Language and the complexity of the world

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Abstract

Nature is complex, exceedingly so. A repercussion of this "complex world constraint" is that it is, in practice, impossible to connect words to the world in a foolproof manner. In this paper I explore the ways in which the complex world constraint makes vagueness, or more generally imprecision, in language in practice unavoidable, illuminates what vagueness comes to, and guides us to a sensible way of thinking about truth. Along the way we see that the problem of ceteris paribus laws is exactly the problem of vagueness and susceptible to similar treatment.

1. What is truth? To say of a statement that it is true is to evaluate it as successful in its representational function. But what is an (ordinary declarative) statement's representational function? And what counts as success?

Here is a natural answer: Working with the simplest possible sort of example, to assert that John is six feet tall is to presuppose that there is a referent of the term, 'John', that there is a property expressed by 'six feet tall', and to assert that John is six feet tall is to assert that the referent of 'John' has the property expressed by 'is six feet tall.' Success then is John's having the property of being six feet tall, that is, the statement is successful just in case this truth condition obtains.

This kind of view is developed in what I will call formal semantics, that works, in outline, by taking lexical items to have semantic values (referents for referring terms, n-place properties for n- place predicates), complex semantic values then being formed by combining these root semantic values as guided by the syntax of a sentence, culminating in a proposition that (in the simplest case) associates an object and a property under the relation of instantiation, where (again, in the simplest case) the object having the property is the truth condition for the proposition.

I take this account of truth provided by formal semantics to be a natural rendering of what I take to be our traditional way of understanding truth, ~~that~~ what I will henceforth refer to as 'Truth', to distinguish it from the very different way of thinking about truth that I will develop. I will use lower case 't' 'truth' both for truth as I will suggest thinking about it, and also as the neutral expression when no stand on how truth is to be understood has yet been taken. [1]

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[1] Some will (some have) maintained that there is only one conception of truth, presumably Truth, and what I am calling 'truth' works in terms of some kind of

With the possible exception of finite mathematics[2], all of language is vague, ‑and the truth of formal semantics will not work for vague statements. The truth of formal semantics is an idealization that idealizes away considerations of vagueness. For a wide range of purposes this idealization serves brilliantly – no case is being made for giving up thinking in terms conventional Truth in, perhaps, most situations. Indeed, thinking in terms of Truth will be encoded into my own account of truth. But when it comes to understanding how language gets connected to the world, the idealization fails radically. Consequently, when it comes to understanding how language gets connected to the world and the concomitant vagueness of language there is a pressing problem in understanding what it is for vague statements to be true.

2. **Two ways in which a statement can fall short in its representational function.** A statement can fall short of success as just described by being inaccurate. If John's height is 5 feet 11.7 inches, on the face of it he does not have the property of being six feet tall and, on the foregoing account of Truth, the statement that John is six feet tall fails to be True. A statement can also fall short by being vague. Suppose that John is six feet tall. Is John tall? (Suppose a reference class supplied by context.) No one specific semantic value gets attached to 'tall', so that the formal semantic account fails entirely, at least in its familiar formulation as presented above..[3] Until ten or fifteen years ago people thought of vagueness as an oddball topic. Abruptly it attracted a lot of attention. Stress with the formal semantic account makes it clear that vagueness is a serious problem, and the more so because vagueness is widespread.

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error account of the use of Truth. No matter. We have two different conceptions that we need to identify with different terms. I regard the issue of whether what I am calling 'truth' isn't really truth (because not Truth) to be an idle terminological dispute. The account of truth that I will outline below could be reconstrued as an error account of the use of 'Truth'; but just which errors are harmless needs systematic elaboration, just what (in outline) I will provide. So, again, insisting that there is only Truth is no more than terminological.

[2] What I have in mind by "finite mathematics" are (statements of) purely combinatorial facts. These would include simple arithmetic statements and truths of sentence logic. The point of the limitation to finite mathematics is that as soon as mathematical structure becomes sufficiently rich to support statements that can have unintended interpretations difficulties like some discussed below threaten to arise.

[3] This claim is elaborated and defended by Braun and Sider (2007). I will extend their argument below.

These two kinds of shortfall are not independent. Start with a statement that we think of as not being in any way vague but which fails just a little in accuracy: The statement that John is six feet tall precisely when his actual height is 5 feet 11.7 inches. We can turn this statement into one that no longer fails in accuracy by "smoothing over" the inaccuracy with some vagueness: John is *about* six feet tall, or six feet tall *close enough*. Conversely, often[4] when we sharpen up a vague statement we end up with something with no vagueness but one that now fails to some extent in accuracy: Sharpen up *John is six feet tall close enough* to *John is six feet precisely* and we have something that is no longer completely accurate: No one is six feet on the nose.

Given this relation between the shortfalls of inaccuracy and of vagueness, a vague statement can be seen as one that "covers up" what might otherwise be an inaccuracy. A leading idea developed in this paper is to exploit this interplay between inaccuracy and vagueness as a way of making out what it is for a vague statement to be true.

Before pressing on I need to tidy up a terminological point. Some reserve the term 'vague' for expressions that will underwrite a sorites argument. I need a notion of vagueness that clearly involves the kind of consideration involved in sorites arguments but that may be broader. For example, will 'funny' support a sorites argument? One joke that is a little less funny than a second in one way may be funnier in another, or less funny for some people but not others. I need a notion that covers the idea of vagueness in this broader sense, and in deference to those who want to reserve 'vague' for sorites-apt terms I will use 'imprecise' instead. This also has the advantage of supporting the antonym, 'precise'. '(Im)precise' is also not an ideal term because it has another meaning that I must separate from the one I need. To say that John's height is in the interval (5', 7') is more precise, in the unwanted sense, than saying that it is in the interval (3,' 9'). Let's call this second meaning, 'I-precision' ('I' for 'interval'). Let us use 'V-precision' for the sense the antonym of which, V-imprecision, is the wanted broader notion of vagueness ('V' for 'vague'). This having been specified, I will henceforth drop the 'V', and take my use of 'precision' and 'imprecision' to be understood in the V sense.

3. Are there any Truths? If one makes the demand of Truth that a True statement suffers neither any inaccuracy nor any imprecision the short answer is, no (with the possible exception of statements in finite mathematics).

