

# **THE CASE FOR LEXICASE**

**An Outline of Lexicase  
Grammatical Theory**

**Stanley Starosta**

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# Foreword

By Richard Hudson

Lexicase has been developing since about 1971, but this is the first book about it; in fact, it is near to being the first published presentation of the theory in any form. This is a pity because the theory has a lot to offer. Most obviously, it defines a range of analytical categories which seem helpful in typology and description, as witness the large number of descriptive linguists who have already used it in analysing a wide range of exotic languages. However, lexicase also addresses some fundamental questions about grammatical theory. Few theoretical linguists have so far paid any attention to its answers. This is perhaps hardly surprising, considering the lack of publications; under the circumstances what is surprising is the quantity of descriptive work. With the publication of this book it is to be hoped that the theory will become better known among theoretical linguists.

Let me pick out three general questions to which lexicase gives interesting answers. In each case the lexicase answer is in tune with developments which seem to be taking place in other theories, while still being sufficiently controversial to challenge standard assumptions. (And in each case, as it happens, Starosta's answers are the same as those which I would give, within the theory of Word Grammar.) The three questions are as follows, and the lexicase answers, in a nutshell, are given in parentheses.

Q.1 How many syntactic levels are there? (Answer: one)

Q.2 Are dependency relations basic or derived? (Answer: basic)

Q.3 Are the rules of grammar formally distinct from subcategorization facts? (Answer: no)

The lexicase answers command our attention not only because of the theoretical arguments given in this book, but also because they have been tried out on a lot of non-European languages as well as on English. The same cannot be said of many of the currently popular theories.

*Q.1 How many syntactic levels are there?* Like several other current theories, lexicase allows only one syntactic structure per sentence (barring ambiguity, of course), namely a completely surface one (without even empty nodes). The claim is that such structures can be generated directly, but it is interesting to note that in order to permit this the structures generated are made far richer than typical phrase-markers, by the addition of several different kinds of relations and categorizations—'case relations' (roughly, theta-roles), 'case forms' (roughly, abstract 'case'), 'case markers' (surface markers of abstract case) and 'macroroles' (roughly, 'subject' versus 'object' in languages of the accusative type). All these are part of the syntactic structure (which is not

distinguished from semantic structure), in addition to quite a rich system of classificatory and subcategorizational features.

The question how well it all works is a matter of judgement, but the lexicase approach does seem to illustrate a very general conclusion of recent work in syntactic theory: the fewer levels of structure there are, the richer each level has to be. Hardly surprising, maybe, but worth establishing for all that.

*Q.2 Are dependency relations basic or derived?* Since the introduction of X-bar theory it has become uncontroversial to make a formal distinction between the head of a construction and its other daughters. However this is only true of the rules; when it comes to sentence structures all nodes have the same status, so the only way to pick out the head of a construction is to go back to the rule which generated it. Thus the dominant tradition in grammatical theory is one in which the dependency relations between heads and non-heads are not basic but derived.

Lexicase links this tradition to a much older one, in which dependency relations are basic and are just as much part of the structure of a sentence as other categorizations such as the word classes and morpho-syntactic features. Of course, main-stream theories are based on the assumption that dependency relations are not in fact basic in sentence structure, so we have to decide between this assumption and the contrary assumption behind lexicase (and a number of other current theories). It is also a matter of debate whether constituent structure has any part to play in grammar once dependencies are taken as basic; according to lexicase it does have a residual role, but others have denied this. The debate will take some time to resolve, but the lexicase answer is a serious contribution to it.

*Q.3 Are the rules of grammar formally distinct from subcategorization facts?* It has been pointed out repeatedly that some phrase-structure rules are redundant if strict subcategorization facts are included in the lexicon, because the rules simply summarize all the possibilities permitted by the subcategorization. If each subcategorization frame defines a distinct construction, then we might conclude that each such frame is in fact a rule, equivalent to a phrase-structure rule—in which case the hitherto watertight boundary between the rules of grammar and the lexicon would of course no longer exist. A different conclusion would be that the phrase-structure rules should be renamed ‘lexical redundancy rules’, implying that they are part of the lexicon (whatever that might mean). The trouble with both of these views is that they are true only of a certain type of phrase-structure rule, namely one with a lexical head; the rules responsible (under standard assumptions) for subjects and adjuncts are unaffected, because they do not correspond to strict subcategorization facts.

