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THEORETICAL ESSAY

WHY DO HUMANS HAVE **LINGUISTIC INTUITION**?

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ABSTRACT

People have spontaneous intuitions about sentence acceptability. These intuitions are critical for the scientific study of language, yet we have almost no understanding of why humans have them in the first place. There is, however, a prevailing and largely unquestioned assumption that humans have some intuitive sense of what is grammatical and what is not. Here I present a different analysis, grounded in theoretical and empirical knowledge from cognitive linguistics, cognitive psychology and evolutionary approaches to the mind. All stimuli perceived as communicative are interpreted as if they have the property of optimal relevance, and sentences are unacceptable when, and only when, they logically cannot have this property. One important corollary of this hypothesis is that there may be no particular cognitive capacity that functions to distinguish the grammatical from the ungrammatical. Linguistic intuitions are rather byproduct effects of core cognitive capacities for the interpretation of communicative stimuli. This byproduct hypothesis explains several otherwise surprising features of linguistic intuition in straightforward and parsimonious ways; it specifies how unacceptable sentences relate to visual illusions; and it aligns with a growing trend towards understanding many distinctive aspects of the human mind as products of biological adaptation to an especially social evolutionary ecology.

RÉSUMÉ

Les êtres humains ont des intuitions spontanées concernant l'acceptabilité des phrases. Ces intuitions sont cruciales dans l'étude scientifique du langage et pourtant nous comprenons très peu pourquoi les humains ont de telles intuition.

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Received: 06/30/2025
Accepted: 10/18/2025
Published: 12/11/2025

HOW TO CITE
SCOTT-PHILLIPS, T. (2025). Why Do Humans Have Linguistic Intuition? *Cadernos de Linguística*, v. 6, n. 3, e868.

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Il existe toutefois une hypothèse dominante, rarement remise en question, selon laquelle les humains ont un sens intuitif de ce qui est grammatical et de ce qui ne l'est pas. Je présente ici une autre analyse, fondée sur nos connaissances théoriques et empiriques issues de la linguistique cognitive, de la psychologie cognitive et des approches évolutionnaires de l'esprit. Tous les stimuli perçus comme communicatifs sont interprétés comme s'ils possédaient la propriété d'être pertinent de manière optimale, et les phrases sont jugées inacceptables lorsque, et seulement lorsque, il est logiquement impossible qu'elles possèdent cette propriété. Une conséquence importante de cette hypothèse est qu'il n'existe probablement pas de capacité cognitive spécifique destinée à distinguer le grammatical de l'agrammatical. Les intuitions linguistiques seraient plutôt des effets secondaires des capacités cognitives fondamentales impliquées dans l'interprétation des stimuli communicatifs. Cette hypothèse du sous-produit explique de manière simple et parcimonieuse plusieurs caractéristiques autrement surprenantes de l'intuition linguistique; elle précise comment les phrases inacceptables se rapportent aux illusions visuelles; et elle s'inscrit dans l'analyse qui vise à comprendre de nombreux aspects distinctifs de l'esprit humain comme des produits de l'adaptation biologique à une écologie particulièrement sociale.

KEYWORDS
Acceptability; Construction Grammar; Communication; Linguistic Intuition; Cognitive Linguistics.

MOTS-CLÉS
Acceptabilité; Grammaticalité; Intuition Linguistique; Pertinence; Cognition Sociale.

INTRODUCTION: WHENCE LINGUISTIC INTUITION?

Native speakers show a great deal of intuitive agreement over whether a given sentence is 'acceptable' in their language. *John speaks French* is acceptable in English but *Speaks John French* is not. These intuitions are immediate, unreflective and involuntary. They occur even if a meaning of the sentence is apparently clear, and even if it differs from acceptable sentences only superficially: *I don't want to go to the cinema* is acceptable in English but *I don't want going to the cinema is not*. Crucially, linguistic intuitions are accompanied by a distinctive, psychological sense that could be called 'oddness' or 'wrongness'. My goals in this paper are, first, to raise the question of why humans have linguistic intuitions at all; and second, to provide an answer, based on a synthesis of theoretical principles and empirical knowledge from several fields.[1]

These issues are of foundational importance because linguistic intuitions are themselves central to the scientific understanding of language and cognition in many ways. First, they are salient and naturally occurring cognitive phenomena in their own right, and as such they are an important target of explanation. Second, linguistic intuitions plainly reflect something important about individuals' knowledge of language, and as such any theory of language should account for them. Third, field linguists habitually elicit linguistic intuitions from native speakers as part of learning and documenting languages ('Is this ok in your language?'). Fourth, linguistic intuitions are widely used as critical empirical data for basic questions about the nature of language, and grammar in particular (Chomsky, 1965; Schütze, 1996/2016; Wasow; Arnold, 2005; Schindle; Drożdżowicz; Brøcker, 2020; Gross, 2021; Scholz *et al.*, 2022; inter alia). So linguistic intuitions are critical in many ways, and explaining why humans have them is a foundational issue for the human sciences.

Yet despite this basic importance, we have no clear explanation or understanding of why humans have linguistic intuition in the first place. Why should any sentence trigger a psychological sense of oddness? The question is not about what specific grammatical phenomena trigger linguistic intuition, nor is it about explaining particular syntactic or morphological phenomena. Those topics are plainly related and they have been the focus of much investigation, but they are not the focal issue here. Enormous literatures have used linguistic intuitions to investigate grammar itself, but there is very little if any focused attention on the question of why such intuitions exist in the first place.

1 For the avoidance of possible misunderstanding: I am using the expression 'linguistic intuition' to refer to the naturally occurring phenomenological experience that a sentence is 'not right' in some way. This is a cognitive phenomenon and 'intuition' is, in my view, a suitable term to describe it. I state this explicitly because in some literatures, or in some schools of thought, the notion of 'linguistic intuition' is used more broadly, to refer to a broad array of possible judgements that can be made about sentences and their use – matters such as ambiguity, pronounceability, social appropriateness, entailment, frequency and so on – which are then used to construct theories of language (Gross, 2021). This broader class of judgments do not entail a phenomenological experience of not-rightness, and as such they are not my target here.

The answer is not as simple as a mismatch between experience and expectation, because many aspects of everyday life mismatch with expectation without generating a psychological sense of oddness. Nor is it simply the violation of norms, because again, many everyday behaviors violate norms without generating a sense of oddness. So why do some sentences? This is an important question, without an answer.

There is, of course, a widespread assumption that humans have some cognitive capacity that functions to distinguish the grammatical from the ungrammatical. That is to say, the very existence of linguistic intuitions, and generally high levels of agreement between speakers, seem good a priori reasons to suppose that humans must have some species-universal sense of what is grammatical and what is not. Indeed this much can seem almost common sense. I call it the *grammaticalness assumption*. It is sometimes stated explicitly – "The only thing we can say directly is that the speaker has an 'intuitive sense of grammaticalness'" (Chomsky, 1975, p.95) – but more often the grammaticalness assumption goes unsaid: so much so that linguistic intuitions are sometimes *called* grammatical intuitions. Moreover, if not all then certainly the overwhelming majority of past discussion about the nature of linguistic intuition seems to take the grammaticalness assumption as a tacit background fact. One example is debate and research about whether linguistic intuitions are affected by individuals' own expert knowledge or prior assumptions about language (e.g. Devitt, 2006; 2010; Culbertson; Gross, 2009; Dąbrowska, 2010; Fitzgerald, 2010; Maynes; Gross, 2013; Drożdżowicz, 2018; Rey, 2020). Another example is discussion of how linguistic intuitions are affected by the parsability of sentences (e.g. Leivada; Westergaard, 2020).

