological directives derived from pre-existing paradigms, such that the sphere of problem-solving, in its empirical/experimental and theoretical modes, necessarily depends on the paradigm that defines it. If we interpret problem-solving as how scientific knowledge increases, for solutions bring order to hitherto unelucidated facets of nature, then such knowledge must depend on the

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<sup>1</sup> Thomas S. Kuhn, *The Structure of Scientific Revolutions*, 4<sup>th</sup> ed. (Chicago, IL: The University of Chicago Press, 2012), xlii.

<sup>2</sup> Kuhn, *The Structure of Scientific Revolutions*, 4.

paradigms through which we regard the world and problem-solving systems derive their character.

This is what Kuhn means when saying that ‘the shared paradigm [is] a fundamental unit . . . that cannot be fully reduced to logically atomic components’,<sup>3</sup> for if paradigm components are modularly compatible between each other, implying possibility for translating them through a series of different paradigms by logical transformations, then they would lose their self-referential character. This character is necessarily circular/self-referential as a consequence of last paragraph’s consideration:<sup>4</sup> if scientific knowledge depends on pre-existing paradigms, then our progression forward in our understanding of the world must be in terms of what was developed beforehand – our *paradigmatic* understandings of the world. Also, this circular character is evinced by the history of scientific development, for ‘science has included bodies of belief quite incompatible with the ones we hold today’,<sup>5</sup> since self-referentiality does not allow reference to anything else but that with the circular character.

## 2.2 Further Functions of Scientific Paradigms

Kuhn not only ascribes knowledge’s mere possibility to the function of paradigms, but even one’s ability to meaningfully regard objects through sight, for, according to him, ‘[w]hat a man sees depends upon what he looks at and also upon what his previous visual-conceptual experience has taught him to see.’<sup>6</sup> Paradigm self-referentiality also ensures that ‘[t]he scientist can have no recourse above or beyond what he sees with his eyes and instruments’,<sup>7</sup> the latter being what enables researchers to indirectly engage those facets of nature that cannot be normally experienced through our senses. Furthermore, noting that the design of scientific instruments is based on what paradigm dictates as relevant features of nature to be explored can allow for a clearer understanding on how heavily paradigmatic structures influence knowledge and sense experience.<sup>8</sup> Lastly, Kuhn finishes outlining the importance of paradigms

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<sup>3</sup> Kuhn, 11.

<sup>4</sup> Kuhn also comments on the significance on paradigmatic self-referentiality in cross-paradigm debate. For him, ‘[w]hen paradigms enter, as they must, into a debate about paradigm choice, their role is necessarily circular. Each group uses its own paradigm to argue in that paradigm’s defense.’ Kuhn, 94.

<sup>5</sup> Kuhn, 3.

<sup>6</sup> Kuhn, 113. Visual-conceptual experience, here, can be treated as helping set the paradigmatic framework through which what a person looks at is regarded meaningfully – that is, regarded *as* something. See also, Kuhn, 4.

<sup>7</sup> Kuhn, 114.

<sup>8</sup> Paradigms allow scientists to emphasise, ‘as paradigmatic observations, the particular cluster of . . . phenomena that [a paradigm] could do most to explain, . . . [which inevitably] restrict[s] the phenomenological field accessible for scientific investigation at any given time.’ Kuhn, 13, 61. To explore the whole breadth of this phenomenal set, paradigms must supply the concepts and methodologies associated with the particular tools and instruments of a scientific trade. See also, Kuhn, 76.

as determinants for a scientific community's experience of nature by commenting on how paradigms create languages of observation that embody 'a host of expectations about nature and [fail] to function the moment these expectations are violated';<sup>9</sup> such languages express reality in terms already supplied by the conceptual paradigmatic structures that formulated the language in the first place.<sup>10</sup>

