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Elaine J. Francis



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Gradient Acceptability and Linguistic Theory

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ELAINE J. FRANCIS

OXFORD
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Great Clarendon Street, Oxford, OX2 6DP,
United Kingdom

Oxford University Press is a department of the University of Oxford.
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Published in the United States of America by Oxford University Press
198 Madison Avenue, New York, NY 10016, United States of America

British Library Cataloguing in Publication Data
Data available

Library of Congress Control Number: 2021937207

ISBN 978-0-19-289894-4 (hbk.)

ISBN 978-0-19-289895-1 (pbk.)

DOI: 10.1093/oso/9780192898944.001.0001

Printed and bound by
CPI Group (UK) Ltd, Croydon, CR0 4YY

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General Preface

Oxford Surveys in Syntax and Morphology provides overviews of the major approaches to subjects and questions at the center of linguistic research in morphology and syntax. The volumes are accessible, critical, and up to date. Individually and collectively they aim to reveal the field's intellectual history and theoretical diversity. Each book published in the series will characteristically contain: (1) a brief historical overview of relevant research in the subject; (2) a critical presentation of approaches from relevant (but usually seen as competing) theoretical perspectives to the phenomena and issues at hand, including an objective evaluation of the strengths and weaknesses of each approach to the central problems and issues; (3) a balanced account of the current issues, problems, and opportunities relating to the topic, showing the degree of consensus or otherwise in each case. The volumes will thus provide researchers and graduate students concerned with syntax, morphology, and related aspects of semantics with a vital source of information and reference.

Gradient Acceptability and Linguistic Theory explores fundamental methodological questions about the nature of linguistic data and its ramifications for theoretical linguistics. The data that linguists use for argumentation and theory building in syntax, whether obtained from elicitation with native speakers, corpus analysis, or experimentation, are often not clear-cut, and the author exemplifies this with data from a wide range of languages and investigates the implications of this for different theories of syntax. The results of this inquiry are relevant to scholars across the theoretical spectrum, and the volume constitutes a significant contribution to the series.

Van Valin, Robert D. Jr.
General Editor

University at Buffalo,
The State University of New York
Heinrich Heine University,
Düsseldorf

Acknowledgments

This book could never have been completed without the support of many people. I would first like to thank the current and former graduate students in my lab at Purdue, who have inspired me with their insights and their incredible research: John Hitz, Charles Lam, Ethan Myers, Maria Pritchett, Vanessa Sheu, Carol Zheng, and Josh Weirick. I also thank the students in my Experimental Syntax classes at Purdue, especially the class members from Fall 2018 who provided helpful feedback and discussion of early chapter drafts: Brittlea Jernigan-Hardrick, Jian Jiao, Lauren “Nik” Nikolai, Sharry Vahed, Josh Weirick, and René Zúñiga Argüello. In 2019, I had the privilege to co-teach a mini-course on Experimental Syntax at the Linguistic Institute in Davis, California with Savithry Namboodiripad. I thank the students in that class for their incisive questions and comments, and I especially thank Savithry for teaching me all sorts of things I did not know and for encouraging me on this project.

Diane Brentari met with me during a conference in Chicago in 2014 and suggested that I develop this book idea into a submission for a new linguistics series at the University of Chicago Press. I was sorry when the series did not materialize, but I am grateful to Diane and the other series editors at Chicago for believing in me and helping me get started.

Several colleagues have returned feedback on chapter drafts, without whom this book would be much poorer. Of course, they are in no way responsible for the remaining shortcomings. First and foremost, I am grateful to Tom Wasow. Tom gave me feedback on every chapter. He also met with me numerous times at conferences and over video calls to discuss the book. I have never met a kinder or more generous colleague than Tom. I am also grateful to Edith Moravcsik, who provided helpful comments on several chapters and pointed me to important references. I thank John Goldsmith, Tom Juzek, David Kemmerer, Laura Michaelis, and Savithry Namboodiripad for their feedback on specific chapters. I benefitted greatly from four anonymous reviews, two from the University of Chicago Press and two from Oxford University Press. The first two reviews helped me reorganize the book in a more reader-friendly way and to narrow the focus, while the second two were invaluable for improving the coverage of the literature review, correcting some inaccuracies and inconsistencies, and better developing the main arguments. I am grateful to series editor Robert Van Valin for his valuable feedback and for the amazing opportunity to publish this book in Oxford Surveys in Syntax and Morphology. Finally, I want to thank commissioning editors Vicki Sunter and Julia Steer and everyone at Oxford University Press who has helped put this book through production.

I am grateful for financial support for this project from Purdue University. A fellowship from the Center for Social Sciences in the College of Liberal Arts provided a teaching release in Fall 2015, which allowed me to get started writing. I am grateful to Edith Moravcsik, Tom Wasow, and Peter Culicover for writing letters in support of the fellowship. I received an Aspire grant from the College of Liberal Arts in 2018, which allowed me to hire Josh Weirick as a research assistant. I thank Josh for building the Zotero reference database and creating the bibliography for the first submission. I also thank Dave Zwicky, a professor from Libraries and School of Information Studies, for helping us get started with Zotero. I thank Maria Pritchett for additional assistance with the Zotero database and the Department of Linguistics for funding Maria's position. I am grateful to the Department of English and Purdue University for granting me a sabbatical leave in 2018–19, which gave me the time to complete several chapters. I thank my friend and department head, Dorrie Armstrong, for providing departmental funds to hire assistants to format the final typescript, and for her endless confidence in me during the final stages of the project. I am grateful to Josh Weirick and Amy Hutchinson for completing the formatting work quickly, meticulously, and with good cheer.

