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The Routledge Handbook of Historical Linguistics provides a state-of-the-art survey of this well-established field of linguistics. Thanks to recent technological advances and the rise in availability of large-scale datasets, the importance of diachrony as a key to understanding human language has been reinforced. This Handbook unites an international group of scholars with expertise in a range of fields relating to the study of language change, and their chapters:

- include an overview of the main current and critical trends
- outline the methods which underpin current work
- examine the relationship between the diachronic and synchronic study of the topic
- provide models of language change
- incorporate examples from primary data
- highlight the importance of historical linguistics for other subfields of linguistics and other disciplines.

Focusing on the synthesis of work on synchrony and diachrony and bringing together diverse aspects of work that relate to language change, *The Routledge Handbook of Historical Linguistics* is essential reading for researchers and postgraduate students working in this area.

Claire Bowern is Associate Professor of Linguistics at Yale University.

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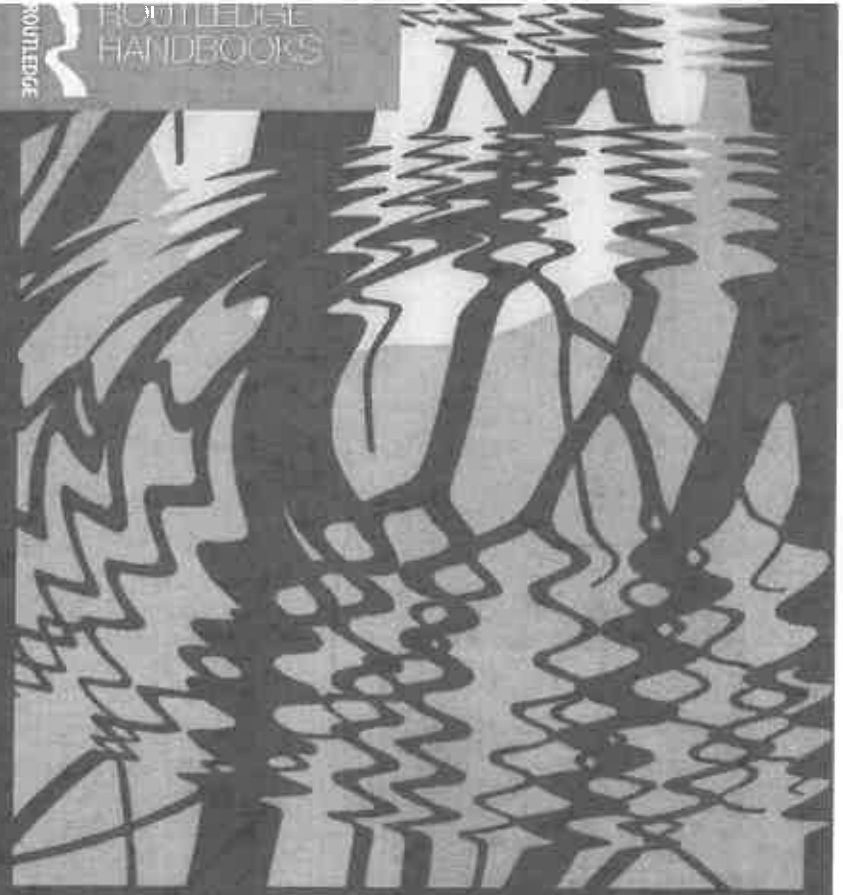

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Editors' acknowledgements

This handbook, aiming to reflect both the state of the art and future directions of historical linguistics, has only been possible through the efforts of many different people. First and foremost we would like to acknowledge the authors, whose contributions have truly shaped the volume, and who have responded patiently to both deadlines and delays. We would also like to thank our editorial board of Nigel Vincent, Joseph Salmons and Johanna Nichols, who have provided advice and support from the very beginning of the project, and have also significantly helped to shape the final product. We are also grateful to Simon Greenhill, Jennifer Hendriks, Jay Jasanoff and Luisa Miceli, who commented on a version of our introductory chapter, and to Nigel Vincent, Joe Salmons and Malcolm Ross, who commented on earlier versions of other chapters in the volume.

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Editors' introduction

Foundations of the new historical linguistics

Claire Bowern and Bethwyn Evans

1 Introduction[1]

Historical linguistics is currently undergoing something of a renaissance.[2] Though diachrony has always been important to the study of language, we see not only an increasing appreciation for the insights that language change can provide for synchronic fields such as syntax and phonology; we also see an increasingly important role for linguistic data in more general studies of the past, with linguistics taking its place alongside other core '(pre)historical' disciplines such as archaeology and genetics.

The current volume reflects this shift. The contributions describe the state of the art, major debates within the field, and the role of linguistics in the study of the past. In compiling this *Handbook*, contributors were invited to show how their subfield of historical linguistics contributes to our knowledge of language change more broadly. As editors, we are concerned to highlight the way in which the study of language change is important for linguistics as a whole. We were also mindful of the growing importance of data from language in studies of the past through genetics, archaeology, and anthropology, as well as the way in which linguistics can contribute to knowledge of evolutionary theory. Lastly, we were concerned to provide a bridge between sub-disciplines of historical linguistics: we do not currently have a 'general theory' of language change, and as the field has become more specialised and we learn more about change in individual areas, it becomes more difficult to relate that knowledge back to change as a whole. In this introduction, we present an overview of the current state of the field. We examine the extent to which historical linguistics has a general theory of change, and whether such a theory is either possible or desirable (sections 2 and 3). In doing so, we place special emphasis on historical linguistics as an 'evolutionary' theory (section 2). We survey recent important debates within the field (section 4). Finally, we summarise the chapters in the volume (section 5).

We view historical linguistics as having three very different lines of inquiry. We can treat language change as a way to explore: (a) language and its structure; (b) human (pre)history; and (c) human cognition and psychology. Firstly, we can, of course, study language change on its own terms. Many handbooks of historical linguistics have focused on this, and the standard textbooks in historical linguistics (Campbell 2004; Crowley and Bowern 2010; Fox 1995; Hock and Joseph 1996; Ringe and Eska 2013; Trask 2003, among others) all devote

much attention to the types of changes which we find in the different domains of language, often with little reference to external factors such as physiology, psychology, speaker biases, or social factors (see further section 3.3).

Language also gives us insights into other areas of study. On the one hand, *language is a tool for investigating the past*. Just as past cultures have left traces in the archaeological record, we can recover parts of prehistory through current languages: through language distribution, through correspondences among related languages, through the study of loan words, and so on. In this case, language serves as a proxy for the populations who speak it. **Epps**[3] makes this point in her discussion of the use of language in studying material culture, while **Heggarty** and **Hale** discuss some of the difficulties in treating language as a proxy for other aspects of human organisation.

Language is also *a tool for investigating the mind* (Hruschka *et al.* 2009) and historical linguistics provides useful data here too. If linguistic organisation does indeed reflect more general cognitive processes (see **Bybee and Beckner**), then empirical data on language change can shed light not only on speakers' linguistic behaviour, including aspects of language and language use that speakers pay attention to (cf. Maiden 2005), but also on other more general aspects of their cognitive behaviour. This can be seen, for example, in the types of constructions that are commonly grammaticised in language (Evans and Levinson 2009), and also in the kinds of constructions that are conservative (or stable) across time and space (see **Wichmann**, Wichmann and Holman 2009). At least, language change tells us something about the behaviour of the language faculty (change is part of universality). This has been underplayed by research programmes that concentrate solely on the individual, and on the idea that because speakers have no access to the history of their language, diachronic information is irrelevant to our understanding of how language works. While we take the point that speakers do not know the history of their language(s), there are many sources of evidence that speakers do not have access to – spectrograms, for example – which are nonetheless very useful in studying aspects of linguistic theory.

Previous handbooks of historical linguistics, such as Joseph and Janda (2003) and Luraghi and Bubenik (2010), have concentrated on the state of the art within historical linguistics, but have provided less discussion of the relevance of historical linguistics to, and beyond, the rest of the field. For example, although the introduction to Joseph and Janda (2003) is a wide-reaching overview about the nature of change and the problems of using language to study the past, the contributions to that volume are mostly stand-alone chapters firmly focused on different subfields of historical linguistics. Luraghi and Bubenik's (2010) excellent introduction focuses on the history of the field, the sources required to do research in historical linguistics, as well as the evolution of writing systems (as they subtitle it: "history, sources, and resources"). One exception is the contributions to Chambers *et al.*'s (2001) *Handbook of Language Variation and Change*, however, even here there is an apparent divide between chapters focused on variation and those focused on change (though with some exceptions, such as Fought [2001]). There have also recently appeared several volumes focusing on language change within particular subfields, most notably Jonas *et al.* (2011) and Yu (2013). In this introduction, and in the volume as a whole, we discuss models of language change from several perspectives, and the ways in which they complement and contrast with each other. That is, we place a special emphasis on the links between our field and others, and between synchronic and diachronic studies of language.

Despite several hundred years of work in the field, a general theory of why and how languages change remains elusive. It is telling that the questions that motivate this volume (and are explicitly addressed in several of the chapters) are the very same ones asked in

Weinreich, Labov and Herzog (1968). They (1968: 98) argued that the structural theories of language prevalent in the 1960s had "saddled historical linguistics with a cluster of paradoxes" that needed to be overcome in order to develop a theory of language change (cf. Kiparsky on the role of theory in historical linguistics). Their article was a significant step towards such a theory in that it explored the "empirical foundations" of change through five questions that any theory would need to account for (Weinreich *et al.* 1968: 100ff, 183ff):[4]

1 What are the *constraints* on the "set of possible changes and possible conditions for change?"
2 How can the *transition* or transfer between linguistic states be explained in a way that accounts for the fact that all the while people continue to talk to each other?
3 How is change *embedded* within the linguistic and social structure of language and associated, non-randomly, with other changes?
4 What are the subjective correlates of the layers of variables within a heterogeneous structure in which change is *evaluated*?
5 What factors account for the *actuation* of change in a particular language at a particular point in time?

These questions still resonate within historical linguistics, forming an important basis of the ongoing endeavours of the discipline. In this introduction we ask the same overarching question as Weinreich *et al.*, but from the perspective of the current state of the field: what a general theory of language change with strong empirical foundations might entail. We ask whether such a theory is desirable, where recent progress has been made, and what are the major outstanding questions (section 4).

Our final concern was to make this book a true 'state of the art'; not only a summary of received wisdom but also a place to find discussion of the most important contemporary questions and debates. And we reject Lightfoot's (2006: 184) conception of historical linguistics as practised by "the aging gentlemen at the end of the departmental corridor" by highlighting how historical linguistics is central to the foundations of linguistics as a whole, and will be of continued relevance to both the study of linguistics and the study of (pre)history.

2 Language change and evolutionary theory

A theory of language change is in a sense a theory of language evolution that provides an explanatory framework for individual- and population-level factors of change, and can thus be viewed through the lens of more general theories of evolution. Discussions of language as a biological object and the parallels between linguistic and biological evolution are not, of course, new. The cross-fertilisation of studies of linguistic and biological history go at least as far back as Darwin (1871), who pointed out parallels in linguistic and biological evolution such as inheritance from a common ancestor. Inspiration between the fields has gone in both directions, though more recently focus has been on the use of computational phylogenetic models and on the utility of biological evolutionary metaphors for language change. Atkinson and Gray (2005) and Greenhill and Gray (2009, 2012) discuss parallels between biology and linguistics and emphasise the long history of productive thought that has resulted.[5]

Debates about the applicability of evolutionary models to language have, as Thomsen (2006: 1–3) notes, revolved around the types of objects that undergo change and whether linguistic elements behave like biological ones for the purposes of modelling change. For example, Blevins (2004: xi), explicitly states that *evolutionary phonology* is a largely

metaphorical take on Darwinian evolution. Others, such as Croft (2006: 92), have attempted to develop "a systematic evolutionary framework" that accounts for both linguistic and biological evolution. However, part of that development has concerned the ways we can develop appropriate analogues to different facets of biological evolution. Croft (2000), for example, devotes some space to the discussion of how the biological concepts of recombination and replication might work in linguistics.