The preceding discussion is meant to highlight one of the main theses of Kuhn: scientific research, paradigmatically guided, is simply an 'attempt to force nature into the conceptual boxes supplied by [an accepted paradigm]'.<sup>11</sup> Consequently, theory, supplied by paradigm, and fact/data, supplied by nature, are made to almost be indistinguishable and seem like two sides of a paradigmatic coin. In 'developing points of contact between a theory and nature',<sup>12</sup> the scientist engages in actual scientific work and research that helps 'add to the scope and precision with which the paradigm can be applied.'<sup>13</sup> Only by finding new areas of paradigm application can constitutive theories be further elaborated/articulated in their explanatory/predictive potentials regarding future natural phenomena. How paradigm development through scientific research practically looks like can take on many forms, but they generally all share the characteristic of consistent realisation of

a promise of success discoverable in selected and still incomplete [problem areas for subsequent theory articulation]. Normal science [i.e. guided by an accepted paradigm] consists in the actualization of that promise, an actualization achieved by extending the knowledge of those [natural] facts that the paradigm displays as particularly revealing, by increasing the extent of the match between those facts and the paradigm's predictions, and by further articulation of the paradigm itself.<sup>14</sup>

For Kuhn, almost all relevant scientific research work abides by these criteria, such that the articulation of a paradigm necessarily allows for the concomitant growth of a scientist's naturalistic view/conceptualisation of reality; this is what is meant by Kuhn's famous assertion that 'when paradigms change, the world itself changes with them.'<sup>15</sup>

Nevertheless, normal science's purpose of 'continually [striving] to bring theory and fact into closer agreement' does not, for Kuhn, connote the common belief of scientific progress being beholden to the methodologically evaluative measures of confirmation or

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<sup>9</sup> Kuhn, 127.

<sup>10</sup> Kuhn, 127-8.

<sup>11</sup> Kuhn, 5. See also, Kuhn, 24.

<sup>12</sup> Kuhn, 30.

<sup>13</sup> Kuhn, 36.

<sup>14</sup> Kuhn, 24.

<sup>15</sup> Kuhn, 111.

falsification,<sup>16</sup> at least to the extent that they are characterised as *external* standards that any paradigm must meet. Instead, if such measures are conceived in the Kuhnian terms of evaluations that only *refer back* to the paradigm from which they derive, then they can be applied.<sup>17</sup> Having scientific progress be evaluated by the core tenets of the progress itself means that what are being evaluated are the problem areas, for theory articulation, ‘whose very existence the validity of the paradigm must be assumed’,<sup>18</sup> otherwise, the problem areas could not be legitimised in their existence as viable problems. This is because the lack of a paradigm’s validity means the lack of acceptable evaluative standards for future solutions to said problems, which would remove any meaningful sense with which these problems can be said to be *for* the paradigm in question.

### 2.3 *The Significance of Unassimilable Anomaly*

Thus, the main consequence of problem-solving and its evaluative standards being referential to the same underlying paradigm is that the solutions to normal research problems can generally be anticipated.<sup>19</sup> However, because these solutions are never a self-assured finality, since nature itself is not a paradigm but is constantly being regarded through the often-fruitful perspective of one, there is always the possibility for anomaly in the empirical data or attempts at solving problem areas. Kuhn says as much when he admits that the very reason why scientific problem areas continue to exist is ‘because no paradigm that provides a basis for scientific research ever completely resolves all its problems.’<sup>20</sup> Evidently, if

[s]cientific fact and theory are not categorically separable, . . . [then it is clear] why the unexpected [anomaly] is not simply factual in its import [but allows for] the scientist’s world [to be] qualitatively transformed as well as quantitatively enriched.<sup>21</sup>

For Kuhn, anomalies, especially those that do not eventually become assimilated into the explanatory world-view of the paradigm through which they were first encountered, are what

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<sup>16</sup> Kuhn, 80.

<sup>17</sup> Both evaluation and paradigm are inextricably linked for Kuhn in his statement that ‘[n]o natural history can be interpreted in the absence of at least some implicit body of intertwined theoretical and methodological belief that permits selection, evaluation, and criticism.’ Kuhn, 17.

<sup>18</sup> Kuhn, 80.

<sup>19</sup> Kuhn, 38.

<sup>20</sup> Kuhn, 79.