If there are any statements that are both completely precise and completely accurate, one might expect to find them in the king of the sciences,

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[4] Implicit in arguments that follow is that this is always the case, possible exceptions only in finite mathematics. But for present purposes "often" is enough".

foundational physics. There are none there to be had. ALL our foundational theories are idealizations.[5] truths there are aplenty in the sciences, but only ones that are in one way or another not completely precise: Water is H_2O, the Earth has exactly one moon, humans have 46 chromosomes…. Under just what pressure and temperatures does a substance count as water? For that matter, do ice and steam count as water? How big does an object have to be to count as a moon? And made by humans? Just what is the referent of the word, 'Earth' – this is the notorious problem of indeterminate temporal and physical boundaries. Many humans have more or less than 46 chromosomes. Of course all NORMAL humans have 46 chromosomes, but that's just the point: 'Normal' is highly imprecise. And so on… Throughout the sciences, truth is purchased at the expense of precision. Understanding what it is for an imprecise statement to be true becomes a pressing problem.

Science is the best of human representation and knowledge. If statements throughout the sciences suffer from inaccuracy and/or imprecision, how much more must that be so for human knowledge generally?

Let's test this conclusion by examining what we think of as giving us an abundance of truths, perception. Naively, for an object to be red is for the object to have the non-relational property, *redness*. That 'red' is highly imprecise is only part of what is at issue here. Since (at least) early modern times, it has been appreciated that colors are "secondary qualities" and involve not only properties of the things to which they are attributed but also the reactions of the perceiver. Readers will know that modern color science shows that human color perception involves an extremely complex relation between the object of perception, the perceiver, and environmental conditions.[6] Our everyday conception of being red, and the semantic value with which formal semantics would characterize the meaning of the word, 'red', are not just imprecise, they are also highly idealized.

No need to belabor the point: Clearly the same sort of issues will arise throughout perceptual knowledge.

Here is a telling case of what would appear to be a Truth that isn't compromised by any taint of imprecision or inaccuracy. Suppose we put John up against a door frame, mark off his height with a pencil and T-square, measure the distance with the sewing drawer tape measure, and find that his height is, near as we can tell, six feet. Now, to be absolutely sure to give an example that

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[5] I make this out in detail for the case of quantum field theory in my (2004a, especially section 7). While one might expect that, at least, statements in foundational physics are completely precise, this supposition is undermined by the general arguments that follow.

[6] See Giere (2006, ch. 2) for an extremely accessible summary

suffers no inaccuracy, I consider the statement that John's height is between three and nine feet. Under the circumstances, there could not be any inaccuracy in that! And the statement would appear also to be completely precise. It is highly I-imprecise, but since the interval is given exactly there would appear to be no V-imprecision.

But wait! The statement presupposes that there is some quantity, *the height of a person*, that lies in this interval. But just what is the "height" of a person? People's heights go up and down around half an inch each day. If we further refine and say height at some very specific time, we still have problems of posture, compression of hair, and the like. There are problems of frame relativity from the theory of relativity, and quantum mechanics tells us, on many interpretations, that there is no such thing as completely precise distances.

If something imprecisely indicated has been attributed to an interval, no completely precise statement has been made. Or, if we think in terms of an idealization of completely precise heights, there is a failure in accuracy. The statement fails in complete accuracy and/or complete precision.

Such considerations dismember the formal semantic account of truth as a way of understanding the truth of statements that we accept as true. On the formal semantic account of Truth, propositions, highest level semantic values, are the ultimate bearers of Truth. But these are formed by structuring root semantic values, referents of referring terms and n-place properties expressed by n-place predicates; but with few, and possibly no exceptions root terms can't get attached to the needed semantic values. Not because there are no things in nature that, in principle, could function as semantic values – there well may be such. The barrier is that these potential targets are so incomprehensibly complex that our meager powers can't pick out one as opposed to another to serve as the identified semantic value of a lexical entry – just how not and why not we will examine in some detail below. With no root semantic values attached to lexical entries there is nothing on which the combinatorial process can work and we get no proposition expressed by any statement. As a consequence statements are never true (or false) in the sense of expressing a true (or a false) proposition. The underlying problem of failure of attachment of terms to semantic values is not one of principle, it is a consequence of the contingent fact that the world is unspeakably complex in comparison with our meager powers, as illustrated in some of the cases above.[7]

If truth is understood as Truth, as analyzed in formal semantics, there are few or no truths. Yet, we take a great many things we say to be true.

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[7] This paragraph summarizes Braun and Sider's (2007) argument. Braun and Sider give no positive argument for the last claim (2007, p. 134). They take it as obvious on its face. I will offer positive argument below.

4. Efforts to characterize what it is for an imprecise statement to be true. The foregoing shows that understanding what it is for an imprecise statement to be true constitutes a ubiquitous problem. And there is now a vast literature wrestling with the issue. This is not the place for a detailed review of this literature, but it is easy to give a quick survey that places all of the contending accounts. First there are various deflationary accounts of truth to which one might appeal. Deflationists brush off my problems: The statement that snow is white is not completely precise, but no matter: The Tarski biconditionals are all that needs to be said about the concept of truth. There are well-known telling difficulties with deflationary accounts, to which I will add one that I've never heard mentioned: The first sentence of this paper was:

> To say of a statement that it is true is to evaluate it as successful in its representational function.

If the reader did not balk at this claim, we're done: To evaluate something is to make a substantive statement about it. This claim so far leaves it open just what kind of evaluation might be involved. It might be to the effect that the statement expresses a True proposition. It might be that the statement "works", whatever that might mean (a question to which we will return). The evaluation might be objective or subjective, for all that has so far been said. But it's not just a logical maneuver.[8]

Next, most accounts of the truth of imprecise statements seek to provide a way of finding precise truth conditions for imprecise statements, in effect to analyze truth in terms of Truth. These include the many truth values and degrees of truth approaches. (See Williamson, 1994, ch. 4 and Keefe 2000 chs. 4,5 for summaries.) ALL of these efforts are ruled out if one accepts the claim that language rarely, if ever, attaches precisely to the world.

Supervaluationist accounts claim that for an imprecise statement to be true is for all *admissible* precisifications to be true. (Keefe 2008, p. 219) The qualification, *admissible*, is essential. On the supervaluationst account 'John is tall' is true just in case all admissible precisifications of 'tall' make the statement true. These can't include, e.g., to be tall is to be at least 6' 6''. 'Admissible is itself, of course, vague. (See Keefe, 2008, p. 320) So supervaluationism makes no progress in circumventing the problem that our world is too complicated for our words to get attached to completely specific semantic values.

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[8] That was awfully quick, of course; but this is not the place to examine this objection, or its close connection to well known objections, in detail. Should this objection fail, there are still the bucket load of others that I take also to be conclusive.