Yet from an evolutionary and, in particular, adaptationist perspective, the grammaticalness assumption is hard to justify. What ecological conditions would select, not simply for a sensitivity to what is and is not grammatical, but for a cognitive capacity that delivers an intuitive association between ungrammaticality, on the one hand, and a psychological sense of oddness on the other? To what fitness enhancing task would such a capacity contribute? I am not asking how these cognitive dispositions might emerge in our species (a question about phylogeny), I am asking why our species should have such dispositions in the first place (a question about function, or adaptation). As far as I am aware, no detailed, focused or theoretically principled answer to this question has ever been developed.

Chomsky has speculated that perhaps an incidental biological mutation simply happened to generate the cognitive capacities and dispositions necessary for language ("Perhaps it was a side effect of increased brain size… or perhaps some chance mutation": 2010, p.59), and perhaps these could include, by chance, an intuitive association between ungrammaticality and a psychological sense of oddness. If such speculation is correct then the intuitive association between ungrammaticality and a psychological sense of oddness is pure happenstance and has no theoretically principled explanation. This speculation is widely criticized on grounds of evolutionary implausibility (Pinker; Bloom, 1990; Chater; Reali; Christiansen, 2009; Planer, 2017; Hurford, 2018; Martins; Boeckx, 2019; de Boer *et al.*, 2020) – but at the same time, it is not as if there are other possible justifications of the

grammaticalness assumption with greater plausibility. The grammaticalness assumption has rather been taken for granted, by Chomskyians and non-Chomskyians alike, and put to use as a foundational assumption in the investigation of grammar itself.

Here I present and develop a cognitive and adaptationist approach to the question of why humans have linguistic intuition, grounded in theoretical and empirical knowledge from several fields, in particular cognitive linguistics, the cognitive psychology of human communication, and adaptationist approaches to the human mind. I shall argue that linguistic intuitions are byproducts of cognitive capacities and dispositions that have as their proper biological and computational function the interpretation of communicative stimuli. One important corollary of my analysis will be that the grammaticalness assumption is both unnecessary and unwarranted.

Here is the main idea. Research on the cognitive foundations of human communication has uncovered how all stimuli perceived as communicative are interpreted on the basis of an unconscious presumption of optimal relevance. I shall describe linguistic intuitions as byproduct effects of this presumption. Specifically, I shall argue that linguistic intuitions are triggered by, and only by, sentences that logically cannot have the property of optimal relevance. It is this logical impossibility that triggers the psychological sense of oddness. I call this the *byproduct hypothesis of linguistic intuition*.

For clarity: the byproduct hypothesis is *not* that 'being irrelevant' triggers intuitions of unacceptability. That cannot be right. Saying something utterly irrelevant in a given context can be unusual, even strange, but it does not entail sentence unacceptability. The byproduct hypothesis is rather that linguistic intuitions are caused by sentences that logically cannot have the property of optimal relevance. Put simply, the psychological sense of oddness is not caused by irrelevance, it is caused by a logical impossibility of optimal relevance. These two qualities are not the same. I will elaborate further on this contrast in §4.3.

I am aware that the byproduct hypothesis violates apparent common sense. It states, in effect, that the apparently plain observation that linguistic intuitions are intuitions about grammar, or grammaticalness, is in fact misleading. It sometimes happens that new scientific understanding upturns what previously seemed obvious and uncontroversial. I believe that is the case here.

Figure 1 summarises the content and structure of the paper. In §1 I specify two key assumptions that underpin the byproduct hypothesis. Both are longstanding, influential and supported by very large bodies of empirical and theoretical research, which I shall briefly summarise. The first assumption is that constructions – mappings between particular forms and particular communicative functions, or "meanings" – are basic building blocks for languages, and that languages can be described wholly in these terms ("It's constructions all the way down": Goldberg, 2003, p.223). The second assumption comes from the Relevance Theory tradition in the cognitive psychology of human communication. Specifically, I assume that humans have core cognitive capacities for communication which include, in particular, a disposition and capacity to interpret communicative stimuli on the basis of a presumption of optimal relevance. In §2 I summarize how these two assumptions together motivate the byproduct hypothesis of linguistic intuition.

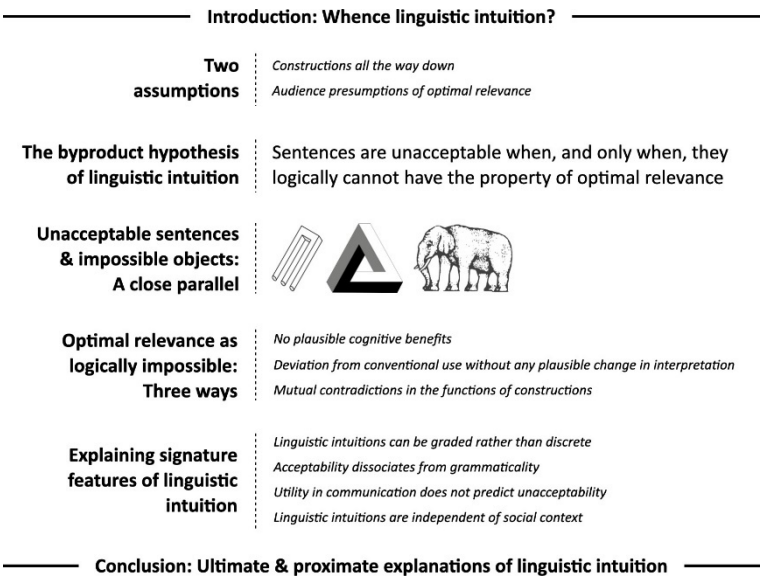

Figure 1. Structure of the paper.

In §3 I motivate and clarify the hypothesis further, by highlighting a close parallel between linguistic intuitions and the psychological sense of oddness that accompanies so-called 'impossible objects': visual illusions in which stimuli appear as objects but which are logically impossible to interpret in any way consistent with the unconscious presumptions that govern the interpretation of all stimuli perceived as objects. This parallel helps to make clear how linguistic intuitions are, at bottom, not properly about grammaticalness at all: they are rather about communicativeness (more technically, 'ostensiveness'). In §4 I describe how the byproduct hypothesis predicts linguistic intuitions. Specifically, I derive three general ways in which sentences logically cannot have the property of optimal relevance, and I describe how each triggers intuitions of unacceptability. In §5 I show how the byproduct hypothesis explains four otherwise surprising features of linguistic intuition. I conclude by placing the byproduct hypothesis in a broader cognitive and evolutionary context, as part of the deeply social nature of human minds.

A note on terminology. It is important to distinguish *acceptability* from *grammaticality*. In the literature on linguistic intuitions these two terms are used in a range of ways, some contrary to one another. Following some others (e.g. Bard; Robertson; Sorace, 1996; Hornstein, 2013; Leivada; Westergaard, 2020), I shall use *(un)acceptability* to refer to the spontaneous intuitions ('linguistic intuitions') that people have about sentences, and *(un)grammaticality* to refer to the relationship between a sentence and the ordinary practices ('norms', 'conventions') of a language community. These two qualities overlap to a very considerable degree – most sentences are either acceptable and grammatical, or unacceptable and ungrammatical – but they are not the same. Indeed they can sometimes dissociate: there are unacceptable-grammatical and acceptable-ungrammatical sentences. I shall give examples, and explain when and why this dissociation happens, in §5.2. Before then, in §1-§4, my target is the intuitions themselves. People have them and can report on them. But why do humans have them in the first place?

1. TWO ASSUMPTIONS

1.1. CONSTRUCTIONS ALL THE WAY DOWN

The first foundational assumption here is that grammars are best described and understood in terms of constructions: mappings between particular forms and particular communicative (micro-)functions, or "meanings" (e.g. Langacker, 1987; Fillmore, 1988; Fillmore *et al.*, 1988; Michaelis; Lambrecht, 1996; Kay; Fillmore, 1999; Croft, 2001; Tomasello, 2003; Goldberg, 2003; 2019; Michaelis, 2006; Bybee, 2013; Hoffmann; Trousdale, 2013; Hilpert, 2014; Diessel, 2019; Christiansen; Chater, 2022; Hoffmann, 2022; Ungerer; Hartmann, 2023; Scott-Phillips, 2025; *inter alia*). Constructions come in many varieties: Table 1 shows some examples. Sentences are assemblies of constructions.