In lexicase (and other theories in which dependency is basic), *every* construction has a lexical head, so subjects and adjuncts can be treated in the same way as complements. This allows lexicase to define all constructions by means of information attached (in the form of features) to lexical items. Of course, some of these features have to be assigned by rule, and lexicase offers a fairly rich typology of such rules, but these rules can be seen as each

contributing to the properties of a lexical item. The consequence is that virtually all of the grammar is concerned with the definition of lexical items, and the boundary between rules and the lexicon disappears. It remains to be seen whether this is nearer to the truth than the standard view, but at least it is a coherent view which is spelled out clearly enough to be assessed.

None of the lexicase answers are self-evidently true, nor are any of them obviously false, so they need the same critical consideration as the more familiar answers. The only way to be sure that one's favourite answer is right is by elimination of all serious alternatives; thanks to the present book another serious alternative is now available for scrutiny.

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*University College, London*

## Features and abbreviations

Acc	Accusative	ndpd	independent
adbl	audible	Nom	Nominative (subject)
Adj	adjective	ntrg	interrogative
adrs	addressee	ntrr	interior
Adv	adverb	P	preposition
AGT	Agent	past	past
anmt	animate	pasv	passive
APS	antipassive	PAT	patient
assn	association	plrl	plural
bstr	abstract	posn	possession
clct	collective	prdc	predicate
cnjc	conjunction	prnn	pronoun
Det	determiner	prpr	proper
dfnt	definite	prsn	person
dgre	degree	ptrr	operator
djct	adjectival	ptnl	potential
dmcl	domicile	qlty	quality
dmmv	dummy	rfrn	referential
dprv	deprived	rtcl	article
drcn	direction	sorc	source
Dtv	Dative	spkr	speaker
fint	finite	srfc	surface
fore	fore	topc	topic
goal	goal	trmn	terminus
humn	human	trns	transitive
lctn	location	V	verb
linr	linear	vrte	vertical
mnnr	manner	xlry	auxiliary
motn	motion	xpls	expulsion
N	noun		

## Preface and acknowledgements

The roots of lexicase go back to a class handout prepared for a syntax course at the University of Hawaii in 1970. Since that time, work has been done in the lexicase framework on the morphology, syntax, lexicon, and/or referential and intensional semantics of more than forty-five different languages, some of it on English but most of it on non-Indoeuropean languages of Asia and the Pacific Basin. The current list of lexicase references runs to ten pages of articles, dissertations, and working papers (cf. lexicase references 1985). Some of the lexicase dissertations have come out as books, and there is a book on the philosophical background of lexicase theory (Starosta 1987). However, in the seventeen years since that first handout, no book has been written to summarize and codify the lexicase theory in a form which would make it accessible to students and professionals outside Hawaii. This volume is intended to be such a book.

Although the bulk of lexicase descriptive work over the years has been done on South, Southeast, and East Asian and Pacific languages, most of the illustrative examples for this volume will be taken from English to make the book more generally useful. Examples from other languages, especially non-Indoeuropean ones, will be introduced when this is necessary to provide evidence for an analysis which is difficult to motivate on the basis of English evidence alone, or when English has no instances of the construction in question.

This work draws substantially on material previously available only in semi-published form, especially 'Affix hobbling' (Starosta 1977), 'The end of phrase structure as we know it' (Starosta 1985e), 'Lexicase and Japanese language processing' (Starosta and Nomura 1984), and on several long reports by Louise Pagotto (Pagotto 1985a, Pagotto 1985b) and by Pagotto and Starosta (1985a, 1985b, 1986), and also to some extent on 'Lexicase parsing: a lexicon-driven approach to syntactic analysis' (Starosta and Nomura 1986).

I would like to dedicate this book to my past, present, and future students, and especially to those adventurous individuals who have done lexicase dissertations with me. I hope they derived as much benefit out of their experiences as I did, and as the lexicase enterprise did. Although there is only one person listed as the author of this work, each of these students has contributed to its completion, and I would hereby like to gratefully acknowledge all their insights, inspirations, criticisms, encouragement, and hard work.