Here we take a different view of the question. We do not seek direct analogues between individual mutation events in linguistics and biology. Since genetic mutation involves differences in proteins and linguistic 'mutation' involves mental representations and their expression in different contexts, we would not expect to see direct parallels. After all, the units of analysis in linguistic change have no physical instantiation.[6] Rather than focusing on the 'right' way to transfer biological models of evolution to linguistics, we focus on developing a model of linguistic change that allows us to contribute to the study of evolution (including the study of language/gene coevolution) but which also allows us to study language on its own terms. That is, we presume that arguments such as the proper parallel for DNA or RNA in linguistics are doomed to failure, and that a more productive line is to treat evolutionary models as operating with a set of properties and considering whether language data has those properties.[7]

The debates about the applicability of evolutionary ideas outside of biology are not by any means confined to language and historical linguistics. We see similar debates within anthropology, archaeology, and other social sciences. Towner *et al.* (2012) point out the long history of debates about horizontal versus vertical transfer of cultural information, mirroring the linguistic debates about the role of contact in change (see **Lucas**) and the way that contact may lead to language split (see **François**). Those debates are also informative for linguistics. For example, Towner *et al.* (2012: 284) (following others) draw a distinction in cultural evolution between models of *ethnogenesis* and *phylogenesis*.[8] In the first case, cultural innovations are presumed to spread primarily by diffusion across groups; in the phylogenetic case, conversely, innovations are presumed to be transmitted primarily by descent and population split.[9]

2.1 The applicability of evolutionary models

The utility of evolutionary models depends to a large degree on how we conceptualise language. Some have treated languages as *species* (cf. Pagel and Mace 2004; and Mace and Holden 2005), others as *organisms* with speakers as their hosts. For Croft (2000), language is a pool of utterances. For Kroch (2001) and Hale (1998) (among others), a language is a *population* of grammars hosted by individuals. Evolutionary models of linguistics, as Croft (2006: 91) notes, have centred around our abilities to compare the evolutions of genes and languages. As **Pakendorf** notes, some of this work has been controversial, particularly as it relates to more remote time depths. Evolutionary models also imply the ability to study the mechanisms of change and of mode and tempo events across trees in systematic ways. That is, we study the evolutionary properties of language change by studying the ways in which language speciation events might correlate with change along branches (to give one example). This type of study is particularly associated with the treatment of language as a "complex adaptive system" (Beckner *et al.* 2009), which "… emerges as a product of its underlying speech community, but also adapts to the very dynamics from which it emerged" (Roberts and Winters 2012: 90). We can then study language change as a function of community change.

What, then, is an 'evolutionary' conception of language change? We consider the evolutionary view of historical linguistics to involve variants in an individual which undergo selectional pressures at the population level. We assume, following Darwin and much other research, that we can identify discrete units which descend through time and which can be spread both vertically and horizontally (through language contact). This view, of course, is not so far removed from other recent views of language change (cf. Hruschka *et al.* 2009)[10] and will have limited impacts on some areas of the field. However, in other ways, as Croft (2006: 92–93) and Bowern (2013) observe, an explicit evolutionary framework brings clarity to some areas but requires a rethinking of others. For example, Croft (2006: 107) points out that an evolutionary view of language change requires the object of study to be a historical entity; this approach is thus at odds with, for example, **Hale**'s, in which proto-languages are abstractions without temporal locations. Some areas of evolutionary thinking are already rather similar to standard assumptions of historical linguistics. For example, both approaches place weight on *parsimony* as a factor in deciding between alternative explanations; all else being equal, prefer the explanation which minimises the amount of change. However, parsimony does not outrank likelihood if the most parsimonious hypothesis also requires us to make demonstrably false assumptions about the processes of change. This tension between likelihood and parsimony can be modelled in evolutionary thinking.

Bowern (2013) points out that an evolutionary view of language change dissolves the long controversy about *where* change occurs – in an individual, or in the community – and places language variation in a central position in a theory of language change. The conundrum of individual versus collective behaviour in evolutionary change has been the subject of long-standing debates in evolution (see, for example, Ariew 2008). If we assume that individuals participate in variation, which can be modelled at the level of a population, 'change' is the shifts we see in the frequency of variants over time.[11] Problems in defining the locus of change (in an individual or a community) only arise if we maintain the fiction that languages are invariant.

More broadly, evolutionary views of historical linguistics can be identified by their approaches to problem solving. For example, historical linguists have long been interested in questions of relative rates of language change, both within lineages and as speciation events (see **Greenhill** and **Wichmann** for further discussion). Evolutionary methods allow us to investigate these questions systematically. Many of these questions can be addressed computationally; it is thus not surprising that evolutionary views of language tend to be closely tied to computational approaches to hypothesis testing.

Some lines of inquiry here have been very productive, but there are still many outstanding questions. For example, much recent work in phylogenetics has concentrated on language classification. Some of these classifications have involved model comparison in order to investigate the appropriateness of different evolutionary models (e.g. Greenhill and Gray 2009; Gray *et al.* 2009; Ryder 2012; Bowern and Atkinson 2012; Atkinson *et al.* 2005; Nicholls and Gray 2008) but none to our knowledge have investigated and published in detail the entailments for *why* a certain evolutionary model may do better in some cases than others (though see Nichols and Warnow 2008 for general discussion about types of models, such as the difference between parsimony, likelihood, and distance models). Other work has used insights in trait evolution and population dynamics to study how language innovations may diffuse through a community (Clark 2010; Gong *et al.* 2012).

Perhaps the most fundamental difference between evolutionary and more traditional conceptions of historical linguistics is the role of probabilistic reasoning, particularly in relation to language relatedness. Linguists have tended to think of their goal as discovering

a single 'true' tree of a language family; that is, the tree which most closely reflects the evolutionary history of the languages. But linguists have also noted that such trees are generalisations over many change events, some of which will follow that history, and others of which will not (compare Sober [1991] for a general view beyond language). Evolutionary and phylogenetic methods allow explicit quantification of uncertainty in a tree. (See section 3.4 for further discussion of trees, networks, and other representations of relationship.) The explicit (rather than implicit) role of probabilistic reasoning in modelling change is, we believe, another advantage of an evolutionary approach to language change.[12]

2.2 Problems with evolutionary views of language

Evolutionary, computational, and phylogenetic models of language change have not been adopted wholesale. Andersen (2006: 59) puts it bluntly: "there is no chance of explaining language change by the mechanisms of evolutionary theory." While we require a consistent view of change across languages, it should not be surprising that some types of questions are more amenable to study with these approaches than others. For example, studies of rates of change among phylogenies require trees where branch lengths are calibrated to the amount of change (either by making the branch lengths proportional to the amount of change, or by calibrating internal nodes to time). The trees to be compared need to be created by identical methods with equivalent models, and such work is very time-consuming. Phylogenetic methods are obviously inapplicable to linguistic isolates which by definition have no neighbours. These models work best in large families where rates can be inferred and compared across the tree.

Phylogenetic studies of trait variation require variation within the tree to make inferences. This causes difficulties for the study of traits where there is no variation, as noted in Dunn *et al.*'s (2011) study of variable word order trends across language families. Stability, or lack of variation, can also mask different mechanisms of continuity and change, including traits that are: (a) archaic and unlikely to change over time; (b) highly diffusible and which quickly reach entropy; and (c) unchanging in terms of categories, but not in terms of the material used to encode them. Such differences are of interest in understanding what lies behind stability and different rates of change (see **Wichmann**).

Other areas are difficult to study because of the nature of language change. For example, Bowern (2013) notes the problem of identifying borrowings between related languages, and whether such borrowings are more or less frequent than borrowings between unrelated languages. This is an empirical question, but in order to test the question there are far too many factors known to affect rates of loanhood to construct a rigorous study. The solution to problems such as this, as Roberts and Winters (2012) discuss, has resulted in the bifurcation of historical study: one direction results in broad scale data sets to test evolutionary hypotheses (often with unrealistic models of demographic processes), while the other is the case study approach. Both approaches lack general explanatory power; the first because it identifies correlations, not causal mechanisms, and the latter because the causal mechanisms are usually too specific to the case study to generalise to other cultures.

Another weakness in the field at present is the way in which models have been adopted wholesale, without careful attention to consistency in their features. Some papers use viral evolution models (Bouckaert *et al.* 2012), others use more general evolutionary models (Gray *et al.* 2009), without much explicit discussion of the entailments of each model for language data. Other problems stem from over-interpretation of data.[13] And when we speak of

language/gene coevolution and wish to tie a genetic phenomenon to a linguistic one, we need to make sure that *all* the predictions of a model are satisfied.[14] Finally, in some cases insufficient attention may have been paid to the assumptions underlying the model, and so the transfer to linguistic data is invalidated. For example, Reesink *et al.* (2009) use the STRUCTURE algorithm for inferring population admixture to argue for population histories, even though STRUCTURE does not have any temporal resolution. For discussion and criticism of STRUCTURE and its modelling of admixture as a model for language contact, see Round (2012).

2.3 Utility of evolutionary models

Dunn discusses some of the uses of evolutionary models in linguistics. Debate about their utility has often focused on a few questions, such as those about the phylogeny of Indo-European (Atkinson and Gray 2006; Ringe, Warnow and Taylor 2002). Some questions can only be addressed with phylogenetic techniques, and evolutionary insights can allow us access to new problems and make it easier to revisit old data. Bowern (2012), for example, uses an algorithm from population genetics to identify source mixing in the vocabularies of Aboriginal Tasmania, a prerequisite for determining how many languages and language families are represented in the data. Work by Pagel and colleagues (e.g. Pagel *et al.* 2007; Calude *et al.* 2011) sheds light on the relationship between lexical stability, lexical frequency and language change. As Jordan (2013) points out, evolutionary methods allow for investigation of phylogenetic topics beyond reconstruction of the tree.

Computational phylogenetic methods are increasingly important to historical linguistics. While computational models of language evolution have been around at least since Swadesh (1964), the last ten years has seen an explosion in this area, first in Indo-European (Atkinson *et al.* 2005; Atkinson and Gray 2006; Ringe, Warnow and Taylor 2002; Nakhleh, Ringe and Warnow 2005) (though see Holden [2002] for an example from Bantu) but more recently in Austronesian (Gray, Drummond and Greenhill 2009), Semitic (Kitchen *et al.* 2009), Arawak (Walker and Ribeiro 2011) and Pama-Nyungan (Bowern and Atkinson 2012) among others. Some of this work (e.g. on Austronesian) has confirmed and expanded that of linguistic comparative methods, while other work (e.g. on Pama-Nyungan) has presented full family trees for the first time.

These trees have been based on lexical coding of basic vocabulary, typically a list of approximately 200 words based on the Swadesh (1971) wordlist. The use of lexicon alone has caused controversy in the field. Previous methods of tree estimation were based on a range of criteria, including shared sound changes, lexical innovations, morphological changes, and syntactic changes. The range of evidence from different domains of language has been seen as a way to guard against mistaking language contact for shared genetic inheritance.[15] Discussions of these methods are well known from textbooks (e.g. Hock and Joseph 1996). However, weaknesses of such methods are less commonly discussed. For example, the use of sound change to identify shared innovations is not without problems. As has been noted, some sound changes are very common and are therefore not diagnostic for shared language history on their own (Heggarty 2008; cf. Harrison's [1986, 2003] discussion of subgrouping). A change of *s to *h*, for example, is known from not only Greek, but also from Arapaho-Atsina (for example, *maxkaseni 'shoe' > *mo?ohon*, [Goddard 1990]), Proto-Malayo-Polynesian (Blust 1990), and the Austroasiatic languages Lamet and Wai (Svantesson 1991). Other changes might be rarer, but have occurred independently several times in a language family. The result is that some trees are proposed based on slim evidence. In well-studied language families, experts in the languages will discuss the weight of evidence, but

for other families where research is at an early stage, there may be little quantification of different subgrouping hypotheses. A solution to this problem is to use methods which allow us to quantify uncertainty.

In short, evolutionary models allow us to study systematically many of the same questions that linguists have long been interested in. These include quantifying change, evaluating support for hypotheses of relationship, weighting evidence for relationships, studying relative rates of change (e.g. grammar versus lexicon) and looking at the relative stability of features. They allow us to investigate these topics beyond questions of evolutionary metaphors, *pace* McMahon and McMahon (2012).

