One of the central aspects of the study of language is the study of syntax and grammar—that is, of the structural aspects of language (or languages) that characterize a sentence or phrase as “grammatical” or “ungrammatical.” Chomsky's initial forays into the subject in the mid-20th century launched something of a revolution, that eventually reached as far as the field of cognitive science. Since language is an almost uniquely human phenomenon, its structural characteristics have important implications for the study of human minds, and minds in general. However, despite the fact that a truly complete theory of all language (human or otherwise) could conceivably have a very real impact on everyday life, the study of the abstract structure of language itself—indeed, independent of its interpretation by humans—is of limited direct practical use.

This not to say that the study of language generally is completely impractical, or even that understanding syntax is not relevant in more practical areas of linguistics. However, the study of syntax specifically—in other words, the construction and examination of grammars that describe the rules of language or languages—does not have much value in terms of its real-world applications. Syntax's most useful contribution to human ability is a set of rules for checking whether a given sentence follows that particular set of laws. As I'll discuss later, this is a task that is largely irrelevant in everyday life.

One of the primary motivations in cognitive science for studying syntax abstractly is that it could lead us to deduce properties of a posited universal grammar. In other words, linguists argue that coming up with concrete descriptions of the syntax of individual languages leads to a
better understanding of which features of language are innate. Even setting aside possible objections to this belief, it's still the case that understanding the innate syntactic features of language does not have as much practical application as it might seem.

Consider the problem of translation, by humans, from one natural language to another. (I'll discuss machine translation later). It should be immediately obvious that deeply theoretical syntactic analysis doesn't make a professional translator's job any easier. From a purely practical standpoint, a translator's goal is to communicate meaning and intent, in many cases completely disregarding how well-formed the original text is in terms of syntax. Syntax, as often demonstrated by Chomsky's famous nonsensical sentence “colorless green ideas sleep furiously,” can be completely independent of meaning. So a translator shouldn't need anything more than a gut feeling for grammaticality to do their job—and this gut feeling is exactly what they possess without ever studying syntax!

In a more everyday application of translation, it might seem at first glance that a good understanding of universal grammar could have a profound effect on foreign language instruction. Hypothetically speaking, future advances in the understanding of the innateness of language would allow us to take advantage of non-obvious similarities between a speaker's first and second languages. One problem with this idea is that it diverges with everything we already know about how humans naturally learn language—that is, through the accumulation of positive evidence, not explicit instruction in grammatical rules. Now, evidence points towards a “critical period,” estimated to be between the ages of 2 and 12, after which learning a second (or, in a few tragic cases, a first) language fluently becomes impossible. One could then make the argument that, despite the fact that immersion and casual instruction are, at least anecdotally, still the best methods we know of for teaching languages, it's still possible that some not-yet-existent
discovery or development in the field of syntax *could* dramatically change language education *for adults*.

However, while it's true that this is a possibility, it's safe to say that it's very remote. Linguistics and syntax have been studied for decades, and they are hardly likely to get *less* complex—and the more complex and abstract our hypothetical development is, the more ridiculous it would be to somehow apply it to language instruction. In addition, in order to be really universally applied, such a theory would have to be widely accepted—and syntax is such a divergent and rapidly changing field that this doesn't seem possible.

Besides translation, it's possible to rule out a whole class of potential applications for the study of syntax. Especially from the perspective of cognitive science, it might seem that studying a system of rules that make sentences grammatical (or not) can lead to deductions about the way that humans make those same determinations—and in particular, deductions about the nature of universal grammar. A good understanding of human sentence parsing seems like an excellent goal to work towards, with at least some possible applications. However, the theory that such applications could arise from a study of syntax has at least two major problems. One is the same as that given above, for translation: as the study of syntax grows more abstract, its ability to describe anything in a simple (and therefore immediately relevant) way is limited. The other problem is one that stems from an idea present in many areas of cognitive science: instinct blindness.

Instinct blindness, the distinct inability of humans to actually understand their own cognitive processes, is a significant obstacle to any practical application of syntax. The reason is that, like any other model of any cognitive process, there's no way to know if a particular system for describing grammar matches what goes on in the brain at anything other than the
computational level. What makes instinct blindness especially damning for the study of syntax is that theories of grammar don't even offer the advantages that models of other cognitive processes do. For example, while models of human perception suffer from the same issue (that they can't be definitively stated to have “strong equivalence” to actual human perception), they can at least provide theoretical limits on human capabilities in that area and point towards new directions for other types of research in perception.