I am indebted to my dissertation advisor, Salikoko Mufwene, and committee members Amy Dahlstrom, Jerry Sadock, and the late Jim McCawley for providing incredible intellectual inspiration during my grad school days at Chicago and beyond. Chapters 1 and 8 are for Jim, who opened my eyes to subtle variations in acceptability judgments, inspiring me to eventually pursue this book project. Chapter 2 is for Amy, who brought a little of Berkeley to Chicago and introduced me to constraint-based theories. Chapter 3 is for Jerry, who inspired me with Automodular Grammar and showed me that semantics and pragmatics really matter. Chapter 7 is for Sali, who taught me to embrace the complexities of linguistic data and to be suspicious of simple, elegant explanations. Your influences have been felt throughout the writing process.

I am grateful to my collaborators, who helped me develop the ideas for this book: Jana Häussler, John Hitz, Jessica Huber, Tom Juzek, Charles Lam, Stephen Matthews, Laura Michaelis, Etsuyo Yuasa, and Carol Zheng. This work has also benefitted from discussions with many other colleagues, including Lauren Ackerman, Ann Bunger, Dustin Chacón, Bill Croft, Peter Culicover, Alejandro Cuza, Brian Dillon, Alex Francis, Ted Gibson, April Ginther, Nik Gisborne, Adele Goldberg, Jack Hawkins, Ray Jackendoff, David Kemmerer, Jean-Pierre Koenig, Ryan Lopic, Charles Lin, Maryellen MacDonald, Savithry Namboodiripad, Mary Niepokuj, Fritz Newmeyer, Joanna Nykiel, Felicia Roberts, Tom Wasow, Ronnie Wilbur, and others.

For their incredible support throughout the writing process, I thank my good friends and fellow writing accountability group members, Maren Linett and Jen William. I am also thankful to many other friends and colleagues who encouraged and supported me along the way and helped me find joy and humor when everything was just too much.

I am so thankful for the love and support of my family. My parents, Dan and Reta Jones, have been a constant source of encouragement and have somehow kept me

out of trouble all of these years. My parents-in-law, George and Bettina Francis, and my siblings-in-law Jennifer Liberto and Theo Francis, have cheered for me in every stage of writing. My children, William and Lyriss, have graciously endured my work habits, entertained me with their goofy antics, and cheerfully loaded and unloaded the dishwasher. My husband, Alex Francis, more than anyone, made this work possible with his enduring love, his constant encouragement, and his promise to clean out the basement office as soon as the book goes to press. I dedicate this book to Alex.

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List of Abbreviations

ADJ	adjective
AGT	agent
BCG	Berkeley Construction Grammar
BNC	British National Corpus
C	complementizer
CL	clitic
CNPC	complex noun phrase constraint
COCA	Corpus of Contemporary American English
CP	complementizer phrase
DD	differences-in-differences
DEP-IO	Dependence Constraint on Input–Output Correspondence
D-linking	discourse linking
DO	direct object
ECP	Empty Category Principle
EEG	electroencephalography
EPP	Extended Projection Principle
ERP	event-related potential
EVAL	harmony evaluation
F/A	function-argument structure
fMRI	functional magnetic resonance imaging
GB	Government and Binding
GEN	candidate generation
HPSG	Head-Driven Phrase Structure Grammar
ICE-GB	International Corpus of English Great Britain
intP	intermediate phrase
iP	intonation phrase
IP	inflection phrase
ISC	intransitive subject control
LFG	Lexical-Functional Grammar
MDP	Minimal Distance Principle
ME	magnitude estimation
N	noun
NP	noun phrase
NPI	negative polarity item
OGJ	offline grammaticality judgement
ORC	object relative clause
OT	Optimality Theory
OV	object-verb
PP	preposition phrase
PPE	preposition phrase extraposition
PRAG	pragmatics and information structure specifications
PRO	pronominal determiner phrase without phonological content
RC	relative clause
RCE	relative clause extraposition
RNN	recurrent neural network
S	sentence
SCR	Sentential Complement Ratio
SEM	semantic properties
SOSP	self-organized sentence processing

Spec	specifier
SRC	subject relative clause
SSC	Sentential Subject Constraint
SVO	subject-verb-object
SYN	external syntactic and categorial properties
T	tense
TP	tense phrase
TSC	transitive subject control
TüBa-D/Z	Tübingen Treebank of Written German
V	verb
VAL	valence
VO	verb-object
VP	verb phrase