Finally, apropos of hard work, my special gratitude goes to two people who contributed more materially to the completion of this volume: Louise Pagotto



and Nitalu Sroka, who spent long hours at their keyboards completing the reference section and the graphics respectively after I had flown off for a summer of relaxation and linguistics on the mainland. Mahalo nui loa!

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# 1. Formal properties of lexicase theory

## 1.1 ATTRIBUTES

Lexicase is part of the generative grammar tradition, with its name derived from Chomsky's lexicalist hypothesis (Chomsky 1970) and Fillmore's Case Grammar (Fillmore 1968). It has also been strongly influenced by European grammatical theories, especially the localistic case grammar and dependency approaches of John Anderson (cf. Anderson 1971), his recent and classical predecessors and the word-oriented dependency approaches of Richard Hudson (cf. Hudson 1976, Hudson 1984). Like Chomskyan generative grammar, it is an attempt to provide a psychologically valid description of the linguistic competence of a native speaker. It can be described in a nutshell as a panlexicalist monostratal dependency variety of generative localistic case grammar, as sketched below:

### 1.1.1 Panlexicalist

Lexicase is intended to be a pan-lexicalist theory of grammatical structure (cf. Hudson 1979a, 1979c: 11, 19), that is, the rules of lexicase grammar proper are lexical rules, rules that express relations among lexical items and among features within lexical entries. Sentences are seen as sequences of words linked to each other by hierarchical dependency relations. To take an analogy from chemistry, each word is like an atom with its own valence<sup>1</sup>, an inherent potential for external bonding to zero or more other atoms. A sentence then is like a molecule, a configuration of atomic words each of which has all of its valence bondings satisfied. This means that a lexicon by itself generates the set of grammatically well-formed sentences in a language: each word is marked with contextual features which can be seen as well-formedness conditions on trees, and a well-formed sentence is any configuration of words for which all of these well-formedness conditions are satisfied. For example, a singular common count noun would be marked for the contextual feature  $[+ [+Det]]$ , indicating that the noun must cooccur with a determiner as a dependent sister, and any tree which failed to satisfy this requirement would be flagged as ungrammatical. Consequently, a fully specified lexicon is itself a grammar, even if it is not associated with a single grammatical rule.

A grammar composed only of a list of lexical entries achieves a kind of descriptive adequacy in the sense of Chomsky's Standard Theory (Chomsky 1965: 24), in the sense that it generates the sentences of a language with their

associated structural descriptions. However, it is a rather unsatisfying kind of grammar for people accustomed to thinking of a grammar, or of any scientific theory, as minimally consisting of a set of generalizations. To create a grammar in this more conventional sense from a 'lexicon grammar', it is only necessary to make a list of the generalizations that can be extracted from the internal regularities among contextual and non-contextual features within items and from the inter-item relationships among lexical entries (cf. Starosta and Nomura 1984: 5). This is in fact the approach which is taken in the lexicase framework.

A conventional lexicase grammar then is a grammar of words. It is a set of generalizations about the internal compositions, external distributions, and lexical interrelationships of the words in the language. Proceeding from this basic idea, it is possible to construct a formal and explicit grammatical framework of limited generative power which is capable of stating language-specific and universal generalizations in a natural way.

There are no rules in this framework for constructing or modifying trees, since ('surface') trees are generated directly by the lexicon: the structural representation of a sentence is any sequence of words connected by lines in a way which satisfies the contextual features of all the words and does not violate the *Sisterhead* or *One-bar Constraints* or the conventions for constructing well-formed trees. There are also no rules which relate sentences to each other by mapping one sentence representation onto another, or by deriving both from a common underlying representation. Instead, two sentences are related to each other to the extent that they share common lexical entries standing in identical or analogically corresponding case or dependency relations to one another. Regular patterns of correspondence, such as the symmetric selectional relationships which originally motivated the passive transformation, are stated in terms of lexical derivation rules: the relationship between passive sentences and active sentences is formalized in terms of a lexical rule which derives the head word of a passive clause from the head word of the corresponding active clause. This rule matches the Agent of the active verb with the Means actant of the passive verb, and thereby formally establishes the connection between the subject of the active clause and the *by*-phrase of the passive clause without any need for a transformation.