<sup>21</sup> Kuhn, 7.

can herald in the crises that lead to scientific revolutions, conceived as the shift from one paradigm into another that can satisfactorily account for the anomaly within its world-view.<sup>22</sup>

The process of discovering anomalies in phenomenal data or theory is a complicated process, mainly since such a discovery ‘involves recognizing both *that* something is and *what* it is.’<sup>23</sup> For Kuhn,

both observation and conceptualization, fact and assimilation to theory, are inseparably linked in discovery. . . . Only when all the relevant conceptual categories are prepared in advance, in which case the phenomenon would not be of a new sort, can discovering *that* and discovering *what* occur effortlessly, together, and in an instant.<sup>24</sup>

As such, discovery also ‘involves a change in paradigm’ as well.<sup>25</sup> There are also parallels with the discovery of theoretical anomalies, for what occurs during attempts at theoretical articulation from which unassimilable inconsistencies emerge is a failure of a paradigm’s explanatory power in accounting for these new developments; the presence of unassimilable anomalies betrays a prevailing conceptual structure’s failure to understand them. In short, the “what” structure of a theoretical anomaly is essentially up in the air, as what was previously employed to explain *what* certain aspects of nature are is no longer currently able to do so in light of anomalies attenuating theoretical coherency. In any case, what is important to note is that, for both empirical and theoretical anomalies, discovery thereof only concludes when a new paradigm supplants the old one and brings the prior anomalies into ordered light;<sup>26</sup> and, only when both anomalous forms become subsequently ‘articulated to a match’ can normal science, guided by a new paradigm, recommence.<sup>27</sup>

#### 2.4 *The Nature and Consequence of Paradigm Shifts*

Now, the process of replacing an old paradigm with a new one is devoted much detail in Kuhn’s work, which will not be fully explored here, but suffice to say that ‘[t]he decision to reject one paradigm is always simultaneously the decision to accept another, and the judgment

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<sup>22</sup> Through the perspective of a new paradigm, what may have once been regarded as anomalies ‘may instead seem very much like tautologies, statements of situations that could not conceivably have been otherwise.’ Kuhn, 78.

<sup>23</sup> Kuhn, 55.

<sup>24</sup> Kuhn, 56.

<sup>25</sup> Kuhn, 56.

<sup>26</sup> This supplanting event also substantiates the claim of paradigmatic incompatibility, for ‘if new theories are called forth to resolve anomalies in the relation of an existing theory to nature, then the successful new theory must somewhere permit predictions that are different from those derived from its predecessor. That difference could not occur if the two were logically compatible.’ Kuhn, 97-8.

<sup>27</sup> Kuhn, 61.

leading to that decision involves the comparison of both paradigms with nature *and* with each other.<sup>28</sup> Since the only recourse to nature is through a paradigm that grants us the understanding of *what* that nature is, at least in part,<sup>29</sup> then really the aforesaid “judgment” leading to “comparison” is simply the comparison of two world-views with each other to see which version of the empirical/theoretical data set, varying paradigmatically defined, makes the most sense; in other words, and hinted at in the previous paragraph, which of the two paradigms evinces the most internal *coherence* by being more adept at effectively/comprehensively explaining the data set. This is not to say that Kuhn disregards an external reality whose objective nature is independent from whatever paradigm one appropriates to conceptualise it, just that it is an unimportant consideration, for all that matters is the engagement with the world meaningfully influenced by paradigm, wherein considerations of external, objective reality do not even have to enter the equation.<sup>30</sup> This engagement change elicited via paradigm shift is so foundational that during such times, ‘the scientist’s perception of his environment must be re-educated’.<sup>31</sup>

What is then apparent in the above discussion is that Kuhn is adopting a strictly coherentist position in regard to scientific knowledge, such that the competition between different paradigms for explanatory dominance is tantamount to a clash between opposing and incompatible world-views that constitute, meaningfully, different worlds within which a scientist can conceptually engage nature.<sup>32</sup> This position also allows Kuhn to claim that, since there cannot be any external standard of evaluation outside the paradigms themselves, what is at opposition here is not present knowledge with past ignorance, but one system of knowledge with one ‘of another and incompatible sort.’<sup>33</sup> When one world-view replaces another, it is not clear whether Kuhn considers this as an *objective* augmentation in scientific knowledge from one world-view into another, for, according to him, after an anomaly’s assimilation into new paradigms, ‘scientists [are then] able to account for a wider range of natural phenomena or to account with greater precision for some of those previously known’;<sup>34</sup> yet Kuhn, in a further section, regards the common view of science as cumulatively progressing from a state of

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<sup>28</sup> Kuhn, 78.

<sup>29</sup> Kuhn, 111.