This leaves one approach to vagueness, epistemicism, that we can describe in this context as simply denying the claim that any statements are imprecise. (The best known exponent is Williamson in his 1994, chs 7, 8.) Epistemicists claim that the circumstances of use do succeed in attaching semantic values to terms. The perceived phenomenon of vagueness is the epistemic limitation that generally we don't know exactly what these attached semantic values are. Epistemicism has been widely discussed in the literature, but there has been little specific critical comment.[9] Here are some considerations that show in specific cases that use could not achieve the claimed precision

Epistemicisits claim that there is a referent for "the speed of my car (say) at 12 noon, Jan 2, 2014. But what is meant by "speed"? Generally the limit of distance traveled in a time interval that includes 12 noon divided by the length of the time interval as that interval shrinks to zero. But there is no such limit, if only because the whole idea of determinate distances breaks down when we get to quantum mechanically short lengths. Waving that worry, we still need the units for time and for distance to get a specific number. The second is currently defined as the duration of 9,192,631,770 periods of the radiation corresponding to the transition between the two hyperfine levels of the ground state of the cesium 133 atom. But this definition is fraught with false idealizations: that the gravitational potential has been exactly specified, that the period is set at 0 degrees Kelvin, ignoring the line width of any emission spectrum, and others. Definition of a unit of length, the meter, fails similarly: it is defined as the distance traveled by light in a perfect vacuum in $1/299,792,458^{th}$ of a second. So the definition inherits all the idealizations in the characterization of a second and adds the idealized requirement of a perfect vacuum, of which there are none.

Problems don't end there. What are the quantities, *time* and *distance*? The best grip we have on these are as characterized in our best fundamental theories in physics. But these theories are themselves highly idealized. So, strictly speaking, no quantities as they actually occur in the real world have been attached to the terms 'time' and 'distance'.

It's not just the worry about how circumstances of use might pick out just one number from an uncountable number of candidates in the continuum: The very idea of speed applies only in highly idealized circumstances, not in the real world.[10]

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[9] Keefe, (2000, ch 3) attacks Williamson's account of how we could be ignorant of, for example, the exact height that sets off short people from others and his efforts to address the extreme implausibility of the claim that use could attach precise semantic values to terms.

[10] This thumbnail summary of these arguments are spelled out enormous detail in my (to appear a)

5. The complex world constraint. If truth is Truth as understood in formal semantics, there are few or no truths. Truth itself is a highly idealized conception. But that doesn't mean we should abandon it! Often, a more idealized conception is a more appropriate one to use than a less idealized one, and in a great many situations it would be silly not to use it. Indeed, my own account of truth, below, will make heavy use of appeal to the idea of Truth. But wise use of an idealization requires knowing its domain of secure application. For example, using the system of idealizations that rest on semantic values works brilliantly for understanding questions about the structure of language. Section 9 will make clear how Truth functions for us in a very broad way. But the idealization fails dismally for certain issues about how language gets connected to the world.

My own account, idealized in its own ways, will focus on broad questions about the word- world connection. Any detailed account must, on pain of doing armchair science, be left to the sciences. However, a great deal can be said on the strength of just one contingent constraint, what I will call

> *The complex world constraint*: The world is exceedingly complex, relative to our linguistic and broadly cognitive capacities.

Two comments on how this constraint is to be read: First, the respect of complexity that is in question, at least for us in this context, is that the complexity makes it impossible, in practice, for us to attach lexical items to specific semantic values, or, more generally, impossible for language to be connected with the world in a way that determines in every case and in every detail just what this connection is. Second it must be emphasized that I claim only that the constraint holds contingently. Obviously, from the point of view of logical truth, the world did not have to be this way.

A very, very few have demanded argument for the constraint. For the case of properties and relations, the argument is by example, and once a few examples have been given, it becomes obvious that the same will hold at least very broadly. Three examples have been discussed above: color, height, and speed. Any remaining skeptics are referred to my (to appear a, section 2) where I examine a range of cases and show how the constraint holds for these cases to an astonishing depth that one would never have expected before the detailed examination.

For the case of referents (stones, houses, people….) the claim may in fact be controversial. Space allows no more than a few words. The problem is that of indeterminate spatial and temporal boundaries. Four dimensional "solutions", should they provide viable ontologies to begin with, can't help with our concerns because to get referents for terms of common speech or any science requires

grouping "time slices", in turn requiring properties and relations, for which the constraint is clear cut.

Finally, even if the constraint should hold only for predicates and relational terms, that would be enough for our objectives: Any Truth requires at least one property or relation.

From this one assumption I will argue for certain features of any sensible account of what it is for a statement to be true. The considerations will include an outline for understanding the phenomenon of vagueness, or more generally, the imprecision of language.

Before details, here is the leading idea. Lexical entries must be applied to the world, in turn requiring some means, or, the term I will use, some mechanism of application. Because of the complex world constraint no humanly accessible mechanism of application can work perfectly. There will be cases in which the mechanism "hangs up": It may give no result, or different applications to the same case may give different results with there being no fact of the matter which is right and which is wrong. Furthermore, in a sense that will emerge during the discussion, just which cases those are may "move around", varying with variation in details of actual and counterfactual circumstances of application. There will be nothing in the (or any) mechanism of application that, in such fringe cases as I will call them, fixes which applications are "right" and which not.

6. Mechanisms and regularities.[11] The behavior of something that one would call a mechanism is, when the mechanism is working properly, reliable. The behavior of a mechanism involves some kind of regularity. Conversely, when there is a regularity we expect there to be some kind of mechanism that gives rise to that regularity. This intimate connection between mechanisms and regularities underlays a fundamental methodological heuristic in the sciences. Where there is a regularity, look for a mechanism that gives rise to that regularity. This heuristic of the sciences is hardly a strict rule; nonetheless it has very widespread application. Clearly, in this context, 'mechanism' is an open-ended notion that is used very broadly. It includes things such as clocks, thermostats, cells, mechanisms of storm formation, all the way down to quantum field theory's "Higgs mechanism".[12]

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[11] Some of my thinking developed in this section goes back to inspiration from Wilson's (1982).

[12] In her (1999) Cartwright makes the same connection between what she calls "nomological machines" and regularities. In my (2002, section 4) I argue that Cartwright's "nomological machines" are really just the traditional conception of a mechanism.

