Chapter 2. Syntax Discussion Correction Notes

In Chapter 2, there are several infelicities that can make the argument on syntax confusing or difficult to follow – infelicities that extend in minor ways to the follow-up discussions of syntax in chapters 4 and 6.

The first infelicity results from the use of the word 'sequence' in two different – albeit somewhat similar – ways. The second error is due to the occasional interchanging of the words 'combinatorial' and 'compositional' – this is in part due to the word 'compositional' typically being used in talk about syntax whereas in this text that word is a technical term and primarily used in a different way.

Some of these errors are traceable to a mistake in my interpretation of Planer (2019) and Planer & Godfrey-Smith's (2021) use of several key words in this discussion. First, they use 'sign' and 'signal' interchangeably in places in their writing on syntax. Planer and Godfrey-Smith use the word 'sign' in these papers to talk about (1) *cues*, (2) the *parts* of complex signals, and (3) about *signals* themselves (and not just their parts).

Another infelicity involves the word 'sequence' being used in more than one way. The way Planer and Godfrey-Smith use the word 'sequence' is to talk about the order of the parts of a signal in the sense of their place in a list going from left to right. However, in the first print run of the book, I've used that word to also describe what Planer and Godfrey-Smith call a "pattern" but of a specific sort. For example, a signaling system might be such that the hue of a signal corresponds to the depth of some body of water – the darker the hue, the deeper the depth. I've described such a system as making use of a corresponding "sequence" between signals and the world. In the revised version of the text, this use has been replaced by the expression "sequential pattern" for clarity.

The final infelicity was not making clear an intuition that is accepted by Godfrey-Smith and Planer (2021) but that is not accepted or followed in the book. This will be added as a new endnote. Planer and Godfrey-Smith (2021) acknowledge that *nominal* and *atomic* might not be such distinct categories yet treat them as such anyway. I am more cautious. To some extent, I follow Millikan (1984), who suggests that a sort of structure just is present and acted upon by signalers in some otherwise apparently atomic signals. I treat the alarm call case where agents make use of decibel levels, for example, as being other than atomic, as being a case of a *composite* signal – the decibel level just is a *part* of the signal and not some "detached" feature of it as Planer and Godfrey-Smith seem to suggest. In response to a similar case, one involving time being relevant to a signal's interpretation, Planer and Godfrey-Smith write, "This puts pressure on the nominal category of our classification, though not on the atomic category, as time of production is not a physical part of the call" (p. 13). In short, I think this may be the right move in some cases but wrong in others, and I believe that the way we talk about cases such as the one involving decibel levels bears this out.

Below are revisions of the key parts of the discussion of syntax, including relevant corrections for chapters 4 and 6.

Pages 58-60:

A recent attempt at an explication is due to philosophers Ronald Planer and Godfrey-Smith.[28] They suggest that what is important when we consider the question of syntax in signaling systems is a pair of three-way distinctions. They distinguish between *nominal*, *organized*, and *encoding* signals, and signals that are *atomic*, *composite*, and *combinatorial*. *Atomic* signals are simply solo signals. So, consider the signals in the Deep Throat case. There are no parts to them. It is not the case that, say, the color of the pot combined with the pot's location determines its meaning – it's just the location that matters. *Composite* signals are signals that have more than one part. So, for example, the AB signal as opposed to an A signal; the pot's location *plus* the pot's color. A *combinatorial* signal is one where, the "order," "sequence properties," or some other sort of relationship matters – so, for example, the order of AB mattering and resulting in a different meaning than the signal BA. *Nominal* signals are ones where there is no role for the relationship that a signal might have to other signals – so consider a case where Woodward just happens to put the potted plant *closer to* or *farther from* one side of the balcony the more or less urgently he needs to meet but where the sender and receiver simply don't notice or make use of that correlation. An *organized* system is one where such a relationship *is* used by the signalers. What an encoded system is is harder to pin down. Planer and Godfrey-Smith write: "When combinatorial signs have their meaning specified by an encoding principle that gives a semantic role to the sequence properties of signs, we have syntax."[29] They also write that what matters is a "relation-between-relations", but this too is left unclarified. The two examples of encoded signals they discuss are binary code and a particular kind of animal alarm call. In the binary case, part of what's key is the sequence – the order in a list of 1s and 0s. In the alarm call case, however, there is no sequence of that kind. Instead, what matters is simply the mapping of signal parts systematically to some other relationship – the distance of the predator to the decibel level of the call: the louder the call, the closer the predator. In Planer's paper, he says that what matters is a "pattern" in the way states are mapped to signs, and that where the mapping is "completely haphazard" there is no encoding.