CLASS	EXAMPLES OF ABSTRACT FORM	CONCRETE EXAMPLES
word		Coffee nevertheless
word (partially filled)	pre-*N* *V*-ing	Prefigure Preproduction Sleeping wanting
idiom (filled)		Kick the bucket You can never be too careful
idiom (partially filled)	jog *X*'s memory *X* is for the asking	
idiom (minimally filled)	the *X*er the *Y*er what's *X* doing *Y*?	The more it happens the less I care The bigger the better What's that fly doing in my soup? What's Jack doing at her place?
transitive	*subj V obj*	The room has a sofa He goes to the shops
ditransitive	*subj V obj1 obj2*	She gave him a fish taco He baked her a muffin
passive	*subj aux VPpp* (*PPby*)	The fish was eaten in a hurry The President was shot
wh-cleft		What they feed their cat is steak tartare What I like is champagne
as for topicalization		As for their cat, they feed it steak tartare As for champagne, I like it
wh-question		What do they feed their cat? What do I like? What does the room that is empty have?

Table 1. *Examples of constructions, at varying levels of complexity & abstraction*. Adapted from (Goldberg, 2013a). Sentences are assemblies of constructions. For example, the sentence *The boy bakes his sister a cake* assembles together: *ditransitive construction*; *V-s*; two *objects*; and the lexical constructions *The*, *boy*, *bake*, *his*, *sister*, *a* and *cake*.

Each construction serves its own communicative function, or 'meaning'. For instance, 'Kick the bucket' has the communicative function to raise the concept of death in a mildly light-hearted way. '*V*-ed' has the communicative function to express the past-ness of an action. 'What's *X* doing *Y*?' has the function to request resolution of some perceived incongruity. The constructions in the last four rows of Table 1 all have information packaging functions i.e. they all package or arrange information for particular discourse goals, such as emphasis, questioning, and placing information into the foreground or background of discourse. Languages are vast arrays of constructions, each one with a different communicative function.

Over the past four decades this constructionist approach to describing and analysing grammars has advanced very considerably, with many empirical successes, resolving issues and advancing understanding at all levels of linguistic analysis. This is not to say that "constructions all the way down" is a universally accepted assumption, but it does have a proven track record and supports a very substantial body of knowledge (see citations above).

Two general aspects of constructionist approaches are particularly important for the byproduct hypothesis of linguistic intuition.

First, no two constructions with the same form can have the same communicative function. This is commonly known as the Principle Of No Synonymy. The idea that there are no true synonyms in languages has a long history and is certainly not unique to constructionist approaches, but it does play an especially foundational role in this literature (Bolinger, 1968; Clark, 1987; Goldberg, 1995; Leclercq; Morin, 2023; *inter alia*). Another way to present it is to say that every construction 'covers' a specific range of possible communicative functions, or meanings, and no two constructions have precisely the same coverage (Goldberg, 2019). For instance, while *subway*, *metro* and *underground* are not different in their denotation (they all describe subterranean railway systems) they nevertheless all have different coverage because they vary in their connotations or their sociolinguistics: each is the more common term in different parts of the world. As such, they do not have the exact same communicative functions.

Second, constructionist approaches have long aimed to explain grammatical phenomena in terms of the functions of the constructions involved. As one simple example, consider the different syntax and semantics of cardinal *one* and anaphoric *one* (Goldberg; Michaelis, 2017). Anaphora are expressions whose interpretation depends on other expressions used in the discourse: the word "one" earlier in this paragraph ("As one simple example…") is an example, where it refers to explanations of grammatical phenomena in terms of the functions of the constructions involved. The key grammatical phenomenon here is that cardinal *one* and anaphoric *one* have different syntax and semantics. In particular, cardinal *one*, and not anaphoric *one*, receives emphasis and asserts the quantity one. Contrast "She left <u>one</u> behind [rather than two]" (cardinal) with "She left one behind [where one refers to something already present in the discourse]" (anaphoric). Or contrast "It was <u>one</u> of them [and not two of them]" (cardinal) with "It was one of them" (anaphoric). This difference occurs because these

are two constructions with the same form but different functions. Specifically, while cardinal *one* has the function to assert *quantity*, anaphoric *one* has the function to assert *existence* or *quality*. So the grammatical phenomenon (syntactic and semantic contrasts between anaphoric *one* and cardinal *one*) is explained in terms of the functions of different constructions (asserting quantity vs asserting existence). This is just a simple example, of course. Other examples involve far more complexity. The important point here is just that over the past four decades this 'functions of constructions' approach has been successfully used to explain a wide and diverse array of grammatical phenomena in an especially parsimonious way (Croft, 2001; Goldberg; Suttle, 2010; Sag, 2010; Auer; Pfänder, 2011; Hilpert, 2014; Goldberg, 2016; Abeillé *et al.*, 2020; Hoffmann, 2022; *inter alia*).

The analysis of linguistic intuitions that I present in this paper assumes that constructionist approaches are on the right track i.e. that grammars are indeed best described and understood in terms of constructions, and that grammatical phenomena can and are best explained in terms of the functions of constructions. At the same time, this paper also supports and reinforces the constructionist agenda to the extent that its conclusions provide a simple and distinctive explanation of an important empirical phenomenon. It is a normal part of scientific progress, that a premise (or set of premises) are supported to the extent that, by accepting those premises, we gain better explanations than before, where 'better' is understood in terms of ordinary scientific desiderata such as simplicity, plausibility, parsimony, consistency with a wide range of evidence and so on. For example, Newton's laws of motion were supported by the fact that they provided for better explanations of basic empirical phenomena such as the movements of celestial objects. In our case, the basic empirical phenomenon is the existence of linguistic intuition, including the psychological sense of oddness. In §2-§5 I will present what I believe is an especially parsimonious explanation of why humans have linguistic intuitions, at the computational level. As such, these arguments build on, enrich and support the constructionist agenda.

To do this, constructionist approaches must be paired with a key insight from the cognitive psychology of human communication (see also Scott-Phillips, 2025).

1.2. AUDIENCE PRESUMPTIONS OF OPTIMAL RELEVANCE

The second foundational assumption here is that all stimuli perceived as communicative are interpreted on the basis of a presumption of optimal relevance.

Any behavior humans can perform, they can perform in a communicative (more technically, 'ostensive') manner: overtly attracting attention and providing evidence of meaning. For instance, I sometimes tilt my coffee cup simply as a byproduct of moving my arms and wrist, but I can also tilt the coffee cup in a way that will attract the attention of a waiter and simultaneously be understood as a request for another coffee. Even the most basic human activities, such as walking or eating, can be done in communicative ways and hence indicate attitudes such as irony, sadness, respect or

hostility. Producing language – i.e. assembling constructions – is, of course, one especially important way of being communicative.

How are communicative behaviors, linguistic or otherwise, understood at all? Human communication is flexible and open-ended, and the interpretation of communicative behaviour, including language use, is always intersubjective and context dependent (Sperber, 1995; Carston, 2002; Recanati, 2004; Verhagen, 2005; 2015; Langacker, 2008; Zlatev *et al.*, 2008; Ludlow, 2014; Assimakopoulos, 2017; Geeraerts, 2021; Tantucci, 2021; *inter alia*). To take a very simple example, consider the simple utterance "We're on time". First, there can be no question that the utterance must be interpreted in a context dependent way, because it uses a pronoun ("We") and so who the utterance actually refers to depends on who the utterer is. Second, the expression "..on time" can be used in many ways, for instance to mean "..not late even though we expected we would be", "Don't worry, everything is fine", "Oh, I read my watch wrong, actually it's 12 o'clock", "..literally standing on a clock", and so on. The point here is that language use is always and inherently open-ended, flexible and context dependent, which in turn raises the question of how – *how just possibly?* – do we ever understand one another? How can we possibly converge on a (more or less) accurate interpretation of any utterance? Without some answer to such questions, the very possibility of human communication is quite mysterious.

