A Scrutinence of Newies: Corpus-based and Experimental Analyses of Derivational Word-Formation in British English

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ABSTRACT

This thesis is a comprehensive study of the mechanisms involved in the creation, recognition and understanding of new words in present-day British English formed by derivational suffixation. It is particularly interested in the formation of *disposable words* that are coined for a single use and thus do not gain official entries in dictionaries of English. An analysis of the use of the term "Productivity" and its attention in the literature revealed that it is inconsistent and in some cases incomplete; therefore a rationale was formed for a more comprehensive analysis through the examination of neologisms formed by suffixation. The research adopted two different but complementing methodologies to examine the Creativity of 145 suffixes in terms of the number of neologisms they create relative to their category size. Firstly, a corpus-based approach was taken, which considered twelve factors that could affect the number of neologisms a suffix creates; these included Derivative Factors of Prevalence, Opacity, Regularity, Convertibility and Distinguishability, and Base Factors of Stress Transfer, Sound Change, Truncation, Semantic Shift, Atypical PoS, Complexity and Allomorphic Variant. These factors were compared diachronically and across registers using databases formed from components of the original British National Corpus and the new Spoken BNC2014 (Love et al. 2017) to determine changes in the nature of Creativity over time and between contexts. It was concluded that two of the most influential factors on Creativity are the suffix's frequency in the language (Prevalence), and the density of non-transparent members of its category (Opacity). Secondly, an experimental approach was taken to examine the ability of speakers to recognize and understand neologisms based on these factors through a Semantic Decision Task and Judgement Task, with reference to dual-route models of complex-word processing (Frauenfelder & Schreuder 1992; Schreuder & Baayen 1995) that predict faster processing times when the dual route is employed. To examine their ability to extract consistent meanings from neologisms, participants also participated in a follow-up study in which they were required to define neologisms. This study has shown that speakers generally have an extensive knowledge of suffixes and suffixation processes; the results of the Semantic Decision Task have provided support for theories of dual-route processing, where the employment of both direct and parsed routes increases the speed with which recognition and understanding can occur. The findings also have strong implications for the changing style of conversational speech towards patterns typical of more formal registers through suffixational Creativity; further study could examine present-day material of more formal registers to investigate whether these trends are one-way or if it is instead the case that register differences are becoming obscured by derivational Creativity and a move towards a common register for a wider variety of contexts.

DECLARATION OF ORIGINAL AUTHORSHIP

I hereby confirm that this is my own work, and that the use of all material from other sources has been properly and fully acknowledged.

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PART I: COMPLEX WORDS UNDER THE MICROSCOPE

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LIST OF ABBREVIATIONS

AP	Atypical PoS (Base Factor)
AV	Allomorphic Variant (Base Factor)
BNC	British National Corpus
C	Convertibility (Derivative Factor)
CG	Context-governed (sub-corpus of BNC)
CG94	Context-governed (complex-word database)
CX	Complexity (Base Factor)
D	Distinguishability (Derivative Factor)
DS	Demographically-sampled (sub-corpus of BNC)
DS94	Demographically-sampled (complex-word database)
DT	Definition Task
EAS	Early-Access Subset (sub-corpus of Spoken BNC2014)
EAS14	Early-Access Subset (complex-word database)
JT	Judgement Task
LDT	Lexical Decision Task
MRM	Morphological Race Model (Frauenfelder & Schreuder 1992)
O	Opacity (Derivative Factor) Opacity (Constituent)
OED	Oxford English Dictionary
P	Prevalence (Derivative Factor) Prevalence (Constituent)

PCA	Principal Components Analysis
PDRM	Parallel Dual-Route Model (Schreuder & Baayen 1995; Baayen, Dijkstra & Schreuder 1997)
PoS	Part of Speech
R	Regularity (Derivative Factor) Realness (Constituent)
RQ	Research Question
RT	Reaction Time
SC	Sound Change (Base Factor)
SDT	Semantic Decision Task
SS	Semantic Shift (Base Factor)
ST	Stress Transfer (Base Factor)
T	Transparency (Constituent)
TC	Truncation (Base Factor)

1 INTRODUCTION

The ability of a language to create new words is one of the most essential features that distinguishes it from the communication of animals. Where other species introduce new sounds and meanings only over immense periods of evolution (Crystal 2007; Yule 2015), adapting to changing features of their environment, human speech thrives on the potentially infinite diversity with which we can create and label both the physical and the abstract. Indeed, the development of a language's vocabulary can be a reflection, more broadly, of the development of the society that uses it, since, like animals, the need for new words is predicated on the creation and introduction of new objects and concepts in our environments to which we need to refer with language. In this sense, perhaps the creation of new words is not so much an essential process in itself, but an inevitable outcome of the development of society. What is clear is that all speakers not only grow accustomed to creating and understanding new words, but that they are in fact ingenious experts at doing so, and that their role in this process at the individual level is necessary to ensure efficient communication and dissemination of ideas.

1.1 The Linguistic Ingenuity of the Lay Speaker

Whether or not they are aware of it, speakers of any language are experts of this kind when it comes to derivational word-formation. The ability to package large amounts of information into short, innovative examples is something that remains in many ways a marvel to linguists despite discoveries that are made about the processes involved. While languages vary in the degree to which they employ derivations in word-formation, English is one such language that engages in this process to a very large extent: while it is inflectionally "poor", the inventory of derivational morphemes is high in any comprehensive dictionary, with counts as high as 843 in the inventory of Stein (2007, cited in Laws & Ryder 2014a).

Perhaps the most famous recent example of a derivational neologism is *selfie*, with the meaning 'a photograph that one has taken of oneself' (Oxford English Dictionary (OED), first attested in 2002), but other recent formations can be encountered regularly, especially thanks to the access between speakers across the globe that has been created by the Internet. A list of recent words added to OxfordDictionaries (2014) includes examples such as *douchebaggery* ('obnoxious or contemptible behaviour') and *hippotherapy* ('horse-riding as a therapeutic or rehabilitative treatment'); alternatively, the author Terry Pratchett, after being diagnosed with Alzheimer's disease, described his condition as an *embuggerance* (Discworld.com 2014), a term that was then also used by other writers in reference to his passing (Burnett 2015). Beyond simply coining words and introducing new meanings, speakers have the ability to understand morphological rules without formal instruction: while a nonsense verb such as *bleem* cannot be understood, the relative meanings of *bleemable*, *rebleem* and *bleemation* are nonetheless clear.

New words are created for different reasons, but perhaps the most common is that there is a gap in the vocabulary of a language of a label for the concept that the speaker wishes to discuss. Spontaneous examples are difficult to capture outside of transcriptions of natural speech in corpora; for instance, the examples given in the previous paragraph have either been around for some time before they are recognized in dictionaries of English, or have been presented publicly only after careful thought. A spontaneous example can however be found used by Graeme Garden in an unscripted episode of *I'm Sorry I Haven't a Clue* (2002), a radio programme broadcast on BBC Radio 4 since 1972. In this programme, a game is played in which players must take turns to say a word to form a coherent story between them;

Table 1.1: *Word by word exchange in* I'm Sorry I Haven't a Clue (2002).

Player	**Word**	**Player**	**Word**	**Player**	**Word**
HL:	Only	**TBT:**	is	**TBT:**	want
BC:	my	…		**BC:**	to
WR:	trousers	**TBT**	my	**WR:**	say
GG:	are	**BC:**	other	**GG:**	which
TBT:	in	**WR:**	cupboard.	**TBT:**	of
BC:	the	…		**BC:**	them
WR:	cupboard.	**WR:**	I	**WR:**	is
GG:	This	**GG:**	don't	**GG:**	*trouserful*.

Garden's italicized word at the end of the exchange in Table 1.1 shows that he is backed into a corner by the fact that he may only say one word, combined with the use of copula *is* by the player before him, as there is no existing single word in the language to capture the meaning of 'containing trousers'; hence, he coins the word *trouserful* in order to achieve the desired meaning within the limits of the rules.

A second common reason for neologism creation occurs with lapses in memory, where a word does already exist within the language to capture the meaning desired, but where the speaker cannot remember it and so must create an alternative; these instances are essentially the same as lexical gaps, to all intents and purposes at the moment at which the speaker requires the missing word. Derivational neologisms are also created simply as a means of word play, employing the techniques skilfully for the purposes of comedy. A plethora of examples of this can be found in Douglas Adams & John Lloyd's (2013) *The Meaning of Liff*, in which definitions are given to place names whose pseudo-bases are necessarily nonsense

Table 1.2: *Neologisms based on place names, taken from Adams & Lloyd (2013)*

Word	**Part of Speech**	**Definition**	**Pseudo-morphology**
Bonkle	v.	'Of plumbing in old hotels, to make loud and unexplained noises in the night, particularly at about five o'clock in the morning.'	*bonk* + *-le*
Grutness	n.	'The resolve with which the Queen sits through five days of Polynesian folk dancing.'	*grut* + *-ness*
Nottage	n.	'The collective name for things which you find a use for immediately after you have thrown them away.'	*nott* + *-age*

words, and yet in which the definitions often reflect semantic features relating to their supposed affixes; Table 1.2 shows some examples of these definitions, with the suffix that they supposedly exhibit alongside for illustration of this point.

On the other hand, it is not unheard of for English speakers to collectively show evidence of limits to their knowledge of suffix inventories. In the lead-up to the United States Presidential Election of 2016, reality television personality Donald Trump was accused – and in some cases derided – in the media for using the adverb *bigly*[1] (BBC News 2016), despite the fact that this word does indeed exist with the meanings of 'with great force' or 'loudly, boastfully' (OED). Clearly, then, it is not simply the case that speakers know all there is to know about derivation; the purpose of this thesis is, in some respects, to test this knowledge and determine how far it extends.

1.2 What Does "Derivational Morphology" Mean?

A great many definitions of the term "derivational morphology" have pervaded its study, although this is understandable given the abstract nature of morphemes about which, it seems, we all have some instinctive knowledge. Stewart (2016) opens his guide to morphological theories by listing a number of definitions, including that of Siegel (1979: 12) who proposed that morphology is 'the study of the word formation processes of a language'. While word-formation is certainly of major interest in the study of derivational morphology, and indeed forms the basis of the current study, there are areas of deeper exploration within this. In particular, there is an important category of derivatives that are referred to as "opaque" as it is not possible to identify an English root from the derivational morpheme(s) involved; for example, while the word *station* is etymologically derived using the suffix *-ion* (OED), its base is from the Latin verb *stare* ('to stand') and does not exist in English. Whether or not lay speakers nevertheless break down opaque examples into their morphological constituents, as well as the psycholinguistic implications of this, could provide valuable insight into the reasons behind the differing productivity of morphemes.

[1] It was later shown that Trump in fact said 'big league' (New York Times 2016), a term that he appears fond of using innovatively in the position of a phrasal adverb, demonstrating even if only in this one instance a capacity for progressive modern thinking.

Perhaps, then, a more accurate definition of morphology is that of Selkirk's (1982) well-known 'syntax of words': this seems fitting, especially in relation to certain suffixes (such as *-ion* or adverbial *-ly*) whose "meanings" do not extend beyond providing the sense of the base with a particular part of speech (PoS), and certain prefixes (such as *anti-*, *in-*, or *un-*), which often merely create opposite meanings to their bases. In any case, what remains obvious is that innovations in derivational word-formation are an intrinsic function of language, and will require linguists to regularly contribute novel insights to morphology to account for the ways in which humans lexicalize new concepts.

1.3 The Current Study

It was the ultimate aim of this project to make novel contributions to the study of morphology in the form of a comprehensive account of neologisms in present-day English in terms of their use, recognition and understanding by lay speakers. Throughout this project, the term "neologism" is used to refer to a word that appeared in the data from the corpora examined, but had no entry in the OED as a feature of present-day English (that is, not listed as either rare, archaic or obsolete). Further discussion of objection in the literature to the use of dictionaries in studies of morphology, and the justification of the use of the OED in this project, can be found in §3.3.2.

These novel contributions were to be achieved through an in-depth diachronic exploration of derivational word-formation, by examining the suffix data of corpora both past and contemporary, as well as psycholinguistic processes of speakers in recognizing new forms. A diachronic and register-based analysis of 145 suffixes was undertaken through the use of the *MorphoQuantics* database (Laws & Ryder 2014b) of English affixes, which contains data for over 850 derivational morphemes extracted from the British National Corpus (BNC), to which similar data was added from the Early Access Subset (EAS) of the Spoken BNC2014 (Love et al. 2017). The results that emerged from this descriptive endeavour were further investigated by identifying the word-formation processes involved in coining neologisms in twenty-first century British English and those that are pertinent to the recognition, understanding and interpretation of neologisms by native speakers of English.

An analysis of the existing literature relating to derivational word-formation is provided in Chapter 2, culminating in Research Questions that drive the study throughout. The thesis is then split into two parts that address the different approaches to the study. In Part I, a corpus-based approach is taken to examining the factors that contribute to the ability of suffixes to create new words; the methodology for this is given in Chapter 3, which is followed by an analysis of these factors (Chapter 4) and an analysis of the neologisms that emerged from the data (Chapter 5) in relation to those factors that were identified as most influential. In Part II, an experimental approach is taken to determine the relationship of the findings in Part I to the actual recognition, understanding and meaning interpretation of neologisms by lay speakers; Chapter 6 again outlines the methodology and is followed by two chapters of analysis, relating to the constituent factors that determine the creation of neologisms and the differences in recognition and understanding thereof (Chapter 7), as well as the meaning that speakers interpreted from the definitions and the degree of consistency that can be achieved in relation to the constituent analysis (Chapter 8). The thesis concludes in Chapter 9 by summarizing the findings of the studies in terms of their impact and limitations in relation to the study of morphology as a whole, as well as suggesting areas for future research based on these limitations.

In a recent interview, the linguist David Crystal observed that one should 'never try to predict the future when it comes to Language' (Ryder 2016: 25), from the point of view that to do so is to attempt to predict the future of society as a whole. While there is undoubtedly truth to this statement, as it may never be possible to predict specific neologisms before they appear, reliable knowledge could nevertheless be gained relating to the contributing factors behind derivational word-formation, which in turn may allow researchers to at least predict certain characteristics of new forms before they are coined and understand better the processes involved in extracting meaning from these words. The current study seeks to achieve this through its unique multi-method design, employing the methods of corpus linguistics to provide descriptions of word-formation patterns based on authentic real-life data and those of psycholinguistics to understand the processes involved using experimental techniques and examples delivered through the corpus analysis, allowing insight to be gained into the major factors that determine a suffix's productivity or lack thereof.

2 LITERATURE REVIEW

This section begins with a brief discussion of the points of morphological theory that are relevant to the current research project, followed by descriptions of the various types of morpheme and arguments for and against inclusion of each type as derivational affixes. It then focuses more specifically on the productivity of derivational morphemes, outlining approaches both old and new as well as both mechanical and psycholinguistic, as established in the literature. The section concludes with a more detailed description of the project's aims based on this literature, and presents the Research Questions (RQs) that are to be the focus of the project.

2.1 Morphological Theory

Given the multitude of definitions that have attempted to address the concept of *morphology* over the years, it is unsurprising that there are also a great many different theoretical approaches to its study. Stewart (2016) provides a comprehensive summary of fifteen such approaches, employing a scoring system of five continua to identify the chief characteristics and differences between them. As this is an extensive topic worthy of several volumes in itself, it is far beyond the scope of this review to address morphological theory in great detail;

however, it is useful to establish a few of the main theoretical principles that will be guiding the current project.

Firstly, this research draws on the Split Morphology Hypothesis (Matthews 1972; Anderson 1982; Perlmutter 1988), that inflectional and derivational morphology are stored separately – the former in the grammar of a language and the latter in the lexicon – and are too distinct to be combined. Traditionally this has raised issues surrounding the "derivationalization" of inflectional endings such as *-ing*, *-ed* and *-en*, each of which may form adjectives and nouns converted from their inflected verb forms. However, as conversions (or "zero-derivations") are to some extent under scrutiny in this project, insofar as their frequency affects productivity, these forms are treated as derivational morphemes. Further *-ing* and *-ed* derivatives, such as resultative nominalization (*a build<u>ing</u>*) and possessional adjectivization (*a right-hand<u>ed</u> man*), are otherwise treated as typical derivational suffixes. There has also been a great deal of debate over the status of adverb-forming *-ly* as derivational or inflectional (Sugioka & Lehr 1983; Zwicky 1995); generally speaking, uncertain cases such as this are avoided in this thesis, since they provide a considerable amount of potential for study in isolation, and the approach taken here is that of an overview of as wide a range of affixes as possible.

Secondly, a large section of literature on morphological theory is focussed on the distinction between morpheme-based (Bresnan 1982; Selkirk 1982; Lieber 1992) and lexeme-based (Stump 1991; Anderson 1992; Aronoff 1994) approaches, and this forms the basis of one of Stewart's (2016) continua. Briefly, in the former, words are said to be recognized by their constituent parts, while in the latter they are recognized as whole lexemes that have already undergone semantic and/or grammatical changes as a result of having had morpheme(s) attached. However, the reality seems more complex than either of these two dichotomies imply: complex words are recognized by either or both of these two pathways, as evidenced by studies such as that of Frauenfelder & Schreuder (1992), which imply a "morphological race" that takes place between parsed-recognition and direct-recognition pathways (see §2.3.3 for further discussion of this model). Further still, perhaps these pathways are neither mutually exclusive nor exhaustive, but rather, each contribute to a word's recognition along with other factors, in line with Giraudo & Voga-Redlinger's (2007: 113) conclusion that 'The recognition of morphologically complex words engages multiple cognitive processes that operate in parallel'. One of the notions the current project seeks to explore is that different

members of a suffix's family (i.e., all the types formed through the attachment of a particular suffix) may be recognized using different or multiple pathways, and the effect that this may have on its productivity.

Finally, different approaches may be taken in dealing with complex words with more than one affix attached, specifically with regard to whether to treat the resultant word as a simplex base (free or bound) plus a multitude of affixes, or as a single affix attached to a previously-existing complex word. The approach taken in this study will be the latter; that is, in a word such as *administratively*, the preferred breakdown is [[[*administer* + *-ate*] + *-ive*] + *-ly*], rather than [*administer* + *-ate* + *-ive* + *-ly*], in part based on the Right-Hand Head Rule (Williams 1981) that the part-of-speech (PoS) is based on the right-most element, the head, in complex and compound words. There are some problems with this rule, especially with regard to inflection and prefixation (although see Nagano (2011) and §2.2.1 below), but the rule generally holds true for suffixation in English (Bauer, Lieber & Plag 2013). Additionally, the rules governing individual suffixes and the PoSs to which they can attach are concerned only with the whole word in all its complexity, rather than its ultimate simplex base; this approach has frequently been justified and employed by other authors in the field (Plag 1999; Gaeta & Ricca 2006; Laws & Ryder 2014a) when the data are analysed using corpus tools and methods. These authors do however highlight an issue relating to the psycholinguistic dimension, since all morphemes are parsed by listeners even in multiply complex words; accordingly, the tendency or otherwise of a suffix to attach to bases that are already complex is to be scrutinized in the corpus-based part of this study (see §3.3.8), in order to inform the experimental studies in Part II that will consider the psycholinguistic implications more closely. For these reasons, as outlined in the sections that follow, a suffixed word's classification in this study is based upon the right-most suffix only as the arbiter of that word's overall meaning and PoS.

2.2 Types of Derivational Morpheme

Derivational morphemes can be classified either by the position they take – word-initial, word-final, or internal – or by the form they take as either an affix (prefix, suffix or infix), a combining form, or a "splinter" (Lehrer 1998). The following subsections give further detail from the literature and examples regarding the latter of these two distinctions.