3 Theories of change

3.1 Definitions of 'change'

Developing a theory of language change is the goal of most historical linguists (cf. Harrison 2003); either as a primary goal or because it underpins other goals such as understanding relationships among languages or reconstructing (pre)history. But this goal is elusive. As we noted in section 1, the questions motivating Weinreich, Labov and Herzog more than 45 years ago still pervade the current volume. Our data set has been enriched by much new documentation of families, languages, and language varieties, but the guiding questions remain difficult to answer.

Crucial to any theory is the definition of a 'change', and here the literature is extensive. Hale (1998) locates 'change' in the individual grammar; others in the point at which it is reflected in the linguistic record. Andersen (1989: 13) distinguishes an innovation in a single speaker from a broader concept of 'diachronic development', or accumulation of individual innovations. In an evolutionary model, we might define change as the result of an individual coming to different conclusions about the structure of their language from the conclusions their parents did. This is innovation at the individual level, and bears much in common with the standard generative definitions of change.[16] If those innovations spread, they will eventually be reflected in the linguistic record and may replace other variants. In Croft's (2000) model, a language is a collection of utterances, and 'change' occurs when speakers differentially select variants to replicate, which again leads to 'change' that is observable in the linguistic record.

3.2 Why does language change occur?

One important explicandum for any theory of language change is why change occurs in the first place. After all, although linguistic systems are extremely complex, children are very good at acquiring those systems. Although the speech signal contains much noise and ambiguity, listeners are nonetheless able to recover the content of utterances with great felicity. And although the seeds for some types of phonetic reanalysis exist in all languages, they only sometimes result in language change. For example, Hombert *et al.* (1979) show that tonogenesis arises from the reanalysis of the effects of voicing on F0 of the vowel following an obstruent. But the pitch differences are universal (or close to) and follow from the physiology of speech production. Explaining how tonogenesis arises from reanalysis of inherent pitch is one thing, but explaining why some languages have developed tone while others have not is quite another. See further Kirby (2013) for this particular example, and for discussion about why certain cues seem to be particularly targeted for phonologisation, and

how the outcomes of phonologisation are sensitive to initial conditions such as the relative functional load of cues.

A dominant claim from early in the history of the field has been the 'errors in transmission' model, which originates in Paul (1880). That is, change occurs when learners incorrectly acquire some aspect of their language. There has been much work characterising the ways in which children (who, as we have noted, are otherwise rather good at acquiring language) might make errors (see, for example, the summary in Foulkes and Vihman 2014). Others (e.g. Snyder 2011) have noted that the types of errors which are most common in child language acquisition are errors of omission rather than errors of commission. For example, as discussed by Maratsos (1998), in the acquisition of inflection, children for the most part either omit the inflection or produce the inflected form; they do not use the wrong inflection. Furthermore, child errors are not by any means the most common types of change. This is a problem for models of change which argue that speech community innovations are driven by the fossilisation of child language errors. (See also **Stanford**'s discussion of the role of children as leaders or followers in language change.)

Thus in summary, explaining why change occurs involves three distinct questions. First, why are some aspects of language targets of change much more frequently than others?, Second, why does some variation result in change but not others? That is, why does a given change occur in Language A at time X, but not in Language B? And third, what leads speakers to innovate and propagate those innovations through the language? That is, why does a particular individual come to one conclusion about the structure of their language and not another?

3.3 Change across domains of language

It is not immediately obvious that change proceeds in the same way across different domains of language. If it does not, a 'general theory' of language change would, in fact, obscure some of the important differences between different linguistic objects. Indeed, there has been considerable work which argues that sound change has different properties from syntactic change. Bowern (2008) summarises some of these arguments, based on earlier work by Pintzuk (2003), Lightfoot (1979) and others. Apparent differences between phonology and syntax include the rates of change, the access that language learners have to underlying representations, and the applicability of comparative methods and the possibilities of identifying correspondences, which affects our ability to reconstruct change.

Some of these differences may be more apparent than real. For example, as Hale (1998, 2007) has noted, the argument that sound change works on 'real' objects, while syntactic change works on abstract patterns, is false, since sound change also applies to underlying representations and not surface forms. Lightfoot's argument that grammars are discontinuous and recreated in the minds of each new speaker does not apply uniquely to syntax, since the same processes apply to acquisition in phonology. We might note, moreover, that grammatical discontinuity has not prevented us from fruitfully studying sound change. We can further observe that despite learners' lack of access to the grammars underlying the production of the observed data, learners come to very similar conclusions about the structural properties of their language. If this were not the case, we would not be able to list the properties of the grammars that generate what people call 'Australian English', and contrast them with 'German' or 'Japanese'.

The debate about what constitutes a change and how to define it has probably been obscured by talk at cross-purposes about the locus of change. Several authors (**Hale**,

Kiparsky, Garrett, Anderson, etc., going back at least to Weinreich *et al.* 1968) recognise a distinction between the innovation in the mind of a single speaker and its subsequent propagation through the community. But this is also rather difficult to conceive, since to define the speaker-based innovation as an innovation requires comparing it to a baseline of other speakers. But that baseline is unlikely to be homogeneous. We discuss this point further below, in section 4.2.

Another potential difference between domains relates to borrowability. Since some domains of language show more resistance to borrowing than others (Haspelmath and Tadmor 2009; Moravcsik 1978; Matras 2010; Thomason and Kaufman 1988), and since language contact is a factor in the speed of language change (Trudgill 2010, 2011), we might expect to see some types of change occurring more frequently in domains that are most affected by contact.

One important factor in language change is social selection. That is, variants are adopted by speakers to different degrees, depending on the extent to which speakers wish to signal that they identify with a particular social group for which that change is characteristic. Some aspects of language are more salient markers for speakers than others, and some aspects are recruited more frequently as social markers. For example, within American English, vowel category realisation is considerably more variable as a marker of dialect membership than voice onset time is. Differences in this area may translate to different behaviour in language change.

Finally, we might expect to see differences in domains of language because of the degree to which facets of language are constrained by physiology. For example, sound change is not random; articulators and perceptual factors make some changes much more likely than others. It is unclear how analogous physiological constraints would be interpreted for syntactic structures, though perhaps psycholinguistic facets of language processing may lead to some structures being favoured over others.

Thus there are reasons to suppose that language change may differ in some respects between domains such as phonology and syntax. There are other reasons to think, however, that such differences are illusory. After all, children acquire all aspects of their linguistic system from the same dataset, and at roughly the same time. Moreover, it is not clear that the differences outlined above constitute differences that relate to mechanisms of change. Differences in rates of change, for example, do not necessarily point to distinct underlying *mechanisms* of change.

3.4 Representing change and 'speciation'

Insights from other disciplines allow us to introduce new ways of thinking about old problems and to reframe our research questions. Historical linguistics is still working through some of these issues. One area where insights from biology are not directly transferable but are nonetheless valuable to linguistics is in the causes of linguistic 'speciation' or split. To date there is a surprising gap in the linguistic literature on the mechanisms by which languages split; certainly in comparison to biology, where the conditions under which species split is a central concern of the field (Coyne and Orr 2004). Linguists have assumed a gradual model of split, where dialects accrue changes that eventually lead to mutual unintelligibility. Note that while there is literature on how to define terms such as 'language' versus 'dialect' (e.g. Haugen 1966), this is not the same as determining what the conditions are under which languages split, what causes rapid or slow split, and whether splits are accompanied by rapid change (Atkinson *et al.* 2008).

Language speciation models will differ in some respects from biological speciation models, because language transmission is different from gene transmission, and language split (for example, the 'split' of creoles from their lexifier 'parents') is crucially dependent on the type of language transmission involved. Gene transmission, for example, is instantaneous: individuals acquire their genes from their parents at conception. Language acquisition is gradual and incremental. Moreover, children acquire language from their peers as well as their care-givers, even in cases of vertical language transmission in monolingual communities (Kerswill 1996; Aitchison 2000). Thirdly, language change is strongly Lamarckian, with features acquired by individuals being passed into the language of subsequent generations. Languages can be acquired by adults who then teach those languages to their children (or to other adult learners). Despite these differences, there are broad parallels between linguistic change and biological change at the macro-level. For example, in both domains there are identifiable discrete units (words in language, genes in biology) which are transmitted both vertically (through inheritance) and horizontally (e.g. through language contact). We can identify homologous units in related species and languages (e.g. cognate words in linguistics) which descend from common ancestors, and using explicit models of change, we can reconstruct features of those ancestors using comparative methods (Sober 1991; Rankin 2003).

Linguists do not usually consider change that results in cladogenesis (that is, the creation of new lineages) to be different from the change that occurs within a language. For example, Nurse (1997: 370–71) claims that most change is associated with languages diverging *in situ* as opposed to following migration, but in doing so, he does not distinguish between anagenesis (change within a lineage) and cladogenesis ('speciation' or language split). Traditional models of language change and split explicitly link the two; that is, they assume a gradual accrual of differences where successive innovations diffuse across a speech community until sufficient isoglosses build up to render the two varieties distinct languages.

This assumption has the advantage that it captures the gradient nature of intelligibility between language varieties, and allows the relatively straightforward modelling of bunching versus spreading isoglosses (Masica 2005; Hock 1991; Campbell, Kaufman and Smith-Stark 1986). However, it is agnostic about the relationship between increasing differentiation between varieties, intelligibility, and speaker contact. That is, do languages split because groups of speakers lose contact with one another and so cease to participate in each other's changes? Or do groups of speakers interact less *because* their speech varieties have diverged sufficiently that casual interaction becomes more difficult? Is a loss of contact a requirement for languages to split, or can languages diverge while speakers retain interaction with one another? And if they retain contact with one another, why do they cease to speak the same language?

Much work (e.g. Bellwood 2001; Dixon 1997; Ross 1997; Renfrew 1989 among many others; see also **François**) has attempted to make connections between the structure of splits in a linguistic family tree and the associated population movements (or lack thereof) that lead to the split. All of this work is problematic to some degree. For example, population expansions are often associated with tree-like language splits; however, other cases of expansion are rather untree-like. The Turkic family, for example, is often described as being difficult to represent using a binary branching tree (Johanson and Csató 1998). Diversification *in situ* can cause problems for tree representations because of partial isogloss overlapping; but so can rapid expansion (because groups split without time for subsets of similarities to develop, leading to a 'rake' or tree with many primary branches). It has long been claimed that family trees do not well represent some language diversification events (e.g. Bloomfield

1933: chapter 18). Some tie this problem to theories of language change and to the Comparative Method itself. Bloomfield, for example, states that the Comparative Method only returns the reconstruction of trees. This is, however, patently false. The Comparative Method allows us to identify regularities in correspondences; but the irregularities and exceptions are also results and inform both reconstruction of etymologies (**Mailhammer**) and subgroups.

How do new languages and dialects emerge? This question has received new attention recently with the claims of Trudgill (2004) and counterclaims by Baxter *et al.* (2009) concerning whether dialect formation is deterministic. Trudgill argues that the origins of New Zealand English (and therefore perhaps other dialects) can be explained purely as a function of frequency – that is, of speakers' exposure to tokens – and accommodation. That is, in Trudgill's model, speakers accommodate to the most frequent pronunciation of a variable; thus by knowing the population numbers and origins of the original settlers, one should be able to predict which features descend into the next generations of speakers. Baxter *et al.*, however, show that in simulation studies of a formalisation of Trudgill's model, accommodation and frequency alone are not sufficient to produce dialect formation. That is, drift (in the evolutionary sense) alone is not sufficient to produce change within a community, and some additional selective pressure is required. Pardo (2012) shows that accommodation also has a strong social component: accommodation is not socially neutral. That is to say, even if Trudgill's model were correct in that accommodation alone accounted for the formation of New Zealand English, accommodation itself is not independent of social factors (see **Michael**).

A further tension in dialect emergence (and consequently language split) is the number of changes needed in order to say that we have a new linguistic entity. This problem is, of course, replicated in biology, where the 'species' problem causes similar concerns about the roles of tree representations (for a summary, see Coyne and Orr 2004). For idealisation models such as **Hale**'s, a single change is sufficient to distinguish entities. For social realist models like Ross' (1997), many changes are necessary, but each change has its own history. This problem, like some others, is in part a result of concentrations on language change as grammar change in *individuals* versus change in *populations*. Since *populations* and *languages* are not always isomorphic, and since changes can be the result of not only new features spreading, but also shifts in frequencies of existing variables, we would expect trees of individual features or change events to not perfectly replicate the changes which can be used to draw trees in the aggregate.