The past four decades of research in the cognitive psychology of human communication have uncovered a general answer. Stimuli perceived as communicative are interpreted on the basis of a presumption of optimal relevance. Here is a simple example, to illustrate the basic idea (adapted from Sperber; Wilson, 1986/1995, p.51-2). A holidaymaker in a foreign country sets off for a walk. The weather is good, with only a few light clouds in the distance. However, as they leave the hotel grounds, a local makes eye contact, points towards the clouds and shakes their head. The holidaymakers understand this as a warning: they infer that local knowledge is that the clouds that are presently distant are probably rain clouds headed this way. How and why did they hit on this understanding? How just possibly? How does a point and a shake of the head mean "Those are probably rain clouds"? The answer is that, having recognised the local's behaviour as communicative, the holidaymakers' cognitive systems determine its meaning by, in effect, presuming that the behaviour has the property of optimal relevance, given the local's abilities and knowledge. With this presumption – *only* with this presumption – the holidaymakers' cognitive systems are able to reverse engineer the local's intended meaning.

These cognitive capacities and dispositions on the audience side marry with cognitive capacities and dispositions on the communicator side. Audiences interpret stimuli perceived as communicative on the basis of a presumption of optimal relevance; and communicators produce stimuli that, if they are interpreted on on the basis of a presumption of optimal relevance, are indeed likely to generate interpretations that converge on their (the communicator's) intended meaning. This pair of insights

together form the Communicative Principle of Relevance, that is central to Relevance Theory (Sperber; Wilson, 2002; Scott-Phillips, 2024).

Informally, 'optimally relevant' means 'efficient use of cognitive resources'. More formally, the relevance of a stimulus is the trade off between the cognitive costs and the cognitive benefits created by attending to and processing the stimulus; and stimuli are optimally relevant if and only if neither costs not benefits can be improved without making the other worse off (Sperber; Wilson, 2002; Scott-Phillips, 2025). Cognitive costs are, in the most general sense, the opportunity costs of attention; and in the specific context of communication this effectively means audience processing costs. Cognitive benefits are, in the most general sense, the impact that attention has on future decision making; and in the specific context of communication this effectively means accurate enough identification of the communicator's intended meaning. Putting all this together, the Communicative Principle of Relevance implies that when interpreting communicative stimuli, audiences presume that no alternative stimulus could suggest the same (or a very similar) meaning at lower processing cost for the audience. That is not to say that speakers are always 'efficient', whatever that might mean. The point is rather that communicative stimuli are (always, unconsciously) interpreted *as if* they have the property of optimal relevance.

A common question is, "What if communicative stimuli are not optimally relevant?". There are two misunderstandings here. The first is that the question treats relevance as a feature of a stimulus itself. But relevance is not a feature of a stimulus, it is a feature of the relationship between a stimulus and an individual mind, at a particular moment in time. What is relevant to one mind at one given moment may not be relevant to a different mind at the same moment, or the same mind at a different moment. As such, no stimulus can ever 'be' optimally relevant in and of itself. The second, related misunderstanding is that, even if it were coherent to ask 'whether' a stimulus is optimally relevant, it would not matter. The key point is that audiences interpret communicative stimuli as if they have the property of optimal relevance (for the mind of the target audience, at that moment), regardless of what features any particular stimulus actually has.

However, there are some minimal general statements we can make about optimal relevance, or reasonably assume. For instance, we can assume that stimuli that follow conventional use entail less attentional resources than stimuli that deviate from conventional use. Hence, any stimulus that deviates from conventional use without any corresponding change in cognitive benefits cannot possibly have the property of optimal relevance. I will use this minimal assumption in §4.

The Communicative Principle of Relevance was first proposed in the 1980s and since then many research programs in experimental psychology, with both adult and infant participants, have reported results that strongly align with it (e.g. van der Henst; Sperber, 2004; Schwier *et al.*, 2006; Gibbs Jr; Bryant, 2008; Scott-Phillips; Kirby; Ritchie, 2009; Behne *et al.*, 2012; Király; Csibra; Gergely, 2013; McEllin; Sebanz; Knoblich, 2018a,b; Tauzin; Gergely, 2018; Ho *et al.*, 2021; Rubio-Fernandez; Mollica; Jara-Ettinger, 2021; Vesper *et al.*, 2021; Royka *et al.*, 2022; Jara-Ettinger; Rubio-Fernandez,

2024). Some of these studies use especially fine-grained behavioural measures, and hence show how people follow the predictions of the Communicative Principle of Relevance in microscopically precise ways, on both the communicator and the audience side (Scott-Phillips, 2024). The principle has also been used to explain or considerably deepen our understanding of a large and diverse range of semantic, pragmatic and other expressive phenomena (e.g. Sperber; Cara; Girotto, 1995; Blakemore, 2002; Nicolle, 1997; 1998; Gibbs; Tendahl, 2006; Wilson; Carston, 2007; Sperber, 2010; Sasamoto, 2012; 2019; Wilson; Sperber, 2012; Yus, 2016; Cave; Wilson, 2018; McCallum; Mitchell; Scott-Phillips, 2020; Ifantidou; De Saussure; Wharton, 2021; Scott, 2022; Wharton; Jagoe; Wilson, 2022; Heintz; Scott-Phillips, 2023; Mazzarella; Pouscoulous, 2023). In this article I am, in effect, extending the reach of the Communicative Principle of Relevance into a new domain, by using it to account for the existence and nature of linguistic intuition.

2. THE BYPRODUCT HYPOTHESIS OF LINGUISTIC INTUITION

Both assumptions summarised in the previous section are longstanding and influential, but until very recently they have not been viewed in conjunction with one another. The idea that constructionist approaches to grammar should be closely connected with the cognitive psychology of human communication is not new (e.g. Tomasello, 1998a,b; Beckner *et al.*, 2009; Croft, 2009; Enfield; Sidnell, 2014; Geeraerts, 2016; Schmidt, 2016), but only recently have constructionist approaches been specifically connected with the insight that audiences interpret communicative stimuli on the basis of a presumption of optimal relevance (Leclerq, 2023; Scott-Phillips, 2025; in press). Here I state how this conjunction in turn suggests the byproduct hypothesis of linguistic intuition.

When humans communicate they can make use of whatever possible communicative tools may be available. These tools include their own bodies; objects available in the immediate environment; and, critically, any communicative conventions they might share with the target audience. (Note: I use 'convention' to mean 'commonly known solution to a recurrent coordination problem'. This use does not include notions such as 'arbitrariness'. For discussion see Scott-Phillips, 2025, §3.1.) These communicative conventions can be non-linguistic, such as pointing or nodding, but if communicator and audience share a language then the communicative conventions they have available includes, by definition, a vast array of constructions (Scott-Phillips, 2025). To share a language is to have shared knowledge of a vast array of socio-cognitive conventions, called constructions, that are used for communicative ends. So when audiences interpret a sentence, interpretation proceeds on the basis of a presumption that whatever the intended meaning might be, no alternative assembly of constructions could suggest the same (or an extremely similar) meaning at lower cognitive cost.

But what happens when a cognitive process that has the function to interpret incoming stimuli as if they have a certain property perceives that a stimulus is assembled in such a way that it is logically impossible for the stimulus to ever have that property? As I mentioned in the Introduction, this is not a question about what happens when people say strange or irrelevant things, or use far more words than they might otherwise need to. Such behaviours may be unusual or frustrating, but they do not entail a logical impossibility of optimal relevance. The question is about what happens when there is indeed a logical impossibility of optimal relevance. The byproduct hypothesis is, in effect, an answer to this question. It states that what happens is a psychological sense of oddness.