### 1.1.2 Monostratal

Because lexicase accounts for the systematic relationships among words in sentences by means of lexical rules rather than transformations, a lexicase grammar has only one level of representation (the surface level). Thus it differs from the various Chomskyan grammatical frameworks in power, since there is no distinct deep structure and no transformational rules to relate two levels. This means that it is not possible in a lexicase description to create some arbitrary and perhaps linguistically unmotivated representation for a sentence and then map it onto the actual words by means of transformations; lexicase is less powerful because there is a much smaller class of structural descriptions which can be assigned to a sentence, and therefore a much smaller class of

grammars which can be associated with human language. In this as in some other respects it is similar to Generalized Phrase Structure Grammar (GPSG), which also adopts the view that grammars should be monostratal: 'our work ... has convinced us that the ready acceptance of multistratal syntactic descriptions in earlier generative linguistics was thoroughly undermotivated. The existing corpus of work in GPSG shows that highly revealing systematizations of complex linguistic phenomena can be achieved with the restrictive framework that we adhere to' (Gazdar, Klein, Pullum, and Sag 1985: 10–11).

### 1.1.3 Dependency

Lexicase is also a type of dependency grammar, a system of grammatical representation which, like valency, originated with Lucien Tesnière (cf. Tesnière 1959). Dependency grammar has been implemented in the generative framework by linguists such as David Hays (cf. Hays 1964), Jane Robinson (cf. Robinson 1970) and John Anderson (cf. Anderson 1971), and has been used for example in the analysis of Japanese syntax by Shinkichi Hashimoto (cf. Hashimoto 1934, 1959) and Hirosato Nomura (Starosta and Nomura 1984). Lexicase dependency tree notation derives from John Anderson's dependency case grammar (Anderson 1971) and Engel's dependency valence grammar (Engel 1977), and thus ultimately from the work of Tesnière, while some of the terminology and constraints are adapted from Chomsky's X-bar theory.

### 1.1.4 Generative

Lexicase is generative grammar in the traditional Chomskyan sense. Generative grammar is simply the result of Chomsky's proposal to apply the hypothetico-deductive paradigm of the physical sciences to the study of language. As such, it views grammars as theories which can be falsified on the basis of a confrontation between explicit characterizations (generative grammars) of speakers' linguistic knowledge and the reactions of speakers to predictions made by these grammars. Lexicase shares with the Chomskyan tradition a conception of a grammar as a formal system that characterizes (generates) the infinite set of sentences of a language by describing that part of a speaker's knowledge (linguistic competence) which enables him or her to recognize structurally well-formed sentences of his or her language. That is, it requires that a grammar have psychological reality, but only to the extent of accounting for a speaker's passive knowledge of his linguistic system (competence), not his use of that system (performance). Lexicase also follows Chomsky in viewing the task of writing grammars as a means to the end of constructing a universal theory of innate human linguistic knowledge. It differs from Chomsky's current practice however in that it takes 'generativity' seriously in actually requiring grammatical rules and representations to be expressed formally and explicitly.

### 1.1.5 Case

Lexicase is case grammar in the Fillmorean tradition. It analyzes every nominal constituent (except for predicate nominatives) as bearing a syntactic-semantic relationship to its regent. However, it has evolved away from other Fillmorean case approaches to some extent in its feature-based formalization, in its emphasis on syntactic over semantic criteria for the definition and identification of case relations, and in the requirement that every verb have a Patient in its case frame.

## 1.2 DOMAIN

### 1.2.1 Competence and performance

I am assuming with Chomsky that a generative grammar is an attempt to represent the speaker's linguistic competence, all the information which he must have access to in order to distinguish between well-formed and ill-formed sentences of the language. That is, a grammar is a model of something which is inside a speaker's head; it is intended to have psychological reality.

This assumption raises several questions. One is of course the old mind-body problem: is mind distinct from body? From the fact that I used the phrase 'inside a speaker's head' in the preceding paragraph, the reader can perhaps guess where my personal sentiments lie: I see no justification for positing a 'mind' as distinct from 'body' if 'mind', like 'soul', is intended to be an entity with no physical reality. (Perhaps my physics apprenticeship is showing through here.) If I use the term 'mind' in the present work, it is rather a term for a system of electrochemical linkages and processes in the brain.