3.5 Causes of change

In section 3.2 above, we noted that the existence of change is itself perhaps surprising, since on the whole, children are excellent at acquiring the speech systems of their communities. On the other hand, since no speech community is uniform, and since language acquisition, production, and perception are mediated by biases of various types, it is not surprising that languages should change over time. However, identifying the triggers for change is non-trivial.

Earlier work speaks of 'causes' of change. Some of these causes might be internal to language; that is, a linguistic state might be ambiguous, or unstable, and so speakers fail to acquire it. In such cases, the 'cause' of the change is the unstable state on the one hand, and the (presumably psycholinguistically grounded) preference of speakers to analyse linguistic structures in a particular way on the other. Other work sees a role for external causes of

change. External factors are of two main types: language contact (that is, the role of other linguistic systems), and environmental and population factors (see section 4.3). More recent work has tended to view causes rather as 'constraints', 'biases' or 'filters' on language, rather than determinants of change. That is, these filters do not cause changes directly; rather, they bias speakers towards certain analyses, which over time will tend to push changes in certain directions. **Deo** discusses work by Schaden (2009, 2012) on semantics in this vein. Examples from phonology are provided by, for example, Garrett and Johnson (2012).

Things become more tricky when social and population structures are considered. Some cases of social influences on language are not in doubt. Grammatical marking of honorification or syntactic marking of kinship relations (Evans' [2003] term is 'kintax') in a pronominal system, for example, are direct reflections of social structure in language structure. Many authors have avoided attempts to link linguistic features to sociocultural phenomena, in part perhaps because of the murky history of nineteenth-century work which attempted to correlate linguistic and social complexity (for a refutation of this position see, for example, Sapir 1921: 219). However, it is not in doubt that speakers assert membership in social groups through language (Eckert and Rickford 2001) and that communities of practice are represented and maintained through language, at least in part. Some claim that this is not a feature associated with hunter-gatherer groups. For example, Gumperz (1993: 135) claims that defined speech registers are a feature of agriculturalist (rather than hunter-gatherer) societies, because of hunter-gatherers' tendencies to lack interaction with outside groups and their egalitarian social structures. In doing so he concentrates only on a particular type of style shift, ignoring the rich variety of speech styles employed by many hunter-gatherer groups, including ritual speech, kinship codes (so-called 'mother-in-law' language), insult registers, and so on. Moreover, we might note that while Gumperz has argued that hunter-gatherers lack the interaction with other groups which might lead to the importing of properties of their languages, others (particularly Dixon 1997, Nettle 1999, and others) have argued that hunter-gatherers tend to have highly elevated levels of language contact. The field of hunter-gatherer studies is full of contradictory claims of this type.

Thus, in summary, there are several ways of considering the question of 'causes' of change, and all of them have representation in this volume, from internal factors (e.g. **Frajzyngier**) to social or demographic factors (e.g. **Greenhill**).

3.6 Universality of theories of change

Throughout the twentieth century, linguists have been concerned with the Euro-centrism of comparative linguistics. Some of the clearest recent statements of this kind come from Dixon (1997), though see also Boretzky (1984). Aikhenvald and Dixon (2001: 6), for example, appeal to the prestige of Indo-European comparative linguistics as a model for linguists working on other language families. As early as Bloomfield (1925) and Sapir (1931), however, we see arguments that sound change is not only regular in non-European languages, but that regularity is a by-product of the way in which change occurs.

A variant of the Euro-centrist argument ties linguistic models of change to population structures. As **Heggarty** (and others) have pointed out, while we might expect universality in how change is modelled within communities, because communities differ widely across the world, and because the propagation of a change through a speech community is influenced by the structure of that community, we might expect to see qualitative differences in the amount and type of change across the world. The processes of change might be the same, but the social conditions may be different enough to render models non-transferable. Consider, for

example, 'super-languages' spoken by tens of millions of people; such languages require both the population expansion and packing facilitated by intensive agriculture, urbanisation, centralised government and social stratification. **François** also addresses this point implicitly, in arguing that tree models of language diversification are tied to migration events that are uncommon in world history. In this case again, the problems for uniformitarianism are in the conditions, and not the responses.

François' model explicitly and causally links a linguistic phenomenon (the type of linguistic 'speciation') with a type of population movement. Other work of this kind includes Renfrew (1989), who defines four types of language spread models based on linguistic patterns such as the presence of significant crossing isoglosses. Such results, however, are difficult to test across the globe, since we have insufficient information about global (pre-) historic population movements. If we take **François'** and Renfrew's models at face value, we can deduce the type of population movement from the language contact and speciation of the tree. But as **Epps** points out, some of the best information about global population movements in prehistory may well come from language and loanword studies. We thus run the risk of circularity in arguments.

A further problem for arguments of this type is that though we see considerable diversity in language change across the world, it does not correlate clearly with population demographics. For example, Nettle (1999) argues that small languages should show more lexical loans than large languages; Bowern *et al.* (2011), however, found no clear effect of population size on the number of loans; rather, they found significant effects in several directions. In the North American languages in their case study, small population size did predict higher loan rates; in the Australian area, however, small population size was significantly correlated with *lower* loan levels. Loan rates overall were low (with a mean rate of 5 per cent), even in areas of the world – such as Australia – where it has been claimed (Dixon 1997) that high loan levels have erased genealogical relationships. Time and again, language families from outside Europe prove tractable using traditional comparative methods. Part of the problem here may stem from unrealistic models, particularly when considering hunter-gatherers. (Arnold (1996) gives an account of ways in which hunter-gatherer populations have been systematically misrepresented in the literature.)

3.7 Language contact and language change

Central to the issue of universality of methods is the degree to which language contact plays a role in language transmission and is reflected in the linguistic record, obscuring genetic relationships (see **Lucas**). Related to this are questions concerning the languages which are the outcome of extensive contact: pidgins, creoles, and mixed languages in particular, but also koinés and languages undergoing restructuring during language death (see **Simpson**). Without doubt, Thomason and Kaufman's (1988) book, *Language Contact, Creolization, and Genetic Linguistics*, brought language contact to the forefront of discussions of language histories and still occupies centre stage in discussions of these topics, both on the role of contact in change and the way in which descent processes are important for considering the Comparative Method.

One area of tension, however, has been the nature of language transmission and its role in change. Thomason and Kaufman (1988) suggest that one particular kind of language transmission, defined by several social and linguistic parameters, is particularly relevant for studying genetic relationships; that is, languages that have a single parent, and that are transmitted as whole packages, not piecemeal. Three parts of this claim have been especially

controversial. One is that it separates creole languages from non-creole languages in discussions of language change, which could be seen to be problematic given the historical discourse of creole studies and past views of whether such languages are natural languages.[17] The second is the way this relates to mono- and multilingualism; that is, how is transmission, defined in this way, relevant to communities where children learn several languages from birth? (See **Miceli** for a more detailed discussion of this question.) The third concerns the status of language shift with imperfect learning, which would not under most circumstances be considered an instance of the kind of transmission associated with genetically-related languages, but which may or may not show effects that would lead to difficulties in language classification. One problem here is that Thomason and Kaufman's (1988: 10–12) definition of language transmission relies on *both* social facts about transmission (that is, what people are doing) and linguistic definitions of diversification (languages don't have more than one parent in genetic transmission). In the 25 years since the publication of Thomason and Kaufman (1988), linguists have identified a broad range of transmission scenarios which cut across mono- versus multilingualism and parent/child versus peer effects.

Language contact has become its own subfield of linguistics (see, for example, Hickey 2010; Matras 2009; Bakker and Matras 2013; Thomason 2001; Van Coetsem 1988; Winford 2003); it is no longer simply the concern of diachronic investigations of language classification and change, but now also that of synchronic studies of bilingualism and multilingualism, second language acquisition, diglossia, code-switching, and so on, as well as diachronic and synchronic explorations of contact languages. Diachronic language contact needs to explore ways in which the findings of contemporary language contact studies can be incorporated into models of contact-induced change (cf. Muysken 2010, 2013), and inform any general theory of language change.

Thus, in summary, the explananda for a theory of language change range from the psychological to the social. Separating questions of representation from questions of modelling and theory allows us to refine our ideas of change, and focusing on types of language transmission allows us to pick the most appropriate model for the languages under study. Theories of language acquisition are central to theories of language change, both so as to explicate the role of both children and adults in change, and to consider the effects of multiple languages within a given community.

4 Major debates in historical linguistics

The field of historical linguistics today is very different from what it was when Weinreich *et al.* (1968: 102) asked:

> Why do changes in a structural feature take place in a particular language at a given time, but not in other languages with the same feature, or in the same language at other times?

The preceding sections illustrate the depth of understanding that has been gained in the last 45 years on the problems of the *constraints*, *transition*, *embedding*, *evaluation* and *actuation* of language change. But despite these advances, some of the fundamental aspects of how change works in language and how best to model it remain debated within the field, and as we noted above, the same questions which motivated Weinreich *et al.* (1968) recur in several chapters in the current volume.

4.1 The role of children in change

Language as a system can be studied independently of those who speak it, and patterns and tendencies of change can be described in terms of their effects on a language system. However, while this may provide evidence for Weinreich *et al.*'s *constraints* problem – "the set of possible changes" – it is clear that the *actuation* of change needs to be understood through the processes and mechanisms that lie behind the outcomes of change, and importantly through the behaviour of individual speakers. Many different explanations of language change place the locus of change within the individual (see, for example, Milroy and Milroy 1992; Kerswill 1994; Labov 2001; Garrett and Johnson 2012, among many others), and so the actuation of an innovation within particular individuals becomes a crucial issue for modelling language change. One debate that has developed relating to this question centres on whether the locus of actuation of change is to be found within certain kinds of individuals within a speech community, and in particular on whether individuals instigate change at particular stages in their lives.

As discussed by **Stanford**, there has been a long tradition of viewing children as the primary locus of change within a speech community. For example, as early as Paul (1880) and Sweet (1899) language change was described as reflecting imperfect learning by children during first language acquisition. That the locus of change lies with children is still a widely held view, particularly within generative approaches to language change. For example, Anderson and Lightfoot (2002: xviii) describe language change as "a working out of the possibilities made available by the human language faculty in the presence of limited and often ambiguous data" during first language acquisition such that children develop I(nternal)-language systems that generate structures and sentences that were not generated by earlier systems (Lightfoot 2006: 77; see also **van Gelderen**, **Kiparsky** and **Hale**). Lightfoot (2006) sets out a model of change within this approach based on children being cue-based learners. That is, a child acquiring a language uses cues from both: (a) comparison of abstract structures within their developing I-language; and (b) variation in their E(xternal)-language input resulting from other speakers using their grammars (I-languages) differently in discourse, to attain their own I-language. This I-language may be different from those of other individuals within the speech community and so may generate different linguistic output (E-language). And this is the mechanism that drives the change that we 'see' in a language over time.

Child-driven approaches to language change are underpinned by certain assumptions that have been questioned in the literature. These approaches often presume that adult speakers of a language have stable grammars, which, once established during the acquisition process, do not change. This, in turn, implies that there is some definable stage in a speaker's lifespan, known in the literature as the 'critical period', before which his/her grammar is developing and after which it is stable and does not change. This assumption is not only relevant to the generative approaches to language change described above, but also lies behind apparent-time sociolinguistic studies of change in progress that take the speech patterns of older speakers as representative of earlier stages of a language (see Sankoff and Blondeau 2007 for a discussion of this).

Although there is good evidence that such a child-driven model of language change is valid in certain contexts, in recent years the stability of adult grammar has been questioned and various studies indicate that speakers' entire lifespans need to be incorporated into our understanding of language change. For example, while Sankoff and Blondeau (2007: 583) maintain the importance of the 'critical period', they show in their study of /r/ pronunciation

in Montréal French that "a substantial minority of speakers" make changes to their pronunciation after the period of first language acquisition. Hendriks (2013) also shows how the personal letters of individual speakers from merchant families who moved between different areas of the Dutch/German dialect region in the sixteenth and seventeenth centuries indicate change in various aspects of the speakers' grammars, including both phonological and lexico-grammatical linguistic features.