The problem of gradient acceptability

This chapter introduces the main problem on which this book is focused: the problem of interpreting speakers' judgments of sentence acceptability in relation to theories of grammatical knowledge. Although this problem is not always acknowledged as an important or difficult one, I will argue that it is both important and difficult. It is important because most of the research about grammatical knowledge within the tradition of generative grammar has been supported with data from speakers' intuitive judgments of researcher-constructed sentences. With the introduction of new technologies such as eye-tracking, functional magnetic resonance imaging (fMRI), and electroencephalography (EEG), and with the availability of large electronically searchable corpora of texts and speech, this heavy reliance on sentence judgments is slowly beginning to change. Given the low cost, convenience, and high success rate of this method, however, sentence judgments are likely to remain as the primary means for testing hypotheses about grammatical knowledge for years to come. As such, it is important to reflect on how we are using these judgments in our theory building, and how our interpretation of judgment patterns is potentially affected by particular theoretical assumptions. The problem of interpreting sentence judgments is difficult because such judgments do not and cannot directly reflect grammatical knowledge. Rather, they are subject to the effects of extraneous factors that can, at times, be difficult to tease apart from the effects of grammatical knowledge. These include semantic and pragmatic factors, constraints on sentence prosody, and general cognitive mechanisms involved in language processing. In this book, I explore this problem in the context of linguistic examples involving *gradient acceptability*, in which sentences that share the same or similar structures differ to varying degrees in acceptability. The current chapter first provides an overview of the relation between grammatical knowledge and sentence judgments as it has been understood in generative grammar, and then illustrates the concept of gradient acceptability using several examples from the literature. The chapter concludes by giving a preview of the chapter contents and the major themes of the book.

1.1 Knowledge of grammar and linguistic intuitions

Language users possesses a vast knowledge of grammatical patterns, some of which appear to be highly general, and others of which appear to be highly specific. For example,

English speakers know that articles come before nouns (as in *the book*, as opposed to **book the*), transitive verbs come before their objects (as in *read a book*, as opposed to **a book read*), and finite verbs agree with third person singular subjects (as in *Jane is dancing* as opposed to **Jane are dancing*). At the same time, they know that the preposition *with* allows a gerund clause, as in (1a), but not an infinitival clause, as in (1b), as its complement, and that the verb *have* negates like a lexical verb when preceding an infinitive, as in (2a), despite having a modal-like meaning similar to *ought* (2c).

- (1) a. We're content with the cleaners returning the drapes next week.
b. *We're content with for the cleaners to return the drapes next week.
(McCawley 1998: 121)
- (2) a. Joe doesn't have to wash the dishes.
b. *Joe hasn't to wash the dishes.
c. Joe oughtn't to wash the dishes.

Similarly, English speakers know that matrix questions with *why* must occur with an inverted auxiliary (3a–b), while matrix questions with *how come* must not (4a–b).

- (3) a. Why did I agree to this?
b. *Why I agreed to this?
- (4) a. *How come did I agree to this?
b. How come I agreed to this?

Chances are that as a reader, you are not at this point questioning my assertion that the contrasts between the ‘good’ and ‘bad’ (i.e. well-formed and ill-formed) sentences in (1–4) reflect some kind of grammatical knowledge. Indeed, for today’s linguists and students of linguistics, it is completely normal and conventional to talk about speakers’ knowledge of grammatical patterns in terms of example sentences such as these. This link between ‘good’ and ‘bad’ example sentences and mental knowledge of grammatical patterns is not self-evident, however. It is, rather, based on the assumption that speakers’ intuitions about sentences—that is, their ability to hear or read a sentence and recognize whether it is well-formed or not—reflect their underlying grammatical knowledge. This assumption has been necessary because the grammatical status of sentences such as those in (1–4), which is conventionally indicated by the assignment of ‘*’ where a sentence is ill-formed, has depended primarily on speakers’ intuitive judgments. This idea that intuitive judgments provide access to grammatical knowledge has been a standard assumption in modern syntactic research within the generative tradition. To understand why this is so, it is necessary to consider why the use of intuitions has been so important to the development of modern generative theories, and how the reliance on such judgments has been justified.

As the founder of modern generative grammar, Noam [Chomsky \(1965; 1986b\)](#) characterized grammar as a mental entity—a form of implicit knowledge in the mind