### 1.2.2 Language, situation, and semantics

One of the most difficult questions to be decided by any syntactic theory is that of the boundary (if any) between syntax and semantics. Lexicase draws this boundary between syntax-cum-intensional-semantics on the one hand and situational semantics and pragmatics on the other.

Lexicase is grammar, by which I mean that it characterizes the properties of words and the sentences in which they occur, not of the real-world situations to which they may correspond. This does not mean that lexicase renounces meaning, but rather that it is concerned with the meaning directly signaled by the sentence itself, meaning which is characterized by the words, dependencies, and coreference relationships symbolized in the single-level lexicase representation. As stated by Gazdar *et al.* (Gazdar, Klein, Pullum, and Sag 1985: 10):

In a very real sense, the syntactic representations we construct are their own 'logical forms'. Insofar as there are structures defined by our syntax to which no meaning is assigned under the semantics we specify, we claim that those structures describe well-formed sentences that do not mean anything coherent, not that grammaticality is defined by reference to the overall predictions of the syntax and semantics combined.

The result of this minimalist approach is that lexicase grammatical representations tend to be quite spare and semantically unproductive. Consequently, colleagues with more baroque tastes have accused me of pushing all the interesting matter under the semantic rug. They contend that by treating syntax and semantics together, the overall system will be simpler and more compact, while treating them separately as I have will result in two systems which add up to much more machinery. Of course, that speculation may ultimately turn out to be true, but the decline of generative semantics, which made exactly that assumption, leads me to believe that it will not. The decision to separate situational and linguistic semantics is an empirical hypothesis about proper scientific domains. If carving nature at this particular joint produces new generalizations in both of the sundered subdomains, as it has recently begun to do, then lexicase was right; and if doubters can resurrect generative semantics and make it generative enough to compare with lexicase, then we can find out which approach produces better generalizations.

The study of semantics in generative grammar has generally based itself on truth values; two sentences have the same meaning, and hence the same semantic representation, if they have the same truth values.<sup>2</sup> Yet we know that truth values are only relevant to declarative sentences (cf. Gazdar, Klein, Pullum, and Sag 1985: 7). How can we give a truth-value definition of the meaning of a command, a question,<sup>3</sup> a speculation, or a statement about a logically impossible situation?<sup>4</sup> Nevertheless these all have meaning for the speakers, and I know of no linguistic reason to believe that this kind of meaning is any different from the kind of meaning that is associated with declarative sentences. It is this broader kind of meaning which must be the subject matter of linguistic semantics, not some artificial and arbitrary system which has only a partial overlap with the information content of natural language. I will try to show especially in Chapter 4 sections 4.2 and 4.5 that what language actually encodes is not particular situations, but rather speakers' perceptions of real or imagined situations (cf. Grace forthcoming;), which I will refer to (following Fillmore) as PERSPECTIVE.

As philosophers learned long ago, natural language is not entirely logical, and since lexicase is an attempt to represent natural language, it should not be surprising that the linguistic meaning of a sentence as characterized by a lexicase grammar may sometimes not match the meaning assigned by logicians on the basis of truth values. It is therefore possible and normal for two sentences with the same truth values to have different lexicase analyses and thus different linguistic meanings, for example (1a) and (1b), or for a sentence such as (2) with a single lexicase representation and thus a single linguistic meaning to have two distinct interpretations, which could be paraphrased as either (2a) or (2b). This constitutes a claim that logic (in both the mathematical and pre-scientific intuitive senses) has no favored place in human linguistic competence as such, and that the ability to make logical inferences or recognize two sentences as having the same or different truth values is independent of the ability to recognize well-formed sentences in a given language (which is of course why formal logic was devised in the first place).