3. UNACCEPTABLE SENTENCES & IMPOSSIBLE OBJECTS: A CLOSE PARALLEL

To help motivate the byproduct hypothesis further, and to highlight what it may share with other domains of cognition, here I describe how the byproduct hypothesis is closely parallel to what happens with so-called impossible objects (Figure 2).

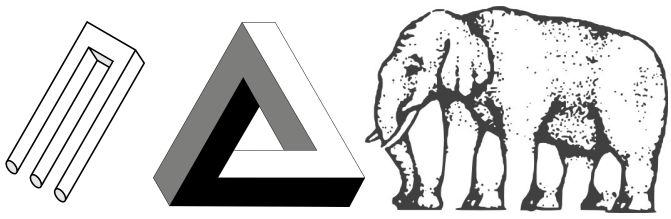

Figure 2. *Impossible trident; Penrose triangle; Shepard elephant* (all three images are in the public domain). In each image, individual parts are straightforwardly interpretable on their own, but they clash with other parts. This in turn makes it logically impossible to interpret the stimulus in any way consistent with the presumption of physical cohesiveness that governs the interpretation of all stimuli perceived as objects.

Whenever stimuli are perceived as objects, they are interpreted on the basis of a presumption that they have certain properties (Spelke, 1990; 2022; Baillargeon, 2004; Carey, 2009; Bai *et al.*, in press). These properties include, at a minimum, physical cohesiveness, subjection to gravity, bondedness and rigidity. Thus, when stimuli appear to be objects but are also assembled in ways that make it logically impossible for the stimulus to ever have these properties, we spontaneously intuit that something is not right. This is specifically what happens with impossible objects. The stimuli in Figure 2 appear to be objects and yet any interpretation of them as objects violates the presumptions that govern the interpretation of all stimuli perceived as objects. For example, it is logically impossible for the Shepard elephant to be physically cohesive, because its body and its legs are in mutual contradiction in this respect.

Both object perception and social interaction are domains of high adaptive importance for humans, and there is, I am suggesting, a tight parallel here (Table 2). In the case of impossible objects, when the different parts are assembled in mutually contradictory ways, it becomes logically impossible for the image to be interpretable in any way concordant with the presumption of physical cohesiveness that underpins the interpretation of all stimuli perceived as objects. In the case of many unacceptable sentences, when the different parts – i.e. the constructions – are assembled in mutually contradictory ways, then it becomes logically impossible to interpret the sentence in any way concordant with the presumption of optimal relevance that underpins the interpretation of all stimuli perceived as communicative. (I elaborate exactly on how sentences can have this property in §4.3, below).

	Objects	**Communicative behaviour**
What properties are stimuli presumed to possess?	Physically cohesiveness; bondedness; rigidity; subjection to gravity	Optimal relevance
What is the biologically adaptive domain for these presumptions?	Object perception	Interpretation of communicative stimuli
What properties can render it logically impossible for stimuli to meet these presumptions?	Mutually contradictory entailments between different parts of the image, with respect to physical cohesiveness, bondedness, etc	Mutually contradictory entailments between the functions of the constructions assembled together in a given sentence
What is the common name given to such stimuli?	Impossible objects	Unacceptable sentences
What are intuitions of oddness ultimately about?	Objectness	Communicativeness

Table 2. *Unacceptable sentences are to communication what impossible objects are to perception*. They are logically uninterpretable in ways consistent with the spontaneous and unconscious assumptions that govern and guide the respective cognitive process.

This parallel helps to highlight and clarify several subtle but important aspects of the byproduct hypothesis.

First, it provides the means for a more informal and intuitive presentation of the main idea. The byproduct hypothesis states that, just as the physical features of impossible objects effectively 'pull' interpretation in two (or more) mutually contradictory directions with respect to physical cohesiveness, the functions of the constructions of many unacceptable sentences effectively 'pull' interpretation in two (or more) mutually contradictory directions with respect to optimal relevance (and I shall describe when and how this can occur in the next section). This creates, in both cases, an unresolvable tension, the consequence of which is a psychological sense of oddness.

Second, the parallel with impossible objects highlights an important distinction between *what the intuitions are about* and *how they are generated*. In the case of impossible objects, what the

intuitions are about is always objectness. That is to say, the intuitions are about whether the stimulus can possibly be concordant with the presumptions that govern the interpretation of all stimuli perceived as objects. In the case of unacceptable sentences, what the intuitions are about is always communicativeness (and not grammaticalness). That is to say, the intuitions are about whether the stimulus can possibly be concordant with the presumption of optimal relevance that governs the interpretation of all stimuli perceived as communicative.

Third, the parallel with impossible objects aids specification and clarification of the relationship between processes of interpretation and the properties of perceived stimuli. When we perceive stimuli as objects, we do not 'track' or 'monitor' their bondedness, physical cohesiveness or other aspects of objectness. Rather, we interpret the stimuli *as if* it has those properties (or put in other words: on the basis of a presumption that it has those properties). Similarly, when we perceive stimuli as communicative, we do not 'track' or 'monitor' their relevance, let alone their optimal relevance. Indeed, research in the Relevance Theory tradition has long rejected any idea that humans mentally represent the relevance of incoming stimuli (e.g. Sperber, 2005; Allott, 2013; Sperber; Wilson, 2025). Rather, we interpret communicative stimuli *as if* they have the property of optimal relevance (or put in other words: on the basis of a presumption that it has the property of optimal relevance). In both domains, a psychological sense of oddness occurs when stimuli cannot actually be interpreted in this 'as if ' way. As such, no mental representation, either of an object's degree of physical cohesiveness or a communicative stimulus' degree of relevance, is necessary for the stimulus to be intuitively perceived as 'not right'.

4. OPTIMAL RELEVANCE AS LOGICALLY IMPOSSIBLE: THREE WAYS

Here I use the definition of relevance, as developed in Relevance Theory (Sperber; Wilson, 1986/1995; 2002; Clark, 2013; Scott-Phillips, 2024), to derive three general ways in which a sentence logically cannot have the property of optimal relevance; and I describe how each of these three ways triggers intuitions of unacceptability.

As summarised in §1.2, relevance is a trade off between two metrics, cognitive costs and cognitive benefits on the audience side, and stimuli are optimally relevant if and only if neither of these metrics can be improved without making the other worse off. Therefore, a sentence logically cannot have the property of optimal relevance if:

- The sentence appears to have no plausible cognitive benefits in the first place (i.e. no meaning can be determined), such that there is no possible trade off of costs and benefits (i.e. no relevance).

- The sentence deviates from conventional use without any plausible change in interpretation, however small or nuanced. Such sentences raise the cognitive costs of interpretation with no plausible change in benefits. (Again, I assume that stimuli that follow conventional use entail less attentional resources than stimuli that deviate from conventional use.)
- There are mutual contradictions between the functions of two (or more) constructions within a sentence, rendering the optimisation of cognitive costs and cognitive benefits impossible. (This is the case that is closely parallel to the case of impossible objects, as described in §3 above.)

In this section I elaborate on how each of these ways can trigger the psychological sense of oddness that is the signature of linguistic intuition. I give simple examples, and I relate them to established findings in the experimental literature.

4.1. NO PLAUSIBLE COGNITIVE BENEfiTS

The most straightforward way by which a sentence logically cannot have the property of optimal relevance is if the sentence is not parseable, and therefore appears to have no plausible cognitive benefits in the first place.

The clearest example of such sentences are those that overload short term memory or other cognitive processes involved in sentence processing; and the classic class of sentences that do this are those with multiple embedded clauses:

(1) The rat the cat the dog chased killed ate the malt.
The dog chased the cat. The cat killed the rat. The rat ate the malt.

(2) The patient the nurse the clinic had hired admitted met Jack.
The clinic had hired the nurse. The nurse admitted the patient. The patient met Jack.