Throughout I will use a distinction between mechanisms considered concretely and considered in abstraction. Start with considering some concrete physical mechanism such as a concrete clock, thermostat, or cell. I will refer to these as *mechanism embodiments*. Contrast these with plans, blueprints, theoretical descriptions, guidelines for building…. These I will call *mechanism blueprints*. These blueprints may be very specific and detailed, or they may be sketchy, schematic, leaving out much detail. And they may require insertion of other mechanism blueprints as components, as when a blueprint instructs you to "bolt in servomotor here".[13]

A leading idea, and our first consequence of the complex world constraint, is that no mechanism blueprint can include full detail for mechanism embodiments. Because things are too complicated relative to our powers of representation, no matter how detailed, a blueprint will leave details to be decided when applied in making some specific embodiment. The blueprint calls for using gauge 16 copper wire. Just what purity of copper? Use a 1" bolt: Just what +/– tolerance for the diameter can be allowed? One can provide answers to such specific questions, but there will always be more. Thus the contrast between a very detailed and very sketchy blueprint is a matter of degree, not of kind. I will refer to this circumstance as the inevitable incompleteness of any mechanism blueprint: Blueprints are always incomplete in the sense of being susceptible to adding further detail.

Mechanism regularities are never exceptionless; they are always ceteris paribus, and this for two related reasons. First, the regularity associated with a mechanism will be a concomitant of some blueprint for that mechanism. But because any blueprint is incomplete, embodiments may be realized in different ways. Different embodiments will have differences in behavior. Generally, at least some of such differences can be expected to affect the behavior covered by the regularity: While this isn't logically required, some examples clearly generalize to cover a great many cases. To illustrate: In extreme conditions e.g., very high temperatures, a mechanism embodiment will fail completely. At just what point it fails or starts to fail will vary with differences in embodiment realization. The second source for ceteris paribus exceptions concerns the embodiments. With a fixed physical composition of a concrete embodiment, the behavior will to some extent vary with variation in the environment. At least some such variations will be variation in behavior relevant to the mechanism's regularity. The same example as the last illustrates this point. As conditions become more extreme, regular behavior will start to break down.[14]

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[13] The blueprints/embodiments distinction is, of course, closely related to the type/token distinction. It is not the same, however, as the idea of a blueprint carries with it the implication of always being susceptible to being made more detailed that is not part of the idea of a type and that is crucial to the present argument.

Could one circumvent my example, for instance by stating the regularity as one that is only sure to hold in a specified temperature range? But there will be, at least in most cases and in practice, indefinitely many things that could go wrong. This is just the point about ceteris paribus laws, the widely agreed observation that ceteris paribus conditions can never be completely spelled out: The same kind of examination of cases that show that ceteris paribus conditions cannot be completely spelled out applies to the general version framed in terms of mechanisms. We also see here that the basis of phenomenon of ceteris paribus laws is exactly the (in practice) inevitable incompleteness of any mechanism blueprint, in turn a concomitant of the complex world constraint. Nature's detailed interplay of causal connections is far too complicated for us to be able to get an account of any concrete physical system that is both complete and with no exceptions exactly right.

Here is another way to bring out the inevitable and never exactly characterizable limitations on the operation of mechanisms. Let me illustrate will the important special case of mechanisms that we embody as concrete artifacts, generally what will count as tools. A tool is designed to operate reliably in the sort of circumstances that we count on usually to occur or the occurrence of which we can reliably arrange. An automobile will reliably function in the environments for which it is designed but not when temperatures range too high or too low or in tornado force winds. A screwdriver will work reliably on screws with a well formed grove, matches will reliably light when we take care to keep them dry and strike them out of the wind; the presence of oxygen is something that in practice takes care of itself. However, the world is too complicated for us ever to be able to detail just what such favorable circumstances are for a given tool. Indeed, whether a given circumstance will count as favorable will always depend, in part, on the tool user: Just how skillful are you at using the tool? How hard and what extra measures are you willing to take, if needed, to get the job done? And just what are your standards for whether the job counts as having been successfully accomplished?

The point I have made with the example of tools clearly applies to the whole idea of a mechanism very broadly understood, whether it is a mechanism that we have fabricated as a tool, "fabricated" by nature in the process of evolution, or an idea that we deploy in understanding workings of the physical world, such as formation of thunderstorms or the propagation of cracks in

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[14] Cartwright has insisted, in too many places to cite, that regularities and laws are always ceteris paribus. As far as I know she has not broken down the sources of ceteris paribus exceptions to the two sources described in this paragraph. My (2004 b) elaborates on the points of this paragraph and argues that all so called strict laws are idealizations that idealize away from the inevitable ceteris paribus restrictions.

materials under stress. Any such mechanism will operate reliably in a range of favorable environments, but the world is too complicated for us ever to be able to specify the exact range of such environments. Whether the mechanism will count as having operated successfully depends, ultimately, on the standards that we set and that may vary from case to case. As above I will refer to the never exactly specifiable range of uncertain operation as *fringe cases*.

7. Application to language. I take the function of language to be to communicate and store information. This requires systematicity of some kind, to coordinate behavior among members of a community and between one's present and future selves. We follow the methodological precept: Where there is regularity there is some sort of mechanism that gives rise to it . Steering clear of armchair science I won't ague for any specific thesis about what such mechanisms might be. Instead I will apply the general conclusion drawn in the last section that any such mechanism suffers the human limitations on the operation of mechanisms generally. And I will seek to augment the plausibility of this claimed applicability to language by looking at how such limitations would arise in a range of ways for thinking about what form such mechanisms might take.

A natural supposition is that there is one mechanism blueprint that is criterial for a given lexical entry. This supposition supports a distinction, not required by the foregoing, between linguistic and factual error. Formal semantics' attachment of lexical entries to referents and properties, though highly idealized, fits this pattern (since any mechanism blueprint is refinable in any case, idealized blueprints are allowed): Apply the word 'red' when the referent has the property of being red. Such a blueprint would have to be supplemented, in the spirit of the component servomechanism example above, with component blueprints for some mechanism for detection or other way of determining when the property in question is instantiated. With this supplementation for the unqualified occurrence of 'red', "apply the word 'red' when the referent has the property of being red" is no longer circularly vacuous.

Or, on this one criterial blueprint approach, the blueprint might be like a dictionary definition. For example

> 'Bookplate": A label usually pasted on the inside cover of a book that bears the owner's name or other identification (American Heritage Dictionary, Second College Edition, p. 196)

I will illustrate in more detail below with the example of 'short'. Such a definition will, again, have to be supplemented, in this case with other blueprints for lexical entries corresponding to such words as 'paste', 'book', and so on. The definition is very open ended, especially with the use of terms such as 'usually' and 'other identification'. But since all blueprints are incomplete, this does not disqualify

such a definition.

On this option, we can expect that language users will develop alternative application mechanisms for a lexical entry initially set up with some criterial blueprint. These alternatives would then count as epistemic, in the sense that they function as auxiliaries for applying the term without themselves counting as part of how the term is set up to connect with the world. Thus mistakes in design or use of such epistemic application mechanisms would correspond to factual error as opposed to misuse of language. For example, suppose that the criterial blueprint for a newly named species is the type specimen together with the relation "can interbreed with".[15] Epistemic application mechanisms would be ones with blueprints framed in terms of identifying phenotypic features.