- (1a) **Mary gave the strudel to John.**
- (1b) **Mary gave John the strudel.**
- (2) **Mary doesn't think John likes his coffee black.**
- (2a) **Mary thinks that John doesn't like his coffee black.**
- (2b) **It is not the case that Mary thinks that John likes his coffee black.**

### 1.2.3 Language and society

Although lexicase grammars are grammars of competence, the linguistic competence characterized by a lexicase grammar is individual rather than group knowledge; a strict lexicase grammar is the grammar of an idiolect. It thus has a much more intimate and immediate psychological reality than integrated linguistic descriptions which profess to describe simultaneously the competence of some arbitrarily chosen group of speakers. Although actual lexicase practice has frequently deviated from this precept, strictly speaking it is not possible to write a psychologically real grammar of a whole language such as English, or of any subvariety of it which has more than one speaker. Where would we look to find the integrated physical system corresponding to, say, 'the grammar of English'? If a grammar must be a model of some real isomorphous physical system, as assumed by lexicase, then only the grammar of an idiolect located in the brain of a single human being is able to characterize a physically specifiable configuration.

If we are looking for physical linguistic reality, we have to turn to the individual native speaker. Where the speaker is, there also is language. Thus lexicase, as a linguistic paradigm which views language as a physical phenomenon, should be focusing on some physical part of an individual speaker, and neurological evidence tells us that the part we want is the human brain.<sup>5</sup> Only the linguistic competence of the individual is psychologically (and ultimately physically) real. 'English' and 'Chinese' are abstractions over ranges of the grammars of arbitrarily selected individual speakers, and as a consequence, a description of 'English' 'or' 'Chinese' is going to be just as arbitrary as the process by which the exemplary speakers of 'English' or 'Chinese' were selected for study. Just to take the question of dialects, for example: which social, regional, and national dialects should be covered in a grammar of English? Is there any non-capricious way of deciding this? Is there any single human being who has internalized all and only the dialects we decide to include? It seems to me that the way to avoid this arbitrariness is to describe the individual's knowledge. The individual is where the next level of linguistic explanation is going to connect up, and an arbitrary non-physical



intermediate level between individual competence and its physiological—and social—bases will merely get in the way.

In this respect, lexicase differs from both Chomskyan grammar and most sociolinguistic approaches (but not all; see Hudson 1980c: 183). The philosophical issue involved is the nature of the reality modeled by a theory. In physics, for example, mass and thermal energy inhere in physical objects, and have no existence apart from them. However, what is the locus of 'the grammar of English'? For Chomskyan grammar, if the question makes sense at all, the answer seems to be that the locus of grammar is the ideal native speaker, while for sociolinguists it must be the community of speakers. But where would we go to look for an ideal native speaker? Whose brain contains all the linguistic information characterized by a 'grammar of English' and no other linguistic information? If it has no physical locus, I maintain that it has no physical reality, and thus is not a legitimate object of study for a hypothetico-deductive science. Richard Hudson has a very nice discussion of this point (Hudson 1984: 31–3) from which I will only quote an excerpt here:

Language is a property of the *individual* . . . the facts only 'exist' in the minds of individuals . . . the place where you look for the data of linguistics is in the individual human being . . . it would be quite wrong to build a general theory of language on the assumption that standard languages are typical . . . Larger aggregates, whether linguistic ('language X', 'dialect X', 'register X') or social ('speech community X') are popular fictions . . . In relation to the goals of transformational linguistics . . . What I reject . . . is the apparent attempt to have it both ways, by preserving the belief that language is a property of the community . . . individuals have minds, but communities do not . . . Accordingly, it makes no sense to advocate a mentalist approach to language if language is a property of a community.

If we replace Hudson's 'mind' with 'brain', then I concur completely.

Note that I am certainly not objecting here to all idealizations *per se*. They are after all ubiquitous and necessary in physics, which I take as the prototype and paragon of the hypothetico-deductive sciences. However, the idealizations employed in physics, such as 'ideal black body' or 'ideal gas', still refer to real invariant properties of real physical objects, which have a locus in space and time. Thus they differ from disembodied idealizations such as 'speech community' and 'ideal speaker-hearer', which do not.

### 1.3 CONSTRAINTS

#### 1.3.1 Why constraints?

Why does a grammar need constraints? Constraints are Good, because they are the content of a theory. An unconstrained theory implies that all things are possible. Such a theory can never be falsified by observations, and thus has no empirical content. A constrained theory on the other hand asserts that certain things are impossible, and can in principle be falsified by finding an instance of the supposedly impossible phenomenon; because a constrained theory can be falsified, then, it has empirical content. The more constraints we can