2.2.1 Affixes

A word-initial affix is known as a prefix, and these are characterized by normally being bound, not altering the sound or stress of the base, and by being generally limited to a reduced set of dimensions, such as time and space (see Laws & Ryder (2014a) for further examples). As a general rule they do not change the word class of the base (Stein 2007); however, some authors consider one or two exceptions, such as *de-*, 'which can make nouns into verbs, as in *de-frost*' (Aitchison 2003: 179) and *be-* in *behead*. On the other hand, the concept of conversion or zero-derivation (from one word class to another with no morphemic development) is long-established in morphological research (Hockett 1958; Quirk et al. 1985; Bauer & Hernández 2005), and it is reasonable to suggest that a form such as *de-frost* heavily implies a previously-converted form of *frost* from noun to verb, even if this stage is "skipped over" in its coinage, since noun-to-verb conversion is common in English (Quirk et al. 1985; Schmid 2011). There are therefore certain arguments to be made against the possibility of PoS change through prefixation (Nagano 2011). Although such arguments are considered by authors such as Bauer, Lieber & Plag (2013: 635) to be 'not terribly convincing', there does seem to be a distinct difference between the inferred existence of a verb *frost* from *defrost* and a lack of such an inferred existence of a verb *person* from *personify*.

Internal affixes, known as infixes, are extremely rare in English, and tend only to occur either for highly specific endeavours, such as *-pe-* (Zerrouki & Balla 2009) in chemistry to indicate complete hydrogenation (e.g. *picoline* → *pipecoline*), or in colloquial language play, such as *-ma-* (Yu 2004) to provide pseudo-sophistication (e.g. *education* → *edumacation*); there is also the concept of "tmesis", in which whole words are inserted between the elements of a single other word, most often used in English for the purposes of intensification, such as *abso-bloody-lutely* and other more colourful examples. Due to their rarity, English infixes receive very little attention in the literature and are likewise excluded from study in this project.

Like prefixes, suffixes – or otherwise, word-final affixes – are normally bound, but they often alter the stress (*átom* → *atómic*) or sounds (/t/ to /ʃ/ in *submit* → *submission*) in the base and the scope of meaning is considerably wider. Most examples change the word class of the base, such as from verb to noun (*governor, combination*), noun to adjective (*fiendish, Darwinian*), or adjective to adverb (*mysteriously*), although a handful maintain the same

word class while altering the meaning on some other dimension (*kingdom*, *yellowish*, *crackle*).

2.2.2 Combining Forms

While the origins of affixes generally cover a wide range of languages, neo-classical combining forms, as the name suggests, tend to derive primarily from Latin and Greek lexemes, although there is an increasing tendency to create new combining forms using "splinters" of modern English blends, such as in *workaholic* or *readathon* (Lehrer 1998; 2007). The treatment of these morphemes differs considerably among authors: while some classify them as affixes (Prćić 2005, 2008; Stein 2007), others consider them to be closer in nature to compound elements (Carstairs-McCarthy 2002; Bauer, Lieber & Plag 2013).

The former approach raises some problems in that the behaviour of combining forms differs in some crucial ways to that of affixes. While *-ography*, for example, behaves similarly to an affix in *oceanography*, in *geography* it is attached to another combining form, raising a difficult issue in identifying the base of the word. Furthermore, while affix/affix combinations such as **re-ic* or **pre-ize* are not acceptable in English (except, hypothetically, in a heavily lexicalized form of one or other affix), affix/combining-form or combining-form/affix combinations do occur, as in *a-pathy* and *psych-ic*. Many authors, such as Stein (2007), posit that these morphemes can be either an affix (in *oceanography*) or a combining form (in *geography*), depending on whether the element to which they are attached is another combining form or a free stem. However, the classification of a morpheme based on the properties of another element, rather than itself, seems highly unconventional, and it is somewhat counter-intuitive to suggest that *-ography* behaves any differently in either of its examples above.

It seems far more practical then, as many authors have done (Adams 1973; Bauer 1983; Schmid 2011) to classify combining forms as 'morpheme-like components' (Schmid 2011: 145) that occur in neo-classical compounds, whose behaviour reflects that of regular compound elements despite the fact that one or two of their components are not free morphemes. These components are highly lexical, and indeed they can be considered an open class as there is a potentially endless supply of combining forms taken from Latin or Greek words of a particular meaning, unlike affixes whose origins are often more obscure and grammatical in nature. Additionally, and again in a way that reflects elements of compounds

and is unlike affixes, many can appear as the left- or right-hand half of a neo-classical compound, as exemplified by *cosmology* and *microcosm*. While they clearly differ from compound elements in that they are bound, even this distinction can become tenuous due to their highly lexical nature, which often enables them to behave like free morphemes, for example by taking regular inflections, as in *ologies* used to mean 'words that end with *-ology*' (Quinion 2002) and adjectival *retro* when referring to types of music or fashion (Carstairs-McCarthy 2002).

2.2.3 Morphological Scope of the Current Study

It is clear that there are a great many potential differences between prefixes and suffixes in morphological terms, and there are also psycholinguistic implications in that, if word-initial and word-final affixes behave differently, they are likely to be represented differently in the brain. As such, it would potentially take an entire thesis to even scratch the surface of these differences before the business of delving deeper into each individually could begin. With this in mind, the focus of this thesis is on suffixes only, as these alone provide a rich base from which to begin considering morphological and psycholinguistic implications based on their behaviour.

Regarding word-final combining forms, although the *MorphoQuantics* database developed by Laws & Ryder (2014b) of complex words in the BNC includes combining forms from Stein (2007) alongside affixes, the differences between the two are considered too great for the purposes of the current project, and would not provide meaningful contributions to the exploration of suffixes in particular for the reasons outlined above. As such, only word-final morphemes that are classified as suffixes have been selected for inclusion in this study. Additionally, following the identification of the theoretical distinctions that can be made between affixes and combining forms and the establishment of some of the factors that can be used to classify them accordingly, it is practical to focus specifically on the productivity of suffixes in particular, since the processes involved for combining forms, as compound-like elements, are likely to be entirely different.

2.3 Productivity

Productivity as a general concept is one of the most key features of human language in that it is one that distinguishes it from animal communication, which does not add new forms except through lengthy evolutionary processes (Crystal 2007; Yule 2015). New words are usually created for one of three reasons: there may be a lexical gap in the language, either because a concept is rare or that it is entirely new due to changing social and technological situation; there may simply be a lapse in memory for a particular existing word, such that a new one needs to be invented ad hoc; or they may be the result of language play. However, in only the first of these cases do the coined words have a chance of achieving the coveted status of a "new word" that is accepted in dictionaries. In the case of memory lapses and language play, neologisms tend to arise for use in one particular linguistic situation and are then forgotten; in this sense they could be thought of as "disposable" words, mirroring the concept of a disposable camera used for one event only and then discarded. This notion is very similar to that of "nonce" words, coined for use in a single occasion; however, it is proposed here that a "disposable" word has even more restricted use, in part by virtue of the fact that it is coined in speech, and referes specifically to those words that serve no purpose – and are not intended to serve any purpose – beyond its immediate use, whereupon it is discarded. In this sense, disposable words are a sub-category of nonce words.

Whatever the purpose, one of the main ways in which neologisms are formed is by employing derivational morphology, which allows the encoding of potentially large amounts of semantic and grammatical information in a comparatively small number of phonemes and graphemes. Accordingly, there has been a great deal of study and debate within this topic in order to identify the mechanisms behind derivational neologisms.

2.3.1 Early Approaches to Productivity

The productivity of an individual morpheme in early literature was considered from a somewhat simplistic view to be either growing in membership size ("productive"), or either fixed or declining in membership size ("unproductive"). According to Jackendoff (1975), this meant that the rules governing the creation of a word using a productive morpheme were the only "true" rules of morphological productivity, whereas the rules governing creation with an unproductive morpheme were considered redundant, accounting for structure but playing no part in the comprehension of existing members.

In addition to this, Siegel (1974) proposed a Level Ordering Hypothesis model by sorting affixes into one of two types: Class I, which cause a stress shift in the base, and Class II, which do not. She observed the implication from this that Class I affixation occurs before the assignment of stress and Class II after, such that it is therefore impossible to return to Class I affixation once Class II affixation has taken place (Figure 2.1). Thus, *-ful* (Class II) may come before *-ness* (Class II) in *cólourfulness*, but not before *-ity* (Class I) in **colourfúlity*. This model was later developed into the Extended Level Ordering Hypothesis (Allen 1978) to include compounding and inflection as additional levels following Class II affixation.

Although this framework, and that of Jackendoff (1975) and others, is somewhat outdated in that researchers now recognize a much larger number of factors that contribute to a morpheme's productivity (see below), there is an interesting implication here in that some morphemes may be more likely to create neologisms simply by having a smaller effect on the base (Don 2014). A suffix such as *-ness*, for example, as a largely "neutral" affix in the sense that it rarely alters the base's sound or stress pattern, perhaps has a natural advantage over *-ity* in that, as a Class II affix, it can be added at later stages of language production, whereas *-ity* and other Class I affixes are "locked" once stress has been assigned.

2.3.2 Features Contributing to Productivity

In a later work, Corbin (1987) proposed three features of morphemes that identify different types of productivity: writing in French, she identified these as 'rentabilité', 'disponibilité' and 'regularité', originally translated by Carstairs-McCarthy (1992:37) as *profitability*, *availability* and *regularity*. However, definitions of each of these terms have been interpreted and relabelled by several authors in different ways (Table 2.1), such that it is not always clear between sources in the literature what is meant by each term; indeed, although an attempt is made here to relate the terms used by different authors to the more generic terms used by Corbin, it should be emphasized that they are not exact equivalents. Nevertheless, three main

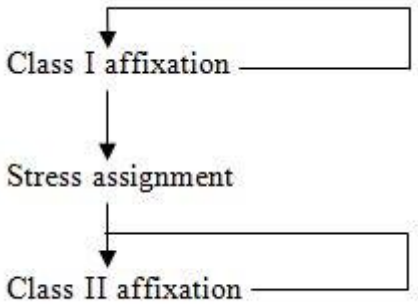

Figure 2.1: *Siegel (1974) Level Ordering Hypothesis, adapted from Don (2014).*

strands can be identified here: the number of existing types, the number of new forms, and the way in which the morpheme interacts with the base have clearly been identified as key areas of study relating to the productivity of morphemes.

Table 2.1: *Varying labels associated with particular morpheme characteristics*.

Feature	**Baayen (1993)**	**Plag (1999)**	**Bauer (2001)**	**Baayen (2009)**
Number of types	Extent of use	Profitability	Profitability	Realized productivity
Number of new forms	Global productivity	Availability	Profitability	Expanding productivity
Interaction between morpheme and base	Productivity in the narrow sense	Regularity	Availability	Potential productivity

The third of these is important to break down further in order to identify more specific features of morphemes that may contribute to the overall productivity in one or more senses. Bauer & Nation (1993), as well as separating out frequency (number of types) and productivity (number of new forms) as distinct factors of affixes as a whole, identify the following six features of each individual complex word within a particular affix family:

i. **Predictability**, relating to the meaning of the affix and its consistency;
ii. **Regularity of the written form of the base**, considering alterations to the base's spelling;
iii. **Regularity of the spoken form of the base**, considering alterations to the stress or sound of the base;
iv. **Regularity of the spelling of the affix**, including the use of allomorphic variants;
v. **Regularity of the spoken form of the affix**, including the use of alternative pronunciations of the affix;
vi. **Regularity of function**: the degree to which the affix consistently attaches to and forms particular PoSs.

The authors stress that this system is based on instinctive judgements and was constructed for the purposes of identifying affixes of increasing complexity as a means of structuring them hierarchically when teaching English to foreign learners. Nevertheless, increasing complexity

on each of these dimensions could certainly contribute to the overall productivity, or lack thereof, of particular morphemes. Furthermore, these dimensions are not necessarily exhaustive, and may themselves be further broken down: criterion (iii), for example, could be split into affixes that do not affect the base (*orphan<u>age</u>*), those that alter the stress (*atom<u>ic</u>*), those that alter the sound (*precis<u>ion</u>*), those that alter both stress and sound (*Palestin<u>ian</u>*), and entirely non-transparent complex words involving non-English bases (*stat<u>ion</u>*).

An approach such as this, which takes into account a wide range of characteristics of morphemes, is clearly more in-depth and realistic than previous accounts that rely on too simplistic a view of the definitions of 'productive' and 'unproductive' (Jackendoff 1975), or which consider only a single distinguishing characteristic of morphemes, such as a shift in stress (Siegel 1974). However, there is a clear need to apply such an approach specifically to the study of productivity, especially with reference to neologism creation, given the authors' own reservations about the generalizability of their model beyond the aims of their own report.

2.3.3 Psycholinguistic Perspectives of Productivity

Although systems such as the above are useful for identifying the mechanics behind productivity, on their own they do not describe clearly the psycholinguistic processes that occur when derivatives are encountered or constructed, nor the difference there may be here when encountering or constructing an existing derivative versus a neologistic one; they cannot therefore alone provide comprehensive enough information regarding the predictability of neologisms and the forms they are likely to take. Several models of complex-word recognition have been proposed over the years, including but not limited to Butterworth's (1983) Full Listing model, Caramazza, Laudanna & Romani's (1988) Augmented Addressed Morphology model and Taft's (1991) Interactive Activation model.

To take an example, Frauenfelder & Schreuder's (1992) Morphological Race Model (MRM) accounts in some ways for the processes that occur when a listener or reader is exposed to a complex word. Essentially, there are two routes in competition for the ultimate recognition of a word: the direct route, in which the whole word is retrieved directly from the mental lexicon along with its associated meaning; and the morphological parsing route, in which the word is broken down into its morphemic constituents, with the retrieval of the base from the mental lexicon alongside that of the affix and meaning constructed from a synthesis of these

parts. In testing this model, the authors show that there is a benefit to processing time in participants where it can be claimed that both pathways are acting together, rather than one or the other acting alone. The assumptions that must necessarily come with this model are that a) non-transparent complex words (e.g. *stat<u>ion</u>*) must be understood via the direct route since no clear base exists to be accessed from the mental lexicon, and b) complex neologisms (e.g. *Google<u>able</u>*) must be understood via the parsing route since the whole form does not exist to be accessed from the mental lexicon. Regarding existing complex words with an identifiable base, the authors of this model found that the choice of route is governed by such factors as transparency (how easily the base can be extracted from a complex word) and frequency, where highly-transparent words of low-frequency are more likely to favour the parsed route alone.

However, there may be other interpretations that question the first assumption, that non-transparent forms must be recognized via only the direct route. Since the basis of the MRM is that, when encountering a word, both routes are activated with one route failing if recognition in this way is impossible, there is a suggestion that the morphological parsing route is activated to some extent when encountering even a non-transparent form such as *stat<u>ion</u>*. In such a case, although recognition through this route cannot be ultimately successful, as *stat<u>ion</u>* contains no English root, nevertheless there may still be an identification of the suffix *-ion* which activates stored rules governing this suffix. This is likely to be dependent on a number of factors, such as the degree to which the phonemic or graphemic realization of an affix occurs outside its family (consider the sequence *er*, a form taken by several suffixes but which occurs often in words that are not examples of suffixation, such as *finger*). It may also be dependent on whether or not the complex word follows its own rules: for example, the recognition of *commiss<u>ion</u>* as a verb may be more difficult than that of *stat<u>ion</u>* as a noun, even though the latter is less transparent, since the rules of *-ion* are associated with forming nouns and an additional process of zero-derivation must take place in order to identify its use as a verb.

Developing the MRM, Schreuder & Baayen (1995; see also Baayen, Dijkstra & Schreuder 1997) propose a Parallel Dual-Route Model (PDRM), opening up the suggestion that the parsing route may have something to offer even when recognition must ultimately be achieved via the direct route; however, the potential for activating morphological rules in non-transparent examples is not discussed explicitly. In addition, one of the processes

involved, the "licensing process", states that the properties of morphemes, once broken down, are checked against each other to ensure that they are compatible, such that *-ness* is subcategorized for attaching to adjectives and no other PoSs. However, this does not account for examples observed in the BNC through (via *MorphoQuantics*) such as *zombieness*, from the noun *zombie*; it is possible that the successful understanding of such an example adjusts the rules governing *-ness* in the brain to be more accepting of the formula 'noun + *-ness*' in future encounters and, hence, in future neologism creation.

Both the MRM and PDRM are designed to be diachronic in that they include a mechanism of activation feedback for transparent complex words, whereby, over time, the parsing route develops an advantage for recognizing transparent complex words, but a disadvantage for non-transparent words. However, this diachronic aspect may also apply to non-transparent forms in reverse. If it is indeed the case that a non-transparent form such as *station* nevertheless activates stored morphological rules for *-ion*, perhaps the failure of these rules to find a transparent base not only does not strengthen the rules, but instead weakens them. That is to say, it may be the case that frequent exposure to non-transparent forms, especially of affixes whose forms do not occur as often in monomorphemic words, steadily weakens the stored morphological rules associated with those phonemes/graphemes and by extension reduces the affix's productivity. There is therefore potential for exploration here into the question of whether a high number of non-transparent members in an affix family correlates with reduced neologism creation.

2.3.4 Other Features of Productivity

Several other key features of affixes are worthy of note here as they are likely to have an impact on degrees of productivity. The first of these relates to the diversity of meanings of affixes – their homonymy, where identical forms of a suffix have very different meanings that are unrelated in etymology (e.g. *-er*^{1} and *-er*^{6}), or polysemy, where identical forms are related in meaning and etymology (e.g. *-er*^{1} and *-er*^{3}). Lehrer (1998; 2007) suggested that derivational affixes carry only limited meanings, yet later authors (Plag 1999; Lieber 2004; Bauer, Lieber & Plag 2013) as well as dictionaries of affixes and their meanings (Quinion 2002; Stein 2007) imply that affixes can in fact have a multitude of meanings. This is further evidenced by Spain (2014), in whose study four out of five affixes exhibited polysemy, and through experience in the construction of *MorphoQuantics*, which highlighted the diversity in meaning associated with many affixes. Well-known recent examples, too, highlight this fact:

the use of *-ie* in *selfie* appears to mean 'a photograph of', which has most certainly never been associated with this suffix in the past[2]. On the other hand, this suffix exhibits a number of other apparently unique examples, such as *foodie* ('a person interested in food') and *onesie* ('a garment made from one piece of material'), which suggests a more general property of this suffix in that it is added to words with the meaning of 'a person/thing in some way related to the base element'. Clearly there are implications here, both in the sense that polysemic affixes may be more productive, and that they may further have the potential to develop yet more diverse or broader generalized meanings.

Also of relevance to productivity is the concept of blocking, whereby certain potential neologisms may be excluded from realization for one or more reasons. Bauer (2001; see also Plag 2006, Fernández-Domínguez et al. 2007) identifies a number of ways in which this can occur; most relevantly, "synonymy blocking" occurs where a neologism such as *stealer* ('one who steals') is blocked by the existence of an existing word with the same meaning (*thief*). While this may hold true for words that are adopted into a language, there is still the potential for synonymy blocking to be ignored in the case of disposable words for filling memory lapses (since the forgotten word may be that which would otherwise block the neologism) or for language play. In addition, as a sub-type of this, "type blocking" occurs when an existing affix blocks the likelihood of another being used that applies the same meaning, as in the case of *-ness* and *-ity* which both form abstract nouns from adjectives. This potentially results in a vicious circle by which one affix grows ever more productive while another becomes less so, since the high productivity of an affix favours it for the purposes of neologisms, and the continuing introduction of further types in turn increases its productivity. Again, however, this does not presuppose that a less-productive suffix could not potentially be used for the purposes of a disposable word.