On the option we have just considered, there is one criterial blueprint for all speakers in a language community. But different language users could acquire the use of the term with different criterial mechanisms. As long as the established applications (in usual environments of use) closely coincide, one could not directly tell the difference between supposition of such multiple as opposed to single criteria. Any choice would have to be made on the basis of indirect evidence. The same observation about alternative epistemic mechanisms for individual speakers applies as it did on the first option.

Yet another option would involve breakdown of the distinction between criterial and epistemic mechanisms. An agent could learn a term based on what would initially be one criterial, or introductory, mechanism and then could learn or develop other mechanisms that initially function epistemically. But the distinction between criterial and epistemic application mechanisms could then break down. As in the previous case, as long as the different mechanisms identify conditions that, contingently, apply the term in the same way as the other mechanisms and the same way as do other speakers, closely enough not to engender difficulties in communication, we would again not directly be able to distinguish this option from either of the first two. Limited versions of this option correspond to cluster concept accounts of meaning.[16] More extreme versions correspond to meaning holism.

On any of these options there will be variation from case to case of what application of a word is determined. The same conclusion will hold for any account that works in terms of mechanism blueprints and embodiments: The conclusion is exceedingly general, a consequence of the general limitations on mechanisms in face of the complex world constraint: Each blueprint, whether

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[15] The example is oversimplified and contentions. But as it is used here only for illustration details don't matter.

[16] For the conception of cluster concepts see, e,g,, Achenstein (1968), Chapters 1 and 2.

criterial or part of an epistemic cluster, will have a range of embodiments. And each embodiment will behave at least somewhat differently in sufficiently different environments. In practice at least some of these variations will make for variation in the application determined. As above, the same kind of broad examination of cases that persuade that ceteris paribus conditions cannot be exactly filled out will work for the kinds of cases under consideration here. The underlying basis for such limitations is that, in practice, and in face of the complex world constraint, the operation of any mechanism is subject to fringe variation as explained in the last section.

It will be useful below to use an example that illustrates much of the foregoing with a term that wears its imprecision on its sleeve: 'short'. First disambiguate (though the proposed analysis clearly generalizes to the other terms of the ambiguity). One can talk about a short time (short movie), short length (short parking space), short discourse (short poem). Here I consider only the usage of 'short' that applies to a person's stature. The idea is that for a person to be short is to have a height that stands out as shorter than others (in a tacitly assumed comparison class). More specifically:

> Someone counts as short just in case, or to the extent that, one will tend to notice the person as shorter than others in the relevant context. To be short is to stand out as shorter than others in the tacitly assumed reference class.

"One will tend to notice" and "stand out as" are better than vacuous, but extremely open-ended. The blueprint must be open ended in this kind of way to capture the manifest vagueness of 'short'.

It is here not important just how good an analysis this is for 'short'. I need only the illustration of the kind of thing that I have in mind as a mechanism blueprint, perhaps in this case more aptly described as an instruction, recipe, or "definition". The example will be useful in illustrating the things I will say about truth.

8. truth. [17] I have proposed that we think of application of language to the world in terms of embodied mechanisms, in turn understood in terms of mechanism blueprints. When will a specific application count as true? I will introduce a general way of approaching this question with two distinct

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[17] Lewis expressed the spirit of the leading idea presented here: "But also we treat a sentence more or less as if it is simply true, if it is true over a large enough part of the range of delineations of its vagueness.(For short: if it is true enough.) If a sentence is true enough (according to our beliefs) we are willing to assert it, assent to it without qualification, file it away among our stocks of beliefs, and so forth. Mostly we do not get into any trouble this way." (1979, p. 352)

motivations or plausibility arguments. And I will introduce the ideas using my analysis of 'short' as an example. Let's suppose the reference class for application of 'short' to be fixed. What would one covey by saying of an attribution of shortness to a person that it is true?

I start with what I take to be the neutral summary with which I began this paper: To say of a statement that it is true is to evaluate it as successful in its representational function. To fill in this ansatz[18] we need to be more specific about what will count as successful. Successful on some one, or some limited number of occasions won't do – indeed this is just what is taken to be the fatal flaw in familiar pragmatic accounts of truth: lots of false statements "work" for some one or limited domain of cases. What we want is, rather, to be generally successful, successful in a broad range of cases, indeed in any case that could reasonably be expected to come up. I will summarize this requirement by interpreting 'successful' as providing *reliable* use in communicating the information covered by the term, meeting relevant standards of reliability over a wide range of potential cases. (I will discuss this requirement in more detail below).[19] In application to 'short', an attribution of 'short' in a concrete instance is going to count as true just in case treating that case as one with easily noticed shortness compared to others will not lead to practical difficulties in any case that might reasonably be expected to come up, for example when the information is offered for use in identifying a person whom you have never seen in picking them up at the airport.

There are two different, but interchangeable ways of thinking about such reliable applications of 'short'. In a situation in which attribution of 'short' counts as true, the case is not borderline.   In such cases there is no question of unclear, borderline cases. So, when such cases are in question, we can proceed as we do in formal semantics and work with the idealization that there is a semantic value, a property of being short that applies in the case at hand. This idealization idealizes away all the problems of unclear cases. But in those cases in which

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[18] The German word 'Ansatz' is widely used in English in physics to mean "initial educated guess".

[19] This account of truth falls squarely in the tradition of pragmatist accounts but differs in significant respects from any that I am aware of, differs in ways that make it immune to the obvious complaints against familiar pragamtist accounts of truth. I refer readers to my (2012), section 5, for elaboration. Here I can also mention that there are points of contact with Wittgenstein's notion of "meaning as use", though also important differences in that the conceptions of representation and Truth are playing important theoretical roles in the present account of truth. See the Stanford Encyclopedia of Philosophy entry on Wittgenstein, http://plato.stanford.edu/entries/wittgenstein/, section 3.3 for a very brief summary for comparison.

use will function reliably this idealization functions as a Truth as understood in formal semantics.

Or, if we don't want to dirty our hands with the extremely idealized "property of being short", don't want to pretend that no other instances are unclear, we can nonetheless recognize that there are many situations in which this attribution will function reliably, and so function as a Truth as understood in formal semantics. On this approach to say that a statement is true is just to say that it functions as a Truth.

I will put this contrast in terms of what I will call idealized and call truth-apt semantic alter-egos. The idealized member of an alter-ego pair is the idealized statement of formal semantics, interpreted in terms of semantic values. Such idealized statements are never True, in the case of 'short' just because there is no such property that could function as the semantic value. But the idealized version will, in fortunate cases, function as a Truth.