Such evidence leads Sankoff and Blondeau (2007: 583; see also Wedel 2006: 5) to conclude that more attention needs to be paid to the "degree and kind of lability that occurs later in life." Kerswill (1996) does indeed begin to investigate this, concluding that speakers of different ages are able to acquire, and thus change, different aspects of their grammar. While adult speakers are the least labile, to use Sankoff and Blondeau's (2007) term, they are able to acquire new lexical items, phonological changes that involve an existing opposition, the reassignment of words to different morphological classes, etc. Adolescents, in addition, are able to acquire new prosodic systems and new morphological classes, while younger children are the most labile and are able to acquire new phonological oppositions and lexically unpredictable phonological rules (Kerswill 1996). Ross (2013) takes a similar approach to understanding contact-induced change, concluding that certain kinds of change, in particular contact-induced syntactic restructuring, by their nature must be driven by preadolescents and adolescents. In contrast, Nahkola and Saanilahti (2004), in a study of change in Finnish, suggest that change in adult speakers' grammar is not of a different kind to that seen in children, but rather depends on whether a linguistic feature displays variation. That is, it is possible for the relative frequencies of variant features to change over a speaker's lifetime, but categorical features or variant features with a clear pattern of dominance are unlikely to undergo major changes across a speaker's lifetime. In this way, Nahkola and Saanilahti (2004) seem to be more aligned with generative approaches to language change, which explain evidence of change in adult language as changes in language performance (E-language), but not in language competence (I-language).

Usage-based models explain such evidence of adult language change in a radically different way. As discussed by **Bybee and Beckner**, such approaches have a more direct link between performance and competence; all language experiences, during childhood *and* adulthood, influence speakers' cognitive representations of the language, and this means that adults, as well as children, are capable of learning and thus of changing their mental representation of a language (see also Chambers 1992). The patterns we see in language change, both within and across languages, reflect the cognitive mechanisms that apply in language use. For **Bybee and Beckner**, such a model can explain changes for which a child-driven explanation is implausible, such as those involving sophisticated semantic and pragmatic inferences. Similarly to Kerswill, **Bybee and Beckner** suggest that children and adults are equally important in language change, but that there are differences in the roles they play – one of which reflects their different social roles. Thus, Kerswill (1996) moves beyond exploring the types of linguistic features that individuals can acquire at different stages in life to the question of the influence that speakers of different ages exert on the speech of other individuals. That is, the role of speakers at different life stages in language change does not simply relate to cognitive and linguistic abilities, but also relates to the transmission of change among speakers. **Stanford** illustrates the significant role in language change of 'socially-influential' speakers, including children, adolescents and adults. And he suggests that the way forward for understanding the mechanisms and processes of language change is an 'all of the above' approach, namely one that considers speakers of all ages. Recognising that speakers of many different ages may be involved in language change within

a community allows us to test empirically a broader range of hypotheses relating to change without being constrained by underlying assumptions of a more restrictive model of change.

The literature surrounding the debate on the role of children in language change has important implications for how we build a general theory of language change. It is clear that such a theory must be able to account for the relevance of speakers of *all* age groups, but it also needs to account for the different ways in which speakers of different age groups may drive different kinds of change. Our theory also needs to be flexible; that is, it needs not only to account for change in general, but to also be applicable to change in specific contexts in which speakers from certain age groups may have played more or less significant roles.

4.2 Individuals and communities

The preceding section points to the importance of individual speakers, of all ages, in understanding language change, but how does the behaviour of individual speakers allow us to model change, manifest as it is in the collective behaviour of a speech community?

For sound change in particular, the motivations for change have been investigated in terms of cognitive and physiological factors (see, for example, Ohala 1993; Pierrehumbert 2001; Yu 2013; Solé, Vives and Recasens 2012). For example, Garrett and Johnson (2012: 58ff) describe a number of factors, including motor planning, speech aerodynamics, speech perception and gestural mechanics, which determine the phonetic biases of the "pool of phonetic variation" that characterises language, and which "represent preconditions for change, and determine the direction of change if it does occur" (Garrett and Johnson 2012: 83). This aspect of individualist models of language change helps to resolve the *constraints* problem – setting out not only the kinds and directions of change that tend to occur cross-linguistically, but also providing explanations for these tendencies at the level of individual speaker behaviour. However, this research is not sufficient to address the *actuation* problem: why, given the always present nature of cognitive and physiological factors, does a specific change occur at a particular time in a particular language? A different approach to the actuation problem is presented in Kirby (2013) and related work. Kirby argues that sound change occurs when speakers enhance the cues that are most informative in signalling a contrast, and de-emphasise the cues with lower functional load. Although the cues which signal phonological categories are present in all languages, they differ in functional load, magnitude and redundancy. The outcome of phonologisation of particular cues is dependent on the initial states, and so we would expect different results to obtain where the same phonological contrast has a different phonetic profile.

As discussed by **Michael**, such individualist models of change in a community can be explained by individual speakers' typically unconscious tendency to accommodate to the linguistic behaviour of their interlocutors (see Mufwene 2001; Pickering and Garrod 2004; Trudgill 2004, 2008). Trudgill (2008: 243), for example, states that "the fundamental mechanism [...] is accommodation in face-to-face interaction" underpinned by the general maxim of human linguistic behaviour: "Talk like others talk" (Keller 1994: 100; Trudgill 2008: 253). This is, in fact, how Labov (2001: 517f) characterises the interaction between individuals and community groups, describing change as follows. Assume a phonemic category Φ_1 (for example, /ɛ/), which is realised variably but with mean formant values $P_{(F1)}$, $P_{(F2)}$. The realisation of /ɛ/ may include tokens which are outliers of Φ_1, and closer to another phoneme Φ_2. As learners in the next generation acquire Φ_1, they acquire a mean P′, which has shifted in the direction of Φ_2. This process continues over several generations, at which point tokens shifted in the direction of Φ_2 occur with greater frequency from younger speakers, and

start to be seen as characteristic of younger speakers (and deviant from the norms of older speakers, who retain the unshifted mean P). As both shifted and non-shifted tokens become more identifiable with particular social groups, younger non-conformists increase their use of shifted tokens, further accelerating the change. At this point, the pronunciation of Φ_1 has socially-defined variation and a change has occurred. Further movement of P′ as older speakers die (thereby decreasing the number of unshifted tokens and providing more learner evidence for P′), coupled with lifespan changes, further spread the change through the speech community. This description points to accommodation among individual speakers as the driving force of change, with "social evaluation and attitudes" playing only a minor role (Labov 2001: 20).

Others, though, would disagree, arguing that while accommodation is an important mechanism, it is not sufficient to explain the links between individual speaker variation and the differential transmission of variants within a speech community (e.g. Baker 2008; Baxter *et al.* 2009; see **Michael** for further discussion). Rather, overlaid on this is the role of social and cultural factors in language change. Linguistic variables have social and cultural meaning: they are used by speakers to signal adherence to or rejection of group norms, membership in social groups, and solidarity with interlocutors. Since the same variables may have different social meaning in different groups, we would expect difference in the degree to which changes are adopted, and the rates at which variants spread. As Labov (2001: 503) puts it, "factors determining the course of linguistic change are drawn from a pattern of social behavior that is not linked in any predictable way to the linguistic outcome."

Building on Labov (1966), linguistic variables are often seen to have static social meaning through association with particular social groups that tend to be characterised by age, gender, socio-economic class or ethnicity (see, for example, Labov 2001). Notions of '(covert) prestige' and 'identity' are then used to explain speakers' differential use of socially meaningful linguistic variants. However, as **Michael** discusses, more theoretically robust conceptualisations are dynamic ones, in which the meanings of linguistic variables "constitute a field of potential meanings [...] any one of which can be activated in the situated use of the variable" (Eckert 2008: 454). While the use of a linguistic variant is still, at one level, an index of membership within a particular social group, the association between them is via fluid ideologies based on the characteristics and stances of individuals. Linguistic variation thus both represents and constructs social ideologies. Another approach is to model the social factors of linguistic variation and change in terms of networks of relationships among individuals, such that networks with dense ties among individuals inhibit linguistic change, while weak ties facilitate change (see, for example, L. Milroy 1987, 2002; L. Milroy and J. Milroy 1992). Apparent correlations between different kinds of social networks and certain kinds of social categories point to similar generalisations about language change; namely that the leaders of linguistic change tend to be upper working class women who have many weak ties within a community (cf. Labov 2001; L. Milroy 2002).

The models described here provide motivations and explanations of the linguistic variation through the behaviour of individuals, but it is not clear how easily they can be scaled up to the level of the community. As L. Milroy (2002: 567) notes, the dense network ties described as creating cohesion and inhibiting language change at a local level, result in 'fragmentation' when viewed from the level of the broader community. And the weak ties, described as facilitating linguistic change, and thus linguistic diversity, at a local level, create 'linguistic uniformity' on a large scale. It is clear that social factors are also important in shaping linguistic variation and change on a global scale (see **Greenhill**), and simulations that build on local-level case studies and generalisations to plot the effects of individual behaviours at

the community level (see, for example, Baker 2008; Clark 2010; Kirby and Sonderegger 2013; Wedel 2006) are an insightful way to bridge the gap between models of individuals, populations and languages. Significant as these individual- and community-based understandings of language change are, their empirical underpinnings are primarily Western, and typically English-speaking, urban societies, while more recent sociolinguistic and variationist research on minority languages and in non-Western societies clearly needs to be incorporated into any theory of language change (see Stanford and Preston 2009).

As Bradshaw (1995) notes, theories which ask the question 'why do languages change?' ignore the human agency in such processes; he prefers the question 'why do people change their languages?' Such a framework, however, avoids confronting the question of how much *individual* agency there is in language change; individuals may be selecting features or adapting their behaviour which may only result in an identifiable *change* generations in the future. Some changes may be unconscious accommodation, and others (such as those based on the deduction of features based on pools of features variants) may involve no more agency than learning language in the first place. Kirby's (2013) modelling of phonologisation involves speaker 'agency' in that speakers maximise certain cues at the expense of others, but the cues to be enhanced are not picked consciously. We do not take the phrase 'how do languages change?' to imply that human agency or conscious variant choice is impossible; merely that it is only one of a number of different mechanisms.

4.3 Motivations for change

A theory of language change needs to account for the causal factors that underpin both the occurrence and absence of change in language. Models of language change based on the behaviour of speakers as individuals and as members of communities often look to internal, namely cognitive and physiological, or external, namely social, causes of change. Much of the literature on what motivates language change centres on discussions of a distinction between 'internal' versus 'external' factors, the relative contributions of each to linguistic change, the relationship between them, and whether they do indeed form a valid descriptive and/or theoretical distinction.

This apparent dichotomy between internal and external causes of change appears to have developed as an accident of the history of the study of language change. Historical linguistics flourished in the nineteenth century, but with a focus on the individual; linguistic behaviour, including the regularity of sound change, was viewed as deriving from psychological factors of the individual, and the importance of the individual in understanding language and language change continued in the work of Saussure, and in generative theories of language (see Weinreich *et al.* [1968] for further discussion). This development of the field firmly placed the causes of language change within the grammar of an individual speaker – that is, change was internally motivated.[18] However, such a model of linguistic change was clearly unable to account for all the empirical data; the Neogrammarians, for example, included analogy and dialect borrowing as causal factors that led to change which did not follow the regularity seen with internally-motivated change. The causes of changes that could not be explained as internally motivated came to be described as externally motivated, and the apparent dichotomy between internal and external change now has a prominent place in the historical linguistics literature (see, for example, Gerritsen and Stein 1992; Farrar 1996; Yang 2000; Croft 2000; Pargman 2002; Jones and Esch (eds) 2002;[19] Torgersen and Kerswill 2004; and Hickey 2012).

But how is the distinction between internal and external change defined? The answer to this question differs depending on the framework within which a particular scholar is working and the kinds of empirical data they are aiming to explain. For those striving to add a robust diachronic component to generative theories of language the distinction between internally- and externally-motivated change aligns with the distinction between I-language and E-language. While the locus of all language change is seen to be a child's acquisition of a different grammar from that of the previous generation, change can be constrained by "the *internal* knowledge of UG [Universal Grammar]" and the "*external* linguistic evidence" (Yang 2000: 232; emphasis ours). Other approaches to the distinction between internal and external change were also responses to apparent gaps in the prevailing conventions of explaining language change in terms of changes to language-internal factors.