To see why a model of human grammar couldn't be as successful, suppose that syntacticians ever did come up with a model that perfectly matched, on an algorithmic level, the way humans judge sentences as grammatical or ungrammatical. Of what use would such a model even be? Since there would be no way to judge its validity based on the study of syntax itself, we couldn't fairly use it to learn anything about how humans understand grammar. So the only useful task the model could accomplish would be to predict whether a given sentence follows its rules. With one important exception (discussed below) this is a largely useless task—humans are perfectly capable of doing this themselves, and if they weren't, then the model would be meaningless anyway. In the end, the model is only capable of restating what humans already know about a language: that certain statements are grammatical because humans believe them to be grammatical.

Note, by the way, that models of human grammar differ from concrete models of many other cognitive tasks in this way. A model of perception implemented in a robot could be deemed successful or unsuccessful by an objective measure, based on its performance in an actual physical situation. There is no such objective test for model of grammar, just human reaction to its judgments.

Many of these arguments for the limited use of studying syntax fail upon consideration of
a critical idea that I've so far managed to avoid for this paper: machine parsing of human language. This is probably the most immediate and obvious application of the abstract study of syntax, since it is a direct use of the abstract grammatical rules that syntacticians aim to develop. Its usefulness is immediately apparent to anyone who has watched any science fiction movie ever, and the objection that a particular grammatical system has no guarantee of having anything to do with actual human cognition vanishes—in this case all that matters is that the model fit observations, not that it be strongly equivalent to an algorithmic description of grammar. So computer language parsing would seem, by itself, to be enough of a reason for the study of syntax to considered an eminently practical branch of cognitive science. But, there are several reasons why this isn't the case.

First of all, this particular application of syntax involves perhaps the least “cognitive” way of thinking about the discipline. Studying syntax in this way becomes a matter of developing an algorithm to answer a yes-or-no question about a sentence, regardless of anything that sentence has to do with the human brain. In other words, the only way to make anything useful out of syntax is to stop treating it like part of cognitive science, and instead treat its most mindless aspects as its only important ones.

Secondly, by itself, an algorithm that can recognize (or even generate) a grammatical human sentence is not of much use unless it can say something about the semantics of that sentence. Machine translation has to rely on more than just sentence structure, and human-machine interaction would not be greatly improved if the extent of said machine's ability was correcting the human on his or her grammar. In fact, this kind of human-machine interaction would be most useful if the computer could interpret the obvious meaning of a sentence even in the case that the grammar is incorrect. Syntax, in its most pure and abstract form, does not
address these issues.

None of this is to say that the study of syntax as a subfield of cognitive science is of absolutely no practical use whatsoever. The structure of grammatical sentences is of some import for those studying languages on a purely academic level—as we discussed in class, for anthropologists, syntax can be a tool used to estimate the spread of cultures when too little is known of how more obvious features of different languages (like vocabularies) compare with each other. Artificial language construction requires deep knowledge of syntax on an abstract level as well. But, while these applications are real, they are still not relevant to even a significant fraction of people.

More relevant might be the ways in which the study of syntax offers support to other branches of cognitive science (particularly those that also fall within the field of linguistics) that, in turn, have their own practical applications. As mentioned above, syntax—when combined with more meaningful study of the meaning of a sentence independent of its structure—has at least one impressively intriguing application. Considerations of syntax can help make theories of language acquisition more robust, even when sentence structure is considered in its most abstract form—and the study of language acquisition is not (necessarily) as impractical as the study of syntax alone. But the study of syntax alone, rather than as one of many components of a larger theory, doesn't really offer anything at all.

The issue is that syntax is an extremely abstract way to study language. In a sense, it's comparable to studying theoretical math. Mathematicians sometimes do accidentally discover something applicable to the real world, but few mathematicians ever set out with a goal of discovering anything practical. So the fact that syntax has no important practical applications doesn't mean that it shouldn't be studied—but it does mean that it doesn't make any sense for
anyone studying pure syntax to be primarily motivated by the potential practical applications of their work.