<sup>30</sup> ‘Confronting the same constellation of objects as before and knowing that he does so, [the scientist] nevertheless finds them transformed through and through in many of their details’ after a paradigm change. Kuhn, 122.

<sup>31</sup> Kuhn, 112.

<sup>32</sup> ‘[E]ach [scientific revolution] transformed . . . the world within which scientific work was done.’ Kuhn, 6.

<sup>33</sup> Kuhn, 96.

<sup>34</sup> Kuhn, 66.

ignorance to a state of greater knowledge as faulty, since this would entail cumulative, and thus compatible, transformations between paradigms, which is what Kuhn is arguing against.<sup>35</sup>

### *2.5 Implications of Paradigmatic Incompatibility*

In any case, what does differ between competing world-views is the state of their corresponding evidence sets, wherein a current paradigm attains a larger explainable set than that of the paradigm it replaces. Furthermore, this quantitative increase in explainable evidence does not necessarily denote an objective increase in a science's accuracy with which a paradigm explains natural phenomena, for if, according to Kuhn, scientific 'data are not unequivocally stable'<sup>36</sup> or fixed, in the sense of the stability of their conceptualisations being independent of paradigmatic recourse, then the data cannot be used to objectively determine whether they can be better explained by new paradigms or even by *past* ones. For this latter point, just because a new paradigm succeeds, where a past paradigm had failed, in assimilating an anomaly does not mean that *that* past paradigm could not have succeeded in data assimilation at all; this is because had additional data been found, then further theory articulation, occasioned by the newfound data, could have provided a better framework through which to better enact the assimilation. Consequently, we cannot rule out the possibility of contemporary paradigm shifts being re-articulations of past paradigms, present multiple paradigm shifts ago, into forms that are better able to assimilate anomalies that may have led to those past paradigms being replaced.<sup>37</sup> Thus, in what has been analysed so far, what Kuhn is showing in his analysis of scientific revolutions is an outlining of appearances, wherein paradigm shifts are viewed as processes whereby one moves from a state of knowledge, through a period of sceptical doubt from unexplainable anomaly, to a new state of incompatible knowledge, without asserting whether the knower necessarily increases in their objective knowledge of nature.

### *2.6 Paradigms as Potentiating Emergence of Anomalies*

One last remark to characterise Kuhn's analysis of paradigm shifts deals with how the structure and conventional application of the paradigm necessarily potentiates the emergence of paradigm shifts. This has been hinted at above by regarding how, for Kuhn, no paradigm is

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<sup>35</sup> Kuhn, 92-110.

<sup>36</sup> Kuhn, 121.

<sup>37</sup> Kuhn, 108. Kuhn even notes that certain modern paradigms in the physical sciences bear striking resemblances to medieval paradigms of motion theory.



fully successful in dealing with all its relevant scientific problems. Also, if a paradigm is ever going to contribute to scientific progress, then it must be applied constantly to problems with no guarantee of success. Moreover, the only way in which anomalies can be detected in the first place is through the realisation of the non-fulfilment of paradigmatic expectations,<sup>38</sup> such that '[t]he more precise and far-reaching that paradigm is, the more sensitive an indicator it provides of anomaly and hence of an occasion for paradigm change.'<sup>39</sup> As such, for Kuhn, the more mature and developed a science is, the more precarious its epistemic stability is, and this can only be because nature has portrayed itself to be more complex and extensive than any paradigm has been so far; as long as this obtains, then an incomplete paradigm will always end up bumping into unanticipated anomalies. Now, whether those anomalies inevitably lead to *paradigm shifts* is another question entirely, for not all anomalies produce these shifts, and not all initially regarded anomalies end up not later being assimilated into prevailing theory by paradigm re-articulation. Kuhn claims as much by noting that when a paradigm is hampered in its applicability by forced restriction of its attendant scientific field only to phenomena that have been studied in the past, then not only is its predictive capacity attenuated, but its 'mechanism that tells the scientific community what problems may lead to [paradigm shifts inexorably] cease[s] to function.'<sup>40</sup>

What is peculiar, then, is not why Kuhn insists that scientific knowledge can be attained regardless of the presence of paradigm shifts, for different paradigms presuppose different self-contained states of coherentist knowledge, but why such insistence takes place concomitantly with the acknowledgement of the unavoidability of anomaly-induced doubt in scientific endeavours. Obviously, Kuhn is adopting a non-sceptical position on knowledge's fallibility, but how can we precisely manage Kuhn's knowledge ascriptions to clearly paradigmatically incompatible scientific eras between which transition periods were usually rife with scepticism? To answer this, we must look to epistemological contextualism to explain, for us to better understand how such an account of knowledge can be justified, just what exactly may be taking place in the transition from an initial paradigmatic knowledge state to what I shall call the sceptical state of anomaly emergence.