In addition to blocking, Plag (2006) provides a number of other potential restrictions to the creation of neologisms with particular suffixes, broadly split into those that are pragmatic and those that are structural in nature. In terms of pragmatic restrictions, as well as the fact that certain suffixes (such as *-nik*) rise and fall in productivity based on extra-linguistic societal factors, Plag raises the issue of nameability, whereby the concepts that are encapsulated by

[2] The influence of this new word may however be having an influence on the future of the suffix *-ie*. In August 2017, the phone company Nokia announced a new feature of its phones that enabled them to take photographs using both the front- and rear-facing cameras simultaneously, in a new type of image dubbed the *bothie* (Gibbs 2017).

suffixes are general in nature rather than overly specific. However, although it is unlikely that a suffix will ever reach the specificity coined in jest by Rose (1973: 516) – 'grasp NOUN in the left hand and shake vigorously while standing on the right foot in a 2.5 gallon galvanized pail of corn-meal mush' – the use of the highly general suffix *-ie* to mean specifically 'a photograph of' represents a more realistic development in specificity worth bearing in mind when examining neologistic data. Regarding structural contraints, Plag gives examples of several different kinds: phonological restrictions, arising for certain suffixes such as the requirement of *-en* (*black<u>en</u>, cheap<u>en</u>*) to attach to single-syllable obstruent-final bases (e..g **blu<u>en</u>, *yellow<u>en</u>*); morphological restrictions, whereby commonly-repeated patterns (such as *-ize* + *-ation* to form *-ization*) may limit the likelihood of semantically-similar potential constructions (such as *-ize* + *-ment* to form *-izement*); and semantic restructions, such as that of *-ee* (*employ<u>ee</u>, refer<u>ee</u>*) in forming only to sentient entities (e.g. *amput<u>ee</u>* cannot be used to refer to the amputated limb). While these structural constraints are certainly noteworthy and relevant to the current study in that they may affect the degree to which a suffix is likely to form neologisms, violations of this rule may not be as 'impossible' as Plag (2006: 550) describes; while it is possible that Plag is referring to only neologisms that become an official part of the language, this does not mean that formations that break structural constraints are impossible, by virtue of the very fact that examples of such formations are given above (*yellow<u>en</u>*, *-izement*, *amput<u>ee</u>*). It must be remembered that, particularly in the context of speech rather than writing, far more is possible as the product of the spontaneity and speed with which a neologism may be coined to fill a lexical gap, as well as the speed with which it is discarded from further use. It is the extent of these possibilities in spoken data that this study of disposable words seeks to examine.

Indeed, the relevance and necessity of the current study in its focus on disposable words and spoken rather than written language is evident from the bulk of the recent litereature on neologisms in English. The work of Grieve, Nini & Duo (2016), for example, as well as others such as Renouf (2012), certainly looks at new words and meanings as deeply as those that are coined by individual users, but in particular focuses on those that gain traction over time and rise in usage; a similar and larger study by Kerremans (2015) again examines the concept of "conventionalization" of neologisms over time and how certain properties of a word can contribute to its adoption into the language. However, such words are by definition not considered disposable words, and hence these studies do not focus primarily on the mechanisms and psycholinguistics behind the creation of each word specifically. It is worth

noting in addition that all of these studies, and others that, to a minor extent consider notions of productivity that are similar to that used throughout this study (e.g. Renouf 2007), all examine written data for the purpose, whether in the form of traditional written media or online forms which may, to some extent, reflect features of speech, but which nevertheless differ in spontaneity. It is important, therefore, to have a focus primarily on speech data, in which the creation of neologisms under such spontaneous conditions can be captured and examined for the processes underlying the ability to do so.

2.3.5 Measures of Productivity

In order to be able to quantify the productivity of a morpheme, a number of different methods for measuring it have been devised, particularly by Baayen (1991, 1993, 2009; & Lieber 1991), since the introduction of corpora into the field. While these have been employed in the literature to measure productivity (Hay & Baayen 2002, 2003; Fernández-Domínguez et al. 2007), this has not prevented critics from maintaining more intuitive approaches towards the assessment of a morpheme's productivity (van Marle 1991; Bauer & Nation 1993).

As the several different types of productivity identified by Baayen have been given different names by different authors, the terminology from his 2009 paper is used here (Table 2.1). "Realized Productivity" refers simply to the type count of an affix category (i.e. all the types that exhibit that affix) within a corpus as an indicator of the number of bases to which the affix has previously produced a new word; "Expanding Productivity" (*P**) divides the number of hapax legomena (the types that occur only once within the corpus) of an affix category by the total number of hapax legomena in the entire corpus, aiming to quantify the extent to which a specific affix is contributing to the lexical diversity of the whole corpus; "Potential Productivity" (P) is concerned with the affix family more specifically and the rate at which it is growing by dividing the number of hapax legomena in its family by its total number of tokens.

However, the use of hapax legomena as a basis for measuring productivity has been questioned (van Marle 1991; Cowie & Dalton-Puffer 2002; Säily 2011; Laws & Ryder 2014a, 2018); while there is a sound theoretical basis for declaring that hapax legomena demonstrate new forms, in practice there are a number of issues here. Firstly, not all hapax legomena in a corpus are necessarily neologisms: this depends highly on the size of the corpus, which, it could be argued, can never truly be big enough. Secondly, and conversely,

not all the neologisms in a corpus are necessarily hapax legomena, since a neologism (or disposable word) may be coined for a larger linguistic purpose than once instance, or a listener may repeat the coined word back to the speaker for clarification if the neologism is amusing or if the meaning is not immediately clear.

Fernández-Domínguez et al. (2007) employ Baayen's formulae to examine whether or not they can be applied to low-productivity morphemes, partly in recognition of the fact that hapax legomena may not always be a suitable measure. They conclude, however, that this area remains unresolved and needs further development; in addition, there is an issue here that certain low-productivity morphemes were already identified for study before the use of quantifying measures, presumably on instinctive feelings. While intuition about the productivity of morphemes has been used in the past, especially before the advent of electronic corpora, it is clear that today this can no longer be considered a satisfactory foundation for productivity measurements – although it would nevertheless be interesting to plot these instinctive feelings, both from linguists and lay speakers, against solid quantifications of productivity to discover any correlations therein.

2.4 Focus of the Current Study

2.4.1 Creativity

In its examination of disposable words and the extent to which different affixes can be and are used for the spontaneous creation of neologisms in speech, the focus of the current study could be said to be more concerned with the notion of "creativity" than productivity. Bauer (2001) puts forward three definitions of creativity, each of which is in some way distinct from previous notions of productivity and which he places along with productivity under the heading of "innovation"; the third of these definitions, "creativity^3" or "non-productive creativity", represents cases of coinings that are not cases of productivity, referring to his list of conditions in the same publication (p.57-58) that do not indicate productivity. Several of these conditions relate to the concept of disposable words, such as 'words which appear to be playful formation' and 'any word which is consciously formed'; all such cases are to be examined in this study, and so the use of "creativity" here is perhaps most akin to Bauer's creativty^3 or non-productive creativity. However, a broader view is taken, in the sense that morphological processes involved in the creation of neologism that are accepted within the

boundaries are included; essentially, any case in which an individual creates a neologism using derivational morphology is of interest from a quantitative perspective, while the contextual and social situation of the neologism can be examined further from a qualitative perspective. Further discussion of the nature of creativity as used in this study can be found in §3.3.2.

It is clear from the previous section that there are many different factors that could potentially affect a morpheme's productivity, and likewise its creativity, and that a comprehensive synthesis of all these factors has not yet been conducted in the literature to a satisfactory degree. There is something of a lack of clarity and consensus in studies that identify these factors, as evidenced by the different interpretations of Corbin's (1987) work, and by Bauer & Nation (1993), who use a more comprehensive but different set of factors again. In terms of quantitative measurements of productivity, while they may be able to provide comparable figures between affixes, they do not provide any information on what is causing increased or decreased productivity without further qualitative investigation; this is in addition to the issues discussed above relating to the reliance on hapax legomena.

While the quantification of productivity is extremely important as a means of providing a numerical base from which to compare different morphemes, it is important too not to lose sight of the value of fixing this upon a qualitative base. That is, once the complete set of types for an affix family have been extracted from a corpus, a qualitative examination of these types and how they are used in context and against a reference dictionary can help to provide a more reliable figure to account for the number of neologisms within that family in the corpus – and hence disposable words, rather than only those which have achieved dictionary status after a certain period of use. This methodological approach has recently been enabled by the *MorphoQuantics* database (Laws & Ryder 2014b), since this provides comprehensive lists of complex word data from the spoken component of the BNC for nearly 850 morphemes and is the first known freely-available database of its kind.

Furthermore, qualitative data regarding the changing behaviour of affixes can be acquired by looking at two similar corpora from different time periods and observing individual instances of neologisms (and their suffix characteristics) that have arisen in between, whether or not they have been accepted into the language; again, this has hitherto been difficult to achieve, but the compilation and release of the Spoken BNC 2014 (Love et al. 2017) now provides

opportunities to conduct such a diachronic analysis alongside the demographically-sampled (DS) spoken sub-corpus within the original BNC, with which it shares common features of register (see §3.2.1 for further details). Although there currently exists no contemporary equivalent of the context-governed (CG) spoken sub-corpus in the original BNC, which concerns situations of more formal speech registers, this can nevertheless be analysed alongside the DS with reference to the Spoken BNC 2014 to determine preliminary register comparisons to present-day speech.

2.4.2 Research Questions

With these gaps in the research in mind, it was the overall aim of the current study to conduct a comprehensive analysis of a wide range of characteristics of suffixes both as overall affix families and in terms of the behaviour of their individual types. In order to provide reliable quantifications and information relating to which of these characteristics, if any, were key to governing an affix's creativity, it was intended that qualitative analyses of the types, especially neologisms, were undertaken to understand the exact nature of their construction and meaning. These findings were then further examined diachronically to discover if trends have changed over time or if they remain relatively stable, in which case they may be more generalizable, as well as between registers, which may provide insight as to whether conversational speech, as a function of complex words, is increasing or decreasing in formality. Combining these findings with examinations into the recognition and understanding of new words among lay speakers, they were used to formulate and develop theories relating to the comprehension and production of complex words in the brain. Specifically, the current study sought to answer the following questions:

RQ1. To what extent is the ability of a suffix to create neologisms influenced by the phonological, phonotactic, syntactic and semantic features of the suffix, and which of these features are the most influential?

- a) Have the most influential features changed over time and, if so, how?
- b) Are the most influential features different across varying registers and, if so, how?

RQ2. How do neologisms created by these suffixes reflect these features most influential on neologism creation and what else can be learned through their scrutiny?

    a) How does this this differ with reference to findings relating to time and register?

RQ3. How is the recognition and understanding of complex words by native English speakers affected by a manipulation of the suffixes based on the features identified as being the most influential?

    a) Can differences be found based on the gender, age group or education level of the speakers?

RQ4. What differences can be found in the interpretation of the meaning of complex word neologisms by native English speakers and how does this relate to the features of the suffix identified as the most influential for neologism creation?

In relation to the first two questions, a breakdown of the specific characteristics under scrutiny is given in §3.3. It was expected that an increase in the number of non-transparent forms within a suffix family (Frauenfelder & Schreuder 1992), as well as those with higher phonological alterations and phonotactic constraints (Plag 2006), would lead to a decrease in neologism creation. It was also posited that suffixes with a more unique presentation were likely to produce more neologisms as they are more frequently associated with the relevant morphological rules and not with monomorphemic words that cannot be broken down into constituent parts. Other factors that could have an effect on neologism creation are discussed in detail in §3.3; in general, it was thought that an increase in the number of factors that either complicate the use of the parsed route for recognition, or otherwise discourage it altogether, would have a detrimental effect on the number of neologisms produced using a particular suffix.

Regarding the third and fourth questions, specific hypotheses could not be formulated until the results of the first part of the study (Chapters 3-5) were completed. At the outset, however, it was expected generally that the ability of speakers in processing new and existing forms would reflect the factors that were found to have an influence on the number of neologisms that could be created using a suffix. That is to say, those suffixes whose features permitted them to more often create new forms would be more easily recognized and

understood in a variety of contexts, and the meanings of such new forms would be interpreted more consistently between speakers.

PART I

COMPLEX WORDS UNDER THE MICROSCOPE

3 METHODOLOGY FOR THE CORPUS STUDY

In this section, the methodological processes undertaken for the collection of the corpus data and its processing for analysis are described. As the design of the experimental part of this thesis stemmed directly from the results of the corpus analysis, the methodological process for this part is not presented here, but rather in Chapter 6. This section and those that follow in Part I of the thesis focus on answering Research Questions 1 and 2 (§2.4.2) through the examination of twelve factors that may or may not affect the number of neologisms that a suffix can and does create (its "Creativity"); these factors, described in more detail in §3.3, are:

- Prevalence (P)
- Convertibility (C)
- Distinguishability (D)
- Opacity (O)
- Regularity (R)
- Stress Transfer (ST)
- Sound Change (SC)
- Truncation (TC)
- Semantic Shift (SS)
- Atypical PoS (AP)
- Complexity (CX)
- Allomorphic Variants (AV)

Throughout this section and the rest of the thesis, examples of complex words in particular suffix categories are cited in italics with the relevant suffix category to which it belongs

underlined, as in *dependency* (*-ency*[1]), *instalment* (*-ment*) and *troublesome* (*-some*[1]). This is in an attempt to ensure clarity in the focus of the discussion at all times, as many words exhibit more than one suffix but belong to only one suffix category according to the guidelines described in §2.1.

3.1 Scope

As has been discussed to some extent in §2.2, the study of derivational morphology comprises an extremely wide range of areas and levels which would be impractical to examine altogether within a single project. Therefore, justified decisions must be made in any such project to limit the scope to within feasible bounds, while also ensuring that the features under examination are relevant to the Research Questions (§2.4.2). Some reference has already been made (in Chapter 2) to the scope of this project; nevertheless, these are repeated here for clarity alongside the full complement of restriction decisions.

The corpus data and analysis in their entirety consisted of examining 145 English derivational suffixes, a full list of which is provided in Appendix 1 with further details about their individual properties. Each of these suffixes produces a particular part of speech (PoS), and is spread across 47 adjectives, 94 nouns and 4 verbs.

It should be noted that these suffixes do not align with those in the *MorphoQuantics* database (Laws & Ryder 2014b) described in §3.2.1. While the original selection of suffixes was based in part on those in *MorphoQuantics*, as well as Stein (2007) and Bauer, Lieber & Plag (2013), alterations to the list were undertaken for a variety of reasons. Suffixes were included based on the fact that they generated adjectives, nouns or verbs, and many were further split into different suffix entries because of their semantic realization, which is largely connected to the PoS from which they derive. For example, while *MorphoQuantics* includes only one entry for noun-forming *-ism*, the database created for this study contained five entries with different semantic realizations, outlined in Table 3.1. This splitting process was undertaken primarily for the reason of grouping the suffixes into separate categories based on their meaning (see §3.2.5). In addition, some arbitrary decisions to count zero-derivations of complex words to other PoSs as separate suffixes were reversed, since PoS conversion of this type is to be examined individually (§3.3.4).

Table 3.1: *Divisions of noun-forming* -ism *used in the databases*.

Suffix	**Meaning**	**Examples**
-ism[1]	'patterns of action or behaviour characterised by the base element'	*absenteeism, professionalism*
-ism[2]	'a doctrine or belief system of the nature or person denoted, or a ceremony of the kind denoted by the base element'	*Darwinism, nationalism*
-ism[3]	'prejudice against the base element, or the belief in the superiority of one kind of the base element over all others'	*racism, sexism*
-ism[4]	'medical conditions, deficiencies, and other scientific terms relating to the base element'	*autism, rheumatism*
-ism[5]	'a kind of language showing elements of or typical of the group identified in the base element'	*Americanism, colloquialism*

Two main subsets of derivational morphology that were not included for analysis were prefixes and combining forms. The differences between these forms and suffixed words, both in theory and in practice, have been described in §2.2, and as such it was felt that comparisons of these different types of derivation were too lengthy to be included alongside the other distinctions to be made in this project, and that this would detract from the depth of the current analysis. "Splinters" of the kind described by Lehrer (1998), such as *-athon* and *-scape*, were also discounted for this reason.

Additionally, words that did not create complex words of the PoSs under scrutiny in this project were removed, in particular those forming adverbs (*happily, downward*), proper nouns (*Crustacea, Jeanette*) and numbers (*nineteen, seventh*). It was judged that the number of suffixes forming these PoSs were too few and limited in their scope. The most notable exception to this is of course the adverb-forming suffix *-ly*[2], which occurs extremely frequently and productively; however, there is considerable debate as to the status of this suffix as derivational (Sugioka & Lehr 1983; Zwicky 1995), since it can be argued that it attaches so freely to any adjective that its behaviour is more characteristic of inflectional suffixes.

Further to this list were added any suffixes that were ambiguous due to their uncertain or unclear etymology as derivations, such as those that come under the category of *-ate*[4] (*devastate, relate*) in *MorphoQuantics*. This suffix is generally seen as an 'adaptation termination' (Marchand 1969:256) rather than a derivational suffix due to its origins in the anglicizing of the Latin past participle *-atus*. While there has been some extensive discussion in the literature, in particular by Marchand (1969) and Plag (1999), as to the criteria for identifying *-ate* forms as adaptational or derivational, this is often inconsistent between sources. Therefore, the approach taken in this study for the inclusion of a word under the category of verb-forming *-ate*[3] follows that of Laws & Ryder (2018: 7-8) – that is, those words for which the OED provides etymology explicitly in the form of the base plus *-ate*, such as *formulate* (*formula* + *-ate*[3]) and *motivate* (*motive* + *-ate*[3]).

Other criteria for exclusion were those suffixes that simply did not occur in one or more of the corpora under investigation, such as *-aster* (*poetaster*) and *-nik* (*peacenik*), since it would therefore not be possible to make accurate diachronic and register comparisons with a different set of suffixes for each corpus. Additionally, suffixes were removed that were deemed to have meanings too restricted for the purposes of everyday neologism creation, in particular those employed in chemistry such as *-ide* (*cyanide*, *fluoride*), *-ose*[2] (*dextrose*, *glucose*) and *-ate*[5] (*carbonate*, *nitrate*) . Finally, since the focus of this project is exclusively on derivational rather than inflectional morphology, certain suffixes that originate from inflections in other languages, such as the plurals *-im* (*seraphim*) and *-a* (*stigmata*), were also excluded.

3.2 The Complex Word Databases

This section outlines the creation of the three databases of complex words, developed from several existing sources and used throughout Part I as a means of comparing present-day conversational speech diachronically and with more formal registers. Except where noted, all methodological processes outlined here and in §3.3 were undertaken for all three sub-corpora.

3.2.1 Existing Materials

Traditionally, natural spoken data in corpora has been hard to come by: it is difficult to collect, since there is no permanent record unless this is anticipated in advance, and it must

undergo the lengthy process of transcription into a written form before it can have corpus methods applied to it. The British National Corpus (BNC) has been the primary source of spoken British English since its publication in the 1990s, containing over 10 million tokens, approximately 40% of which is demographically sampled (DS) and 60% context-governed (CG). The former sub-corpus consists of everyday conversations collected by giving recording devices to members of the public to carry with them throughout the day, whereas the latter contains data from more formal situations such as lectures, meetings and sermons. Complex word data for both these corpora was extracted prior to the current project to build the *MorphoQuantics* database (Laws & Ryder 2014b). This is the first known freely-available database of its kind, and enables researchers to quickly examine characteristics of derivational morphology, as shown in several studies already undertaken (Spain 2014; Säily & Suomela 2017; Laws, Ryder & Jaworska 2017; Laws & Ryder 2018).