Weinreich *et al.* (1968), in setting out the goals of an empirically-based theory of language change, conclude with a number of statements on language change that need to be incorporated into any theory of change, the seventh of which is:

> Linguistic and social factors are closely interrelated in the development of language change. Explanations which are confined to one or other aspect, no matter how well constructed, will fail to account for the rich body of regularities that can be observed in empirical studies of language behavior.
>
> (Weinreich *et al.* 1968: 188)

Researchers who took up this challenge of incorporating social factors into their models of language change thus distinguish between "[a]ny change which can be traced to structural considerations in a language and which is independent of sociolinguistic factors" (Hickey 2012: 388) versus "[a]ny variation and change in a language which can be connected with the community or society using that language" (Hickey 2012: 389), as being internally- and externally-motivated, respectively. Thus, in the domain of historical sociolinguistics the distinction between internal and external change is perceived as one between change that is motivated by factors relating to language structure at the level of the individual in contrast to change that is motivated by factors relating to the social aspects of language use at the community level.

A final way in which internal and external change are defined relates to language contact. As described by **Lucas**, it has long been recognised that language and dialect contact plays a role in language history. However, contact-induced language change had, with a few notable exceptions (see, for example, Dawkins 1916; Bailey 1973; Thurston 1987), been marginalised within historical linguistics until the publication of Thomason and Kaufman's (1988) book. Thus, within the language contact literature, external changes are those which have been brought about by the bilingual or multilingual setting of the speech community in which the language is spoken (see **Lucas** for more detailed discussion).

So what does this distinction – regardless of how it is defined – mean for a general theory of language change? That is, is it a distinction that is fundamental to explaining the occurrence *and* absence of linguistic change or is it simply a useful descriptive tool for developing an understanding of the kinds of mechanisms of change that any theory needs to account for? While initially discussions of internal and external change aimed at highlighting the importance of external factors – E-language, social factors or language contact – in accounting for language change, it quickly became apparent that it is the interaction between these two 'kinds' of change that is important for a general understanding of change (see, for example, Yang 2000; Farrar and Jones 2002; Hickey 2012). For Thomason and Kaufman (1988), a

different process of language transmission lies behind external, or contact-induced, language change. Thus they (1988: 9–10) described internal change as occurring in situations where the transmission of a language is from older to younger generations within a speech community exhibiting "regular internally motivated" and "relatively small degrees" of change – and external change as occurring in situations outside of this default case, including those where "transmission is imperfect" in some way (see Thomason and Kaufman 1988 and **Miceli** for further discussion). More recent theories and models of language contact typically focus on the role of individual bilingual (or multilingual) speakers (see, for example, Van Coetsem 2000, **Lucas**), but it remains true that the distinction between internal and external, contact-induced, change relates to the process of language transmission within bilingual social settings. However, although the process of transmission is seen as different, the kinds of change in terms of linguistic features are not seen to be distinct. That is, as Thomason and Kaufman (1988: 57ff; see also Thomason 2010) state, a single change may result from multiple motivations – internal and external – highlighting the need for an understanding of the interaction among different causal factors in any theory of language change. Similarly, but with different reasoning and argumentation, Labov (2007) presents the distinction between internally- and externally-motivated change as one that relates to the different processes of transmission in child and adult language learning (cf. Trudgill 2011). However, in earlier work Labov (1994, 2001) also argued that internal and external changes were different linguistically, suggesting that particular kinds of socially motivated linguistic changes are above the level of social awareness, while others are below the level of social awareness.[20] Although, as Labov (1994, 2001) suggests, certain kinds of (sound) change may be more or less likely to be socially (thus externally) determined given differential social awareness of linguistic features, this approach still leaves some open questions. As Hickey (2012) points out, while incorporating social causes into an account of language change improves our understanding of reversals of change, changes that are otherwise counterintuitive, and indeed lack of change, it does not seem possible that social factors can explain the cross-linguistic tendencies for some kinds of change to be more frequent than others. Rather, internal factors – ones "connected to structural features of language (in phonology and morphosyntax) or to contingencies of language production (in phonetics)" (Hickey 2012: 392) – are needed to account for this.

Regardless of how internal and external change are defined, the current consensus is that a theory of language change needs to move away from viewing it as a fundamental distinction. For Hickey (2012), structural and social factors are different, but complementary, with internal factors determining the direction and linguistic nature of change, and external factors determining the actuation and transmission of change. This parallels the ways in which cognitive, physiological and linguistic factors, alongside social factors have been found to be crucial in modelling sound change (cf. Garrett and Johnson 2012; Kirby 2013; Baker 2008; Clark 2010). Mufwene (2001, 2007, 2008), who takes an evolutionary approach to language change, argues that the distinction between internal and external is an "artificial" one, and that "all language changes are externally-motivated, in the sense that motivation for [...] change is external to language structure" (Mufwene 2007: 66). For Mufwene, change reflects processes of competition and selection of linguistic variants within the communicative system(s) that are available to speakers. All language change is thus underpinned by the same mechanisms, regardless of whether speakers are accommodating to each other through use of one or more linguistic systems (see Mufwene 2001: 15ff).

5 The current volume

The current volume builds on the recent recognition of historical linguistics as central in understanding not only language history and change, but also many aspects of synchronic linguistics, and it presents the state of the field, the methods which underpin recent work, models of language change, and the importance of historical linguistics for other subfields of linguistics and other disciplines.

Historical linguistics today is very different from what it was in 1968 when Weinreich *et al.* set out the 'empirical foundations' for a theory of language change. The study of language change has broadened and taken on specialised knowledge from other subfields of linguistics, as well as other disciplines, and this is the research that is shaping the field and taking historical linguistics forward. Although the traditions of historical linguistics are grounded in the study of European languages (especially Germanic and Romance), there is a noticeable shift in recent research to work on other language families.[21] This is in part driven by the recent focus on language documentation and description that allows progress in language classification and linguistic reconstruction; see, for example, recent work in South America (e.g. Heggarty and Beresford-Jones 2012; Epps and Stenzel 2013; Walker and Ribeiro 2011; Michael, Donohue and Epps in preparation; Moore and Romney 1994; Chacon forthcoming) and the New Guinea region (e.g. Foley forthcoming; Pawley 2012; Hammarström 2012; Wichmann 2012; Evans 2012; Holton *et al.* 2012; de Vries *et al.* 2012, Stebbins, Evans and Terrill forthcoming; Suter 2012; Daniels 2010; Loughnane and Fedden 2011). Research on non-European languages is also adding to the understanding of processes of change and reconstruction methodology, as can be seen in recent work on Australian languages (Bowern and Atkinson 2012; see also **Miceli**). This volume reflects these new trends, presenting historical linguistics from different perspectives, including a range of languages and language families, different theoretical approaches, and different fields of study within and beyond linguistics.

The volume comprises five parts: (i) overviews; (ii) methods and models; (iii) language change; (iv) interfaces; and (v) regional summaries. The diverse chapters in each of these parts together provide a picture of historical linguistics that encompasses the traditions and recent developments of core issues and topics within the field, as well as the new theories and methods that are currently driving the field forward.

5.1 Overviews

Following this introduction, the three chapters in Part I present holistic views of the field of historical linguistics, providing an overview of current debates and a bird's-eye view of the state of the field. Based on extensive empirical and theoretical research experience, Roger Lass, Paul Kiparsky and Nigel Vincent take three very different angles on understanding the history and future of the field. **Lass** takes the birth of historical linguistics as his point of departure, exploring the ideas that formed the beginnings of the field, particularly with respect to genealogy and reconstruction, and highlighting the current relevance of classic nineteenth-century works, such as Verner (1877 [1875]). **Kiparsky**, in contrast, takes the perspective of recent trends and developments to investigate progress on answering the 'what', 'how' and 'why' of language history. He places historical linguistics as a central point among different branches of linguistics and emphasises the need for the field to truly unify synchrony and diachrony. **Vincent** also highlights the importance of integrating diachrony and synchrony. He, however, takes a single fundamental principle of natural

language, namely compositionality, and investigates the ways in which it adds rigour to diachronic analyses and how historical understandings of it add to our understanding of synchronic language structure.

5.2 Methods and models

The Comparative Method is a cornerstone of historical linguistics and remains the most widely-accepted method for establishing historical relationships among languages and for reconstructing linguistic history. Despite the continued relevance of the Comparative Method, recent years have seen developments in historical linguistics that both complement and extend traditional models and methods. These include computational methods for investigating linguistic phylogenies (e.g. **Dunn**), simulation modelling of linguistic change and maintenance (e.g. **Hamann**), and theories of diachronic stability and diversity across time and space (e.g. **Greenhill, Wichmann**), which are currently at the forefront of historical linguistic research. Due to space and time limitations, we were unable, however, to include chapters describing the complete toolkit of historical linguistics.[22]

This section of the volume begins with **Weiss**' critical assessment of the Comparative Method and broader discussion of its two main uses – language classification and linguistic reconstruction. **Weiss**' and **Hale**'s contributions highlight different facets of the Comparative Method using examples from two language families that are often viewed as exemplars of its success, namely Indo-European and Austronesian (cf. **Fortson** and **Kikusawa** respectively). **Weiss**' chapter sets out the fundamentals of the method – the details of how it can be applied to sets of lexical data, the principles it presupposes with respect to language change, its limits, and its extension into aspects of historical linguistics beyond phonological reconstruction. **Weiss** focuses in part on regularity: why *systematic* correspondences between languages are essential for principled comparison, and how regularity can be used as a heuristic for identifying loans and dialect mixing. He also highlights the way in which different aspects of the Comparative Method, subgrouping and reconstruction provide mutually informing evidence. That is, discovering the history of a language family involves a back and forth between subgrouping hypotheses, hypotheses for directionality in change, and formal reconstruction; all of this is made possible by the systematicity of change and the principled nature of exceptions to regularity.

Hale also begins his chapter with a traditional table of lexical data like that found in so many textbooks and handbooks of historical linguistics to illustrate the use of the Comparative Method. However, in contrast to many other discussions of the method, **Hale** investigates the 'hidden complexities' of such a set of data. Taking a narrow definition of the Comparative Method and a more 'instrumentalist' than 'realist' view of reconstructed proto-languages, **Hale** sets out the theoretical underpinnings of each step of data analysis and interpretation in applying the method, examining such assumptions as the object of comparison ('languages' or 'grammars'; cf. section 3.1 above) and the meaning of linguistic representations such as phonemes.

Both **Weiss** and **Hale** present qualitative methods of investigating language history and language relationships, but such approaches can now be complemented by quantitative methods that can test not only hypotheses of language relationships and language change, but also those relating to human dispersals and processes of cultural change. **Dunn**'s chapter presents an overview of such quantitative methods, which are driving the field of historical linguistics into new areas of research, but are not uncontroversial in their use and the interpretation of their results. The phylogenetic approaches that **Dunn** discusses are embedded

in evolutionary models of language change (see section 2 above), which place our understanding of language change within more general theories of evolutionary processes, and incorporates rigorous and quantifiable phylogenetic inference into models of language history. Phylogenetic approaches, and indeed traditional applications of the Comparative Method, are typically closely linked to tree-like models of language diversification. These are models that **François** argues are likely only realistic in a small proportion of the world's language families. Instead, **François** pays special attention to the utility of networks in modelling language diversification and the relationships among languages within a family. His Historical Glottometry method (see also Kalyan and François forthcoming) builds on the wave model of language diversification, but quantifies the "cohesiveness" and "subgroupiness" of languages based on detailed mapping of shared innovations. **Wichmann**'s chapter is also concerned with patterns of shared linguistic features, but while **François** discusses methods that use and build on the Comparative Method, **Wichmann** looks at methods that move away from the traditional focus of history based on shared form–meaning pairings to the diachronic behaviour of abstract linguistic features. This chapter presents some of the major research on diachronic typology, beginning with Greenberg (1978) and summarising current research through the results of Wichmann and Holman (2009). **Wichmann**'s chapter, and the body of research it represents, explores the notion of stability, defined in different ways (see section 2.2), which along with related work on rates of change, forms a crucial part of more general understandings of mechanisms of change (cf. **Greenhill**) and processes of language diversification (cf. **François**, Gray *et al.* 2010).