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<sup>38</sup> Anomalies emerge 'only with difficulty, manifested by resistance, against a background provided by expectation. Initially, only the anticipated and usual are experienced even under circumstances where anomaly is later to be observed.' Kuhn, 64.

<sup>39</sup> Kuhn, 65.

<sup>40</sup> Kuhn, 101. Notice how no mention can be found here of the notion of paradigm shift being an *inevitable* expression of scientific progress developing concomitantly with a growing attendant phenomenological field.

### 3. Interpreting Kuhn through Epistemologically Contextualist and Invariantist Accounts

#### 3.1 General Remarks

Contextualism is a broad umbrella term labelling any epistemology claiming that the truth value for knowledge ascriptions varies with context.<sup>41</sup> Why such variation occurs is because different epistemic contexts require different epistemic ‘standards that one must meet in order for one’s beliefs to count as knowledge.’<sup>42</sup> Accounts of contextualism generally define the relation between the epistemic position of the subject, S, the relevant epistemic standard needed to justify knowledge ascription, and the epistemic state of the proposition itself, P. For Turri’s initial account, the context of the one attributing knowledge states ‘determines how strong an epistemic position S must be with respect to P in order for “S knows that P” to express a truth in the attributer’s mouth.’<sup>43</sup> The epistemic position of S can mean the evidence and rationality concerning how justified S is in believing that P; basically, what are the reasons that S has for their belief.<sup>44</sup> We must be careful though, because misinterpretation can lead one to believe that how epistemic standards change is through differing *relative* epistemic positions between S and P – different contexts dictate the extent of the epistemic *distance* between S and P that counts as knowledge ascription – and not through similar *concomitant* shifts in the epistemic positions of both S and P – different contexts dictate the extent of the *absolute* positions of both S and P, while keeping the *relative* distance between them the same.

The latter interpretation is formal contextualism, while the former is subject-sensitive invariantism (SSI).<sup>45</sup> Williamson characterises the former interpretation by noting that, ‘[f]or [subject-sensitive invariantists], what epistemic standard [S] must meet in order to know is *sensitive* to non-epistemic features of [S’s] circumstances.’<sup>46</sup> This sensitivity is such that one in a sceptical context may have to meet a higher *absolute* epistemic position in relation to P in order to know that P than what one in a non-sceptical context has to meet, despite both knowers

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<sup>41</sup> For brevity’s sake, mentions of knowledge ascriptions will presuppose that the knower and the one proposing the knowledge claim are one and the same.

<sup>42</sup> Tim Black, “Contextualism in Epistemology,” in *Internet Encyclopedia of Philosophy* (accessed March 4, 2018): para. 1, <https://www.iep.utm.edu/contextu/>.

<sup>43</sup> John Turri, “Epistemic Invariantism and Speech Act Contextualism,” *The Philosophical Review* 119, no. 1 (2010): 78, <http://www.jstor.org/stable/41684360>.

<sup>44</sup> In the case of scientific knowledge, epistemic positioning could just refer to the data at hand.

<sup>45</sup> Turri thankfully clarifies his initial outlining of, and consequently espouses the contextualist position by assuming ‘that knowledge requires a probability of one on your evidence.’ Turri, “Epistemic Invariantism and Speech Act Contextualism,” 86.