The truth-apt semantic alter-ego is the statement understood without having idealized away its status as vague. Thought of this way, the statement can count as, literally, true, where its being true just comes to the idealized semantic alter-ego functioning as a truth.

How is "functions as a truth" to be understood? This requires a full-scale study on its own, but for a start, among other things, a statement functions as an exact truth when, or to the extent that, when we use it as a premise in theoretical or practical inferences, it tends to lead to conclusions that, when implemented in actions, objectively and in fact meet our needs and interests.[20]

This packaging will raise hackles because it is framed in terms of the contrast between "cases in which the idealized statement functions as a Truth" and "cases in which it doesn't". A traditionalist will take "functions as a Truth" to be a truth condition in the traditional sense in which case the present account would appear to differ only in detail from familiar ways of thinking about Truth. Such a traditionalist will then go to work finding fault with present account's versions of Truth conditions and conclude that the account is completely unviable. Any such thinking is a product of being trapped in our familiar ways of thinking about truth. "Functions as a Truth" is not a Truth condition in the familiar sense that requires Truth conditions to be precise and to provide necessary and sufficient conditions for Truth of a statement. This is simply because "functions as a Truth" is open-ended. As a result the idea of truth developed in the present

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[20] For more on "functions as a Truth, see my (to appear), in sections, 9, 10, and 11.

analysis is itself an imprecise notion.[21]

I want to present a second route to my proposal, one that should also help with the worries of the last paragraph. The leading idea is that, although statements are discrete, whether or not they are true works in ways relevantly similar to success of representations, such as maps, that work overtly in terms of form, shape, or more generally some kind of similarity.

We describe a map as accurate when we evaluate it as up to the representational job that we expect it to perform. Accuracy isn't an all or nothing matter – a thing may be more or less accurate. But we say that a map is accurate, full stop, when we take it to be accurate enough for the kind of job to which it will be applied. Proposal: To say that a statement is true is relevantly analogous to saying that a map is accurate (full stop). Statements don't represent on the strength of similarity in the way that maps do. Nonetheless, when it comes to evaluating for truth, something that is a matter of degree comes into play, namely functioning more or less well as a Truth. When we say that a map is accurate, full stop, we mean that it is accurate enough for any purposes that could reasonably be expected to come up; analogously to say that a statement is true comes to saying that it functions as a Truth well enough for any purpose that could reasonably be expected to come up. "Reasonably expected to come up" is open ended, so the analysis preserves the open-endedness of how words apply to the world.

Could I not say more simply: 'true' functions as does 'true enough'; or even more bluntly: 'true' as we ordinarily use it, just *means* 'true enough'?[22] Yes, if 'true enough' is understood in just the right way. But I don't like that way of putting it because 'true enough' is often, perhaps usually, understood in different ways. For example:

> How well does this medicine work?
>
> "Wonderfully! 90% of patients receiving this medication have complete remission of symptoms within a week!"
>
> "True enough, but you haven't mentioned the side effect of heart failure in 10% of the cases"

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[21] See my (to appear) pp MS 21-2. for a much more detailed development of this point and specific argument for the claim that the present account does not provide Truth conditions in anything like the traditional sense.

[22] In her (2004) Elgin explores many of the ramifications of thinking about truth along the lines of "true enough".

That is we often use 'true enough' to acknowledge the literal truth of what was said, but to call attention to the circumstance that information that should have been included was omitted, so that, although literally true, the statement misleads.

Let me dwell for a moment about how the "enough" is to be understood in the application to 'true'. Suppose we have a map that is accurate (enough) for our travels today, but not accurate (enough) for your use in some different area or where you have higher accuracy demands. It would be very misleading for me to tell you that the map is accurate, full stop. For "accurate full stop" to be appropriate the map must be accurate enough for any use to which it might reasonably be put. For example, if sold as a road map, accurate enough for any car travel over the area represented. 'true' similarly. Use of 'true' has a social function. To characterize a statement as true is to attest to its reliability in any situation that might reasonably come up. It is to present it as an "off the shelf reliable statement", one that you can go ahead and use without worry about being misled. So understanding 'true' as "will function as an idealized Truth" has to be understood as will function as an idealized Truth in any circumstance that might reasonably come up. There is a lot of latitude here. But I think that consideration of some examples (left as a simple exercise for the reader) supports the conclusion that this corresponds well to latitude in the appropriate uses of 'true'.

Incidentally, "functions as Truth" includes functioning as a Truth when it comes to ordinary classical logic. So this approach to truth does not require any rethinking about logic. [23]

One might ask what the connection is on this account of truth between the account on the one hand, and the role of application mechanisms, both blueprints and embodiments, on the other. Application mechanisms, whether criterial or epistemic, are tools for applying worlds to the world. The account of truth is a statement, at a very high level of generality, of what counts as successful application of such tools. So the form of the relation between application mechanisms and the account of truth is, very simply, that of tools to their standards of successful application. The relation is intimate, but indirect. Application mechanisms are no more directly part of the account of truth than a hammer and blueprint for building a hammer are directly part of an account of what will count as successful use of the hammer. Consideration of one informs consideration of the other without providing a component of an analysis. The relation is not only indirect, it can be expected to vary a great deal from case to case.

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[23] Material in section 9 will facilitate expanding on this point.

Both of the rationales for my approach to truth reflect a broader use of 'true' to things other than statements. 'true' [4]can be used to characterize something as dependable: a true friend, a true line. A true friend doesn't have to be flawlessly reliable no matter what. Thinking of 'true' as signaling being dependable coincides with the foregoing suggestions: a description on which one can depend in getting around in the world. Depend on for anything that might reasonably come up. This parallel pleases because it shows that the proposed account of truth makes truth of statements a special case of this broader, and older[24], use of 'true'.

9. Why the grip of Truth can be hard to shake, **and some loose ends.**
For many participants of Western intellectual culture, the grip of Truth can be hard to shake. I would like to suggest a simple reason for this grip. Understanding the source of this grip will facilitate finding truth to be a natural conception.

Stalnacker (2002, following ideas of Grice, Lewis and others) has characterized a natural feature of ordinary conversations that he calls *common ground*. For a conversation to proceed effectively there must be some stock of statements, what Stalnacker calls the conversation's presuppositions, that all participants take for granted, at least for purposes of the conversation. Suppose we are discussing who will pick up Ms Smith at the airport. Another conversationalist describes her arrival time as 5:00. I know, or believe, the more accurate arrival time to be 5:05. But for what is at stake in this conversation, that makes no difference. So I carry on with the assumption of 5:00 treating this, for the purposes of this conversation, as true.