I have several worries about this analysis. First, it's not clear why "completely" in "completely haphazard" is important here – how haphazard can a mapping be and still count as encoding (as opposed to organized) according to their analysis? I don't know, and they don't say. Second, as I said, they don't really spell out exactly what they mean by "sequence" here, and their analysis doesn't make clear why a "sequence" or what kind of "pattern" is really necessary. Consider the Woodward case again. Suppose Woodward made it so that not only did the pot's location tell Deep Throat that he needed to meet or not but that the *color* of the pot corresponded to how soon Woodward needed to meet. Then there is a "sequence" of sorts (what I'll call a "sequential pattern") in how soon Woodward possibly needs to meet – from sooner to later – but there need be no corresponding sequential pattern mirrored in the possible signal colors. Compare this to an alarm call case where there is a sequential pattern utilized in the calls – the

decibel levels – *and* present in the world – the various distances of the predator. There would be a sequential pattern of sorts in the Woodward signal if it were the distance of the pot from one side of the balcony that corresponded to the urgency of needing to meet. Then we have a sequential pattern that can be useful for receivers when it comes to predicting what, say, a potted plant of distance *D* from one side of the balcony means. Consider also the case where Woodward uses the color of the pot to indicate something other than some sort of sequential pattern (to be clear: by "sequential pattern" I mean something that comes on a scale or spectrum – properties like distance, time, weight, etc.). Suppose Woodward uses the color of the pot to mean he wants to meet at the garage of that color. Here there doesn't seem to be a sequential pattern in the nature of the signs – the distance of the signs, their decibel level, etc. – but there is still some sort of systematic mapping – from color to color.[30] We can even imagine Woodward using a yellow pot to mean the red garage (which in the real world might be a good idea for someone engaging in covert activity). I suggest interpreting encoding broadly to include cases such as these too.

Now consider *composite-encoded* signals. Why must order or sequence matter for something to count as a case of syntax? Suppose A means "Lion" and 1 means "1 foot away" and so A1 means "Lion one foot away". This case has a systematic mapping of signal parts to other properties, has a "relation-between-relations", but it could also be such that 1A means the same thing. It's not obvious why a language that operated this way should not also be described as having a syntax. Some analyses of Latin suggest that that language works in this manner, that order doesn't matter – though, others disagree.[31] In any case, it doesn't seem impossible to imagine a human language that would work in this way. And it seems somewhat arbitrary to set such cases aside as cases of language without syntax.

There's more. Planer points out that in the case of binary, the order matters, but there are not unique atomic signals mapped to unique things in the world. 1s and 0s are all there is in a binary string, and they are reused *within* and *across* signals. So, compare 100010110 having a different meaning from 101111110 and the order mattering and ABCDEFGHIJ having a different meaning than ABCJIHGFE, where in the letter example the individual atomic parts are not being reused *within* the combinatorial signal – A and B only appear once. Both kinds of signals can have mappings from parts to meanings, but only one reuses signals in more than one way and determines their meaning in some instance in part also by their place in the sequence. Planer points out that something similar but slightly different happens in natural language. The word *he* has a certain meaning in "Spencer told Daniel he went to the store" and that meaning is different when used in the sentence "Daniel told Spencer he went to the store." Of course, there is also something that is somewhat the same in the meaning of *he* in both cases – it has the sense of being about a man or refers to the person whose name precedes it.[32] But compare this to the sentence "Connor likes jazz" where the order doesn't seem to play a role in specifying the meaning of the parts in the same way. Planer suggests we extend combinatorial encoded signals to fit these cases where order can have a role in determining individual part meanings. I'll add a slightly different case that I think should be include as well. Consider the sentence "I went to the store." Here, word order matters, and the parts map to specific meanings, but the meaning of *I* changes (in the sense of its referent) depending not on what