<sup>46</sup> Timothy Williamson, “Contextualism, Subject-Sensitive Invariantism and Knowledge of Knowledge,” *The Philosophical Quarterly* 55, no. 219 (2005): 217, <https://www-jstor-org.ipacez.nd.edu.au/stable/3542889>.

attaining the same *relative* epistemic positions in relation to P.<sup>47</sup> For traditional invariantism (TI), it denies any context-sensitivity for the truth conditions of knowledge ascriptions,<sup>48</sup> such that the relevant epistemic standard is an *absolute* standard referring to S's *absolute* epistemic position regardless of its relation to P; here, the standard is usually set to a sceptically high margin that applies cross-contextually.<sup>49</sup>

We can easily dismiss a TI or SSI interpretation on Kuhn's account of scientific knowledge. If Kuhn had espoused TI, then he would not have claimed knowledge for different scientific eras with clearly different absolute epistemic positions. If Kuhn had espoused SSI, then it is not clear whether knowledge ascriptions should have been made to every scientific era guided by contextually accepted paradigms, for we can conceive of two groups of scientists that both attain the same *relative* epistemic position with each other, but with one group being guided by a different paradigm situated in slightly varying non-epistemic circumstances to that of the other. One espousing SSI would not be obliged to ascribe knowledge to both groups simply on the basis of their similar *relative* epistemic positions, because the difference in their non-epistemic circumstances could entail different non-epistemic standards for knowledge attribution. In Kuhn's case, he gives no indication of doing this, nor does he even comment at all on the relevance of non-epistemic standards to knowledge ascriptions. Thus, when Kuhn states that scientists from different eras possessed scientific knowledge, he is utilising the *epistemic* standard of knowledge sensitive to their different contexts.<sup>50</sup>

The defence of TI brings up a usual argumentative strategy within contextualism-invariantism debates, that being: it is absurd to claim that, for two contexts in which S's *relative* epistemic positions are the same, S truthfully knows that P in one context while lacking such knowledge in another simply by being made aware, in the latter context, of the possibility of P not obtaining – this newfound awareness could be due to a newly recognised lack of sufficient evidence and/or reasoning. The case for TI argues that S saying, in the sceptical context, that they were wrong all along in claiming that they knew that P indicates a truthful recognition of the sceptical epistemic standard that *does not* change. SSI would rebut by arguing that S's being made aware of their possibility for epistemic error necessarily acts as the non-epistemic

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<sup>47</sup> Williamson, "Contextualism, Subject-Sensitive Invariantism," 218.

<sup>48</sup> Turri, "Epistemic Invariantism and Speech Act Contextualism," 78.

<sup>49</sup> For Williamson, TI 'ignores any indexicality in the word "know". It treats "know" as having the same reference, and making the same contribution to what proposition is expressed by sentences in which it occurs, irrespective of the context in which the utterance is made.' Williamson, "Contextualism, Subject-Sensitive Invariantism," 215.

<sup>50</sup> We can take Kuhn to be speaking from the perspective unique to each era, and not from his own, which would have precluded Kuhn's knowledge attributions, as all of the eras evince varying epistemic standards dependent on their *absolute* epistemic positions. This also justifies our usage of knower, as the subject, and attributor, as the one asserting knowledge ascription, as one and the same person, for that is Kuhn's implicit methodology.

impetus for the change in standard. Contextualism denies both interpretations and instead asserts that, in being made aware of P possibly not obtaining, S enters a sceptical context that informs S of a different *sense* of “know” than in the non-sceptical context; this sceptical sense, which requires a higher epistemic standard, is what is appropriated by S in their assertion that they all along did not know that P – all S is doing is realising that their previous non-sceptical way of knowing does not meet the higher *absolute* epistemic positioning standard needed by the sceptical way of knowing, which is the sense in which S did not know all along.<sup>51</sup> Williamson summarises this contextualist defence by noting that the word “know” always refers to a purely *epistemic* standard, although which epistemic standard it refers to varies contextually.<sup>52</sup> This differs from SSI, because its knowledge standard can only be non-epistemic if it is affected by non-epistemic circumstances.

### 3.2 *Relevance of Anomaly and Doubt on the Contextualist Interpretation of Paradigm*

In Kuhnian terms, the realisation of unassimilable anomalies acts as the transition process for S from a non-sceptical context – one that gives no cause that the paradigm is doomed to fail – to a sceptical context – one where persistent anomaly causes S to fundamentally doubt their possession of a sceptical way of knowing. If we regard both Turri’s definition of the epistemic standard of knowledge, as a probability of one on S’s evidence,<sup>53</sup> and that of Williamson, as the dependency of ‘a given case of true belief [as] knowledge . . . on both the probability and the similarity of cases of false belief’,<sup>54</sup> then we can recharacterise paradigmatic un-assimilability as a veritable drop in the possibility of a *general* paradigm’s veracity, for it expresses a general proposition, about nature, whose explanatory power of the evidence-set is attenuated.