of a speaker. In doing so, Chomsky broke with the American structuralist tradition of the time, according to which grammar was understood as a system of social conventions, and the task of a linguist was, as Leonard Bloomfield put it, to “describe the speech habits of a community” (Bloomfield 1933: 37). According to Bloomfield, a linguist “must record every form he can find and not try to excuse himself from this task by appealing to the reader’s common sense or to some other language or to some psychological theory, and above all, he must not select or distort the facts according to his views of what the speakers ought to be saying” (Bloomfield 1933: 38). Besides urging linguists to be meticulous, avoid their own biases, and take a descriptive rather than a prescriptive approach, Bloomfield specifically warned against the dangers of a mentalistic view of language, which “may tempt the observer to appeal to purely spiritual standards instead of reporting the facts” (Bloomfield 1933: 38). He gave the hypothetical example of a linguist reporting that “combinations of words which are ‘felt to be’ compounds have only a single high stress” and criticized this approach on the grounds that “we have no way of determining what the speakers may feel” (Bloomfield 1933: 38). This is not to say that Bloomfield and other American linguists of the time never relied on their own intuitions or the intuitions of their language consultants. However, Bloomfield upheld an objective approach to linguistic description based on observations of linguistic behavior as the ideal practice.¹ Chomsky, by contrast, conceived of grammar as fundamentally psychological rather than social or behavioral. Accordingly, the task of a linguist was “discovering a mental reality underlying actual behavior” (Chomsky 1965: 4). He referred to this mental reality as *competence*, which he clearly distinguished from actual language use, or *performance*. As Chomsky (1965: 4) acknowledged, this distinction was closely related to the distinction between *langue* ‘language system’ and *parole* ‘speech,’ as proposed by the Swiss linguist Ferdinand de Saussure in *Cours de Linguistique Générale* (Saussure 1916). Chomsky’s idea of competence differed from Saussure’s *langue* in at least two important respects, however. First, for Saussure, *langue* was a collective entity belonging to a speech community, rather than a mental entity belonging to each individual. To the extent that *langue* existed in an individual’s mind, it existed only in a partial, imperfect form: “the language is never complete in any single individual, but exists perfectly only in the collectivity” (Saussure 1983: 13). Second, while Saussure’s *langue* was an interconnected system of linguistic signs, Chomsky’s competence was “a system of generative processes” (Chomsky 1965: 4). As Newmeyer (1996: 25) observes, Chomsky put syntax—the system for generating an infinitively diverse variety of novel sentences by means of productive processes—into the forefront of linguistic inquiry, highlighting the creative aspect of language more so than his predecessors had done.

Chomsky was critical of traditional and structuralist grammars in that they tended to focus on exceptions and irregularities but “provide only examples and hints concerning the regular and productive syntactic processes” (Chomsky 1965: 5).

¹ Bloomfield (1933) occasionally used “*” to mark ill-formed structures, and surely made use of his own and others’ intuitive judgments. However, he explained in a footnote that “*” is used to mark forms that are “theoretically posited” but unattested (Bloomfield 1933: 516), thus emphasizing the importance of attested forms.

To overcome these limitations, he saw as essential the development of an explicit formal metalanguage through which syntactic rules could be formulated to predict the set of well-formed sentences. Hence, the permissible structures of a language (such as in 1a, 2a, 2c, 3a, and 4b) should be licensed by the appropriate formal rules, while logically possible but non-permissible structures (such as in 1b, 2b, 3b and 4a) should be excluded.² How should this distinction between permissible and non-permissible structures be justified? Chomsky (1965: 19–20) acknowledged a variety of potential sources of information, including observations of actual linguistic behavior and experimental procedures, but asserted that the most useful and decisive evidence came from the intuitive judgments of speakers: “The structural descriptions assigned to sentences by the grammar, the distinctions that it makes between well-formed and deviant, and so on, must, for descriptive adequacy, correspond to the linguistic intuition of the native speaker (whether or not he may be immediately aware of this) in a substantial and significant class of crucial cases” (1965: 24).

Now more than fifty years later, the research program of generative grammar encompasses a wide range of distinct formalisms and theoretical perspectives, all of which differ substantially from the proposals put forth in Chomsky’s early work. Regardless of their differences, however, practitioners of generative grammar have remained committed to the study of implicit knowledge, or competence, and have continued to emphasize the creative abilities of language users. Furthermore, intuitive judgments have remained as their primary data source. As Schütze (1996: 2) observes, this heavy reliance on intuitive judgments, which are more commonly known today as ‘acceptability judgments,’ has been well justified, given the aims of generative theories. Most importantly, acceptability judgments provide a simple method for showing minimal contrasts between sentences hypothesized to differ in grammatical status due to the presence or absence of a particular structural property (e.g. the syntactic category of the complement of *with* in (1a–b)). Data from spontaneous discourse, by contrast, do not contain direct evidence for structures that fail to occur, making it difficult to distinguish between grammatical but rarely produced sentence types and ungrammatical sentence types. Furthermore, this reliance on acceptability judgments has been fruitful. Practitioners of generative grammar have been able to achieve remarkable success in elucidating the human capacity for language, providing both detailed analyses of the syntactic patterns of individual languages as well as broader generalizations that apply across typologically diverse signed and spoken languages.

The continued reliance on intuitive judgments has not been without controversy, however. From early on, linguists and psychologists have expressed skepticism over the validity of intuitive judgments for discovering facts about the underlying competence grammar. In part, these concerns were due to the informal and uncontrolled

² This formal metalanguage initially took the form of string rewriting rules which followed the mathematical framework of Emil Post (1943). According to Pullum (2010: 242), Chomsky acknowledged Post’s ideas but never cited his technical papers. Pullum notes that Chomsky (1956) cited Post’s proposals indirectly through Rosenbloom (1950). Thus, the formal basis for generative grammar followed from Post (1943), while the application to linguistic theory was an innovation.

manner in which judgments were typically collected, either through interviews with a small number of speakers or through the researcher consulting their own intuitions. In cases where speakers disagreed with each other as to the status of a particular sentence type, informal methods provided no systematic method of resolving data disputes. Labov (1972: 106) laments: “It is unfortunate that this proliferation of the intuitive data has not been accompanied by a methodological concern for the reduction of error, or a search for intersubjective agreement.” Other concerns were regarding the nature of judgments themselves as a type of metalinguistic performance which may be affected by many other factors besides speakers’ underlying competence grammar—a problem which Chomsky himself recognized (1965: 11). For example, pointing to the secondary status of linguistic intuitions as imagined episodes of language use, Levelt (1972: 22) states: “It is not at all obvious that intuitions will reveal the underlying competence.” These and other similar criticisms inspired numerous empirical studies testing the validity of intuitive judgments (Greenbaum 1976; Nagata 1988; Snow and Meijer 1977; Spencer 1973; Vetter, Volovecky, and Howell 1979), which in turn inspired the development of more rigorous standards for data collection.