(3) That that that Bill left Mary amused Sam is interesting is sad.
Bill left Mary. The fact that Bill left Mary amused Sam. The fact that this amused Sam is interesting. The fact that this is interesting is sad.

These sentences all follow the grammar of English. In particular, they all use embedded clauses in ordinary and conventional ways. However, they also embed multiple clauses inside one another. This can overload short term memory or other aspects of processing, making the sentences hard or impossible to parse, and hence without cognitive benefit for the audience. Prosody and other aspects of language production can help to demarcate embedded clauses or other aspects of sentence structure, and hence reduce these impacts on language processing (e.g. Fodor; Nickels; Schott, 2017), but if these impacts are present then cognitive benefits are reduced to zero or near zero, hence making it logically impossible for the sentence to have the property of optimal relevance.

Of course, it is not controversial that limits on short term memory and other processing factors can impact on judgements of acceptability. This has long been known, and investigated in detail (e.g. Miller, 1962; Gibson; Thomas, 1999; Phillips, 2006; Karlsson, 2007; Sprouse, 2013; *inter alia*). The important point here is just that this fact is consistent with – in fact it is predicted by – the byproduct hypothesis of linguistic intuition. Overloading cognitive processing renders it difficult or impossible to identify and track relations within a sentence; so such sentences entail cognitive costs for no real cognitive benefit; which in turn means that the sentence logically cannot optimise the trade off between cognitive costs and cognitive benefits. This impossibility triggers the psychological sense of oddness.

4.2. DEVIATION FROM CONVENTIONAL USE WITHOUT ANY PLAUSIBLE CHANGE IN INTERPRETATION

The second way in which a sentence logically cannot have the property of optimal relevance is if it deviates from conventional use without any plausible change in interpretation, and hence no plausible change in cognitive benefits. Two simple examples were given in the Introduction:

(4) She gived me a book
Rather than "She gave me a book"

(5) I don't want going to the cinema
Rather than "I don't want to go to the cinema"

In these cases, the sentence uses one or more constructions in ways that deviate from conventional use, and as such the sentence entails cognitive costs beyond those entailed by conventional use. (As I mentioned in §1.2, I assume, other things equal, that stimuli that follow conventional use entail less attentional resources than stimuli that deviate from conventional use.) At the same time, these deviations from conventional use appear to offer just the same cognitive benefits i.e. the same meaning, including the same pragmatics, as following conventional use would have done. Together, these two properties (additional costs; no change in benefits) mean that these sentences logically cannot optimise the trade off between cognitive costs and cognitive benefits.

As with §4.1, there is no controversy that sentences such as (4) and (5) are routinely judged as unacceptable. Deviations from the ordinary practices of a language community impacts on judgements of acceptability. But also as with §4.1, the important point here is just that this fact is consistent with, indeed it is predicted by, the byproduct hypothesis of linguistic intuition.

Of course, some sentences deviate from conventional use to some degree but, by doing so, they warrant meanings (again, including pragmatics) that conventional use would not have done. Here are three simple, imagined examples.

(6) She smiled him a thank you

(7) Can I ninja your spot in line?

(8) They meandered the conversation to a weird place

This kind of productive deviation from conventional use is plainly important for linguistic creativity and language change (Kaschak; Glenberg, 2000; Robenalt; Goldberg, 2015; Turner, 2018; Goldberg, 2019; Hoffmann, 2019; Bergs, 2025; *inter alia*). We can reasonably say that such sentences incur increased cognitive costs relative to more conventional use (§1.2), but they also warrant interpretations that conventional use would not have done i.e. they have distinctive cognitive benefits; and as such it is not the case that they logically cannot have the property of optimal relevance. Hence, we cannot and should not predict that these sentences will necessarily trigger intuitions of unacceptability. They might or might not, depending on the specifics of each case. (A further complicating factor here is that many individuals' self-reported intuitions about linguistic creativity may be affected by their own ideas about how language does or should work. For instance, self-identified prescriptivists may be more likely to say that such sentences are unacceptable purely by virtue of their unconventionality).

4.3. MUTUAL CONTRADICTIONS IN THE FUNCTIONS OF CONSTRUCTIONS

The third possible way in which a sentence logically cannot have the property of optimal relevance is if there are mutual contradictions in the functions of two (or more) constructions within a sentence, rendering the optimisation of cognitive costs and cognitive benefits logically impossible.

Information packaging constructions, and in particular the contrast between foregrounding and backgrounding, provide the clearest class of examples. Many information packaging constructions have the function to place information in the background of discourse, while others have the function to place information in the foreground (Table 1); so if these two functions are applied to the same information, they will inevitably be in contradiction. Information cannot be both foregrounded and backgrounded at the same time, and as such any assembly of constructions that applies both functions to the same information will be logically impossible to interpret in terms of optimal relevance.

As a simple example, consider the sentence, "The woman who called Uber for a ride to the restaurant lost her glasses". It has a main clause that places certain information in the foreground, highlighted here in capital letters:

(9) THE WOMAN who called Uber for a ride to the restaurant LOST HER GLASSES

Below is the same clause but now edited with the addition of a wh-question construction, used to ask about information that is foregrounded by the main clause. Bold has been added to indicate what the wh-question places into the foreground.

(10) **What did THE WOMAN** who called Uber for a ride to the restaurant **LOSE?** (A: **HER GLASSES**)

Now consider how the same wh-question construction might be used to ask about information that is backgrounded by the main clause. Again, bold indicates the information that the wh-question places into the foreground.

(11) **Who did THE WOMAN call for a ride to the restaurant** LOST HER GLASSES**?** (A: **Uber**)

Plainly, while sentence (10) is acceptable, sentence (11) is not. *Ex hypothesi*, this is because in (11), and not (10), two of the constructions within the sentence have mutually contradictory functions. They are 'trying' to achieve two contradictory things: the main clause (in CAPITALS) is trying to foreground the fact that the woman lost her glasses, and by doing so it must background who she called for a ride; while the wh-question (in **bold**) is trying to foreground who she called for a ride, and by doing so it must background the fact that she lost her glasses. So there is an unresolvable tension between the functions of these two constructions. The tension can be seen visually by the fact that, in (11), "**call for a ride to the restaurant**" is in bold but not capitals, and "LOST HER GLASSES" is in capitals but not bold.

This is just a simple example, to illustrate. Phenomena of this kind have long been known about: they are especially important for so-called 'island effects' in syntax, and other forms of long distance dependency. Constructionist approaches, aiming to explain grammatical phenomena in terms of the functions of constructions (§1.1) make a clear, precise and otherwise surprising empirical prediction in this area: that intuitions of unacceptability should occur when, and only when, information packaging constructions place into the background information that is otherwise in the foreground, or vice versa (Cuneo; Goldberg, 2023; *inter alia*). Furthermore, since foregroundness and backgroundness are graded qualities (they are matters of more-or-less rather than yes-no) then the prediction is for a correlation: measures of the degree to which backgroundedness and foregroundedness clash within a sentence should correlate with measures of the degree to which that sentence is judged unacceptable. Recent large scale, preregistered experimental studies have shown this effect decisively (*ibid.*). Baseline sentences of many different kinds were repackaged by information packaging constructions and participants were asked to judge the acceptability of the repackaged sentences. (The example sentences above are taken from the stimuli used in this study.) Results followed the prediction closely: the degree to which the repackaged sentences were judged unacceptable strongly correlated with the degree to which information that was

foregrounded in the baseline sentence was backgrounded by the information packaging construction, or vice versa. Several other studies pursuing the same line of argument report complementary results (e.g. Ambridge; Goldberg, 2008; Goldberg, 2013b; 2016; Abeillé *et al.*, 2020; Liu *et al.*, 2022; Winckel *et al.*, 2025).