5.3 Language change

Developing a theory of change and continuity in language is a primary goal of most research in historical linguistics, and this section explores what is currently known about linguistic change from two perspectives – change in particular domains of language, and general principles of language structure and use which are shaping theories of language change. Common threads that run through the chapters in this section are those issues described earlier in this introduction, including the linguistic and non-linguistic motivations of change, linguistic variation and change in progress, as well as the actualisation of change throughout a speech community. **Vincent**'s chapter, though appearing in Part I, is also very relevant here.

As described in section 3.3, it is not necessarily the case that language change proceeds in the same way in different domains of language, and thus any theory of language change needs to incorporate both the similarities and differences in mechanisms and processes of change across different domains. This section of the volume includes eleven chapters that explore in detail language change in specific domains of language, including phonetics and phonology (**Garrett, Hamann**), morphology (**Anderson, Koch**), syntax (**Frajzyngier, van Gelderen, Barðdal**), semantics (**Urban, Deo**), lexicon (**Mailhammer**) and discourse and pragmatics (**D'Arcy, Deo**). While it is practical to have these chapters divided up along the lines of traditional linguistic domains, each chapter shares the common goals, set out by **Garrett** in terms of three of Weinreich *et al.*'s (1968) questions: what changes are possible?; how is a change embedded in linguistic and social structures?; and why does a possible change take place when and where it does? In some cases the answers to these questions are specific to the linguistic domain under discussion, while in others they cut across the different domains; compare, for example, **Koch**'s discussion of the specific knowledge of morphological change that is needed to undertake morphological reconstruction with **Anderson**'s statement

that the general mechanisms of morphological change are no different from, and a subset of, those found in other linguistic domains.

Garrett's and **Hamann**'s chapters illustrate different ways in which progress has been made in understanding sound change, and raise different outstanding questions. It is now generally accepted that "sound change emerges from phonetic variation and a process of selection," but as **Garrett** describes, there is less agreement on what drives the selection processes and how to link the relevant individual psychological factors and community social factors. **Hamann** locates the seeds of phonological change in differences between generations of speakers, but again suggests that the selection process raises questions; why does a speaker add a phonological rule and how does this lead to a different grammar in the child language learner? Despite these differences both chapters highlight the importance of understanding the different roles of speakers and listeners and of modelling change across a speech community.

The two chapters on sound change focus on issues of change alone and make little mention of methods of reconstruction. The very nature of the Comparative Method (see **Weiss, Hale, Lass**) means it is best suited, or some would say *only* suited (Harrison 2003), to the lexico-phonological domain, where arbitrary form–meaning pairings can be used to establish cognacy. Reconstruction in other domains is more controversial and is explicitly addressed alongside change (see **Urban**) or is the topic of separate chapters (see **Barðdal, Koch**). As mentioned above, with respect to morphology this has led to two chapters with rather different perspectives. **Anderson** is concerned with possible kinds of morphological change, and argues that the abductive and deductive mechanisms that underpin them are equivalent to those found in other domains. In contrast, **Koch**'s chapter, with its focus on morphological reconstruction, is concerned with the details of possible morphological change in order to 'undo' changes and so reconstruct earlier morphological systems. **Koch** highlights the differences between morphological and phonological reconstruction, but also illustrates how the principles of morphological reconstruction build on those established in phonology. As **Barðdal** describes, syntactic reconstruction is very different from phonological reconstruction and has been viewed not only as controversial but also impossible, primarily because of the apparent difficulty in establishing cognacy among syntactic objects (see also section 3.3 above). Construction Grammar (Goldberg 1995), that views syntactic structure as form–meaning pairings, provides a solution to this problem, which **Barðdal** illustrates with a study of case frames in Indo-European languages.

Like **Koch**, **Barðdal** also highlights the need for syntactic reconstruction to be based on adequate theories of language change, but suggests that current models do not account for the diversity of change found in different syntactic systems. The two other chapters on syntax illustrate how different theoretical perspectives account for different aspects of syntactic change. Individual language learners are the instigators of change in the generative approach, presented by **van Gelderen**, and so research in this framework tends to focus on internal causes of change. As **van Gelderen** describes, this is useful for explaining certain kinds of change, such as those that result in system reorganisation, but often does not account for the propagation of change beyond individual speakers. **Frajzyngier**, taking a functional approach, presents a very different view of syntactic change. For him, change is motivated by communicative functions that are explained through a range of language internal and external factors, and which are shown to account for a range of different kinds of syntactic change.

These two views of syntactic change are often taken to reflect opposing formal and functional perspectives on language change. However, as **Vincent** and **Deo** argue, these two approaches are not incompatible with each other. The view that grammar is shaped by

cognitive and communicative functions implies that change occurs gradually via the interactions of speakers (cf. **Bybee and Beckner**), which is often contrasted with the abrupt nature of change within the grammars of individual speakers under a generative approach (**van Gelderen**). However, **Deo** demonstrates how current theories of meaning, especially formal pragmatics, have come to model interactions between, for example, semantic content and utterance context. In this way, **Deo** argues that synchronic and diachronic approaches to language should be brought together (cf. **Kiparsky, Vincent**).

'Interactions' are also the focus of **D'Arcy**'s approach to change in discourse structures. However, for her the embedding question – that is, the path a change follows through both the language and the speech community – is central to understanding language change. Discourse structure is the domain of language where "speakers must negotiate meaning" and **D'Arcy** demonstrates how a variationist sociolinguistic approach offers insights into the processes of speaker interaction and negotiation that influence change.

Deo's and **D'Arcy**'s chapters are, however, restricted to explaining semantic and pragmatic change in functional items. **Urban** tackles semantic change in the lexical domain, and also highlights the role of synchronic lexical semantics, especially polysemy, in any understanding of diachronic semantics. While **Mailhammer** stresses the continuing importance of etymology and lexical reconstruction in broader understandings of language history, **Urban** discusses how semantic reconstruction, an equally crucial component of lexical reconstruction to phonological reconstruction, has received little attention in comparison to the long history of research on semantic change. Besides providing overviews of previous research on semantic reconstruction in the lexical domain, **Urban** sets out additional observations that form a basis for developing methods and principles of semantic reconstruction.

Each of the chapters described above on linguistic change and reconstruction in different domains of language is concerned solely with spoken languages, but how similar or different are the historical processes found in the development of sign languages? **Fischer** argues that sign languages raise issues relating to language change that have been easy to ignore in the study of spoken languages, thus broadening our theories of change. Sign languages are different from spoken languages in a number of ways that are directly relevant to understanding both their history and the history of spoken languages. The sociolinguistic context of sign languages, including that children and adults learn the language at different ages, peers rather than parents are influential in the language acquisition process, signers show varying degrees of acquisition of the surrounding spoken language, and that there is a great degree of variation in sign languages, clearly affects the emergence and development of sign languages.

As described in section 4.1, the transmission of language between generations and the acquisition of language by children are often seen to be the locus of change (see **Hamann, Anderson, van Gelderen**), but what exactly is the role of acquisition in language change? This is the topic of **Stanford**'s chapter. In his discussion of language acquisition and change, Stanford does not limit himself to child language acquisition, but rather takes a 'community-oriented approach', and also considers the ways in which different age cohorts in a community influence change. **Stanford**'s own approach is a variationist one and so addresses the process of variant selection, which like **D'Arcy**'s discussion of discourse structure, necessarily incorporates social factors. **Michael**, who takes on the task of describing the social factors of change, explores not only the ways in which social and cultural factors facilitate the propagation of particular linguistic variants, but also the propagation of a linguistic variant across a socially-structured network of speakers within a community. And despite the fact that variationist sociolinguistic research often has a strong focus on large industrialised Western speech communities, **Stanford** and **Michael** highlight the importance

of incorporating a greater range of human societies into any broader understanding of the social dimensions of language change. These chapters focus on the social, or external, influences on language change, but others in the volume pay more attention to internal factors. **Van Gelderen**, for example, defines change as the internal reanalysis in a speaker's mind. Both **Garrett** and **Hamann** look to the cognitive factors that affect the outcomes of phonetic and phonological change, respectively, with Hamann, in particular, also concerned with simulating speaker/listener interaction and a change's spread throughout a speech community. **Bybee and Beckner** specifically address the cognitive mechanisms that underpin all language change. They take a usage-based view of language and describe in some detail the ways in which cognitive processes, including categorisation, chunking, habituation, and priming trigger language change. Similarly to **Stanford** and **Michael, Bybee and Beckner**, argue that any model of language change needs to incorporate the roles of children, adolescents and adults.

Many chapters in this volume, as in the historical linguistic literature, mention and then put to one side the issues of language contact. Language contact has flourished as its own field of research, and like historical linguistics in general, is connected to many fields of synchronic linguistic research and other non-linguistic disciplines (see section 1 above). In presenting aspects of language contact that are most relevant to developing a theory of language change, **Lucas** focuses on the mechanisms that underlie contact-induced change and how the linguistic variation that results from individual and community bilingualism influences change. **Lucas** builds on Van Coetsem's (1988, 2000) model of contact-induced change, and thus pays close attention to the role of individual speakers, suggesting that generalisations about contact-induced change should be looked for in cognitive processes associated with bilingualism, including the acquisition of a second language and reduced accessibility, or attrition, of a first language. For **Lucas** apparent attrition of a first language is a matter of language performance rather than language competence. This is in contrast to **Simpson** who explores "shifts in ways of talking" in terms of language use by individuals and communities, discussing both the range of sociolinguistic settings that could be broadly described as "reflecting the disappearance of a way of talking," and the diverse effects that this may have on linguistic structure.

5.4 Interfaces

Historical linguistics is seen more than ever as a core discipline in the study of human (pre) history, and in recent years has taken on a more central role in innovative and interdisciplinary approaches to studying the past in many regions of the world (see, for example, Evans and McConvell 1997; Pawley *et al.* 2005; Ross, Pawley and Osmond 1998, 2003, 2008, 2011; Bowern 2010; Epps forthcoming). The four chapters in this section provide different examples of the ways in which linguistic and non-linguistic knowledge may together provide insights into the past.

Greenhill explores language history on a global scale, asking what drives the great variation in linguistic diversity worldwide. Linking explanations of this diversity to rates and causes of language change, **Greenhill** looks at the different ways in which the dynamics of human populations may (or may not) influence language change and thus patterns of linguistic diversity. This chapter also highlights new methods and computational simulations (cf. **Dunn**) that allow for effective quantitative testing of different hypotheses on such a large scale. Some of the hypotheses that **Greenhill** considers relate directly to questions that **Heggarty** describes as key in the "search for correspondences between linguistics and

archaeology," namely the *where*, *when* and *why* of language history. For **Greenhill** these are questions of how geography and ecology, time depth, and a range of social factors may have influenced global patterns of language distribution, while **Heggarty** focuses on the links between historical linguistics and archaeology that centre around major language families and processes of geographic expansion. At the level of language families, these three questions relate to locating the homeland, dating expansion from the homeland area, and motivating the dispersal of the ancestor language. Historical linguistics and archaeology approach these questions in different ways, and as **Heggarty** describes, particularly with respect to Indo-European, hypotheses established both within and across the two disciplines can be hotly debated. **Heggarty**'s chapter is a cautionary one. Echoing Renfrew's (1987: 287) famous comment about linguistics and archaeology "building on each other's myths," he warns of the need to keep the research of each discipline independent of the other. He also warns of the difficulties in accurately reconstructing (pre)history from the linguistic record.

Just how much the linguistic record can tell us about the past is taken up by **Epps**. While also setting out the caution that must be taken, **Epps** highlights the ways in which historical linguistics provides a window into facets of the past that are not recoverable from the archaeological record, including aspects of society and culture, and interaction among social groups. **Epps'** focus is not only on the ways in which well-supported reconstructions of lexical and grammatical aspects of proto-languages can shed light on the lives of past speakers and speech communities, but also on how historical linguistics is able to build on the growing body of linguistic documentation and description to investigate the histories of small language families, and regions of language contact. Often the linguistic evidence of social contact can be striking and provides a basis for building up hypotheses on the nature of past social contact and interaction (cf. Ross 1997, 2013). As **Pakendorf** describes, these hypotheses can be tested using research in molecular anthropology. Her chapter presents a case study from Zambia, to illustrate the ways in which matches and mismatches in the distributions of genes and languages can lead to a more detailed picture of the social processes that lie behind different outcomes of contact-induced change.