In the most comprehensive and important work on this topic to date, *The Empirical Base of Linguistics*, Schütze (1996) provides a detailed review of these early criticisms and empirical studies of linguistic intuitions. His approach is fair and even-handed, pointing out the flaws and limitations of previous empirical studies on linguistic intuitions, while acknowledging the genuine insights and highlighting the real problems which these studies revealed, and with which linguists who rely on acceptability judgments ought to concern themselves. While agreeing that judgments can be affected by a variety of factors related to the speaker’s background, the task, the sentence materials, and the judgment process, Schütze argues convincingly that judgment data, when properly controlled, provide a rich source of information about grammatical knowledge. He points toward some exemplary studies that had already been conducted at the time (Cowart 1994; Snyder 1994), lays out a set of practical suggestions for collecting judgment data by means of well-controlled experimental tasks, and outlines a proposal for a psychological model of sentence judgments. Importantly, he considers how the data can best be interpreted in the face of the common problem that Labov (1972) and many others had noted: variation within and across speakers. Essentially, Schütze argues in favor of using carefully chosen speaker populations and carefully controlled sentence materials to eliminate known confounds (e.g. regional dialect, lexical frequency), and statistical techniques to identify systematic variation and factor out random variation in the results. When the expected systematic variation is confirmed through tests of statistical significance, for example a systematic difference in acceptability between sentences like (2a) and (2b) *as averaged across multiple speakers and across multiple sentence sets with different lexical content*, this can be taken to provide evidence of grammatical knowledge. When unexpected systematic variation is discovered, for example a difference in acceptability between two sentence types hypothesized to be fully grammatical, it can then be studied separately: “[Extraneous factors]

might add sufficient noise to obscure actual grammatical phenomena, but they cannot systematically change the pattern of results unless they too are stable. If so, they can be studied directly and then factored out..." (1996: 121). Finally, Schütze (1996: 180) argues in favor of using data from other sources in addition to sentence judgments, such as corpus data from spontaneous speech and data from other types of psycholinguistic experiments, in order to provide converging evidence for a particular grammatical construct.

Over the past 25 years, Schütze's (1996) proposals for rigorous data collection techniques, along with similar proposals elaborated by Cowart (1997) in his foundational textbook *Experimental Syntax*, have failed to cause any sweeping methodological revolution in syntax. The vast majority of studies in recent years have continued to use informally collected judgments. These groundbreaking proposals have, however, influenced a growing minority of linguists to begin to apply such techniques to the study of syntax. These empirical studies have been successful in showing quantitative support for (or in some cases, against) numerous theoretical constructs in syntax (Myers 2009). Consequently, the strong criticisms of intuitive judgments, such as those expressed by Labov (1972) and Levelt (1972) have died down. Although we still lack any established psychological model of the judgment process (Lewis and Phillips 2015: 42), it is now generally accepted, at least among those linguists who see generative grammar as a worthwhile research program, that intuitive judgments *can* be a reliable and valid source of data for building theories of grammatical knowledge. Currently two major controversies concerning acceptability judgments persist. The first concerns the extent to which traditional informal methods of data collection are acceptable for supporting theories of syntax. While the majority of syntax researchers find them to be generally acceptable for most purposes, a vocal minority argue that well-controlled experimental methods are almost always to be preferred (Edelman and Christiansen 2003; Featherston 2007; Gibson and Fedorenko 2013; Wasow and Arnold 2005). The second concerns how to tease apart the different factors *in addition to grammatical knowledge* that may affect speakers' judgments of sentences. It is my purpose in this book to explore the second controversy, with some implications for the first as well. In particular, I will explore how linguists can distinguish grammatical knowledge (specifically, knowledge of syntax, to the exclusion of phonology and semantics) from other factors that affect speakers' intuitions in cases that are less clear than those introduced so far. My focus will be on a few factors that are easily confusable with syntactic knowledge, namely knowledge of semantic, pragmatic, and prosodic constraints, and effects of general cognitive mechanisms such as working memory capacity. I will explore these issues in the context of linguistic examples involving *gradient acceptability*, in which sentences that share the same or very similar structures differ in acceptability to varying degrees. In the following section, I will introduce the concept of gradient acceptability and discuss two possible ways of explaining it, using Chomsky's (1965) example of selectional restrictions.

1.2 Gradient acceptability: the case of selectional restrictions

Chomsky (1965) recognized that speakers' intuitions are not always clear-cut, and that for certain types of grammatical phenomena we must recognize different degrees of acceptability. For example, he identifies three “degrees of deviance” for the following sentences, with (5a) being the strongest deviation from a normal grammatical sentence and (5c) being the weakest deviation. I have included a fully grammatical example in (5d) for the sake of comparison.