What I am adding here is a cognitive explanation of why an unresolvable tension in the function of constructions should lead to a psychological sense of oddness at all. It is because unresolvable tensions make it logically impossible for a sentence to have the property of optimal relevance. In the example of sentence (11) above, if we entertain the interpretation that the communicator is asking about who was called by the woman who lost her glasses (**Uber**), then the main clause is unnecessarily costly in terms of cognitive resources, because it focuses attention on something different (THE WOMAN LOST HER GLASSES). Alternatively, if we entertain the interpretation that the communicator is asking about what was lost by the woman who called Uber (HER GLASSES), then the choice of wh-question is unnecessarily costly in terms of cognitive resources, because again it focuses attention on something different (**Who… call[ed] for a ride to the restaurant?**). In such ways, inherent tensions between the functions of constructions will make it logically impossible for a sentence to have the property of optimal relevance. This is just as is the case for impossible objects, where inherent tensions between different features of the objects make it logically impossible for them to have the property of physical cohesiveness (§3).

Note that this kind of explanation does not work for sentences that are plain irrelevant, in the everyday sense of that word. I mentioned in the Introduction that 'irrelevant' and 'logically impossibility of optimal relevance' are not the same, and it is only the latter that triggers intuitions of unacceptability. Consider a sentence of absurd length, packed full of apparently unnecessary information. Say, for instance, that sentence (9) is enriched so that the relative clause includes enormous amounts of additional information about the woman.

(12) THE WOMAN who called Uber for a ride to the restaurant and was especially looking forward to meeting her friend who had just come back from a long holiday where she learned how to pilot a small green plane and… [continue like this for much longer]… LOST HER GLASSES

Suppose, furthermore, that this is uttered for no apparent reason, perhaps even by a stranger in the street. Such behaviour is socially unusual and the sentence is irrelevant in the everyday sense of the term. However, there is nothing about the sentence that makes it *logically impossible* for it to have the property of optimal relevance. The apparent meaning is unnecessarily rich, maybe even absurdly rich, but it does not involve the logical impossibility of optimal relevance, and hence does not trigger the psychological sense of oddness.

5. EXPLAINING SIGNATURE FEATURES OF LINGUISTIC INTUITION

Linguistic intuition has some distinctive and intriguing features. Four of the most salient are:

- Linguistic intuitions can be graded rather than discrete
- Acceptability can dissociate from grammaticality
- Utility in communication does not predict unacceptability
- Linguistic intuitions are independent of the social situation

Any good explanation of why humans have linguistic intuition should be able to account for these features. On the grammaticalness assumption, the first two are at least somewhat surprising, or noteworthy. They have, accordingly, been the focus of enormous amounts of investigation over the past 50 or so years. The second two have been sometimes used as arguments against social and communicative approaches to grammar.

In this section I describe how all four of these features are corollaries of the byproduct hypothesis of linguistic intuition. I say they are corollaries because to explain them I will appeal to no *ad hoc* hypotheses. Rather, these features of linguistic intuition are all straightforward consequences of the byproduct hypothesis. Specifically, they are all downstream of the three general ways, identified in §4, in which a sentence logically cannot have the property of optimal relevance.

5.1. LINGUISTIC INTUITIONS CAN BE GRADED RATHER THAN DISCRET

Linguistic intuitions are sometimes matters of more-or-less rather than yes-or-no. This is so both at the level of individuals ('I think this sentence is slightly more acceptable than that one') and the level of populations ('More people think this sentence is acceptable than that one'). Under the grammaticalness assumption, this graded property is not necessarily expected, and hence is in need of explanation. Accordingly, it has long been an important topic in the study of grammar (e.g. Bard; Robertson; Sorace, 1996; Schütze, 1996/2016; Sprouse, 2007; Lau; Clark; Lappin, 2017; Francis, 2021).

Under the byproduct hypothesis, the graded nature of linguistic intuition is both expected and predicted. This is because the critical qualities that determine whether a sentence triggers linguistic intuition (§4) are themselves graded. For instance, some sentences exceed limits on short term memory only in a marginal or borderline way (§4.1). Some deviate from ordinary use only to a marginal or partial degree (§4.2). And some constructions, especially those with information packaging functions, have functions that are contrary to other functions in the same sentence in

partial but not absolute ways (§4.3). Indeed, I mentioned above recent experimental research that directly investigates how partial but not absolute clashes of function predict gradedness in linguistic intuitions (Cuneo; Goldberg, 2023). So these critical qualities are all graded, meaning that the sense of a logical impossibility of optimal relevance should itself be graded. Hence, we should expect linguistic intuitions to be graded.

None of this is to deny that many linguistic intuitions are indeed matters of yes-or-no. Whether a sentence logically can or cannot have the property of optimal relevance is often clear and unambiguous. The point is just that unclear, ambiguous and partial cases are possible, predicted and expected under the byproduct hypothesis.

5.2. ACCEPTABILITY DISSOCIATES FROM GRAMMATICALITY

I mentioned in the Introduction that acceptability and grammaticality are not the same property. Following others, I use (un)acceptability for the spontaneous intuitions that are the main focus of this article, and (un)grammaticality for the relationship between a sentence and the ordinary practices ('norms', 'conventions') of a language community. This terminology hence clearly distinguishes between two different empirical phenomena: individual intuition and community practice.

These two phenomena overlap to a very considerable degree: sentences are typically either acceptable and grammatical, or unacceptable and ungrammatical. However, acceptability and grammaticality can and do sometimes dissociate (Chomsky, 1965; Montalbetti, 1984; Frazier, 1985; Barton *et al.*, 1987; Schütze, 1996/2016; Phillips; Wagers; Lau, 2011; Hornstein, 2013; Wellwood *et al.*, 2018; Leivada, 2020; Leivada; Westergaard, 2020; Tubau *et al.*, 2020; *inter alia*). As examples, sentences (1)-(3) in §4.1 are all grammatical but are routinely judged as unacceptable. The opposite is also possible: sentences can be acceptable but ungrammatical (I give examples below).

Here I describe how the byproduct hypothesis predicts, explains and otherwise approaches the fact that acceptability and grammaticality can dissociate.

First, the byproduct hypothesis predicts that, while they are different phenomena, acceptability and grammaticality should nevertheless overlap to a very considerable degree. This is because each tends to entail the other. Following the ordinary practices of a language community (i.e. being grammatical) will typically keep cognitive costs at a minimum for whatever cognitive benefit might be achieved (i.e. it will entail acceptability). And vice versa: keeping cognitive costs at a minimum for whatever cognitive benefit might be achieved will, almost by definition, involve following the ordinary practices of a language community (modulo small deviations that can be used creatively: see §4.2). This mutual entailment is why acceptability and grammaticality are easily conflated.

When precisely should this mutual entailment dissolve? The most obvious case is when a sentence follows ordinary practice but also exceeds limits of short term memory or other processing

constraints: this possibility was described in §4.1. Such sentences are trivially easy to create: just add sufficient layers of embedded clauses.

In the other direction, the byproduct hypothesis predicts that ungrammatical-acceptable sentences should be rare or perhaps impossible, and certainly difficult to generate *ex nihilo*. Significant deviations from ordinary practice should entail an inherent impossibility of interpretation consistent with the presumption of optimal relevance. And indeed this prediction appears to hold: it is very hard to write or identify new ungrammatical-acceptable sentences.

That said, there are a few apparently good examples of ungrammatical-acceptable sentences. (13) and (14) are probably the most robust and studied examples. Both initially strike many people as acceptable, but they are not grammatical. That is, they do not follow ordinary practices of English.

(13) The doctor the nurse the hospital had hired met John
The nurse the hospital had hired met John. So what did the doctor do?

(14) More people have been to Russia than I have
More people have been to Russia than I have what?

So while acceptable-ungrammatical sentences are certainly rare, (13) and (14) are an existence proof that they are possible. How can this be, if the prediction is that they should not occur? Our best experimental studies to date seem to suggest that these sentences have some idiosyncratic features that cause people to fail to identify their structure i.e. they do not identify the constructions accurately – and crucially, once people do notice the actual structure then they then readily judge the sentences as unacceptable (Wellwood *et al.*, 2018). In other words, acceptable-ungrammatical sentences quickly become unacceptable-ungrammatical sentences on further reflection, as the byproduct hypothesis predicts. Further focused research is needed here, including in languages other than English.