In addition to the two spoken components of the BNC, the more recent Spoken BNC2014 project (Love et al. 2017) has led to the compilation of a new corpus of more modern spoken English, the Early Access Subset (EAS), which was made available to the researcher in the fifth month of the current project. This comprises approximately 5 million tokens and matches the DS component of the old BNC in register. The utilization of these three corpora enables not only a diachronic comparison of the EAS to the DS component, but also an examination of register variation in everyday conversation over time, such as that by Laws, Ryder & Jaworska (2017), with the CG component acting as a reference of more formal speech from that earlier period. However, as there is currently no modern equivalent for this CG component in the Spoken BNC2014, register comparisons can only be made in the light of diachronic differences that are first identified by a comparison of the two corpora of conversational speech; this is the procedure undertaken throughout the Part I analysis (Chapters 4 and 5).

It should be noted that, although the register for the DS and EAS corpora are largely the same – everyday, conversational speech – the methodology by which each dataset was collected may result in some differences of importance to the analysis of the findings. For example, there was a stronger focus on the quality of recording in EAS, whereas in DS participants were asked to record all their spoken interactions over a period of two days; while this arguably provides more accurate transcriptions (and therefore a more accurate representation of language) on the one hand, on the other it suggests that the Observer's Paradox (Labov

1972) may play a larger role as the conversation is likely to be more focused and the participants aware for a larger proportion of time that they are being recorded (Axelsson 2017). Furthermore, there are some differences in the demographic balance in EAS, because the dataset was made available to researchers as an early sample of the final corpus and the compilers were not able to ensure that all demographic features were equally represented. As a result, it appears that there is an overrepresentation of young adults (comprising 38.3% of all utterances), those with higher education qualifications, and in particular the highest and lowest social grades in comparison to the countrywide demographic split (Table 3.2). On the other hand, in some respects the social grade system that is used represents a breakdown of traditional divisons, and it could be argued that grades A and B roughly correspond to "middle-class", while the remainder correspond to "working-class"; from this point of view, there is close to a fiffy-fifty split between the two traditional groups. Nevertheless, the differences should be borne in mind in case they affect the reliability of the conclusions that can be drawn from the data.

Table 3.2: *Approximated Social Grade in EAS vs. the UK Population*.

	EAS (%)	**UK Population* (%)**
AB	52.63	22.17
C1	12.49	30.84
C2	2.04	20.94
DE	31.92	26.05

* Source: 2011 UK Census, taken from UK Geographics (2014)

Although some detail is given in Laws & Ryder (2014a), an extensive outline of the process by which *MorphoQuantics* was constructed has not yet been provided in publication. The following subsections describe the process used to create the database of complex words from the EAS corpus; this reflects the process by which *MorphoQuantics* was constructed except where noted, since further changes were made to form the database of complex word data used in this project from the DS and CG components of the BNC. For the sake of clarity, while these parent corpora are labelled EAS, DS and CG, the complex-word databases that were developed for the project are referred to as EAS14, DS94 and CG94 respectively, reflecting their year of completion and distinguishing them as databases of complex word data, rather than full corpora of transcribed speech.

3.2.2 Extraction of Complex Words

Initially, all the words within the corpus that end with a suffix in the target set of 145 were extracted; this was achieved through the use of the BNC*web* (Hoffmann & Evert 2013) for DS94 and CG94 extractions, and CQP*web* (Hardie 2012, 2016) for EAS14 extractions. Searches were conducted using the "**suffix*" string, indicating any number of wild cards preceding the suffix, which hence returned every word that ended in each individual search string. Alternative graphemic representations of suffixes, such as the *-ise* variant of verb-forming *-ize*, were borne in mind at all times and searches performed on each alternative. In addition, inflected forms of these suffixes were extracted based on their PoS – *-s* and *-'s* for nouns; *-s*, *-ed* and *-ing* for verbs[3]; *-er* and *-est* for adjectives – since these affect only the grammatical position of the word and were considered "duplicates" of the uninflected lexeme (§3.2.4).

However, some refinements were made to the extraction of these forms. Although suffixes tend to create a specific PoS, it is quite possible that they can undergo conversion to other forms without further suffixation (§2.2.1); therefore, although *-ion* creates nouns (*the commission*, *a petition*), the fact that it has potential to create verbs (*to commission*, *to petition*) means that it is necessary also to check for verb inflections for this suffix. Since Convertibility is one feature under scrutiny in this project (§3.3.4) and it was important not to bias the results, all suffixes needed to be checked for all inflections.

Fortunately, the reality of this was less daunting. Since derivational forms of *-er*, *-ed* and *-ing* were to be extracted anyway, there was no need to search for these separately for every other suffix. Further, since both nouns and verbs contain an identical *-s* inflection, this needed to be extracted only once. In addition, in both the BNC*web* and CQP*web*, possessive *-'s* is transcribed with a space between itself and the base word, which meant that this inflection could be effectively ignored. Therefore, the only inflections that required separate extraction were *-s* (covering two separate inflections) and *-est*. Since the number of tokens for the latter was likely to be minimal (complex words infrequently take this inflection for the comparative form), this was extracted separately in its own category and the few relevant types identified (§3.2.3).

[3] The inflection *-en* is counted in *MorphoQuantics* separately due to its attachment only in irregular past participles; however, since it is inflectional, it was excluded from analysis in this project in any case.

Table 3.3: *Multiple suffixes included within more simple extractions.*

Search String	**Inclusions**
**an*	**arian, *ian, *ician*
**ion*	**ation, *ition*
**y*	**ancy, *ary, *cy, *ency, *erly, *ery, *iety, *ify, *ity, *ly, *ory, *ty*

A final point of note at this stage is that the extraction of certain suffixes entailed certain others where their ending appeared the same; for example, the extraction of *-ion* types and their inflected forms also captured those of *-ation*. A guide was initially drawn up prior to any extraction in which only the necessary searches were listed along with all the further extractions that would be included within it, to ensure that the process was as efficient as possible; an example of this is given in Table 3.3.

3.2.3 Identification and Verification of Complex Words

Once the data had been extracted from the corpus, a number of procedures were followed to ascertain which of the words were valid entries into each suffix category, since many words that end in a particular string of letters are not necessarily complex words (for example, *tortoise* is not an example of the suffix *-ise*). All words needed to be checked against a reference, the OED, to ensure that they were genuine examples of a particular suffix in etymological terms; this included cases where the categorization was not initially clear, such as *orientation*, categorized by the OED as from *orient* + *-ation* rather than *orientate* + *-ion*. The OED was chosen as a reference due in part to its reputation, but also due to an existing reciprocal agreement between Oxford University Press and the University of Reading with respect to information provided on the *MorphoQuantics* interface.

In the case of neologisms, because they were by definition not present in the OED, these were assessed based on their context to decide to which suffix category they belonged, and in the vast majority of cases this was possible. However, for a small handful of cases, the context was unable to provide clarification, usually due to overlapping speech that made the role of a neologism within an utterance unidentifiable; in such cases, the words were discarded from use so as to avoid biasing in favour of any particular role.

Following verification against the OED, the words were then checked within the corpus itself for a number of reasons. Firstly, this was to ensure that their PoS had been tagged correctly. In the BNC*web* interface, the CLAWS5 tagging system used is in many cases unable to identify a single PoS for a particular word and therefore assigns it an ambiguous tag; for example, *patient* may be given the tag [AJ0-NN1] or [NN1-AJ0], meaning that the tagger is unable to detect definitively whether, in the context, it is an adjective or a noun. Such tags needed to be disambiguated by checking the function of the word in the original corpus. An example of this is given in Table 3.4 for *patient*, in which 18 tokens tagged as [AJ0-NN1] and 43 as [NN1-AJ0] have been disambiguated into their correct totals for adjectives and nouns and thus which variant of the suffix (*-ent*[1] adjectives or *-ent*[2] nouns) they belong to; the shaded cells highlight those parts that have been resolved from the ambiguous tagging above them, and only the bold figures for tokens are then included in the total for *patient* for each variant of the suffix.

Table 3.4: *Disambiguation of* patient *as an adjective or noun from BNC raw data*.

Word	**BNC PoS**	**Resolved PoS**	**Tokens**	**Suffix**
patient	[AJ0]	adj	**28**	*-ent*[1]
patient	[AJ0-NN1]	-	18	-
	-	n	**12**	*-ent*[1]
	-	adj	**6**	*-ent*[2]
patient	[NN1-AJ0]	-	43	-
	-	n	**41**	*-ent*[2]
	-	adj	**2**	*-ent*[1]
patient	[NN1]	n	**129**	*-ent*[2]
patients	[NN2]	n	**378**	*-ent*[2]
		Total *-ent*[1]:	**42**	
		Total *-ent*[2]:	**554**	

In the CQP*web* interface for the EAS14 words, the CLAWS6 tagger is used; as the software employs a more advanced algorithm for identifying PoS status, this tagging system does not award ambiguous tags to any words, although this does not mean that it is infallible. However, due to the time constraints of this project, and indeed life in general, it was not possible to check every potentially ambiguous word in the corpus for its PoS. Instead, only cases where the tag appears to be especially unusual were checked, such as the tagging of

judgements as a third-person verb, which unsurprisingly turned out to be a mis-tagged plural noun.

Certain words were also checked in context at this stage in order to account for cases of homonyms, where two (or more) variants may be categorized differently. An example of this is *counter*, in which only the meaning of 'a person/thing that counts' is an example of the suffixes *-er*[1] and *-er*[3], and its meaning of 'table/worktop' is not. It was also at this stage that the identification of neologisms could be made, since these had no entry in the OED but were identified as complex words from their context in the corpus (see §3.3.2 for a more detailed definition of "neologism" for the purposes of this project).

3.2.4 Duplication and Summation of Complex Words

The final process to apply to the data was to identify the "headword" of each entry such that duplicates of the same complex word could be summed into one token total. This total included all the inflected forms of the word and, as such, implies that each headword is more accurately identified as a "lemma" rather than a "type". However, the headwords also included prefixed forms, such that entries in the corpora for *impatient* and *outpatient* are included within the total for *patient* in *-ent*[1] and *-ent*[2] respectively. The decision to include prefixed forms in *MorphoQuantics*, and hence the databases in this study, stems from the notion outlined in §2.1 that the Right-Hand Head Rule (Williams 1981) should be used to classify complex words with multiple suffixes into the last suffix that has been attached; here, a decision was made, based on the etymology listed in the OED, to include words that were prefixed after suffixation within the suffixed headword, and those that were prefixed prior to suffixation as their own headword. For example, *unquestionable* is classified as a duplicate of *questionable* because the prefix *un-* is added after the suffix *-able* (an underlying process of [*un-* + [*question* + *-able*]]), whereas in *interchangeable* the prefix *inter-* is added prior to the suffix *-able* (an underlying process of [[*inter-* + *change*] + *-able*]). In examples that were not clear from the OED etymology in which order the process had occurred, these were usually treated as in the case of *unquestionable*, unless there was a clear semantically-driven reason

Table 3.5: *Duplicates of the plemma* organize *in the DS94 database*.

Plemma	**Total tokens**	**Duplicates (with individual token counts)**
organize (v.)	92	*disorganised* (1), *disorganized* (1), *organise* (7), *organised* (9), *organising* (2), *organize* (15), *organized* (36), *organizes* (2), *organizing* (17), *reorganize* (1), *reorganized* (1)

to treat it otherwise. It should be said that the distinction between these two categories was almost always clear from the meaning; however, where the different treatment of *reformation* (the act of reforming) is necessarily different to that of *re-formation* (a repetition of the act of forming), all examples were checked contextually to ensure that each was classified correctly.

Furthermore, it is possible that certain neologisms could arguably arise from transcription errors rather than through speaker choice, especially in cases where a suffix substitution has occurred, such as *-ize* for *-ate*[3] in *inoculize*. Although some of the original audio recordings are available for the original BNC, this is few and far between, and none is yet available for the Spoken BNC2014; as such, it was deemed impossible to recognize when such a transcription error had occurred, and indeed difficult to identify where such an error could occur, and so any such examples were taken at face-value as the innovation of the speaker, whether deliberate or through their own substitution errors.

The headwords thus represent something more than the typical definition of either lemma or type as discussed and debated in the literature (Richards 1987; Youmans 1990); they also do not reflect the more recent term "flemma", argued as a more useful term that includes the traditional inflected forms of lemmas plus identical forms in alternative parts of speech such as participials (Pinchbeck 2014; McLean 2017), since the latter are not included within the headwords or in the analyses in the chapters that follow. The headwords in this study therefore cover a new set that includes prefixed forms on top of those included within the lemma, but not within the flemma. For this reason, the term used throughout this thesis is "plemma" (a blend from *prefixed lemma*), referring to the raw form of a complex word, its inflected forms, its prefixed forms, and graphemic variants of all of the above; the example *organize* is given in Table 3.5 to illustrate the full coverage of an individual plemma. Note that, in cases where an entry in the database appeared only in an inflected and/or prefixed form, an uninflected and un-prefixed headword was created to represent the plemma for the sake of consistency. For example, in EAS14, there were five tokens for the word *Iranians* (plural form of *-ian*[2]), but none for *Iranian* (in its noun form); a headword *Iranian* was therefore created within *-ian*[2] with a count of 0 tokens, to which the 5 plural entries were added.

It should also be noted here that, in all cases, words are classified according to only their right-hand-most suffix; thus *organizational* is not included with the suffix *-ize*, nor

within *-ation*, since this word is considered an example of the suffix *-al*[2] attached to the base *organization*. This is in line with the principles of morphological theories discussed in §2.1 to which this project adheres, whereby a multiply-complex word such as *organizational* is considered to have been built up in stages rather than having had all its morphemes attached to the base *organ* at the same time. This approach has also been taken in other corpus-based analyses of derivatives, such as Plag (1999).

3.2.5 Categorization of Complex Words

Once all the words from the suffixes had been fully processed, an assessment was made as to their range of meanings so that each could be categorized into a particular group based on its usage; the purpose of this was to enable analyses relating to the semantic properties of each suffix as well as across the full range of suffixes. In *MorphoQuantics*, the breakdown of suffixes was based primarily on Stein (2007), although additional variants were added in the process of its development based mainly on the PoS that they created or that to which they were added. To address suffix polysemy more exhaustively in this project, further sources beyond Stein (2007) were used that define suffixes extensively (Quinion 2002; Bauer, Lieber & Plag 2013) in conjunction with the OED; however, the final arbiter of a suffix's range of definitions was the context in which its constituent words were used. For the majority, these were clear from common usage; however, some more uncommon words were checked to see if their usage conformed to the understood definitions of the suffix. In cases where there were several complex words of a hitherto unidentified definition, a new suffix category was created with this new definition. It was found that this was often the case when a suffix was formed from more than one PoS: the resultant meaning of a complex word tended to be consistent within this parameter.

For example, the suffix *-age* in *MorphoQuantics* has only one entry, forming nouns from both verbs and nouns, with the definition 'an instance/result of an action, or collection, place, rank of the base element'. However, on closer inspection, each of the words within this category was clearly definable as one type or the other – those from verbs formed 'instances/results of an action', and those from nouns formed 'collections, places, or ranks'. Since many other separated suffixes exist that have similar meanings to both the former definition (*-al*[2] in *burial*, *-ence*[1] in *correspondence*, *-th*[1] in *growth*) and the latter (*-ate*[2] in *doctorate*, *-hood* in *brotherhood*, *-ice* in *cowardice*), these were separated into two distinct suffixes, *-age*[1] and *-age*[2] (Table 3.6). Further to this, to illustrate the importance of checking

Table 3.6: *Divisions of noun-forming* -age *used in the databases*.

Suffix	Forms Y from X	Definition	Examples	Source(s)
-age[1]	v → n	an instance, the process, or a concrete result of the action denoted by the base verb	*haul<u>age</u>*, *stor<u>age</u>*	- Stein (2007: 3-4), def. 1&2 - Bauer et al. (2013: 251), def. 2&3
-age[2]	n → n	the condition, rank, or state of what is denoted by the base noun	*sign<u>age</u>*, *volt<u>age</u>*	- Stein (2007: 4), def. 5 - Bauer et al. (2013: 251), def. 1&3
-age[3]	n → n	a collection of or place for what is denoted by the base noun	*orphan<u>age</u>*, *vicar<u>age</u>*	- Stein (2007: 4), def. 3&4 - Bauer et al. (2013: 240)

inter-suffix similarities in meaning, the denominal definition pertaining to 'places for' a particular entity or group was found to exist in many other distinct suffixes (*-arium* in *planet<u>arium</u>*, *-ery*[2] in *nunn<u>ery</u>*, *-y*[6] in *friar<u>y</u>*); hence, this was further separated into a third suffix, *-age*[3], so that it could be grouped with those accordingly.

The total 145 suffixes were then given a code pertaining to their particular group, made distinctive based on the PoS that was being created (or maintained) by suffixation: adjectives were labelled A1, A2, A3, etc., nouns N1, N2, N3 etc., and the single verb category as V1. A full list of suffixes sorted by group, along with the general definition of these groups, is provided in Appendix 2. Note that these categories are not exhaustive as far as all semantic possibilities are concerned; for example, the verb category V1 includes the various semantic role of words within these suffix groups, identified by Laws & Ryder (2018) by synthesizing analyses from Marchand (1969) and Plag (1999, 2004), such as ornative ('provide with X', e.g. *glor<u>ify</u>*) versus inchoative ('become X', e.g. *calc<u>ify</u>*) uses of *-ify*. Instead, the categories listed in Appendix 2 identify an overall generalization of the meaning of the suffix in order to draw comparisons between suffixes with closely-associated meanings and to avoid the comparison of every single suffix individually that would be the inevitable result of increasing the depth of semantic analysis.

Two special cases are worthy of note here. The first is the suffix *-less*, which is categorized into group A3 ('causing/showing/full of'), along with other suffixes that exhibit this meaning (*-ful*[1] in *hate<u>ful</u>*, *-ive*[1] in *mass<u>ive</u>*, *-ous* in *poison<u>ous</u>*). This suffix is somewhat unique in its negative meaning ('not causing, showing or full of the base'), which is often the duty of prefixes (*anti-* in *<u>anti</u>-war*, *im-* in *<u>im</u>possible*, *un-* in *<u>un</u>happy*); however, it was felt that in this case it still belonged to group A3, with the proviso that it carries negative force and may be interesting to examine in isolation from other suffixes as well. Appendix 2 also includes a group of nouns, N11, which each appear to have unique meanings that do not conform to any other suffixes in the total set.

3.2.6 Ethical Considerations

In any research project, it is always of the utmost importance to take ethical matters into consideration in dealing with potentially sensitive data. However, for this part of the project, the analysis of corpus data required no considerations of ethics as access to the material is either public or previously granted by the relevant authority, and the individual participants will have already given their consent at the time at which the corpus was compiled.

3.3 Scoring Categories and Criteria

Once the full set of data had been collected and processed according to the methods described in §3.2, it was further prepared for analysis by scoring the suffixes on various criteria designed to address RQ1 (§2.4.2). It must be said here, if for no other reason than the researcher's self-respect, that this scoring process took an extraordinary length of time, particularly for the criteria described in §§3.3.6-3.3.8 involving the analysis of each individual plemma in all three databases. At the same time, there is of course a certain amount of overlap between the types within each corpus, such that many of the scores could be copied across from one to the other, ensuring consistency as well as saving great swathes of time.

3.3.1 Frequency

The plemma and token frequency count of each suffix was obtained and collated into an index page for each database from which a summary of all suffixes could be observed (see Appendix 3 on attached CD). These were then further summed to obtain figures for the total

number of plemmas and tokens within each database; these are presented in Table 3.7 alongside the totals for each of the parent corpora DS, CG and EAS.