other words appear before it, its place in the order, as in the Spencer and Daniel case or the binary case, but on *who* sends the signal. Probably there are other examples out there that stretch the boundaries and expand the category, but I won't try to mention them all here.

Page 60 (Correction #2):

I'll consider one more reason I think the reliance on "order" and "sequence" is problematic. I'll expand on this idea in chapters 4 and 6 when I talk about art and maps. Consider something like a grid system. A simple example is a 2×2 grid. As we saw, a signal such as ABCD can be encoded and combinatorial. The order can matter, and it can be that each atomic part has a certain meaning it maps to in a systematic way. But a grid system can do something similar. (See figure 2.6.)

The grid from figure 2.6a can have a meaning different than the grid from figure 2.6b, and it can be that the meaning is a matter of combinatorial structure and encoding yet where in this case combinatorial structure is extended to include the "arrangement" (for lack of better words) of the parts in a two-dimensional sense, not just in a one-dimensional sense – that is, in the sense of from left to right, in the sense of a place in a sequence like the 1s and the 0s. "Order" just seems like the wrong word to use in the grid case. And we can further imagine that the hue of the squares matters too. It might be that the hues map in a systematic way to certain meanings, in which case the grid from figure 2.6a will have a content different than that from figure 2.6c despite having the same colors in the same arrangement. I can even imagine this sort of situation being expanded further to include three-dimensional examples and possibly more.

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Chapter 4. Syntax Discussion Corrections:

Pages 140-141. Starting at the last paragraph of page 140. It should read:

> Consider again the Easter Island paintings. These seem to have a fairly obvious sort of structure. There are parts, and the parts (or some of them) map fairly systematically to parts of the real world. Where the monuments are painted relative to the shore matters – arrangement matters. The shading of the objects in the paintings corresponds systematically to the lighting of the world. What we seem to have is an encoded combinatorial (minimally organized) signal.

Page 143. First sentence of the second full paragraph should read:

> Tsevhu is effectively a combination of a phonological system and positional encoding. And the language is complicated enough to fit our description of an *encoded combinatorial* signal – the parts have systematic mappings, the arrangement and combination of parts matters, and sequential patterns of various sorts can be represented.

Page 151. Second and third full paragraph should read:

> Add on to that the order, the sequence, in which things happen in this song is important—as is the case with many other songs—and we seem to have an example of a song that is *encoded* and *combinatorial.* We seem to have a case of a song that fits many of the markers researchers care about when they talk about syntax and language.
>
> Of course, in the case of *Peter and the Wolf*, the music has a more *explicit*, structured signaling function. It was intended to convey information in this systematic and combinatorial way.

Page 152. First and second paragraph should read:

> What we get is a song that seems to be a case of an *encoded combinatorial* or at the very least, an *organized compositional* signal and not one that is so, for lack of better words, explicit in its structuring as the *Peter and the Wolf* case.[33]
>
> In short, a sort of syntax seems to be possible in music as in spoken and written language. Some cases will be *encoded* and *combinatorial* like supposedly paradigm cases of language. Many cases, however, I think, will probably fall closer to something like an *organized combinatorial* signal.

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Page 155. First paragraph, last line should read:

Here, it seems we also find a case of an *encoded combinatorial* signal.

Page 157. First paragraph, second to last line should read:

Either way, what we appear to get here is not just a case of a dance being communicative, but of dancing having an *encoded combinatorial* structure.