- (5) a. Sincerity may virtue the boy.
 b. Sincerity may elapse the boy.
 c. Sincerity may admire the boy.
 d. Sincerity may frighten the boy.

At least superficially, all three sentences in (5a–c), from Chomsky (1965: 152), conform to the typical structure of a transitive clause in English as in (5d), but each deviates in some way from the norm. While (5a) violates the requirement for a verb to act as head of VP (*virtue* is a noun), and (5b) violates the strict subcategorization of the verb *elapse* (which is normally intransitive), (5c) violates only the selectional feature of the transitive verb *admire* (which normally requires a sentient subject). To account for these differences in acceptability, Chomsky considers two possibilities: (1) that all three sentences are ungrammatical and that therefore we must recognize different “degrees of grammaticality” (1965: 153); and (2) that (5a–b) are ungrammatical, while (5c) is grammatical (i.e. syntactically well-formed) but deviant in its combination of semantic properties. In favor of the second option, he notes that sentences which violate selectional restrictions can often be interpreted figuratively, given an appropriate context (1965: 149). For example, (5c) could involve personification of the abstract concept of sincerity. However, he ultimately settles on the first option—including selectional features within the syntax—citing examples in which selectional features such as animacy appear to cause structural deviance (e.g. **the book who you read*). He proposes a hierarchy of dominance to account for the observed differences in degree of deviance in sentences like (5a–c): “features introduced by strict subcategorization rules dominate features introduced by selection rules, and...all lexical features are dominated by the symbols for lexical categories” (1965: 153). Incidentally, McCawley (1968) rejects Chomsky's proposal and instead argues in favor of the first option, in which sentences such as (5c) are syntactically well-formed, and selectional features are purely semantic in nature.

The sentences in (5a–d) exemplify the key concept of *gradient acceptability*. While example (5a) is clearly ill-formed, and example (5d) is clearly acceptable, examples (5b–c) are intermediate in acceptability, meaning that speakers are likely to judge them as neither fully acceptable nor fully unacceptable. Often such sentences are marked with ‘?’ or ‘??’ instead of ‘*’ in studies of syntax. Significantly, examples (5a–d) appear to share the same grammatical structure, in this case the structure of a simple

transitive clause, but differ incrementally in terms of speakers' judgments of their acceptability. Chomsky's (1965) discussion of these examples illustrates two possible types of explanations, which, following Phillips (2013a: 157), I will refer to as *formal syntactic* and *non-syntactic*.³ A formal syntactic explanation requires reference to some properties of the sentence that are purely structural, such as a syntactic category (e.g. verb), feature (e.g. nominative case), or relation (e.g. subject of). A formal syntactic explanation does not require that structural features be the *only* thing accounting for the deviance of the less acceptable sentence, however. In (5a), for example, it is clear that there are semantic anomalies, in addition to the syntactic category error. But Chomsky's explanation for the deviance of (5a–c) crucially refers to formal syntactic features. A non-syntactic explanation, by contrast, does not require reference to any syntactic property of the sentence. In this case, Chomsky considered (but rejected) an explanation in which selectional features, such as animacy, are stated only at the level of semantics. McCawley (1968) later took up this suggestion and developed a purely semantic account of selectional restrictions. Thus, McCawley (1968) represents a non-syntactic account of selectional restrictions, or more specifically, a semantic account.

Throughout the history of generative grammar, non-syntactic accounts—especially involving semantics and pragmatics—have been proposed as an alternative to formal syntactic accounts of certain phenomena (e.g. Erteschik-Shir and Lappin 1979; Ginzburg and Sag 2000; Jackendoff 1992; Levinson 1987, 1991; Oshima 2006). More recently, non-syntactic accounts involving working memory capacity or other general cognitive mechanisms have become more common, especially with respect to phenomena involving long-distance dependencies (Chaves 2013; Goldberg 2013; Hofmeister and Sag 2010; Hofmeister et al. 2013). In the following sections, I will discuss some additional examples of gradient acceptability with the aim of briefly introducing the major types of explanations for contrasts in acceptability that have appeared in the literature.

1.3 Formal syntactic explanations: superficial similarities can mask underlying structural differences

A formal syntactic explanation for a contrast in acceptability says that the less acceptable sentence differs from the more acceptable sentence according to some crucial syntactic property, with the less acceptable sentence violating a grammatical constraint. The examples I am considering here are distinctive in that the contrasting sentences appear, at least superficially, to share the same grammatical structure.

³ Following the suggestion of an anonymous reviewer, I have replaced Phillips's original term, *reductionist*, with a more neutral term, *non-syntactic*. This avoids the ambiguity and negative connotations associated with the term *reductionist* while maintaining the two-way distinction that Phillips used. This two-way distinction is not intended to detract from the individual importance of semantic, pragmatic, prosodic, or processing-based factors but rather reflects the focus of the current book, which is to explore the implications of gradient judgment data for theories of syntax and notions of syntactic well-formedness.