This is an idea that has surfaced many times in recent philosophy. Thinking along such lines can be found in Carnap's framework principles, and perhaps things written by Putnam, Quine, Nietzsche and probably many others. I want especially to call attention to Kuhn's idea of a disciplinary matrix in his "normal science". As Kuhn insists, one can't get anywhere in scientific research if one is forever going back to check first principles. For the purposes of a line of research one learns basic principles and carries on treating these as true, unless and until one runs into difficulties that one simply cannot resolve in any other way than by questioning the initial basics. For the purposes of hydrodynamics, water is a continuous medium. For the purposes of quantum field theory, space-time is flat. I submit that this is exactly the idea of common ground if we take a flexible attitude to what is going to count as a "conversation"[25]

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[24] The English 'true' shares roots with the German 'treu', meaning faithful.

[25] By thinking of Kuhn's normal science in this way, roughly substituting truth for Truth, puzzles for Kuhn about "truth in a paradigm" and about "rational paradigm

I have taken Stanlancker's conversational common ground and stretched the applicable notion of a conversation to include things like a scientific research program. In the spirit of these prior versions of Stalnacker's idea we can stretch the idea of a conversation to groups, smaller and larger, engaged in joint epistemic endeavors, indeed stretch it all the way up to relatively coherent cultural systems. We can also shrink the idea of a conversational group all the way down to one individual. Just as a real conversational group, an individual will have a system of presuppositions , what I will call the individual's "personal platform", that the individual takes for granted in all but very extraordinary circumstances.

What is the status of the presuppositions of a conversation, thus widely understood? They do not need to be regarded as true (or as True) by the conversational participants, but they are committed to treating the presuppositions as true for the purposes of the conversation. Substituting in the analysis of truth, to be true is to function very broadly as a Truth, we have that the presuppositions are treated as functioning as True, not very broadly, but only for the purposes of the conversation. In this conclusion "function as" is redundant, so we have the conclusion that the presuppositions are treated as True for the purposes of the conversation: In this context, treated as true and treated as True come to the same thing. The upshot is that, when the range of things for which the "for the purpose of" qualifier becomes sufficiently broad the contrast between truth and Truth wavers. Especially for personal platforms, and for certain presuppositions of whole cultural systems, the contrast between truth and Truth may quite fall out of sight.

People are different. I certainly don't claim that the foregoing applies to everyone equally. But for some, perhaps for many, it can provide an obstacle to taking the present approach to truth to heart.

There is one refinement to the considerations that I have so far reviewed in this section. The idea of a conversational presupposition is that, for the purposes of the conversation, one can just go ahead and use the statement without worry that it might fail us. This is for the purposes of the conversation to treat the statement not only as true but as without any imprecision. To include a statement in the conversation's presuppositions is to be free to plunge ahead without concern that, for the purposes of the conversation, the statement might turn out to be a borderline case what would require us to reconsider whether the statement really applies or not. This fits exactly with what I have urged throughout, that to be a full-fledged Truth is to be free of both inaccuracy and imprecision. To be a presupposition of a conversation is to be a statement that, for the purposes of the conversation one can ignore any possibility of either

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change" evaporate. See my (2008)

inaccuracy or imprecision, which is just to treat it as True. The same considerations apply in the same way to personal platforms.

These considerations help in seeing the complications with what people have over the years given to me as what they take to be obvious counterexamples to my account: Water is H¬2O, the Earth has one moon, John's height is between three and nine feet…. These are, people insist, (pound the table) True! In section 3 I have already reviewed what is problematic about these three examples. With possible exceptions in finite mathematics, when pushed to extremes, any statement becomes problematic. This can be hard to see because, as entries in our personal platforms, they have never failed us in any situation that has actually come up, nor would they fail us in counterfactual cases that immediately come to mind. But it is never so hard, and without resorting to science fiction, to think of possible circumstances in which these claimed Truths will fail.

A closely related worry goes like this: I am given a case, for example that the water in the glass before us is H_2O. When I try to problematize the example with reference to what would happen under extreme pressures and temperatures I get interrupted; No! No! No! I am said to be conflating clear and borderline cases. Agreed, there are issues for borderline cases. But the glass before us is no borderline case. I am told that what would be involved were there to be pressure and temperature extremes is irrelevant to the truth of this statement: that *the water in this glass* is H_2O

To make this objection stick, I am owed an account what it is for a vague, and more generally imprecise statement to be true in a clear case. The case is clear but the statement uses, it has been acknowledge, an imprecise term, in this case 'H_2O', so that the statement as a whole is imprecise. As an account of truth the approach of formal semantics has been shown to crash and burn. I have very briefly surveyed difficulties with various approaches to imprecision and offered my own that is tailored to truth for imprecise statements. In the next section we will see in more detail why the present account provides the natural alternative.

Before proceeding there are some loose ends that I want to tie up.

A concomitant of taking science to offer truths instead of Truths is that we have to require truth rather than Truth for explanation. I have no account of explanation that makes this out in detail,[26] but this claim about explanation is

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[26] Following the appeal to mechanisms discussed above, much explanation in science works by characterizing mechanisms, and in so doing we take ourselves to have understood a mechanism well enough for present purposes when we offer a sufficiently detailed, though incomplete and generally not completely accurate, model of the mechanism. This suggestion calls for a great deal more

manifest throughout the sciences. In hydrodynamics the continuous medium idealization provides the basis, not just for predictions, but for real understanding of fluid phenomena. In the same way the idealization of thermally moving classical particles provides real understanding of diffusion, electrolysis, and many other matters of interest. The idealized models involved, though strictly speaking False, nonetheless provide real understanding of the world.

Second, the point that we are always working from some common ground, treated as a body of exact Truths, reexpresses the point about logic mentioned above. Within a common ground we use classical logic just as we are accustomed to doing. When application of classical logic leads us astray, that is a sign that the common ground needs to be refined, not that we need some new logic.

Two more worries I here have space only to acknowledge and refer readers to other places where I have addressed the issues:

In epistemology we start with the ansatz that knowledge is justified *True* belief. If so, with possible exceptions in finite mathematics, there is no knowledge. So we better instead start with the idea that knowledge is justified *true* belief. This involves a host of complications and issues that epistemology needs to take on. I have attempted a start on this project in my (2009), but a great deal more needs to be said.

Finally one may ask whether I am now committed to the truth of statements that we now take to be falsehoods though they would appear to have functioned as Truths in the past, such as past statements that the Earth is flat and that the accused in the Salem witch trials were in fact witches. I address this concern in my (2012, pp. 262-3).