The type/token ratio (TTR) is a measure often used to identify the lexical richness of a body of data. In this case, as the complex words are collected under a single plemma, the plemma/token ratio (PTR) would be more appropriate, in the same way that lemma/token ratio (LTR) is generally a more suitable measure when inflected forms are counted under a single headword; Granger & Wynne (1999), for example, suggest that LTR is more appropriate for pedagogic means unless one were to be specifically studying the acquisition of inflections. However, it was also felt here that a division of the number of tokens by the number of plemmas would be a useful additional measure, as it shows more clearly the relative density of complex word types in each subset; the token/plemma ratio, or 'TPR', is therefore used in Table 3.7 and throughout the thesis to refer to this measure. It should be borne in mind, however, that using TTR (or any equivalent allowing for lemmas or plemmas) can be an unreliable practice as it is very sensitive to the token count; for this reason, in the analyses that follow, it is primarily used as a way of more clearly comparing the ratio of tokens to plemmas in an individual and specific context rather than as a means of drawing conclusions across a broad set of data.

Table 3.7: *Plemma and token frequencies and TPR across all databases.*

Database	**Totals**			**Parent Corpus Totals**	
	Plemmas	**Tokens**	**TPR**	**Plemmas**	**Tokens**
EAS14	6,420	121,248	18.89	34,482	4,789,185
DS94	5,036	87,921	17.46	31,901	4,233,962
CG94	8,068	342,003	42.39	46,287	6,175,896
Totals	**10,681**	**552,250**	**51.70**	**76,806**	**15,199,043**

While token data can be summed to get a total for the density of complex words used across all three databases and corpora, the same cannot be achieved with the plemmas, because many co-occur in either two of the corpora or all three. The figures represented in Table 3.7 as the totals of plemmas are therefore totals of the unique types across all three databases or corpora. These were calculated by obtaining full plemma lists from each database or corpus and eliminating duplicate types from a combined list.

3.3.2 Creativity in Suffixation

The term "Creativity" here refers not to the potential of a suffix to create new forms, but a representation of the actual realization of neologisms within the databases, specifically "disposable" words (§2.3) rather than those that enter into the language officially. Two scores were awarded to a suffix in reference to its Creativity: one for the number of plemmas and one for the number of tokens. These were achieved in each case by dividing the total number of neologistic plemmas and tokens by the Frequencies established above added to the figures for neologisms, to obtain a number between 0 and 1 effectively representing a percentage of new forms based on the frequency. Table 3.8 illustrates this for three suffixes in EAS14, although separate scores are also obtained for DS94 and CG94.

The definition of "neologism" in this project stemmed primarily from the fact of whether or not the word appeared in the OED: those that did not, but which made sense from the context of the text and were clear examples of the suffix in question, were labelled as neologisms. Words that appeared in the OED, but were listed as either obsolete, archaic, or rare were also considered new words created by the users even though the word's past usage was recorded in the OED, as it was judged in all cases that speakers would be unfamiliar with the prior existence of such words.

There is something of a controversy over the use of dictionaries in studies of morphology, particularly in regard to productivity for reasons that are described in detail in Plag (1999:96-100); broadly speaking, these reasons relate to a bias towards idiosyncratic, less transparent derivations over those whose meaning is predictable from its morphological elements, and the argument is made that corpus-based approaches provide more reliable results, such as those of Baayen & Renouf (1996) whose corpus-derived findings contrast with those of Cannon's (1987) dictionary-driven findings. However, the approach taken in this thesis is not so much one that relates to productivity or Creativity in a direct sense, but is used for the sole purpose of identifying those words that comprise the inventory of a particular suffix, which in

Table 3.8: *Example suffix scores for Creativity from EAS14.*

Suffix	**All Derivations**		**Neologisms**		**Creativity**	
	Plemmas	**Tokens**	**Plemmas**	**Tokens**	**Plemmas**	**Tokens**
-age[2]	32	1,392	8	15	0.250	0.011
-ist[4]	4	31	2	3	0.500	0.097
-ness	173	1,473	24	26	0.139	0.018

turn is for the purpose of identifying neologisms. The frequency of a derivative is the only criterion that is of interest here, rather than its explicit listing as a separate entry derived from a base plus a suffix; that is to say, it is not of interest where or how the derivative is presented in the dictionary, but rather that it appears at all as an "official" part of the language and, therefore, that its usage in the corpora studied is less likely to be an instance of Creativity on the part of the speaker over a more typical use of an already known word. Again, the OED is deemed an appropriate source for this information due to its reputation and the establishment by studies such as Cannon (1987) that its coverage of derived forms is much more comprehensive.

One potential problem that does stem from this dictionary-based approach to a suffix's inventory for the purposes of this thesis is that it does not account for the words used by speakers in DS94 and CG94 that were new disposable words at the time of recording, but which have entered into the language and the OED during the intervening period. Such a problem had the potential to skew the results in favour of more neologisms in the newer data. To account for this, lists of additions to the OED between 1980 and 2012 were consulted (Wilton 2012); it was found that none of the complex words therein occurred in any of the databases, and it was concluded that this potential problem was not in effect here.

3.3.3 Prevalence of Suffixes

While "frequency" in this thesis refers to a raw figure of the number of occurrences of a certain suffix (tokens) or the individual words that employ it (plemmas) within the databases, "Prevalence" refers instead to its frequency in general usage. To derive such a figure, each complex type in the database was identified in the OED and the band number for its frequency was recorded. The OED rates most entries with a band number from 1-8, with 1 containing 'extremely rare words' and 8 'the most common English words' (OED 2017);

Table 3.9: *OED frequency bands with examples (adapted from OED 2017).*

Band	Frequency /million	% of entries in OED	Examples
8	> 1,000	0.02%	*the, she, in, but, will, do, some*
7	100-999	0.18%	*man, thing, four, small, best*
6	10-99	1%	*machine, yellow, Irish, socialist*
5	1-9.9	4%	*tumult, appropriate, Platonic*
4	0.1-0.99	11%	*nutshell, subpoena, satirically*
3	0.01-0.099	20%	*agglutinative, cutesy, emote*
2	< 0.0099	25%	*satinize, abactinal, unwhigged*
1	-	18%	*abaptiston, gurhofite, zarnich*

these bands (summarized in Table 3.9) are calculated primarily from Google Books *Ngrams* data (Google 2013), although with cross-checking to other corpora and analysed manually to resolve possible ambiguities. There is currently in the literature some evidence and debate regarding the reliability of Google *Ngrams* data, such as the problem of a lack of accompanying metadata as an essential part of analysis (Koplenig 2017) or the fact of its heavy reliance on scientific texts, leading to calls to properly establish the dynamics of the dataset before conducting future study (Pechenick et al. 2015); an additional item of note for the current study is of course that the *Ngrams* data are based on written texts, rather than spoken transcriptions. However, it was felt that the inclusion of Prevalence based on this data was nevertheless justified, in part because it is simply the only available data of its kind, but also because this study considers register differences through examination of CG94 data, and this can be used to mediate findings relating to Prevalence if differences are found between the more and less formal datasets.

The OED frequency scores from 1-8 for each complex type were then averaged to obtain a mean value for each suffix, which is identified as the Prevalence score (P) of a suffix. Additionally, during the assessment of complex word Prevalence, neologisms were awarded a score of 0 and removed before calculating the mean value.

3.3.4 Convertibility Potential of Suffixes

The concept of conversion was discussed to some extent in Chapter 2 and refers to the changing of the PoS of a word without the addition of a morpheme or, sometimes, with the addition of a "zero-morpheme". "Convertibility" therefore refers to the ability of a suffix to convert to alternative PoSs; for example, the ability of *-age*[2], forming nouns such as *the dam<u>age</u>*, to permit conversions to verbs, such as *to dam<u>age</u>*. This score is obtained in much the same way as Creativity above; however, in this case the total plemmas and tokens for the converted types is not added to the total 'All Derivations' as displayed in Table 3.8. Thus, while the figure for Creativity could be considered a percentage or density of neologisms among all types, the Convertibility score (C) shows instead the tendency of a suffix to create conversions as a factor of its total realizations in the "expected" PoS. It is therefore possible in some cases for this number to be greater than 1, since there may be more converted plemmas and tokens than regular plemmas and tokens; Table 3.10 again provides examples from EAS14.

Table 3.10: *Example suffix scores for Convertibility from EAS14.*

Suffix	All Derivations		Conversions		Convertibility	
	Plemmas	Tokens	Plemmas	Tokens	Plemmas	Tokens
-age[2]	32	1,392	5	166	0.156	0.119
-ist[4]	4	31	8	97	2.000	3.129
-ness	173	1,473	1	17	0.006	0.012

3.3.5 Distinguishability of Suffixes

Although suffixes have a particular graphemic representation, it is not always the case that the appearance of this representation within a word is a genuine example of the suffix; for example, while *father* could seem to contain one of the six *-er* suffixes in the database, it is not in fact derived this way and is therefore a 'false' representation of these suffix categories. Clearly it can be expected that certain suffixes occur more often in false representations due to their graphemic simplicity (*-an*[1-2], *-er*[1-6], *-y*[1-6]) compared to others with more complex forms (*-itude*, *-manship*, *-osis*), and the degree of this attribute is what is referred to in this thesis as the "Distinguishability" score (D).

The computation of this score was somewhat more multifarious than that of Creativity and Convertibility. In this case, there was a need to return to the complete set of extractions obtained in §3.2.2 in order to divide the number of true realizations of a particular suffix by the total number of entries in the corpus that contained the graphemes, achieved by searching for each suffix preceded by a wildcard asterisk. However, four alterations were made to the data before this division occurred:

i. *Only those words in the corpus that matched the suffix's intended PoS were used*. It was reasoned that, although complex words may zero-convert to alternative PoSs, they must first exist as the original PoS (even if only by implication); hence, for example, the realizations of adjective-forming *-ful*[1] in the database were divided into only the adjectives ending in *ful* in the parent corpus.

ii. *Notable outliers were removed*. It was noted in examining the corpus data that there were a number of entries which matched the PoS for the suffix, but which clearly could not be considered complex words since they were monosyllabic, and complex words are by their nature polysyllabic. There was a concern that they may skew the Distinguishability data as many of them had high frequency; for example, the noun

plan occurs in EAS14 322 times, yet it is highly unlikely that this could be mistaken for an instance of noun-forming *-an*[2]. Because some of the more frequent culprits of this phenomenon were also those with the most hits, it was not practical to search through every monosyllabic entry within the corpus to remove it; however, a threshold of 100 tokens was chosen to indicate particular high-frequency entries, and these were removed manually before Distinguishability was calculated.

iii. *Inflected forms were included for calculating token Distinguishability only*. Since the type data in the corpus in fact refers to plemmas as headwords of the inflected entries, the calculation of Distinguishability by plemma used only the corpus entries obtained by a search of, say, *-ness* for the division; following this, the division to calculate the score for Distinguishability by tokens was calculated adding in nouns obtained by a search of *-nesses*.

iv. *Existing data for homographic suffixes was removed*. It was reasoned that, where more than one suffix of the same graphemic representation formed the same PoS, it was illogical to include it within the Distinguishability calculation since a speaker would recognize it as a true realization of another suffix. Thus, the calculation for noun-forming *-er*[1], for example, discounted the plemma and token totals for the noun-forming suffixes *-er*[2-6]; similarly, the calculation for *-er*[2] discounted data for *-er*[1] and *-er*[3-6]; and so on. This also included non-homographic suffixes which nevertheless ended with the same graphemes as a shorter suffix; thus, in the same example, data for *-eer*, *-ier*, and *-ster* were also excluded.

Table 3.11 below shows examples of the plemma and token counts for genuine examples of the suffix (e.g. *pol<u>ar</u>*) and the lemma and token counts for all appearances of its form in the EAS corpus (e.g. *tartar*), with adjustments made based on the criteria above; these are then

Table 3.11: *Example suffix scores for Distinguishability from EAS14*.

Suffix	**Suffix Frequency**		**Form Frequency***		**Distinguishability**	
	Plemmas	**Tokens**	**Lemmas**	**Tokens**	**Plemmas**	**Tokens**
-ar	32	1,157	62	1331	0.516	0.869
-ish[2]	5	15	18	29	0.278	0.517
-itude	11	130	11	130	1.000	1.000
-our	14	808	31	1,156	0.452	0.699
-th[2]	12	415	73	1,586	0.164	0.262
-y[5]	18	448	911	21,111	0.011	0.004

* Figures adjusted for incorrect PoS, outliers, and homographic suffixes

divided to obtain Distinguishability scores for both plemmas and tokens.

Two further points are of note in relation to the score for Distinguishability. The first is that the totals for the words containing a particular grapheme were obtained using the EAS corpus and used for the calculation of the scores for all three databases EAS14, DS94 and CG94. The main reason for this relates to the discussion in §3.2.3 about the tagging systems used within the corpora. While the complex-word data in *MorphoQuantics* taken from BNC*web*, which uses CLAWS5, had already been disambiguated where more than one PoS tag was suggested, this was not the case for the non-complex-word data and would have taken an unfathomable length of time to achieve. The EAS corpus, on the other hand, using the more advanced CLAWS6 and providing no ambiguous tags, allowed for a faster and more accurate calculation of Distinguishability by PoS. This assumption is considered reasonable since a) the figure for Distinguishability is one that is unlikely to be affected over time and the EAS represents more up-to-date data, and b) the exercise of preparing data for Laws, Ryder & Jaworska (2017) identified that, for various reasons, the register for EAS sits somewhere between that of DS and CG when it comes to complex-word data.

The second item of note is that the Distinguishability figures calculated here refer to the written form of the suffixes, whereas the project in general is designed to examine spoken data. Unfortunately, this problem would appear to be unresolvable at the time of writing: the only way to avoid this problem would be to use a corpus presented entirely in phonetic transcript, such that one could instead search for /ə/, for example, instead of *-er*. However, the researcher is unaware of the existence of any such corpus, and certainly not on the scale of either of the corpora used elsewhere in this study.

3.3.6 Opacity of Derivatives

While the plemmas in each of the databases were being checked against the OED to collect Prevalence data, the bases of the words were also recorded. Those that had a clear Modern English base were considered "non-opaque" and scored 0 on this strand; those that did not were considered "opaque" and scored 1. A mean value was then taken of these individual-word scores in order to obtain a value between 0 and 1 that represented the overall "Opacity" score (O) for the behaviour of each suffix; in other words, the division of opaque plemmas by all plemmas. A second value was also collected for this strand that was weighted by the number of tokens, since the occurrence of a few high-frequency opaque items could make a

Table 3.12: *Example Opacity scores for some* -age[1] *words from EAS14.*

Plemma	Tokens	Base	Opacity
block<u>age</u>	4	*block*	0
camoufl<u>age</u>	2	-	1
haul<u>age</u>	1	*haul*	0
mess<u>age</u>	548	-	1
stor<u>age</u>	25	*store*	0
us<u>age</u>	8	*use*	0
Total:	**588**	**Mean (plemmas):**	**0.333**
		Mean (tokens):	**0.935**

potential difference to the Creativity of a suffix. Table 3.12 gives some examples from the suffix *-age[1]* to highlight this difference; here, the Opacity score for plemmas is a division of the two opaque examples by the six total, whereas the Opacity score for tokens represents a division of the sum of the tokens for the two opaque examples (550) by the total token count (588). This second measurement allows for the fact that, although *mess<u>age</u>* represents only one plemma in the whole suffix category, its occurrence in fact accounts for a very high number of instances of *-age[1]* overall, which means that the fact that it is opaque may be of more significance than the fact that *camoufl<u>age</u>* is also opaque.

3.3.7 Regularity of Suffixes

The "Regularity" of a suffix here refers to whether or not the suffix itself, as presented in each individual word, is regular according to its conventional pronunciation, both in terms of sound and stress. In the same way as Opacity, this was scored as either 0 for regular or 1 for irregular forms of the suffix, which were then averaged by plemmas as well as by tokens, as before considering the weighting of individual token counts. The resultant figures therefore represented the Regularity score (R) for each suffix; Table 3.13 gives examples of this from the suffix *-ine[1]*, with the regular unstressed pronunciation /aɪn/. This factor is in many ways related to Bauer & Nation's (1993) "Regularity of the spoken form of the affix", in their

Table 3.13: *Example Regularity scores for some* -ine[1] *words*

Plemma	Tokens	Suffix Pronunciation	Regularity
alp<u>ine</u>	1	/ aɪn /	0
Benedict<u>ine</u>	3	/ iːn /	1
estuar<u>ine</u>	1	/ aɪn /	0
femin<u>ine</u>	15	/ ɪn /	1
mar<u>ine</u>	12	/ iːn /	1
tanger<u>ine</u>	2	/ iːn /	1
Total:	**34**	**Mean (plemmas):**	**0.667**
		Mean (tokens):	**0.941**

framework discussed in more detail in §2.3.2. Note that, in this case unlike the other scores, the name "Regularity" here represents the non-marked form rather than the marked form.

3.3.8 Affixation Process of Base and Suffix

Where the scores identified so far refer to features of the resultant complex words as they present in the language, a handful of further scores were identified that were based on the various features of the suffixation process itself. §2.3.2 discussed a number of these, particularly in relation to Siegel's (1979) Level Ordering Hypothesis and Bauer & Nation's (1993) features that contribute to productivity, which are both in some way related to Corbin's (1987) concept of Regularity and interpretations of that term since. A total of seven scores were derived, based in part on this literature, but also from further distinctions that emerged as the process was already underway. Because these are based on the interaction between the base and the suffix during the affixation process, only words that were identified as "non-opaque" (i.e. O = 0) were possible to score on these metrics, since opaque examples necessarily had no Modern English base from which assessments could be made about the suffixation process. These seven scores, with examples for each, are given below; in each case, 0 is awarded to unmarked words and 1 to marked words.

i. **Stress Transfer (ST):** *Whether or not suffixation shifts the stress in the base*. Note that this does not include cases in which the regular pronunciation of the suffix is to take primary stress, unless this would also alter the stress in the base word. Thus, *consider<u>ation</u>* would receive 0 since *-ation* typically takes primary stress and the internal stress of the base *consider* remains unaltered, whereas *accusation* receives a 1 since the internal stress of *accuse* has been altered. This factor, as well as the following two are in part covered by Bauer & Nation's (1993) "Regularity of the spoken form of the base".

   0: *diverse* → *divers<u>ify</u>* (*-ify*)

   1: *solid* → *solid<u>ify</u>* (*-ify*)

ii. **Sound Change (SC):** *Whether or not suffixation alters the sound(s) within the base*. Note that this is distinct from truncation of the base (below) and changes in the sound of the suffix (§3.3.7).

   0: *American* → *American<u>ism</u>* (*-ism*[5])

   1: *critic* → *critic<u>ism</u>* (*-ism*[5])

iii. **Truncation (TC):** *Whether or not suffixation truncates the base*. This is considered distinct from changes to the base's sound (above), provided the remaining part of the base after truncation is unchanged.

0: *add* → *add<u>ition</u>* (*-ition*)

1: *recognize* → *recogn<u>ition</u>* (*-ition*)

iv. **Semantic Shift (SS):** *Whether or not the meaning of the complex word reflects a fusion of the base's meaning and that of the suffix*. In this case it may be the case that an obsolete definition of the word does indeed reflect the base's meaning, but the focus for this score is entirely on its usage in Modern English. This factor largely maps onto Bauer & Nation's (1993) "Predictability", referring to the meaning of the affix, although in this case the meaning of the base is considered as well.

0: *resist* → *resist<u>ant</u>* (*-ant*[1])

1: *flip* → *flipp<u>ant</u>* (*-ant*[1])

v. **Atypical PoS (AP):** *Whether or not the suffix is attached to the correct PoS for its meaning*. As suffixes have been carefully grouped in relation to their meaning in light of the PoSs to which they attach and form, it is of interest to note cases where the meaning would place a word under one particular suffix, but the PoS of the base is unusual for this purpose. This is related to Bauer & Nation's (1993) "Regularity of function".

0: *meaning* → *meaning<u>less</u>* (*-less*)

1: *relent* → *relent<u>less</u>* (*-less*)

vi. **Complexity (CX):** *Whether or not the suffix is attached to words that are already complex*. Note that, for the purposes of this study, this refers only to words that already contain derivational suffixes; that is, bases that are compound words, combining forms, prefixed words, or any other non-suffixed equivalent, are given a score of 0.