It is precisely for these types of cases that non-syntactic accounts become plausible, and that formal syntactic accounts become especially tricky. The example given in (6) illustrates this phenomenon with respect to the constraint commonly known as a comp-trace or *that*-trace violation. The status of (6a) is uncontroversial: it is an acceptable sentence in which the relativized element *which* functions as the subject of the complement clause. Assuming a traditional movement-based analysis, *which* moves from its original position and leaves behind a trace, as indicated by ‘__’. Example (6b) illustrates the same type of relative clause formation, but with an overt complementizer *that* introducing the complement clause. This is an example of a classic comp-trace violation, resulting in ungrammaticality and degraded acceptability as compared with (6a). Example (6c) is the same as (6b), except that an adverbial PP *for the most part* is added following the complementizer *that*, causing the sentence to again become more acceptable. This amelioration effect (i.e. the increase in acceptability associated with the addition of an adverbial phrase) has been confirmed experimentally by Sobin (2002: 543), using an acceptability rating task administered to 23 participants using slightly different sentence materials (involving interrogatives with comp-trace violations rather than relative clauses).

- (6) a. These are all ideas which I think __ should be easy to implement.
 b. *These are all ideas which I think that __ should be easy to implement.
 c. These are all ideas which I think that for the most part __ should be easy to implement.

Various syntactic analyses have been proposed to account for comp-trace violations as in (6b) (Chomsky 1981; Chomsky and Lasnik 1977; Culicover 1993; Pesetsky 1982; Stowell 1981). Many of them depend on some version of the Empty Category Principle (Chomsky 1981; Hornstein and Weinberg 1995), which requires that a trace in subject position be properly governed by a coindexed antecedent in a higher position. Comp-trace effects as in (6b) occur because an overt complementizer, such as *that*, cannot itself act as an antecedent and blocks government by the antecedent of the trace (*which*), leaving the trace in subject position unlicensed. For a grammatical sentence such as (6a), the null complementizer fails to block proper government by the coindexed antecedent. Under this type of account, it is not obvious why a sentence like (6c), which also appears to contain a comp-trace violation, should be judged as more acceptable. A few studies have explicitly addressed this issue, only one of which I will consider here. (For ease of exposition, I am omitting some of the technical details.) Sobin (2002) proposes that null complementizers but not overt complementizers have properties allowing them to license a trace in subject position, resulting in the observed contrast between (6a) and (6b). For a sentence such as (6c), however, the overt complementizer *that* merges with the adverbial PP. The resulting structure contains a null complementizer in head position followed by *that*+PP in an adjunct position. Thus, the subject trace in (6c) is licensed by the null complementizer just as it is in (6a), and

only (6b) contains any comp-trace violation. In more general terms, the presence of the adverbial phrase in (6c), which might appear to be irrelevant to the licensing of the subject trace, actually changes the structure in a crucial way, according to [Sobin's \(2002\)](#) analysis.

1.4 Prosodic explanations: ill-formed prosodic structures may be confusable with syntactic rule violations

Phenomena commonly believed to be syntactic in nature have occasionally been analyzed as instead involving constraints on prosodic structure. Again considering the case of comp-trace violations in English and their mitigation by the addition of an adverbial phrase, [Kandybowicz \(2006\)](#) presents an alternative to the Empty Category Principle and other syntactic explanations that have been proposed. Under this analysis, comp-trace sentences do not violate any syntactic rules but instead show an ill-formed prosodic contour: “In English, the sequence $\langle C_0, \text{trace} \rangle$ is illicit when C_0 and trace are adjacent within the same prosodic phrase and C_0 is aligned with a prosodic phrase boundary” ([Kandybowicz 2006](#): 223). Here I repeat the examples from (6a–c), this time showing the relevant prosodic boundaries. Following the original notation, iP indicates Intonation Phrase and intP indicates Intermediate Phrase ([Kandybowicz 2006](#): 223).

- (7)
- a. These are all [iP ideas which I think __ should be easy to implement].
 - b. *These are all [iP ideas which I think [intP that __ should be easy to implement]].
 - c. These are all [intP ideas which I think that] [iP for the most part] __ [intP should be easy to implement].
 - d. These are all [iP ideas that __ should be easy to implement].

According to this analysis, the addition of an overt complementizer, as in (7b), introduces an intermediate prosodic boundary, causing an illicit prosodic structure in which the intermediate boundary is followed by an overt complementizer and a trace. However, the addition of an adverbial PP, as in (7c), repairs the prosody of the sentence by introducing an additional prosodic phrase before the trace, and therefore preventing the type of prosodic structure in (7b) from occurring. As [Kandybowicz](#) acknowledges, this solution is of the same flavor as the filter-based approach of [Chomsky and Lasnik \(1977\)](#), who proposed a simple constraint barring an adjacent complementizer and trace. The difference here is that the constraint on adjacency is stated at the level of prosody, leaving unacceptable sentences such as (7b) syntactically well-formed. This solution also accounts for the acceptability of simple relative clauses such as in (7d) in terms of prosody, claiming that even though there is an adjacent complementizer and trace, there is no prosodic boundary before the complementizer.