10.Complexity of the world and the imprecision of human language. Formal semantics, indeed any theoretical framework that presupposes exact extensions for predicates, idealizes away any imprecision in language. It makes the simplifying assumption that there is no imprecision. As I have been at pains to emphasize, for many purposes this simplification provides a powerful framework for dealing with many theoretical issues and it underlies the whole idea of a common ground. But the imprecision of language is not one of the cases where ignoring imprecision provides a useful simplification.

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discussion and is, at best, only part of a larger picture. Such a line of thinking has been extensively explored by a number of people. See Craver (2006,2009), Bechtel and Abrahamsen (2005), Machamer et al (2000), and Craver et al (2013)

I will illustrate with the case of the infinite tower of higher order borderline cases that is, I submit, entirely an artifact of the idealization of formal semantics. The property constituting the semantic value of a term is presupposed to have a completely determinate extension and anti-extension. But, as we see so vividly in the case of 'short', there are borderline cases. So we seem forced to postulate a tripartite division between an extension, an anti-extension, and borderline cases. But the same sort of considerations that lead to the borderline cases also lead to borderline cases between borderline short and short, and between borderline short and not short. So we have further to refine our characterization of extensions with the class of cases that are second order borderline. And we are off and running.

Once we have a more promising alternative, with hindsight, all this looks a little like trying to force a square peg through a round hole.

To bring the better alternative into focus, begin by thinking of each application mechanism as a tool for applying language to the world. We then review general features of limitations on use of a tool by reviewing such limitations in a particularly simple case, for example a screwdriver. A screwdriver works smoothly whey applied to a screw with a well-formed and sized grove, the screw well accessible in line with the screwdriver, and applied to wood or material that is sufficiently similar to wood. On the other hand, use of a screwdriver will fail completely if there is no grove in the "screw", if one tries to screw a screw into solid steel, or if one can't access the screw with the screwdriver anywhere near to in line with the screw. The fringe cases occupy middle ground between these extremes: a screw with a poorly formed or worn grove, attempted application into somewhat crumby particle board, or when one can access the screw only at an awkward angle.

Our point of focal interest is that it is impossible to give anything like a general, closed account of how things will go in such fringe cases. Just how worn the grove, how awkward the angle? These are particularly open-ended when we also take into account variables such as: just how hard you are willing to try to get the screwdriver to work in this case, what auxiliary resource you may or may not have, and what are your standards for success. All of these will vary in a unsystematic way from case to case and person to person.

There is a great deal of systematicity, of course, for the central cases for using a tool. What is unsystematic is the way these central cases shade off to the fringe cases and what happens in those fringe cases

Generally: Tools are objects or systems that people use to achieve one or another objective. Just how well a particular tool will perform in achieving the objective will, to the extent that the case is a fringe case, vary in an unsystematic way with variation in the details of the case, especially when we take into account the interaction between varying physical and human details such as skill, effort,

available resources, and standards. Just which cases will count as fringe to begin with is hostage to such vicissitudes. In many respects it is up to us individually to classify a case as fringe or not, in ways that will vary with the sort of human considerations just mentioned.

Application mechanisms for language are tools for applying language to the world in ways that will guide our expectations, what to expect in the future, both for ourselves and for our fellows. As such, fringe cases will be open-ended in all the ways illustrated with the example of a screwdriver. Blueprints can never be fully filled in. Embodiments will vary, unsystematically, with the ways in which open aspects of a blueprint are filled in. Each concrete embodiment will have unsystematic details of response brought about by unsystematic variation in environmental conditions, and especially with variation in the human considerations.

The upshot is that, in our complex world, application of language to the world will always be open-ended. Application mechanisms will work reliably in environments for which they have been designed or in which they have evolved. There will be domains where application mechanisms completely fail to operate. There will be no fixed boundary between such cases and the frontier in between, the fringe cases in which an application mechanism doesn't fail completely but also doesn't work smoothly. Speaking metaphorically, such boundaries "move around" with variation in physical and human details. All such instances must be addressed on a case-by-case basis taking into account the physical details of the case and the needs, skills, and attitudes of the language users. Any one case can be understood in an illuminating way, but there can be no theoretical framework that would apply in a mechanical way to just any case that might come up.

Let's apply these considerations to our running example of 'short'. A fringe case will be one in which it is iffy whether an individual stands out as shorter than others. Still, is the contrast good enough to meet your communicative needs? What are your standards for success and failure, and what is your cost in the case of failure? It makes much better sense to be prepared to handle such cases on a case by case basis rather than to try to apply some context independent theoretical tool such as "degree of truth" or truth in all "appropriate" precisifications.

Attempts at a general theoretical framework that will apply to any case of imprecision that might come up also deflects attention from what is usually the most sensible way of addressing problematic cases of imprecision. When a tool does not work well for us, most often the best response is to look for a tool that works better. Drop sorting in terms of short and not short in favor of describing in terms of height in inches. Does the card you are issued to open your hotel room count as a key? It has the function of a key, but it operates in an entirely different way than does a traditional key. Rather than struggling to find some theoretical

status for the term 'key' that neither clearly applies nor fails to apply in such cases, invent a new term, a new tool, that will do the work that needs doing. 'Keycard', 'key card' and 'card key' are all in wide use.

What are the implications for the idea of borderline cases? A borderline case is one in which it is not clear whether application of the tool will achieve its intended objective. In very special cases one may be able to make sense of it not being clear whether it is clear whether the tool will perform as deigned. This is perhaps a fair description of a situation in which you are undecided whether to press on with an imperfectly working tool, or whether to scrap the tool in favor of some alternative. But its not being clear, whether it is clear, whether it is clear has no useful application in understanding how language applies to the world.

Limitation on application mechanisms just *is* the phenomenon of vagueness, or more generally the ubiquitous imprecision of language. In view of the complex world constraint, imprecision is never completely eliminable. Often an application mechanism blueprint will be left much less detailed than we could make it. No point in making an application mechanism/imprecision of a word, more precise than needed for practical applications. Often leaving a term open ended provides useful flexibility. [27]

11.Reprise. Details of how words get attached to the world is a scientific question. But the complex world constraint imposes conditions on any account of the word-world connection. In particular the complexity of the world makes imprecision of language unavoidable. Looking at the ways in which the complex world constraint operates, deployed with a very general idea of an "application mechanism", provides an outline of what this imprecision comes to and suggests an attractive way to understand what it is for an imprecise statement to be true.

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[27] Wainsman (1968) makes this point in his discussion of what he calls the "open texture" of language. Ludlow (to appear) explores this kind of consideration in great detail in his treatment of what he calls "the dynamical lexicon".

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