0: *great* → *great<u>ness</u>* (*-ness*)

1: *useful* → *useful<u>ness</u>* (*-ness*)

vii. **Allomorphic Variant (AV):** *Whether or not the suffix is realized as a recognizable allomorph of itself*. This is again distinct from marked Regularity (§3.3.7), since many suffixes have slightly altered but highly common forms that may affect Creativity without detracting from their recognizability as a particular suffix. An "allomorph" here refers to any instance of a suffix with added phonemic and graphemic material that does not in itself constitute another suffix or part of the base; hence *-eous*, *-ious* and *-uous* were each considered an allomorph of *-ous*, while *-ization* was not considered an allomorph of *-ation* since it is a combination of this suffix with *-ize*.

0: *contradict* → *contradictory* (*-ory*[1])

1: *explore* → *exploratory* (*-ory*[1])

In the same way as other scores, the mean value is taken for each of these seven factors for both plemmas and tokens. Some examples for the suffix *-ic* are given in Table 3.14, showing also that scores for these factors cannot be obtained for the opaque examples *chronic* and *toxic* and hence that mean scores weighted by tokens do not consider these words.

Table 3.14: *Example Base Factor scores for some* -ic *words.*

Plemma	Tokens	Base	ST	SC	TC	SS	AP	CX	AV
alcoholic	21	*alcohol*	1	0	0	0	0	0	0
Celtic	12	*Celt*	0	0	0	0	0	0	0
chronic	7	-	-	-	-	-	-	-	-
dyslexic	19	*dyslexia*	0	0	1	0	0	0	0
futuristic	4	*future*	0	0	0	0	0	0	1
journalistic	2	*journalist*	1	0	0	0	0	1	0
panoramic	1	*panorama*	0	1	1	0	0	0	0
platonic	3	*Plato*	1	1	0	1	0	0	1
psychiatric	6	*psychiatry*	1	1	1	0	0	0	0
simplistic	7	*simple*	0	0	0	0	1	0	1
toxic	2	-	-	-	-	-	-	-	-
Total:	**84**	**Mean (plemmas):**	.364	.273	.273	.091	.091	.091	.182
Total (non-O)	**75**	**Mean (tokens):**	.427	.133	.347	.013	.093	.027	.187

3.4 Statistical Analysis to Part I

Chapter 4 begins the analysis in this part by examining the twelve factors in relation to their effect on Creativity, and any interplay therein. To do this, multiple regression analyses are employed as appropriate for studies involving the influence of multiple continuous factors on

a continuous dependent variable (Brown 1992), and these by definition include the use of ANOVA and correlation statistics. While the data here are not strictly normally distributed, current multiple regression modelling techniques are typically very robust to all except major deviations from normality, and observations of both P-P and Q-Q plots suggested that the deviation was not so great as to cause problems. Although data can be corrected for diversions from normality through the use of transformations (such as logarithmic conversions, square roots or reciprocal values), these approaches were not used here, and may reflect a potential limitation of the analysis.

Principal Components Analyses are also used as a method of reducing the number of factors later in the analysis and examining their interrelation; the suitability of the sample size for these are judged using the Kaiser-Meyer-Olkin Measure of Sampling Adequacy and the Bartlett's Test of Sphericity statistics. In addition, Mann-Whitney *U* tests are utilized to compare the mean scores for each of the factors in creative and non-creative suffixes.

In Chapter 5, the analysis continues by analysing more deeply the neologisms themselves, relating to features such as part-of-speech and the findings of the factor analysis in Chapter 4. Here, Chi-square tests of homogeneity are employed to draw comparisons between the behaviour of the factors in relation to creative and non-creative suffixes between each of the three databases.

4 ANALYSIS AND DISCUSSION OF FACTORS

In this chapter, the range of factors outlined in Chapter 3 are analysed to determine to what extent they impact the Creativity of suffixes; the full list of scores given to all factors in all datasets is provided in the index pages in Appendix 3 (accompanying CD). All statistical analyses that follow were conducted using the IBM SPSS Statistics package (IBM Corp 2013), having imported the data from the index page spreadsheets created using Microsoft Excel.

Initially the EAS14 dataset is analysed in order to address the first RQ (§2.4.2) and determine the factors that are most significant in present-day informal conversation. The analysis then continues to focus on the DS94 and CG94 data, which respectively address differences across time and register relevant to RQ2. For each database, the five factors identified in §§3.3.3-3.3.7 are considered first, under the heading of 'Derivative Factors', since these are concerned with properties of the derivative complex word after affixation has taken place; the seven features identified as part of the suffixation process (§3.3.8) are then assessed under the heading of 'Base Factors', since these refer to features of the base and how it undergoes change during this process. The twelve factors are then taken together for further assessment regarding their interaction.

Originally, each of the factors (with the exception of Prevalence) was in fact a set of three scores comprising one each for plemmas, tokens, and TPR. However, it was found that there was a strong positive correlation between each of these distinctions within a particular factor – for example, between plemma, token and TPR scores for Opacity – including during the running of various kinds of regression analysis, which require that the independent variables do not strongly correlate with each other. Further, in examining token and TPR factors in separate regression analyses, it was found that there were no significant deviations from the patterns exhibited by scores for the plemmas. In order to simplify the report of the analyses that follow, results for factors are presented only in terms of their plemma scores and will henceforth be referred to by their simple overall name – "Opacity", "Convertibility", "Truncation", etc. – as umbrella terms that apply across plemma, token and TPR scores.

4.1 Present-Day Characteristics: EAS14

Initially, the 145 suffixes were assessed visually to identify any anomalous data. A single suffix, *-ade* (*par<u>ade</u>*), was found to have no transparent instances within EAS14, meaning that figures for Base Factors could not be obtained; this suffix was therefore removed from further analysis, bringing the total number of suffixes down to 144.

Based on their Creativity, representing a density of neologisms based on a division of neologistic plemmas by the total number of plemmas for each suffix (§3.3.2), the suffixes were split into two categories: any suffixes that produced no neologisms in the data (Creativity = 0) were deemed "non-creative" (81 suffixes), and any that produced at least one (Creativity > 0) were deemed "creative" (63 suffixes). Although this means that some suffixes may be excluded from the category of creative suffixes by the fact that they have few plemmas, this was not deemed to be too much of a problem to the data since Creativity is measured as a factor of Frequency throughout. Index pages can be found in Appendix 4 which list the same details as Appendix 3, but in which the suffixes are split into the two categories of non-creative and creative.

For the creative group, a mean (0.118) and standard deviation (0.127) were calculated for Creativity scores, as well as for each of the twelve factors across both groups, presented in the sections that follow. In each case, outliers were identified as those figures that lay outside

three standard deviations above or below the mean; this definition was felt to be appropriate since the data were to be analysed primarily through multiple regressions, which typically follow this standard (Field 2013). Overall, less than 2% of the data were found to be anomalous; in each case, figures were replaced with the mean in order to effectively remove suffixes from analysis for the factors in which they were anomalous, but retain them for those in which they were not.

4.1.1 Derivative Factors in EAS14

Table 4.1 shows the means and standard deviations for the five Derivative Factors of Prevalence (P), Opacity (O), Regularity (R), Convertibility (C), and Distinguishability (D), as defined in §3.3.3-3.3.7. Mann-Whitney *U* tests were conducted on each of the factors across the two groups to determine if there were any statistically significant differences between their respective means; eta-squared (η^2) effect sizes were calculated using Lenhard & Lenhard (2016), with thresholds for small (0.02), medium (0.13) and large (0.26) effect sizes based on Cohen (1988).

Table 4.1: *Means and standard deviations for Derivative Factors across non-creative and creative groups in EAS14*.

Factor	**Non-creative**[1]		**Creative**[2]		
	μ	***σ***	***μ***	***σ***	**Sig.**
Prevalence	4.916	0.647	4.569	0.654	****
Opacity	0.290	0.272	0.185	0.198	-
Regularity	0.004	0.019	0.000	0.002	-
Convertibility	0.043	0.090	0.043	0.084	-
Distinguishability	0.490	0.303	0.572	0.315	-

[1] N = 81
[2] N = 63
* $p < 0.05$, ** $p < 0.025$, *** $p < 0.01$, **** $p < 0.001$

Of the five tests, only Prevalence was found to show statistical significance ($U = 1{,}750$, $N_1 = 81$, $N_2 = 63$, $z = -3.228$, $p < 0.001$, $\eta^2 = 0.072$); in Table 4.1 and in those that appear throughout this chapter, shaded cells indicate instances of statistical significance. This test indicated a negative association between Prevalence and Creativity; that is, suffixes that are creative are less likely to be as prevalent in the language as a whole when compared to those that are non-creative. At first glance, this result seems somewhat counter-intuitive, in that it might reasonably be expected that a suffix category whose constituent plemmas occur more

often in English is more likely to be creative since speakers will be exposed to it more often and perhaps begin to recognize patterns in meaning that correspond to the word ending in question.

To explore this phenomenon further, and to consider potential effects of other Derivative Factors, a multiple regression analysis was conducted on the creative group, with the Creativity score as the continuous dependent variable and each factor as a separate continuous independent variable. In the step-wise process used, it was found that again only Prevalence was entered into the model as a statistically significant factor ($R^2 = 0.167$, $F(1,61) = 12.230$, $p < 0.025$, adjusted $R^2 = 0.153$); the correlation matrix for this regression can be found in Table 4.2, highlighting that no two factors correlated beyond the degree of acceptance of ±0.8 for such an analysis (Bryman & Cramer 2011) and that the multi-collinearity condition was not violated. These figures indicate that Prevalence could reliably be said to explain 15.3% of the variance in Creativity and, with a correlation of -0.409 and a correlation coefficient of -0.88, does indeed hold a negative influence on the degree to which a suffix is used to create neologisms. Again, it may be expected that suffixes that are more prevalent in English would encourage its recognition and hence Creativity. Yet this does not appear to be the case, not simply in the sense that exposure does not correspond with Creativity, but further that it seems to be actively detrimental: a more prevalent suffix such as *-ment* (e.g. *engage<u>ment</u>*, P = 5.427) is less creative than a less prevalent one such as *-y*[2] (e.g. *choos<u>y</u>*, P = 3.186) at least in part due to the very fact that it is more prevalent.

Table 4.2: *Correlation matrix for Derivative Factors and Creativity in EAS14*.

	Creat.	**P**	**O**	**R**	**C**	**D**
Creat.	1.000	-0.409[3]	0.023	-0.162	-0.135	-0.134
P	-	1.000	0.286[2]	0.112	0.281[2]	0.355[3]
O	-	-	1.000	-0.128	0.285[2]	0.352[3]
R	-	-	-	1.000	-0.022	0.148
C	-	-	-	-	1.000	0.066
D	-	-	-	-	-	1.000

[1] $p < 0.05$, [2] $p < 0.025$, [3] $p < 0.01$, [4] $p < 0.001$

However, some light could be shed on the matter when considering the well-accepted dual-route model of morphological processing (Schreuder & Baayen 1995; Ullman et al. 1997; Vannest, Polk & Lewis 2005), in which both a 'direct' route of whole-word recognition

works alongside a 'parsed' route of morphological deconstruction when recognizing words. As discussed in §2.3.3, the evidence that supports this model shows that words are recognized using one or both processes depending on what is available for the word in question, and that, as words become less frequent, more use is made of morphological deconstruction for word recognition. This being the case, it can therefore be deduced that suffixes found in words that are generally less prevalent are therefore more often involved in recognition via this parsed route and therefore that such a suffix is more often detached from its base in the mind in order to extract meaning from a word. It may be that this process gives speakers reinforcement of the meaning and rules surrounding suffixes in those whose words are less prevalent and hence more regularly employ a breakdown of morphemes for recognition, whereas complex words of more prevalent suffixes are more frequently recognized directly, and so rules and trends surrounding their meaning and use are less often considered. The act of considering a suffix's meaning and usage patterns may in turn provide a more informed basis for the creation of new words. Hence, the prevalent suffix *-ment* (1 neologism, *relaxment*) creates fewer new words than the non-prevalent suffix *-y*^{2} (38 neologisms, e.g. *collapsy, muffly, recycly*). In addition to the further analyses in this chapter, this phenomenon will be addressed in more detail by looking at semantic processing times of words of prevalent vs. non-prevalent suffixes, in addition to judgements regarding the meaning of neologisms in suffixes of each type (see Part II).

Although the factors of Opacity, Regularity, Convertibility and Distinguishability were not entered into the step-wise regression model – meaning that they did not add significantly to the degree of variance explained – the analysis nevertheless continued to hierarchical regression, in which each factor can be entered into the model manually in a predetermined order to examine the change in R^2 and overall model significance, since information about their behaviour and any effects on the role of Prevalence might still have been gained by doing so. Over several such regressions, in which a range of combinations and sequences was

Table 4.3: *Hierarchical regression model for Derivative Factors in EAS14*.

Factors Entered	R^2	**Adjusted** R^2	**Sig.** F **Change**	**Overall Sig. of Model (*p*)**
Prevalence	0.167	0.153	0.001	0.001
+ Opacity	0.188	0.161	0.215	0.002
+ Regularity	0.197	0.156	0.424	0.005
+ Convertibility	0.200	0.145	0.658	0.011
+ Distinguishability	0.200	0.130	0.874	0.023

investigated, it was found that indeed none of the other factors contributed significantly to explaining the variance, and that Regularity, Convertibility and Distinguishability reduced the adjusted R^2 as well as significance of the model overall (Table 4.3). Nevertheless, the final model taking into account all five factors remained significant overall ($R^2 = 0.2$, $F(5,57) = 2.852$, $p < 0.05$, adjusted $R^2 = 0.13$). It is interesting to note that these factors do not have any significant role to play in determining or influencing the Creativity of a suffix according to this data; Distinguishability, for example, particularly reduced the adjusted R^2, meaning that the form of a set of suffixes (e.g. *-er*[1-6]) appearing more or less often in words in which it is not an example of a derivational morpheme (e.g. *finger*) does not have a bearing on whether or not that suffix is used to create more or fewer neologisms. This suggests that speakers are generally adept at identifying when a form is being used as a suffix and when it is not, further implying a good level of (at least subconscious) understanding of derivational morphology as it is used within English.

While all four other Derivative Factors showed little to no effect on the variance explained in the hierarchical regression model, Opacity differed in that the difference was positive – that is, in this case alone, it increased the adjusted R^2 by a small amount (Table 4.3). Although this change did not reach statistical significance, and the significance of the model overall was reduced slightly, it is interesting to note this single trend in the opposite direction to the other Derivative Factors. In this case, since it had a positive coefficient, Opacity may be associated positively with Creativity in that the presence of more opaque examples in a suffix category could increase the likelihood that it will create neologisms. This is again a somewhat counter-intuitive finding in that, to take an example suffix *-ism*[4] (forming medical conditions and other scientific terms), it might be expected that a higher density of opaque examples (e.g. *aut<u>ism</u>*) rather than transparent (e.g. *alcohol<u>ism</u>*) would lead to a more frequent employment of the direct recognition route alone, thus not engaging in the parsing process and not having the opportunity to reinforce the rules governing that suffix. It is important to remember, however, that this result did not reach statistical significance, and the fact that the means for Opacity (Table 4.1) show a relationship in the other direction should help to reiterate this point. Given that Opacity does not yield a significant result when taken in isolation, it cannot be concluded definitively that the opposite is true, that a higher density of opaque items encourages Creativity. However, the fact that there is some increased explanation of variance when combined with Prevalence, combined with the fact that it has an inverse relationship in terms of its association with Creativity, implies that there may be

something deeper to the relationship between these two factors; it may be that the effect of increased Opacity on Creativity is greater when Prevalence is controlled at either high or low levels. This relationship is further explored through a Principal Components analysis (§4.1.3) and experimentation (Part II).

4.1.2 Base Factors in EAS14

The same procedure was undertaken for the seven Base Factors of Stress Transfer (ST), Sound Change (SC), Truncation (TC), Semantic Shift (SS), Atypical PoS (AP), Complexity (CX) and Allomorphic Variant (AV). Table 4.4 shows means and standard deviations for these factors between the non-creative ($N_1 = 81$) and creative ($N_2 = 63$) groups of suffixes in EAS14; Mann-Whitney *U* tests were conducted in order to determine statistically significant differences between the two groups.

Only two of the seven Mann-Whitney *U* tests showed a significant difference between the two groups: Atypical PoS ($U = 2{,}926$, $N_1 = 81$, $N_2 = 63$, $z = 2.249$, $p < 0.0025$, $\eta^2 = 0.016$) and Allomorphic Variant ($U = 2{,}936$, $N_1 = 81$, $N_2 = 63$, $z = 2.128$, $p < 0.05$, $\eta^2 = 0.017$). Both of these factors are positively associated with creative suffixes; that is, the complex words in which creative suffixes are found are more likely to show signs of having a wider range of PoSs to which they are attached, as well as being more likely to employ allomorphic variants between the base and the standard form of the suffix. Although the effect size is shown by eta-squared to be rather small (Cohen 1988), these factors nevertheless represent the most influential of all Base Factors and their significance should not be dismissed.

Table 4.4: *Means and standard deviations for Base Factors across non-creative and creative groups in EAS14.*

Factor	**Non-creative**[1]		**Creative**[2]		
	μ	***σ***	***μ***	***σ***	**Sig.**
Stress Transfer	0.071	0.131	0.123	0.225	-
Sound Change	0.151	0.200	0.111	0.165	-
Truncation	0.182	0.319	0.120	0.177	-
Semantic Shift	0.034	0.069	0.023	0.040	-
Atypical PoS	0.007	0.025	0.008	0.019	**
Complexity	0.224	0.329	0.152	0.196	-
Allomorphic Variant	0.019	0.076	0.049	0.113	*

[1] N = 81

[2] N = 63

* $p < 0.05$, ** $p < 0.025$, *** $p < 0.01$, **** $p < 0.001$

In the case of AP, it may be that the ability of a suffix to attach to a wider number of PoSs gives it a certain versatility or "elasticity" when it comes to its meaning, making it a more frequent option in coining new words. For example, the suffix *-age*[2] creates nouns from nouns with the meaning 'the condition, rank, or state of what is denoted by the base noun' (Laws & Ryder 2014b), in words such as *bagg<u>age</u>*, *percent<u>age</u>* and *volt<u>age</u>*; however, this suffix also attaches to certain adjectives to make words such as *rough<u>age</u>* and *short<u>age</u>*, giving it a somewhat higher score for AP. This tendency may be partly responsible not only for the fact that *-age*[2] produces several neologisms (with a Creativity score of 0.250), but also that some of these neologisms exhibit a slight change in the meaning of the suffix; for example, *bed<u>age</u>*, in the example extract below from the EAS, appears to refer more to the objects involved in or perhaps surrounding the base noun:

S0041: Yeah (.) snuggle (.) snuggle on down in **bedage**

This concept is explored further in §5.1.2. It should be noted here however that, although the AP score of *-age*[2] may be related to its availability for word-formation, none of the neologisms themselves for this suffix attach to any PoSs other than nouns.

The fact that creative suffixes are associated with those that more often employ allomorphs is an intriguing one: in some ways the AV score is closely related to Regularity, and as such it may be expected that suffixes presenting in different forms would "muddy the waters" and discourage them from use in derivation. On the other hand, to take an example such as the highly-creative *-y*[1], this suffix is often attached to bases with word-final vowels (e.g. *vinegar<u>y</u>*) and in these cases an allomorph is used that includes a linking or intrusive /r/. This phenomenon can be found in several of the neologisms it creates with words such as *vodka* and *Sambuca*, evident through the original transcription, in which the word is spelled to include this /r/ sound:

S0062: so we got a tiramisu **vodkary** thing

S0025: it's like a **sambucary** type

Attested examples may have the effect of increasing the phonotactic versatility of a suffix, thus providing it with a larger pool of base words to which it can be added. Additionally, it is

Table 4.5: *Correlation matrix for Base Factors and Creativity in EAS14*.