This re-characterisation is dissimilar to the common “S knows that P” case, which merely signifies to S that P can possibly turn out false, which can happen with or without the empirical presence of anomaly. For the paradigm case of anomaly emergence, however, it signifies a more concrete manifestation of a paradigm’s, or a previous knowledge state’s fallibility through such emergence. To illustrate, in the popular sceptical diagram of whether S can tell the difference between a zebra and a cleverly painted mule, the paradigm case would obtain if the animal in front of S suddenly and consistently acted against S’s present idea of

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<sup>51</sup> Remember that the *relative* positioning between S and P remains the same cross-contextually.

<sup>52</sup> Williamson, “Contextualism, Subject-Sensitive Invariantism,” 216.

<sup>53</sup> Turri, “Epistemic Invariantism and Speech Act Contextualism,” 86.

<sup>54</sup> Williamson, “Contextualism, Subject-Sensitive Invariantism,” 225.

how a zebra should behave, as opposed to someone just saying that the “zebra” could be a cleverly painted mule, which is the “S knows that P” case; in the “zebra” acting anomalously, S’s lack of sceptical/higher standard knowledge is either because the “zebra” is actually a cleverly painted mule, or S’s paradigm of a zebra is incomplete, or both. Nevertheless, either reason means that S’s new evidence set – old phenomenal data + new anomalous phenomenon – sows deep doubt that the animal in front of them was ever what they had initially thought it was.

The paradigm case does not conclude that the “zebra” must be either objectively a mule or a zebra, just that S’s initial zebra paradigm may be erroneous, for if a paradigm cannot assimilate anomaly, then the paradigm, in its current *specific* form, is in doubt,<sup>55</sup> regardless if its further articulation ends up assimilating said anomaly. This form of doubt in the paradigm case is one not only of a drop in explanatory power for a *general* paradigm, but of an ostensibly certain falsehood in the truth value for a *specific* form of the paradigm and for any of the claims to scientific knowledge associated with it. We can thus interpret Kuhn’s attribution of knowledge to the different scientific eras as an ascription concerning the *general* paradigm and the *specific* form that it took right before being replaced by an incompatibly different one; this interpretation can be made since truthful knowledge attribution only takes place on the evidence set that can be explained, say, with a probability of one, and not on the new set that attains the inexplicable anomaly. As such, the presence of this anomaly engages S in the sceptical context whose higher epistemic standard necessarily involves utilisation of the new evidence set.

Moreover, I argue that, even in the simple “S knows that P” case concerning the zebra/mule scenario, the fact of S being unable to tell either animal apart is because S’s paradigm of a zebra is not precise/articulated enough for effective discrimination; the doubt sown by just bringing up the possibility of S’s belief that P being wrong reveals an incapacity of S’s initial paradigm of P to discriminate between P’s veracity or falsehood. This also occurs for the paradigm case of anomaly emergence, as unassimilable anomaly could be potentiated by a paradigm not being precise enough to discriminate between two different natures that appear similarly in the paradigm’s non-sceptical evidence set.<sup>56</sup> It seems, then, that we can

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<sup>55</sup> I say “may be erroneous” because the un-assimilability of the anomaly could simply just be due to a case of extremely unfortunate misinterpretation, which would not necessitate further paradigm articulation if reinterpretation of the data is conducted instead.

<sup>56</sup> The sceptical evidence set would then be a confirmation of the significance of this initial lack of *specific* paradigm precision.

make a similar transformation for any scenario involving varying sceptical/non-sceptical epistemic contexts.