Each of these chapters not only highlights the contribution that historical linguistics makes to our understanding of the human past, but also how much historical linguistics can learn from other disciplines. Some linguistic patterns may only make sense with knowledge from outside the discipline, a point made clear by **Pakendorf**. Also, insights from other disciplines allow us to introduce new ways of thinking about old problems and to reframe our research questions.

5.5 Regional summaries

The final section turns to using historical linguistics to understand the linguistic history of a particular family or region. The strong empirical basis of chapters in the preceding sections show the ways in which data from languages worldwide are needed to contribute to our understanding of language change and linguistic histories. The chapters in this section also have a strong empirical basis, but focus on specific sets of languages and how as a whole they contribute to the discipline. Each chapter in this section: (a) provides a brief overview of a particular language family or region for non-specialists; and (b) highlights the relevance each group of languages has for the field more broadly. The section consists of five chapters: three on well-established language families – Indo-European, Austronesian and Austroasiatic; one on a language family whose status has been debated – Paṃa-Nyungan; and one on a linguistic area – the Pacific Northwest.

The vast literature on different language families and regions of the world highlights the success of the field of historical linguistics, particularly with respect to using language as a tool for investigating the past. **Fortson** describes some aspects of Indo-European phonological and morphological reconstruction, demonstrating ways in which such details of Indo-European are relevant beyond the language family in terms of general methodological issues, including the role of typology in assessing reconstructed linguistic systems and limitations of the Comparative Method in reconstruction. **Kikusawa** discusses the history of phonological reconstruction in Austronesian, setting out some of the conflicting reconstructions found in a language family where traditional methods of phonological reconstruction (cf. **Weiss, Hale**) have led to a deep understanding of phonological histories. **Sidwell** focuses almost entirely on phonological reconstruction in his chapter on Austroasiatic, illustrating how the typologically diverse phonological systems of attested Austroasiatic languages can be understood diachronically, through changes in syllable structure. Austronesian and Austroasiatic present language families with very different phonological histories, but along with Indo-European, understanding change within each family has contributed to general understandings of sound change (see **Garrett**, and references therein).

Indo-European, Austronesian and Austroasiatic are language families for which we have detailed linguistic reconstructions (see, for example, Fortson 2010; Blust 2009; Blust and Trussel 2013; Ross, Pawley and Osmond 1998, 2003, 2008, 2011; Shorto 2006; Sidwell 2000, 2011). We see similar, though currently less extensive, linguistic reconstruction for the Pama-Nyungan languages of Australia (see, for example, Bowern and Koch 2004), and yet unlike these other three language families, Pama-Nyungan languages are ones whose very status as a family has been the subject of heated debate. As **Miceli** describes, while many Australianists view Pama-Nyungan as a language family, Dixon (2002) rejects the notion of Pama-Nyungan as either a genealogical or areal grouping. Rather than joining this debate, **Miceli**'s chapter instead turns to the theoretical questions that underpin it. That is, she asks what is meant by genealogical relationship and what kind of evidence is needed to support a hypothesis of genetic relatedness. **Miceli**'s concluding questions relating to our understanding of multilingualism, sociolinguistics and linguistic transmission are ones that are invaluable for deeper understandings of the history of all groups of languages – regardless of whether the historical connections between the languages concerned are best described as genealogical or contact-induced.

The final chapter in this volume turns to a group of languages whose histories need to be understood from both genetic and contact perspectives. The Pacific Northwest appears often in the literature among the classic cases of linguistic areas – groups of languages whose shared linguistic features are explained diachronically through contact-induced change. (See Matras, McMahon and Vincent 2006 and Enfield 2005 for case studies of other linguistic areas.) However, as **Thomason** shows, the histories of the individual linguistic features that provide support for the Pacific Northwest as a linguistic area are not well understood. The chapter provides an overview of the features that are shared within and across language families of the north-western Pacific region and explores the possible diachronic explanations for the attested and reconstructed linguistic data. Through her discussion of this region, **Thomason** highlights some of the fundamental questions relating to linguistic areas in general, such as how they can be understood in the broader context of language history and contact-induced change, and how multiple factors, including both inheritance and contact, can be incorporated into models of language history.

6 Concluding remarks

As this chapter has emphasised, five questions of Weinreich *et al.* (1968) are as relevant now as they were 45 years ago and still permeate the discipline: (i) *what* constrains language change; (ii) *how* linguistic states transition from one to another; (iii) *how* change is embedded in linguistic and social structures; (iv) *how* variation is evaluated; and (v) *how* the actuation of change can be explained.

The ever broadening empirical basis of the field through the documentation and description of an increasing proportion of the world's languages has allowed historical linguists to establish more robust typologies of change, thus adding to our knowledge of *what* kinds of change are possible in language. But the *how/why* questions also tell us about the *what* of language change. For example, biases in production and perception that provide explanations of the actuation of sound change also explain why some types of change are very common and others exceedingly rare. These *how/why* questions have been investigated differently in different areas of historical linguistics. Thus, studies of sound change address the transition and actuation questions through the roles of physiological and learning characteristics of speakers as individuals, and use simulations to test the way individuals' use of variant forms becomes embedded in a speech community. In contrast, historical sociolinguistics investigates the actuation and embedding questions by defining individuals who are social leaders of change and the spread of linguistic variants across a community via social networks. In addition, language ideologies are used to explain individual and community evaluation of linguistic variants. Evolutionary views of language change focus on the nature of linguistic variation rather than on individuals versus communities, and such a perspective forms the basis of phylogenetic methods that map transitions from one linguistic state to another, and thus linguistic change and diversification at the level of language families and linguistic areas. However, these, and most other, approaches to *how/why* questions share the notion of uniformitarianism – that processes and mechanisms of language change are essentially the same across languages and societies and across time – but investigations of *what* questions raise doubts regarding its validity. For example, it is not clear that social factors known to influence language change, such as social interactions, networks and organisation, are socio-culturally or historically uniform (cf. Stanford and Preston 2009; Trudgill 2011; Marvel *et al.* 2013).

This volume highlights historical linguistics as a field informed by and informing many different subfields of linguistics, as well as other disciplines, each of which tells us something of the nature of language change. We may not have achieved a single generalised theory of language change, but having such a common goal brings together researchers from diverse perspectives, allowing us to resolve some questions and to ask new ones. This greater understanding of language change, in turn, informs and is informed by other goals of historical linguistics, including its role as a tool to understanding language structure, human (pre) history, and human cognition and psychology. The chapters in the volume represent the current diversity of historical linguistics and the questions, models and theories that are driving it forward. We can end by echoing **Garrett** on sound change, and say that the volume demonstrates the dramatic changes that have defined and continue to define historical linguistics, and looks to coming generations of historical linguists to shape the field in new ways that deepen our understanding of both language and change.

Notes

1 While writing this introduction, we have benefited from discussions with Nick Evans, Simon Greenhill, Jennifer Hendriks, Andrew Pawley and Malcolm Ross. We'd also like to thank Simon Greenhill, Jay Jasanoff, Luisa Miceli, Joe Salmons and Nigel Vincent for comments on an earlier draft. We gratefully acknowledge funding from National Science Foundation grant BCS-1237202 'LSA Satellite Workshop: Foundations of Historical Linguistics', which allowed us to present many of the chapters in this volume to an audience at the Linguistic Society of America's Annual Meeting in Boston, Massachusetts, in January, 2013.

2 Witness, for example, the establishment of new journals (*Journal of Historical Linguistics*, *Journal of Language Dynamics and Change* and *Historical Syntax*) within the last three years.

3 Throughout this introduction, references to other chapters within the volume are indicated by the contributor's name in bold. Summaries of the chapters are given in section 5.

4 Weinreich *et al.* (1968: 187f) also propose a number of general statements on the nature of change that have been equally influential in the subsequent literature. These will not be described here, but we return to them in following sections.

5 Some discussion can also be found in McMahon and McMahon (2012: 14–16), including on the question of biological evolution as a metaphor for studying linguistic change. However, they explicitly state that their view of *evolutionary linguistics* concerns the evolution of language (i.e., the origin and development of the language faculty), rather than changes within language.

6 For a similar debate regarding the status of 'memes' as units of cultural evolution, see for example, Henrich *et al.* (2008) and the references therein. Croft's discussion of recombination follows Hull's (2001) generalised model of evolution 'General Analysis of Selection' in which the central element of evolution is the *replicator*; there is also an *interactor* which causes the differential replication of replicators (that is, resulting in differential selection) by interacting with its environment.

7 Note that this is not the same as a 'domain-neutral' model (Thomsen 2006: 12–13); we make no claims at this point regarding general theories of 'evolution'.

8 Kroeber (1948: 260–61) is a clear example; he contrasts a 'tree of species' with the descent patterns in cultural evolution, which "… is a ramification of … coalescences, assimilations, or acculturations." For further discussion and especially critiques of phylogenetic evolutionary methods in cultural domains, see Moore and Romney (1994) and Gould (1987).

9 Towner *et al.* (2012) propose a novel way to test the relative amounts of horizontal and vertical transfer in different areas of culture. They also discuss the ramifications of such models for tree structures. Importantly (and perhaps controversially) for linguists, they use linguistic affiliation as their proxy for phylogenetic/treelike structure (and geography to test horizontal transfer), on the grounds that language is a 'cultural trait' that 'characterises the history of populations' (compare also Gray *et al.* 2010; see **Hale** for a different view).

10 The views of change as involving 'grammars' tend to be underspecified with respect to sociolinguistic models (that is, the actuation aspect of change); alternatively, they locate change as purely (or overwhelmingly) a function of child language acquisition, which, as **Stanford** shows, is problematic. Sonderegger and Niyogi (2010) show from simulation studies that a neutral model of change is not sufficient to account for the patterns we find, and that social selectional pressures must also play a role.

11 Given that we have an imperfect record of variation in languages over time, some shifts in variant frequencies will have the appearance of innovations *de novo*. Others will be genuine innovations.

12 We do not, however, deny the fact that these models are based on assumptions about language change which also need to be discussed and debated.

13 For example, see McMahon and McMahon's (2005) discussion of several southwest Australian vocabularies. McMahon and McMahon treat the difficulty of calculating a phylogeny for the vocabularies as evidence for punctuated equilibrium (Dixon 1997). In fact (as discussed by Bowern [2007]), the vocabularies are poorly attested varieties from closely-related languages, and the languages most probably do not show a clear phylogeny because the data are scrappy, incomplete, and the languages are closely related, without clear bunching isoglosses.

14 For an example of this problem, see Hunley *et al.*'s (2012) critique of Atkinson's (2011) claim that phoneme inventory size supports a serial founder effects process in linguistic change. Hunley *et al.* showed that only one of four predictions was satisfied, and so the same processes were unlikely to account for both the linguistic and genetic data.

15 For further discussion and defence of the use of lexicon in computational methods, see Greenhill and Gray (2012).

16 One difference between the standard generative models of change and the individual evolutionary model, however, is in the *cause* of the change. In standard generative models, innovations are usually seen to be the result of imperfect learning (see further section 3.2 below); in evolutionary models, however, innovations are primarily driven by exposure to different input data.

17 Thomason and Kaufman are clear about this, stating that although creole formation may not constitute the typical kind of language transmission, once the creole is established, it is subject to the same processes of language change that other languages are.

18 That speakers are part of a speech community or speech communities which also play a role in the development of language has also long been recognised, it is simply that change was seen to be primarily explained at the level of the individual.

19 Farrar and Jones (2002) make a three-way distinction, also discussing extra-linguistic (sociopolitical, economic) factors of language change; others would label such factors as 'external'. While undoubtedly important, we will not attempt to incorporate such factors into the discussion here.

20 Labov's discussion of these two types of change – change from above and change from below – aims to explain in a single account Neogrammarian and Lexical Diffusionist models of sound change.

21 See Campbell and Poser (2008), however, for discussion of early historical work on other language families, including Finno-Ugric (Sajnovics 1770), Arawak and Carib (Gilij 1965 [1782]).

22 For example, we were unfortunately unable to include a chapter on the use of corpora in historical linguistic research. The reader is referred to Kawaguchi *et al.* (2011) for work in this area.

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Part I

Overviews