	Creat.	**ST**	**SC**	**TC**	**SS**	**AP**	**CX**	**AV**
Creat.	1.000	-0.252[1]	-0.302[3]	-0.153	0.033	-0.108	-0.086	-0.073
ST	-	1.000	0.444[4]	0.185	0.121	0.011	0.164	0.180
SC	-	-	1.000	0.016	0.086	0.056	0.045	0.304[3]
TC	-	-	-	1.000	0.013	0.485[4]	0.003	-0.142
SS	-	-	-	-	1.000	0.182	-0.151	-0.070
AP	-	-	-	-	-	1.000	0.127	-0.070
CX	-	-	-	-	-	-	1.000	0.111
AV	-	-	-	-	-	-	-	1.000

[1] $p < 0.05$, [2] $p < 0.025$, [3] $p < 0.01$, [4] $p < 0.001$

possible that certain allomorphs simply do not affect the parsability and hence the recognition of a word; any examples of allomorphic variants of suffixes, such as *-ry* for *-ery* (*circuitry*, *forestry*, *rocketry*) and *-ative* for *-ive*[1-3] (*argumentative*, *informative*, *representative*,) occur with such frequency and behave in such a regular way that they may simply have come to be recognized with as much speed and precision as their parent suffixes.

Although these tests show that both non-creative and creative suffixes tend toward certain factors more than others, further analysis is required as before to determine the extent to which these and the other Base Factors have an overall effect on the Creativity of a suffix. A step-wise multiple regression analysis was conducted on the EAS14 Base Factor data to this end. In this case, it was found that only the factor of Sound Change was entered into the model significantly ($R^2 = 0.091$, $F(1,61) = 6.101$, $p < 0.025$, adjusted $R^2 = 0.076$), explaining 7.6% of the variance in Creativity; the relevant correlation matrix for Base Factors is presented above in Table 4.5. With a coefficient of -0.257, this indicates that Sound Change has a negative association with Creativity, such that suffix categories more densely populated by words that exhibit a change in the sound of the base during suffixation are less likely to be as creative as those that do not. There is a clear logic to this: if the base of a complex word undergoes a change in sound, then it is more challenging to extract the base meaning than those that are presented identically in both complex and simplex forms, and hence to apply the suffix to new bases.

However, when taken with the findings of Opacity in the previous section, this poses something of a conundrum. Although the multitude of factors analysed cannot reliably be collectively placed on a scale from most to least transparent, it is reasonable at a minimum to

observe that a change in base sound (*face* → *fac<u>ial</u>*) lies somewhere between 'full' transparency (*region* → *region<u>al</u>*) and 'full' Opacity (Latin *legere* → *leg<u>al</u>*). In this case, there would seem to be something of a discrepancy between the fact that Sound Change is negatively associated with Creativity while Opacity is positively: a small deviation from full transparency reduces Creativity on the one hand, while a greater deviation increases Creativity on the other. Yet it may be the very fact that there is a discernible base in the case of SC words that discourages the use of suffixes in which this occurs in creating neologisms. Where there is an attempt to parse an opaque complex word (in low-Prevalence settings where the direct route is less successfully employed alone), by definition there is no Modern English base to provide input to its meaning, resulting in the entirety of the focus to be given over to the rules of the suffix itself and its role in the meaning of the word; it was suggested in §4.1.1 that this strengthens knowledge of the semantic and grammatical role of a suffix, and hence increases Creativity. Contrastingly, where there is a discernible Modern English base, there is clear semantic and grammatical input from this into the complex word as a whole, which may be at odds with deviations in its presentation such as when there is a change in the base's sound; upon hearing *fac<u>ial</u>*, for example, once the suffix is extracted from the base the remaining morpheme can only be recognized in turn once its pronunciation is corrected from /feɪʃ/ to /feɪs/. In such an example, there is something of a "betrayal" of the expected transparency of the word, which does not occur in fully opaque forms since the direct route achieves recognition instead, and this results in discouragement from using the suffix to create new words. In essence, the use of suffixes that have been identified in opaque words is less complicated, since the role that the suffix is playing in the word is clear and its rules can therefore be discerned, whereas in a non-opaque example that employs a change in base sound is effectively more complicated, since the speaker must now apply the rules regarding changes in the sound of the base in addition to those suffix rules that are revealed in opaque examples. It should however be remembered from the previous section that there must necessarily be a limit to the degree of Opacity that is permitted within a suffix category before it begins to discourage Creativity due to having too many opaque examples. In addition, since Opacity appears to be affected by the Prevalence of a word (because, as discussed, more prevalent suffixes are recognized chiefly through the direct route alone and therefore the opportunity to develop suffix rules is missed), this may also be the case for Sound Change for the same reasons; the relationship between Derivative and Base Factors together is discussed further in §4.1.3.

It is interesting further that the factors of Atypical PoS and Allomorphic Variant were not entered into the model given that creative suffixes were significantly associated with exhibiting these traits. Hierarchical regression analyses revealed that entering these factors first, whether together or one at a time and whether alone or with other factors entered later, showed no notable effects. Similarly to the Derivative Factors, the only factor to be of any significance when considered in isolation was Sound Change, and the addition of other factors beyond this reduced the significance of the overall model and decreased the R^2, indicating that the models accounted for progressively less of the variance as more factors were considered. Despite this, it was not the case that the addition of any single factor to the model of Sound Change on Creativity resulted in a non-significant model; rather, the model remained significant during the addition of one or two factors, and eventually dropped below the threshold of $p < 0.05$ as further factors were added. There was some evidence to suggest that the factor of Stress Transfer (e.g. *immúne* → *ímmunize*) may have been playing a similar role to that of Opacity in the Derivative Factors – that is, its addition increased the R^2 to a very minor degree. In this case, however, the negative coefficient for Stress Transfer showed that it had a direct relationship with Sound Change rather than an inverse one; therefore, suffixes that more often demonstrated a movement in the stress of the base during suffixation were less likely to create neologisms. This trend however was not found to be statistically significant, so although changes in the sound of the base may discourage Creativity for the reasons outlined in this section, movements in the stress of the base do not do this to the same degree, even though they may again be placed somewhere between "fully" transparent and "fully" opaque.

4.1.3 Combined Factors in EAS14

The Derivative and Base Factors were compiled together and analysed in the same way to

Table 4.6: *Correlation matrix for Combined Factors in EAS14*.

	P	**O**	**R**	**C**	**D**
ST	0.284[2]	0.066	0.089	-0.032	0.131
SC	0.266[2]	0.394[3]	0.038	0.094	0.148
TC	-0.032	0.105	-0.045	-0.137	0.020
SS	-0.052	0.060	-0.071	0.121	-0.080
AP	-0.064	-0.041	-0.011	-0.120	-0.072
CX	0.201	0.093	0.388[3]	-0.156	0.218[1]
AV	0.276[2]	0.094	0.051	0.310[3]	0.144

[1] $p < 0.05$, [2] $p < 0.025$, [3] $p < 0.01$, [4] $p < 0.001$

determine interactions between them. Initially a step-wise regression was performed; the correlation matrix for the Derivative Factors against the Base Factors are presented in Table 4.6 below, added to the separate correlations seen in Tables 4.2 and 4.5. This test yielded the same result as the step-wise regression for the Derivative Factors alone, in that Prevalence was the only factor to be added to the model to predict Creativity, and in this case Sound Change was not added.

However, hierarchical regressions in which the factors were added manually in predetermined sequences gave more insight as to some of the interactions between the twelve combined factors. In §4.1.1, Opacity was found to have an effect on the significance of Prevalence as well as its effectiveness in explaining the variance; this was also found to be the case when Opacity was added to the model containing only Sound Change as a factor, with the overall model remaining significant ($R^2 = 0.115$, $F(2,60) = 3.888$, $p < 0.05$, adjusted $R^2 = 0.085$). Furthermore, the addition of Opacity to the model containing both Prevalence and Sound Change as factors resulted in a statistically significant increase of R^2 of 0.052 ($F(1,59) = 4.158$, $p < 0.05$), and the model itself was significant overall ($R^2 = 0.259$, $F(3,59) = 6.880$, $p < 0.001$, adjusted $R^2 = 0.221$), explaining 22.1% of the variance. As in previous models, the coefficients of Prevalence (-0.860) and Sound Change (-0.251) indicated a negative association with Creativity, while Opacity (0.180) was instead positive.

This reinforces the notion put forward in §4.1.1, that, while Opacity appears to have a positive influence on the Creativity of a suffix, this influence is dependent on its Prevalence. The degree to which Opacity increases Creativity is lessened where Prevalence is high, and strengthened where it is low; this can be deduced from observing that these two factors have an inverse relationship when it comes to their effect on Creativity, coupled with the fact that, when both factors are included in the model to predict Creativity, Opacity's effect is more significant, rather than Prevalence's effect being nullified. It can be expected therefore that highly-prevalent suffixes with very few opaque examples may be among the least creative, while less prevalent suffixes with a certain number of opaque examples may be more often used by speakers in neologisms. However, as before, it should be remembered that there must necessarily be an upper limit to the density of opaque forms within a suffix category, since clearly those that have little or no transparent examples do not create many new words.

As well as emphasizing the relationship established between Prevalence and Opacity, this hierarchical regression also highlights a similar pattern between the latter and Sound Change. Although there is clearly some effect of considering Opacity in the light of Prevalence, it only reaches statistical significance when this Base Factor is also accounted for in the model. There is again an inverse relationship between Opacity and Sound Change in their effect on Creativity: the former tends to increase it, while the latter tends to decrease it. As above, this indicates that the positive effect of Opacity on Creativity is lessened where the density of words that alter the sound of the base within a suffix set is high. This is for the same reasons outlined in the previous section, that although base sound changes can be regular within a suffix (*solve* → *solut<u>ion</u>*, *evolve* → *evolut<u>ion</u>*, *absolve* → *absolut<u>ion</u>*) they represent an increase in the complexity of the rules of adding a suffix to a base, as a further step must be applied during both suffixation and recognition. In opaque examples (*caut<u>ion</u>*, *junct<u>ion</u>*, *vis<u>ion</u>*), an dual-route attempt may be made at recognition in which the base is quickly discarded as having no Modern English form, resulting in recognition through the direct route with reference to the suffix, which has nevertheless been extracted and whose meaning can therefore be seen reflected in that of the whole complex word (*-ion*: 'the action or instance, result or product of what is denoted by the first element'). The employment of this dual-route process even where parsing cannot lead to full recognition, helps to strengthen the grammatical and semantic attributes of a suffix, while not discouraging its employment with Modern English bases as there are no further rules to be learned regarding sound alterations or stress placement.

A Principal Components Analysis (PCA) can be undertaken on data of this kind to determine if the various strands on which the "participants" – in this case, the suffixes – are measured can be reduced to a small number of "components" as they are apparently measuring the same phenomenon – in this case, Creativity. While a multiple regression analysis requires that no two factors correlate beyond ±0.8, for a PCA it is essential that each factor has at least one correlation with another factor that is beyond ±0.3. Reassessing the correlation matrices in Tables 4.2, 4.5 and 4.6, it can be seen that the Derivative Factor of Convertibility and the Base Factor of Semantic Shift violate this requirement; therefore, they were not entered into the PCA, bringing the total number of factors used from 12 down to 10.

Table 4.7 shows the rotated component matrix produced by SPSS in response to carrying out a PCA on the four Derivative Factors and six Base Factors considered. It can be seen that a

Table 4.7: *Rotated component matrix of four components identified for Combined Factors in EAS14.*

Factor	**Component**			
	1	**2**	**3**	**4**
Sound Change	0.769			
Stress Transfer	0.761			
Allomorphic Variant	0.616			
Opacity		0.813		
Distinguishability		0.764		
Prevalence	0.407	0.525		
Truncation			0.860	
Atypical PoS			0.817	
Regularity				0.823
Complexity				0.772
Total Variance Explained:	23.88%	15.69%	13.93%	11.07%

total of four components were identified across the ten factors, and that each naturally explains progressively less of the variance, for a total of 64.57% of variance explained by the four components taken together. A Kaiser-Meyer-Olkin Measure of Sampling Adequacy automatically produced by SPSS gave a figure of 0.520, only just within the boundaries of acceptability. However, a Bartlett Test of Sphericity, also used to identify the adequacy of sample sizes, was found to be highly statistically significant ($p < 0.001$); it was therefore judged that the sample of 144 suffixes was suitable for the purpose of this PCA.

Taking the first two components together, it can be seen that the most significant in terms of the amount of variance explained included the factor of Sound Change, while the second included Opacity. This is consistent with the findings earlier in this section and in those that precede it, since these two factors appear to have opposite effects on Creativity. However, given the strength of the significance with which Prevalence was found to negatively influence Creativity, it is surprising that this has been included in Component 2 rather than Component 1. Yet it is clear from examining the coefficients that Prevalence did indeed have a strong influence on Component 1 in addition to 2, since the procedure to generate the PCA in SPSS included the instruction to suppress coefficients lower than 0.3 following the recommendation of Field (2013). From this point of view, the results of the PCA suggest that Prevalence is harder to place into one component or the other, since it is having an effect that matches those of the factors in both components. This is indeed consistent with the discussion earlier in this section, as the influence on Creativity of the factors of Sound Change

(negative) and Opacity (positive) within a suffix are both dependent on its degree of Prevalence in the language as a whole.

Sound Change is accompanied in Component 1 by Stress Transfer, which has again already been seen to not only correlate with it but also to cause it to have stronger effects due to a compounding effect. Allomorphic Variant is also included in this component; this is interesting given that it was associated with more creative suffixes in the Mann-Whitney *U* test (Table 4.4); however, taken into consideration with the fact that this factor has a negative (albeit non-significant) correlation with Creativity, the conclusion to be drawn here is that, while creative suffixes may show a tendency towards exhibiting Allomorphic Variants, the most creative of these do so to only a small degree. Distinguishability is included within Component 2, although it should be remembered that this factor had no significant effect in the any of the analyses, implying that speakers seem able to tell the difference between pseudo- and real instances of suffixes insofar as Creativity is concerned. Effectively, then, Component 1 could be considered to represent the primary negative influence on Creativity, while Component 2 represents its primary positive influence, with the caveat that Prevalence more accurately occupies a space somewhere between the two, as it strongly determines the degree of influence on Creativity in either direction.

Components 3 and 4 explain progressively less of the variance in Creativity, and both are comprised of factors that tend towards being negatively associated with it. In some sense they therefore perform the same function as Component 1, but to a degree that is significantly reduced enough for them to be considered separate by the PCA, with Regularity and Complexity weaker still than Truncation and Atypical PoS.

To complete the analysis of the EAS14 data, a multiple regression analysis was repeated in which the independent variables were each of the four components as identified by the PCA and calculated into separate new variables by SPSS. In the step-wise regression, only Component 1 was added to the model to predict Creativity ($R^2 = 0.099$, $F(1,61) = 6.728$, $p < 0.025$, adjusted $R^2 = 0.085$), explaining only 8.5% of the variance. When all components were included, the model just reached significance ($R^2 = 0.155$, $F(4,58) = 2.664$, $p < 0.05$, adjusted $R^2 = 0.097$) even though Components 2-4 were not found to have a significant effect on Creativity; however, the amount of variance explained did increase to 9.7%. Hierarchical regressions showed that Component 2 was the most significant in terms of decreasing the

amount of variance explained by the model; the likely reason for this is that, although Components 3 and 4 are less "responsible" for fluctuations in Creativity than Component 2 as determined by the PCA, they are nevertheless associated with negatively influencing it in the same way as Component 1, whereas Component 2 instead has an overall positive influence on Creativity and thus, in a sense, reduces the effectiveness of all the other components to a certain extent. However, this is not the same as saying that it does not have an effect on Creativity overall, since it is identified as doing so by the PCA.

4.2 Diachronic Differences: DS94

In order to draw conclusions about diachronic differences in the driving factors of Creativity, the same analytical process as for EAS14 was applied to the DS94 dataset.

An initial observation found that 9 of the 145 suffixes exhibited no non-opaque examples, such that scores for Base Factors were impossible; these suffixes, removed from further analysis as before, were *-ade* (*par<u>ade</u>*), *-esque* (*grot<u>esque</u>*), *-ette*[1] (*brun<u>ette</u>*), *-ile*[1] (*frag<u>ile</u>*), *-ile*[2] (*sen<u>ile</u>*), *-itude* (*alt<u>itude</u>*), *-kin* (*nap<u>kin</u>*), *-trix* (*ma<u>trix</u>*), and *-ulent* (*succ<u>ulent</u>*), bringing the suffix total down to 136 for the DS94 data. The suffixes were then again split into groups depending on whether they were "non-creative" (Creativity = 0) or "creative" (Creativity > 0): in this dataset, 104 suffixes were non-creative and only 32 were creative (see Appendix 4 for index pages arranged by Creativity category). For the latter group, the mean Creativity score was 0.102, with a standard deviation of 0.094. Outliers (greater than 3 standard deviations from the mean) for all scores were dealt with in the same way as for EAS14, by replacing the figure with the new mean once the outlier had been excluded; again, less than 2% of the data were replaced in this way.

4.2.1 Derivative Factors in DS94

Table 4.8 shows the means and standard deviations for the Derivative Factors across the groups of non-creative and creative suffixes. A Mann-Whitney *U* test was conducted on each of the factors to determine group differences; in this case, Prevalence (U = 641.5, N_1 = 104, N_2 = 32, z = -5.249, $p < 0.001$, η^2 = 0.202) was found to be highly significant as before, but in addition Opacity (U = 1,184.5, N_1 = 104, N_2 = 32, z = -2.497, $p < 0.025$, η^2 = 0.044) and Regularity (U = 1,471, N_1 = 104, N_2 = 32, z = -2.002, $p < 0.05$, η^2 = 0.001) showed

Table 4.8: *Means and standard deviations for Derivative Factors across non-creative and creative groups in DS94.*

Factor	Non-creative[1]		Creative[2]		
	μ	σ	μ	σ	Sig.
Prevalence	5.030	0.592	4.247	0.716	****
Opacity	0.266	0.268	0.093	0.132	**
Regularity	0.005	0.022	0.000	0.000	*
Convertibility	0.045	0.090	0.014	0.026	-
Distinguishability	0.515	0.308	0.517	0.324	-

[1] N = 104

[2] N = 32

* $p < 0.05$, ** $p < 0.025$, *** $p < 0.01$, **** $p < 0.001$

significant differences between the two groups. As all have a negative *z* statistic, each is associated with non-creative suffixes.

Although the role of Prevalence remains unchanged, it is especially interesting that Opacity should in this case be associated with non-creative suffixes since it was found during the multiple regressions analyses in the previous section to be having a positive influence on Creativity. Possible reasons for this are explored through further analysis using multiple regressions below.

Regularity was also found to be associated with non-creative suffixes, just reaching significance ($p \approx 0.045$) and having a small effect size of 0.001 (Cohen 1988), where this was not the case in the present-day data, meaning that creative suffixes are less likely to show differences in the way the suffix itself is presented with the complex word. It should be borne in mind however that very few suffixes have a Regularity score greater than zero – that is, most suffixes present regularly in complex words – and as such the difference here may be a result of only one or two suffixes that have changed in the last twenty years. For example, in EAS14, the suffix *-age*[2] is highly-creative, with a score of 0.250 and 8 neologisms, and it also has a relatively high Regularity score (0.125) given the rarity of this phenomenon, with irregular examples such as *cors<u>age</u>* and *vis<u>age</u>* where the pronunciation shifts from /ɪʤ/ to /ɑːʒ/. In DS94, on the other hand, this suffix does not create any neologisms despite remaining one of few suffixes that exhibit these changes in Regularity. Alternatively, it could be considered that this particular phenomenon is not as apparent in written communication, which has increased greatly over this time period especially in the format of instant

messaging and other online forms that typically mimic spoken language (Baron 2010; Copeland 2013), and which has therefore enabled more irregular suffixes to continue to be creative. However, in some ways this is not consistent with other factors that are similarly less recognizable in written communication, but which have nevertheless been found to be detrimental to Creativity, such as Sound Change.