1.5 Semantic explanations: semantic anomalies may be confusable with syntactic rule violations

We have seen that [Chomsky \(1965\)](#) suggested and then rejected a purely semantic explanation of selectional restrictions. Because of the undeniably close relationship between structure and meaning, the division of labor between the syntactic and semantic components of linguistic knowledge has been one of active controversy throughout the history of generative grammar. As I will argue in Chapter 2, this division depends largely on one's theoretical assumptions regarding the degree of isomorphism between syntax and semantics. For now, I will provide one additional example of a semantic explanation for acceptability contrasts often assumed to reflect a syntactic difference. Starting with [Chomsky \(1973\)](#), the standard analysis of examples such as (8a) has been that the verb *believe* takes an infinitive clause *Chris to be a spy* as its complement. This contrasts with the analysis of similar sentences such as (8b), in which *Chris* is the object of the matrix verb *persuade*, and the infinitive clause *to be a spy* takes a null (PRO) subject which is co-referential with *Chris*. This type of analysis accounts for the contrast in acceptability between sentences like (8c) and (8d) as being due to this difference in structure. For example, [Chomsky \(1981: 37\)](#) attributed this contrast to one component of the Projection Principle, which required that elements in object position should always receive a semantic role (theta role) in that position. Because *there* is an expletive element (i.e. is non-referential) and does not receive any semantic role, it should not occur in an object position. For this reason, (8d) is ungrammatical. Such a problem does not apply to (8c), however, as long as *there* resides in the subject position of the infinitive clause.

- (8) a. Pat believes Chris to be a spy. ([Pollard and Sag 1994: 112](#))
 b. Pat persuaded Chris to be a spy.
 c. Pat believes there to be a problem.
 d. *Pat persuaded there to be a problem.

[Pollard and Sag \(1994: 112–23\)](#) are critical of this type of analysis, on the grounds that it fails to straightforwardly account for the numerous object-like properties of the NP following the verb *believe*, which had under earlier transformational accounts been treated as the effect of a transformation of subject-to-object raising (i.e. moving the subject NP of the infinitive clause up into object position) ([Postal 1974](#); [Rosenbaum 1967](#)). Pollard and Sag do not themselves adopt a raising analysis, but instead argue for a purely semantic account of contrasts such as the one in (8c–d). They claim that sentences like (8a) and (8b) share the same syntactic structure (in which *Chris* is the object of the matrix verb), but differ in semantic content (1994: 122). A sentence such as (8d) is semantically ill-formed because existential *there* does not refer to any entity which would be capable of being persuaded, whereas *Chris* does. A sentence such as (8c) is acceptable because the verb *believe*, unlike the verb *persuade*, does not impose any semantic requirements on the NP in object position. While proponents of both

types of analysis would agree that there is a semantic anomaly in (8d), Pollard and Sag (1994) recognize *only* the semantic anomaly, whereas Chomsky (1981) posits a syntactic rule violation which correlates with the semantic anomaly. Pollard and Sag's (1994) analysis is therefore non-syntactic in our sense.

1.6 Pragmatic explanations: grammatical sentences may appear ill-formed in an inappropriate discourse context

Similar to semantic explanations for gradient acceptability, pragmatic explanations propose that variations in the acceptability of structurally similar sentences are due to factors in the discourse context rather than syntactic rule violations. Ward et al. (1991) present such a pragmatic account of the phenomenon known as 'outbound anaphora'. Their analysis is presented as an alternative to several previous analyses, starting with Postal (1969), which treat the reduction in acceptability for sentences such as (9b) as being due to a syntactic rule violation. According to Postal (1969), a personal pronoun, such as *its*, cannot take a morpheme in a word-internal position as its antecedent due to a syntactic constraint on anaphora, i.e. pronoun-antecedent relations. Because *coffee* is part of a compound in (9b), it cannot act as an antecedent of *its* and the sentence is unacceptable under such an interpretation. In (9a), this problem does not arise, since *coffee* is an independent word acting as the complement of a preposition.

- (9) a. Drinkers of *coffee* tend to enjoy *its* taste.
 b. **Coffee* drinkers tend to enjoy *its* taste. (adapted from Postal 1969: 230)
 c. At the same time as *coffee* beans were introduced, the Arabs made changes in *coffee* preparation that greatly improved *its* flavor. (Ward et al. 1991: 452)
 d. *Changes in *coffee* preparation greatly improved *its* flavor.

In defense of their pragmatic account of this type of anaphora, Ward et al. (1991) demonstrate that the supposed rule against word-internal antecedents is routinely violated in discourse, citing the example in (9c) (from a book about coffee and tea) and a number of similar examples from spontaneous speech and from various written sources. They propose that pronouns refer to discourse entities rather than linguistic antecedents. While a linguistic antecedent can help evoke the relevant discourse entity, there is no necessary syntactic relationship between the pronoun and its linguistic antecedent. In this view, outbound anaphora is pragmatically infelicitous in those cases for which the discourse entity is not sufficiently accessible from the context. In (9a), *coffee* has independent reference, making it immediately accessible to pronominal co-reference, whereas in (9b), *coffee* acts as a word-internal modifier, making it less accessible. In (9c), although *coffee* still acts as word-internal modifier, the context evokes coffee as a discourse topic. While there is no independent noun phrase to act as the antecedent of the pronoun *its*, the discourse entity 'coffee' is, apparently, sufficiently accessible. If we remove part of the facilitating context, as in (9d), we can see