5.3. UTILITY IN COMMUNICATION DOES NOT PREDICT UNACCEPTABILITY

In the Introduction I gave a simple example of how sentences can be unacceptable even if their meaning is apparently clear: *I don't want to go to the cinema* is acceptable but *I don't want going to the cinema* is not. Such pairs of sentences are sometimes called 'Why Nots' (because they invite the question, why is one of the sentences not acceptable?: Rey, 2020) or 'Fine Thoughts' (because they highlight sentences that express a clear thought even though they are unacceptable: Chomsky, 2013). Any syntax textbook provides many more examples. These have long been highlighted as critical data speaking against communicative approaches to grammar, because they show that possible utility in communication does not delimit the acceptable from the unacceptable. Sentences that can be useful in communication may or may not be acceptable.

However, while the byproduct hypothesis of linguistic intuition is predicted on a communicative approach to grammar (§1.1), it does not at all predict utility in communication should delimit the acceptable from the unacceptable. On the contrary, the hypothesis states that what delimits the acceptable from the unacceptable is something different: it is the logical impossibility of optimal relevance (§2). Thus, since 'possible utility in communication' and 'logical impossibility of optimal relevance' are not the same concept, the fact that utility in communication does not delimit the acceptable from the unacceptable is expected.

In fact, the byproduct hypothesis states the conditions under which sentences may be useful in communication but unacceptable: it is when 'possible utility in communication' is different to 'impossibility of optimal relevance'. §4.2 and §4.3 identified and described the two general sets of circumstances in which this will happen (and §4.1 describes how a sentence can have neither quality).

5.4. LINGUISTIC INTUITIONS ARE INDEPENDENT OF THE SOCIAL SITUATION

One entailment of the byproduct hypothesis is that linguistic intuitions are determined in context. This is because relevance, and hence optimal relevance, is a relationship between a stimulus and an information processing system, such as a mind, at a given moment and hence in a given cognitive context (Sperber; Wilson, 1986/1995; Assimakopoulos, 2017; Wilson, 2023; Scott-Phillips, 2024). So if linguistic intuitions are intuitions ultimately about the logical impossibility of optimal relevance (§2) then linguistic intuitions must be determined in context.

This fact may seem to be a problem for the byproduct hypothesis, because describing a social situation in which a sentence might be uttered is unlikely to change intuitions about (un)acceptability. (Perhaps providing a social situation can change linguistic intuitions at the margins, but I assume it does not change linguistic intuitions in general.) So how can this be? How can it be that linguistic intuitions are determined in context, but changing the social situation does not change the intuitions?

There are (at least) two important points to make here. First, the fact that (i) linguistic intuitions are determined in context does not at all entail that (ii) changing the social situation should change the intuition. There is just no inherent entailment or contradiction here. Second, the byproduct hypothesis actually *predicts* that changing the social situation should not change linguistic intuitions at all, because it states that what triggers linguistic intuitions is the perception of a *logical* impossibility of optimal relevance i.e. an impossibility *regardless* of social situation. Again, in §4 I identified the three ways in which a sentence can have this property.

6. CONCLUSION: ULTIMATE & PROXIMATE EXPLANATIONS FOR LINGUISTIC INTUITION

One broader goal of this article is simply to raise the question of why humans have linguistic intuitions at all. The issue is basic for cognitive science yet it has not received the focused attention it deserves (see Introduction). Cogent answers will deepen, reinforce, reshape or in other ways considerably advance understanding in several areas.

Understanding of biological capacities or dispositions can be pursued at both ultimate (evolutionary) and proximate (mechanistic) levels (Mayr, 1961; Ariew, 2003; Scott-Phillips; Dickins; West, 2011; Dickins; Barton, 2013; Nettle; Scott-Phillips, 2023; Al-Shawaf, 2024; *inter alia*). Ultimate explanations identify the adaptive function(s) of a trait, if any, and proximate explanations describe how that functionality is achieved. Put another way, ultimate explanations describe why a given trait exists in a species, and proximate explanations describe how it operates. The two levels are separate, and good explanations at each level will be mutually supportive of one another.

Here I have presented both ultimate and proximate explanations of linguistic intuition. Ultimately, humans have linguistic intuition because linguistic intuitions are byproduct effects of core cognitive capacities and dispositions for human ('ostensive') communication, that are themselves biological adaptations to the deeply social nature of humans' evolutionary ecology (Sperber; Wilson, 2002; Enfield; Levinson, 2006; Tomasello, 2008; Frith; Frith, 2010; Scott-Phillips, 2015; Heintz; Scott-Phillips, 2023). Proximately, linguistic intuitions are triggered by sentences that, one way or another, logically cannot have the property of optimal relevance.

These answers could be further enriched in many ways, for instance by identifying the physical manifestation of linguistic intuition in the brain. We know that language processing has several distinctive neurological markers, such as N400 and P600 effects, but we know less about specific markers of linguistic intuition and the phenomenological experience that something is 'not right' about a sentence (but N400 effects may relate to expectations of relevance in communication: Kourtis *et al.*, 2020). Identifying neuroscientific markers of linguistic intuition might allow us to identify its natural character more precisely than at present, and in ways that do not directly equate it with judgments of acceptability.

The bigger picture is a growing trend in evolutionary approaches to the mind, towards understanding many cognitive capacities as products (and byproducts) of biological adaptation to an especially social evolutionary ecology. Over the past 30 or so years, detailed investigation has suggested that many of the most distinctive features of the human cognitive phenotype have primarily social and interpersonal functions. This includes not only capacities that are plainly social in nature, such cooperative and competitive dispositions, intuitions about fairness and so on; but also many other capacities that can seen, on first blush, to be individual and 'internal' phenomena:

examples include reasoning, episodic memory, belief formation and many of the emotions (Humphrey, 1976; Sperber; Baumard, 2012; Whiten; Erdal, 2012; Tomasello, 2014; Mercier; Sperber, 2017; Mercier; Dezecache; Scott-Phillips, 2017; Mahr; Csibra, 2020; Soares da Silva, 2021; 2022; Williams, 2021; Scott-Phillips, 2022; Al-Shawaf; Shackelford, 2024; *inter alia*). The byproduct hypothesis of linguistic intuition fits this pattern. Linguistic intuitions are sometimes conceived of as being primarily individual phenomena, indeed they are primary data for the 'internalist' approach to language most associated with Noam Chomsky (for a recent overview see Rey, 2020). But they are better understood as byproduct effects of social cognition, specifically the distinctive social cognition that underpins all human communication.

ACKNOWLEDGEMENTS

Thank you to Yolanda García-Lorenzo, Christophe Heintz, Benoit Leclercq, Elena Marx, Cameron Morin, Daniel Nettle and Eva Wittenberg for comments on previous drafts. I also received many thoughtful comments following presentations I delivered while developing these ideas. Thank you to audiences at: *Society for Philosophy & Psychology Annual Conference*; *Relevance Researchers Online Conference*; *Institute for Logic, Cognition, Language & Information*; *Pragmatics Reading Group*, *University College London*; *Evolution, Cognition & Culture Workshop*.

ADDITIONAL INFORMATION

CONFLICT OF INTEREST

The author declares no conflicts of interest.

STATEMENT OF DATA AVAILABILITY

There is no original data associated with this manuscript.

AI USE STATEMENT

The author declares that no AI tool was used in the preparation of this manuscript or the underlying research.

REVIEW AND AUTHORS' REPLY

Review: https://doi.org/10.25189/2675-4916.2025.V6.N3.ID868.R

Authors' Reply: https://doi.org/10.25189/2675-4916.2025.V6.N3.ID868.A

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