### 3.3 Context/Paradigm Shift as Change in P

What all this illustrates is that, when the sceptical transition takes place, the propositional content of the knowledge claim inevitably changes as well, if we accept the interpretation of P as paradigm and of S knows that P as P giving S the terms needed to know cases of P. This is because, in the sceptical epistemic standard, not only does knowledge ascription not make sense if P remains the same unarticulated/unshifted paradigm – with old evidence set without anomaly – but even so if the *denial* of this ascription refers to this same P. This nonsensicality occurs since, one, ascription is supposed to be in relation to probability of one on an evidence set, two, different contexts entail different evidence sets, and three, according to Kuhn, evidence and theory/paradigm are ‘not categorically separable’.<sup>57</sup> In other words, and to argue against Williamson’s system, it does not make sense for the epistemic standard for knowledge to be defined in terms of both the varying *absolute* yet similarly *relative* epistemic position of S to P *while* also making the case, as Williamson does, that the only scenario in which P remains the same between contexts is when, within those contexts, different true knowledge ascriptions obtain.<sup>58</sup> Williamson’s case would be as if one need only consider the *absolute* positional differences between P and S’s different senses of “know”, regardless of the non-similar *relative* positions between one context’s S/P relation and another’s.<sup>59</sup>

The last, and probably most convincing argument for the necessity of P change across contexts comes from Rieber. In this case, what counts as knowledge is if the fact that P explains S’s belief that P, but only if, in the sceptical context, the fact that P *rather than* not-P explains S’s belief that P *rather than* not-P.<sup>60</sup> This “rather than” addition is meant to entail that, for true knowledge ascription, S’s sceptical-context belief must be explained by *both* P and the ‘absence of a corresponding event’ for not-P, which translates to the absence of a causal relation between the fact that not-P and S’s belief that not-P similar to that between the fact that P and

<sup>57</sup> Kuhn, *The Structure of Scientific Revolutions*, 7.

<sup>58</sup> Williamson, “Contextualism, Subject-Sensitive Invariantism,” 215-6, 219.

<sup>59</sup> This is similar to SSI, but Williamson’s system does not use differences in *absolute* epistemic position between S and P as criteria for knowledge ascription *denial*, just that such absolute differences are used in relation to knowledge ascription *confirmation*.

<sup>60</sup> Steven Rieber, “Skepticism and Contrastive Explanation,” *Nous* 32, no. 2 (1998): 199, <http://www.jstor.org/stable/2671964>.

S's belief that P.<sup>61</sup> In other words, in the sceptical context, if S's belief that P is such that S cannot discriminate between the fact that P and the fact that not-P, then the belief does not count as knowledge.<sup>62</sup> If we manipulate the above arrangement by adapting Kuhn's paradigm/fact relation, then scientific knowledge ascription becomes true only if the fact that nature-P rather than not-nature-P explains S's belief that paradigm-P rather than not-paradigm-P.<sup>63</sup> The not-paradigm-P here simply is a broad label for another paradigm, either completely different or re-articulated from paradigm-P, and thus does not need definite character. However, notice how, in the sceptical context, the original non-sceptical form of paradigm-P transitions into the sceptical "paradigm-P rather than not-paradigm-P" form.

#### 4. Conclusion

From the preceding discussion, we have outlined Kuhn's account of scientific knowledge as explicable in terms of a certain kind of coherentist contextualism. In doing so, we have paralleled this essay's interpretation with Kuhn's own methodology of descriptive interpretation, for both are only on the level of appearances – any claim on future developments hinges on descriptions that history has revealed to us. In the end, if science ever develops to the point where progression evinces objective augmentation of communal knowledge, then Kuhn's account will have to be relegated to an era characterised by a paradigmatic epistemology beholden to the limited data of the time.

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<sup>61</sup> Rieber, "Skepticism and Contrastive Explanation," 198-9.

<sup>62</sup> Rieber, 199. Of course, being able to discriminate without accounting for how one does so is at odds with scientific knowledge and rationality, which relies heavily on explicated explanatory coherence. However, if we take for granted that being able to discriminate in the realm of science cannot but be through the employment of paradigmatic explanations and accountancies, then S's lack of discriminatory capacity between the fact that P and the fact that not-P naturally presupposes the unfulfilled necessitation of discriminating in an accountable way.

<sup>63</sup> I choose nature-P instead of evidence/fact-P because the unassimilable anomalous fact, which transitions S into the sceptical context, brings to the foreground the possibility of another nature – a not-nature other than that accounted for by paradigm-P – that is not fully accountable by paradigm-P, but which may be so by another not-paradigm-P. Also, the example given in the text is about the zebra/cleverly painted mule scenario, but we can validly generalise the cleverly painted mule to a cleverly painted not-horse.

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