Page 163. First paragraph, 6th, 7th, and 8th sentences should read:

The numbers on a tab, and which row they are on, represent which string and how it should be played – open or on a particular fret. A sort of sequential mapping. Numbers are also arranged in order of when they are supposed to be played relative to the other notes. A (temporal) sequence.

Page 164. Last sentence of the first paragraph should read:

Again, we seem to get examples of signals that are *combinatorial* and *encoded* and that seem to take advantage of some similarity between the way things are arranged in the signal and how they are arranged in the target domain, some part of the world.

Page 166. First paragraph, last line should read:

We get an *encoded combinatorial* structure, and, more than that, a three-dimensional one.

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Chapter 6. Syntax Discussion Corrections:

Page 228. Second paragraph, line 9-12 should read:

> But what really seems to be going on is that the ordering of numbers is being mapped onto the various depths in a systematic, sequentially patterned way.[18] It's possible Camp could have something like this in mind when she's talking about isomorphism— this stronger sequentially patterned form of it being involved. Think about the blue on a map indicating the sea. Sometimes to indicate a greater depth, the shading is made darker on that part of the map. This is like the Woodward case, where the distance of the potted plant maps to how soon he needs to meet.

Page 229. First and second paragraph. It should read:

> Now let's take a step back and look at the big picture. What we get is rather interesting. Recalling some of our other lessons from chapter 2, maps, it seems, can be and often are *compositional*, and not just that but *combinatorial* and *encoded* too – just like many other signals. This seems to be part of how they work. Recall the color grid system example from our discussion of syntax in chapter 2 (figure 2.6). Many maps seem to be just much more complicated grid cases. And yet, maps need not always adhere strictly to any sort of sequential patterning. Again, the water can be red. The elevations reversed or mixed. The shading conventions reversed or jumbled.
>
> Why might maps tend to make use of sequential patterns as well as iconic representation and the systematization of things like icons and their referents? As I suggested earlier, one answer, or part could be that senders were predisposed to make maps that way for whatever reason. But another answer could be that these ways of making maps make interpretation easier for map users (like us, at least). Iconic interpretation can make things fairly obvious – this is why road signs with just figures, such as the silhouette of a deer, are helpful. When it comes to sequential patterning, it could be it makes it easier to predict, for example, that this darker blue region means this part of the bay will be 15 feet deep, given these other two slightly lighter shaded regions were 10 and 5 feet, respectively, in reality. It could be that having systematized icons allows a user to predict that the next time they get to a place on the map with such and such an icon, there will be a freshwater spring there too.

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Page 231. Second paragraph from the bottom should read:

In these maps, arrangement matters. And there are systematic mappings—from color to political party, ecoregion, or habitat. Is there room for some sort of sequential pattern? There's room for that too. A map showing the population density of administrative divisions of France, for example, might be such that the darker a region is painted, the denser the population. In the contour map examples, there's a sequential pattern in the way elevations were represented. In the shaded relief maps, there's a sequential pattern in the shading. There are many ways such patterns can have a role.

Pages 233. Second paragraph, lines 4-5 should read:

They are combinatorial, often encoded, and they make use of similarities and sequential patterns.

Pages 234-35. Last line on 234 should read:

And both maps and scores make use of arrangement and encoding and take advantage of sequential patterns and similarities.

Page 237. Last line of the second to last paragraph should read:

Often sequential patterns will be used.

Page 238. Last paragraph, third sentence should read:

And there is a use of sequential mappings.

Page 239. Last full paragraph, third sentence should read:

Systematic encoding and sequential patterns might matter too – for example, in the circulatory system, bigger veins or arteries might be drawn wider or in dark red.

Page 240. Second full paragraph, last 3 lines should read:

What we get with models is that they aren't just compositional signals. They're combinatorial. And they're not just organized but also encoded.

Page 243. Last sentence should read:

Maps can be *combinatorial* and *encoded* – just as art can be and just as most paradigm human communication is.

Page 244. 5th line should read:

They can be combinatorial and encoded, make use of systematic mappings and arrangement.