In fact, none of the suffixes in the creative group had a score greater than 0 for Regularity; for this reason, it was impossible to include it in the regression analyses, since there were no circumstances under which it could be multiplied by a coefficient to add significantly to the equation to predict Creativity. Therefore, the remaining four Derivative Factors of Prevalence, Opacity, Convertibility and Distinguishability were entered into the step-wise multiple regression; the correlation matrix for this test is given in Table 4.9. It was found that none of the factors were entered significantly into the step-wise regression and, accordingly, there were no significant effects on Creativity or co-effects on other factors to be gleaned through hierarchical regressions.

Table 4.9: *Correlation matrix for Derivative Factors and Creativity in DS94*.

	Creat.	**P**	**O**	**C**	**D**
Creat.	1.000	-0.326[1]	-0.142	-0.088	-0.092
P	-	1.000	0.236	-0.246	0.404[2]
O	-	-	1.000	-0.018	0.058
C	-	-	-	1.000	0.148
D	-	-	-	-	1.000

[1] $p < 0.05$, [2] $p < 0.025$, [3] $p < 0.01$, [4] $p < 0.001$

On the one hand, it may simply be that the reason for this result was that the sample size for the creative suffixes is too small; there were only half as many creative suffixes in DS94 as there were in EAS14, and as such it may be that this was not enough to derive any significant tendencies in the Derivative Factors that aligned with the overall Creativity scores of the suffixes. Indeed, the difference in the raw number of neologisms was greater still between the two datasets, and there was a greater variance in the Creativity scores in EAS14 as highlighted by standard deviations around the mean. However, it is possible that something of a nullification effect is occurring, given that the Mann-Whitney *U* tests revealed a tendency for Opacity to be associated with non-creative suffixes in this dataset. The results of

the EAS14 data for this set of factors (§4.1.1) suggest that Opacity should not be considered in terms that are too simplistic: it is not necessarily the case that an increase in Opacity increases or reduces Creativity, because this is dependent on the Prevalence, which appears to be the more predictive factor. In a sense, the role of Opacity may be pulled in one of two directions based on the Prevalence: either it detracts from Creativity where opaque words are common and more likely to be recognized as a single unit (e.g. *simplify*), or it aids it where opaque words are less common and a known suffix is identified in an attempt to parse it anyway (e.g. *organism*). It should be noted again, as highlighted earlier and discussed in more detail in Chapter 5, that there are far fewer neologisms overall in DS94 than in EAS14, with one neologism for every 33.57 lemmas compared to every 18.66 lemmas in EAS14. This difference may be the reason for the lack of "energy" in the regression analyses, in that the roles of individual factors are less pronounced, and this may be why the role of Opacity in promoting Creativity is understated here.

4.2.2 Base Factors in DS94

Mann-Whitney *U* tests of the group differences between the means of non-creative and creative suffixes (Table 4.10) showed that the only difference of statistical significance was in the factor of Sound Change ($U = 1{,}254$, $N_1 = 104$, $N_2 = 32$, $z = -2.4220$, $p < 0.05$, $\eta^2 = 0.033$). This is of course consistent with the findings from EAS14, that creative suffixes are generally those that are less likely to alter the sound of a base during the suffixation process. However, in this assessment, the factors of Atypical PoS and Allomorphic Variant are no longer significant.

Table 4.10: *Means and standard deviations for Base Factors across non-creative and creative groups in DS94.*

Factor	**Non-creative**[1]		**Creative**[2]		
	μ	***σ***	***μ***	***σ***	**Sig.**
Stress Transfer	0.108	0.190	0.033	0.070	-
Sound Change	0.147	0.191	0.043	0.075	*
Truncation	0.169	0.310	0.097	0.139	-
Semantic Shift	0.033	0.068	0.019	0.036	-
Atypical PoS	0.013	0.037	0.011	0.032	-
Complexity	0.219	0.316	0.091	0.137	-
Allomorphic Variant	0.049	0.123	0.008	0.022	-

[1] N =104

[2] N = 32

* $p < 0.05$, ** $p < 0.025$, *** $p < 0.01$, **** $p < 0.001$

Table 4.11: *Correlation matrix for Base Factors and Creativity in DS94*.

	Creat.	**ST**	**SC**	**TC**	**SS**	**AP**	**CX**	**AV**
Creat.	1.000	-0.216	-0.190	0.064	0.070	0.078	-0.059	-0.286
ST	-	1.000	0.788[4]	0.267	0.425[3]	0.123	-0.056	0.819[4]
SC	-	-	1.000	0.388[2]	0.077	0.528[3]	0.038	0.792[4]
TC	-	-	-	1.000	0.004	0.182	0.112	0.212
SS	-	-	-	-	1.000	0.063	-0.002	0.056
AP	-	-	-	-	-	1.000	0.192	0.069
CX	-	-	-	-	-	-	1.000	-0.072
AV	-	-	-	-	-	-	-	1.000

[1] $p < 0.05$, [2] $p < 0.025$, [3] $p < 0.01$, [4] $p < 0.001$

The correlation matrix for a multiple regression analysis of the Base Factors against Creativity in DS94 (Table 4.11) shows that there is too strong a correlation between Stress Transfer and Allomorphic Variant (0.819) as it is greater than the 0.8 acceptable for a multiple regression analysis (Bryan & Cramer 2011); additionally, the correlations between the factor of Sound Change and those of Stress Transfer (0.788) and Allomorphic Variant (0.792) are also high enough that they should be highlighted. To address this, several regression analyses were run that involved the removal of each factor individually and in combination in order to fully determine what effect this had on the overall significance of the model and the amount of variance explained. Despite this, however, it was again found that none of the Base Factors significantly added to the model to predict Creativity across all step-wise and hierarchical regressions attempted in order to derive conclusions about their relationship.

Although none of these factors reached statistical significance, it is worth noting that two of them have a relationship with Creativity that differs in direction from that in EAS14: Truncation and Atypical PoS, each of which now has a positive association with Creativity where in EAS14 it was found to have a negative association (Table 4.5), and each of which also slightly increased the significance of the role of Sound Change in the model, even if this still did not reach statistically acceptable levels. Regarding the former, although it is again important to remember that the findings did not reach significance, there may be a link here to the fact that blending, as a form of word-formation, has been on the increase in recent years (Lehrer 2007; Mikić Čolić 2015) and is responsible for a greater number of new words according to recent lists of additions to the Oxford English Dictionary (OED 2018a, 2018b). In many ways, the process of blending, certainly in cases where the right-hand element does

not undergo truncation (as in *British* + *exit* to make *Brexit*), is no different to that of Truncation in suffixation (as in *euthanasia* + *-ize* to make *euthanize*), in that the right-hand element – here, the suffix – retains its usual presentation while the left-hand element is clipped. It is possible that increasingly encountering and parsing blends in present-day speech causes some confusion when complex forms are encountered that include a truncated base, since the rules are so very similar but do not result in two clear free stems in the same way that blends do. Contrastingly, it is possible that the decreased tendency to form words by blending in English at the time of the older data allows for more Creativity in suffixes whose examples exhibit Truncation, as they are much simpler to parse than other forms that frequently involve Sound Changes. Indeed, it is possible that this may even be a partial cause of the increase in blending; certain kinds of suffix, dubbed 'splinters' by Lehrer (1998), originate from repeated blends of the same right-hand element (for example, with the combination of *alcoholic* with other elements to form *workaholic* and *chocoholic*, to the eventual identification of *-(a)holic* as effectively a new suffix). However, perhaps for the very reason that this process is becoming so commonplace and accepted in present-day conversation, when Truncation often occurs in combination with a Sound Change (such as *audacious* + *-ity* to make *audacity*), this is seen as a violation of an accepted rule, and diminishes the "availability" of the suffix, in the sense put forward by Corbin (1987), although the term is largely avoided in this thesis, since it is ambiguous in the literature and rarely – if ever – clear whether or not a suffix can be truly "unavailable" in this sense; Bauer (2001) suggests for example that *ment* is no longer available, yet the example of *relaxment* can be found in the EAS14 database, as well as further examples from the written components of the BNC (see Bauer, Liber & Plag 2013).

A similar phenomenon may be at work in terms of the difference in the way Atypical PoS is associated with Creativity in DS94 when compared to EAS14. In this case, the conclusions that can be drawn are that, in the older data, variation in the PoSs used within a particular suffix increased its likelihood of forming new words, whereas in present-day language the effect is negative. The obvious interpretation of the former is that the ability to attach to a wider range of PoSs gives a suffix greater flexibility in how it is used, as well as the potential to give speakers greater pause over a complex word and so highlight the semantic and grammatical rules of a suffix. Yet there is no such obvious reason for why this situation should have changed over the last few years. Again, it may be that the tendencies found in the older data are in some way causal of those in the newer: perhaps this greater flexibility, in

Table 4.12: *Definitions for* -age *suffixes in all databases*.

Suffix	Base PoS	Definition	Examples
-age[1]	V	an instance, the process, or a concrete result of the action denoted by the base verb	*block<u>age</u>*, *stor<u>age</u>*
-age[2]	N	the condition, rank, or state of what is denoted by the base noun	*coin<u>age</u>*, *volt<u>age</u>*
-age[3]	N	a collection of or place for what is denoted by the base noun	*orphan<u>age</u>*, *vicar<u>age</u>*

particular in terms of a suffix's semantics, is the cause of a wider range of meanings possible with each suffix. For example, in the *MorphoQuantics* database (Laws & Ryder 2014), which currently looks only at data from the original BNC, only one interpretation is listed for the suffix *-age*; for the purposes of this thesis however, and in particular when examining the EAS14 data, it was decided that in fact three *-age* suffix readings were necessary in order to encapsulate the full range of meanings available for this form (Table 4.12).

It should be emphasized however that the conclusions drawn here about the causation of EAS14 phenomena from DS94 can be tentative at best, since a) the associations between these factors and Creativity are not shown to be statistically significant in this context, b) this is highlighted by the fact that the associations between means for creative and non-creative suffixes do not match the correlations produced by the multiple regression analyses, and c) further study is required using a methodology with these specific hypotheses in mind.

4.2.3 Combined Factors in DS94

Unsurprisingly, a step-wise multiple regression analysis run to include all 11 factors used in the DS94 analysis showed again that there were no factors added into the model as none reached statistical significance in terms of their ability to predict Creativity; nevertheless, the correlation matrix for Derivative Factors against Base Factors is given in Table 4.13.

A PCA was conducted as before to determine the underlying associations of the 11 factors together and whether they could be satisfactorily put into groups whose members measured the same phenomena. In this analysis, as well as the fact that Regularity was already removed for the reasons identified in §4.2.1, Complexity was found to have no correlations beyond ±0.3 in Tables 4.9, 4.11 and 4.13; the total number of factors used in the PCA was therefore again 10. Table 4.14 shows the rotated component matrix produced by the PCA in SPSS, in

Table 4.13: *Correlation matrix for Combined Factors in DS94*.

	P	O	C	D
ST	0.431[3]	0.507[3]	-0.122	0.041
SC	0.413[3]	0.460[3]	-0.161	0.112
TC	-0.192	0.264	-0.171	-0.157
SS	0.189	0.082	-0.105	-0.074
AP	0.217	0.054	-0.115	0.073
CX	0.094	0.071	0.134	0.297[1]
AV	0.263	0.405[2]	-0.148	0.041

[1] $p < 0.05$, [2] $p < 0.025$, [3] $p < 0.01$, [4] $p < 0.001$

which four components were identified, comparable to the findings of EAS14. As before, a Kaiser-Meyer-Olkin Measure of Sampling Adequacy lay only just within the boundaries of acceptability at 0.503, but a Bartlett Test of Sphericity was found to be highly statistically significant ($p < 0.001$); it was therefore judged again that the sample of 136 suffixes was suitable for the purpose of the PCA.

A total of 73.202% of the variance is explained by these components, which is greater than those identified for the EAS14 data. However, in many ways the four components created are less clear in this case: although the main factors of each component can be seen in Table 4.14, there are also several cases where a component has 'secondary' factors. This may again be a result of the fact that the data for creative suffixes in DS94 are relatively limited, and so it is harder for the PCA to permit more definite conclusions about the components into which each factor belongs.

Table 4.14: *Rotated component matrix of four components identified for Combined Factors in DS94.*

Factor	**Component**			
	1	**2**	**3**	**4**
Stress Transfer	0.894			0.353
Allomorphic Variant	0.869			
Sound Change	0.823		0.499	
Opacity	0.713			
Distinguishability		0.789		
Prevalence		0.721		0.345
Truncation	0.398	0.587	0.372	
Atypical PoS			0.849	
Semantic Shift				0.799
Convertibility			0.504	0.555
Total Variance Explained:	34.701%	15.046%	11.768%	11.686%

Nevertheless, certain tendencies can be observed. The first component, highly influential in explaining more than twice the variance than the second, takes into account the same three factors as the first component for EAS14: Stress Transfer, Allomorphic Variant and Sound Change. This shows that, despite other differences, it is the same factors that are having the largest negative effect on Creativity; however, here Opacity is included in the same group, highlighting the negative role that this appears to play in the older conversational data. The second component is again similar to that of EAS14, including both Distinguishability and Prevalence as well as Truncation, which, as has been discussed, has a positive influence on Creativity; however, given that Prevalence is already known to have a very strong negative effect on Creativity, and that the positive correlation of Truncation with Creativity is very small (0.064), and that Prevalence is not also associated with Component 1 as it was in EAS14, it is likely that Component 2 also represents an overall negative influence on Creativity.

The only Component that could be said to represent a positive influence on Creativity is the third, which includes only the single factor of Atypical PoS. This perhaps reflects the fact that there are such a great deal fewer neologisms in the DS94 data than in EAS14, even when normalization of the database sizes is accounted for (see Chapter 5). Although there are a number of other factors that may have a 'secondary' role in Component 3, these are again likely to be due to very low non-significant correlations in the first place, such as the -0.088 correlation between Convertibility and Creativity.

The rotated component matrix in Table 4.14 provides in some ways a visual summation of the findings of the diachronic analysis, in that the factors cannot clearly be delineated as having a significantly positive or negative effect on Creativity; rather, there is a more general negative influence of most factors on it, leading to a lack of neologistic "energy" and little that can be reliably concluded about the most and least influential factors. A final step-wise multiple regression analysis emphasized this, since none of the four components were entered into the model to predict Creativity, and all but Component 3 were found to be associated with it negatively.

4.3 Register Differences: CG94

Having established where possible the diachronic differences between the two sets of data of the same type – conversational speech – an analysis was made of the differences between registers. The CG94 database was used to draw comparisons to the EAS14 conclusions, while taking into account the established diachronic effects as this too comes from the original BNC.

Only 4 of the 145 suffixes in this dataset were found to have no non-opaque examples and were therefore removed from further analysis: *-ile*[1] (*frag<u>ile</u>*), *-ile*[2] (*sen<u>ile</u>*), *-kin* (*nap<u>kin</u>*), and *-trix* (*ma<u>trix</u>*). The remaining 141 suffix were split into 'non-creative' and 'creative' groups as before, with totals of 81 and 60 respectively (see Appendix 4 for index pages arranged by Creativity category); the creative group had a mean Creativity score of 0.063 and a standard deviation of 0.052.

It should be noted prior to the more in-depth analysis of each factor type that there are again noticeably fewer neologisms in CG94 when compared to EAS14 from which conclusions can be drawn. Although in this case the neologisms are spread over almost twice as many suffixes when compared to DS94, there are nevertheless only 171 neologistic plemmas across 8,068 for the whole dataset (a ratio of roughly 1:47), with 151 in DS94 (1:33) and 344 in EAS14 (1:19). This is in itself an extremely interesting finding, and is discussed in more detail in §5.3.1; nevertheless, it is worth bearing in mind here that the CG94 analysis suffered from a lack of neologistic "energy" similar to that of DS94, despite the initial appearance given by the fact that the non-creative and creative groups contain a similar number of suffixes each.

4.3.1 Derivative Factors in CG94

Means and standard deviations for the five Derivative Factors were calculated for each group and are presented in Table 4.15 below. Mann-Whitney *U* tests were run for each factor; both Prevalence ($U = 1{,}672$, $N_1 = 81$, $N_2 = 60$, $z = -3.161$, $p < 0.01$, $\eta^2 = 0.071$) and Opacity ($U = 1{,}790$, $N_1 = 81$, $N_2 = 60$, $z = -2.685$, $p < 0.01$, $\eta^2 = 0.051$) were found to be highly statistically significant, and each was associated more with non-creative suffixes, such that creative suffixes were likely to be less prevalent and less opaque.

Table 4.15: *Means and standard deviations for Derivative Factors across non-creative and creative groups in CG94.*

Factor	Non-creative[1]		Creative[2]		
	μ	σ	μ	σ	Sig.
Prevalence	4.849	0.569	4.511	0.549	***
Opacity	0.287	0.283	0.130	0.141	***
Regularity	0.009	0.334	0.002	0.010	-
Convertibility	0.075	0.145	0.024	0.045	-
Distinguishability	0.534	0.317	0.520	0.303	-

[1] N = 81

[2] N = 60

* $p < 0.05$, ** $p < 0.025$, *** $p < 0.01$, **** $p < 0.001$

Prevalence remains significant, as it has been in the analysis of all three databases, highlighting its particular importance in shaping the likelihood of a suffix being creative. The presence of opaque forms is here associated with non-creative suffixes in the same way as DS94 rather than EAS14; this suggests that the phenomenon of Opacity encouraging the creation of neologisms, and the interesting interaction it has with the factor of Prevalence as discussed in §4.1.1, is relatively recent and particular to present-day speech. A potential reason for this may be the increase in average education levels in the United Kingdom over the last twenty years, which have been shown to have an effect on the use of derivational morphemes (Plag, Dalton-Puffer & Baayen 1999; Cowie 2006; Laws & Ryder 2018), increasing the general ability to speak and think in more formal and academic registers, in turn opening up awareness of a greater number of suffixes (see Chapter 7 for more on this theory). Given that the number of neologisms in CG94 is very close to that of DS94 despite the fact that almost twice as many different suffixes were creative, it is clear that the more formal registers make use of a much more diverse range of possibilities for derivational word-formation, and the effects of an increased exposure to such registers may spill over into conversational speech.

The five Derivative Factors were entered into a multiple regression analysis using SPSS as before to determine which had an influence on Creativity within the creative group of suffixes; Table 4.16 shows the correlation matrix for this analysis. In a step-wise regression, only the factors of Prevalence and Distinguishability were entered into the model, which was statistically significant overall ($R^2 = 0.319$, $F(2,57) = 13.324$, $p < 0.001$, adjusted $R^2 = 0.295$) and accounted for 29.5% of the variance in Creativity.

Table 4.16: *Correlation matrix for Derivative Factors and Creativity in CG94*.

	Creat.	**P**	**O**	**R**	**C**	**D**
Creat.	1.000	-0.480[4]	-0.292[2]	-0.141	0.079	-0.428[4]
P	-	1.000	0.305[3]	0.180	-0.215	0.302[3]
O	-	-	1.000	0.192	0.097	0.099
R	-	-	-	1.000	-0.020	0.049
C	-	-	-	-	1.000	0.021
D	-	-	-	-	-	1.000

[1] $p < 0.05$, [2] $p < 0.025$, [3] $p < 0.01$, [4] $p < 0.001$

The inclusion of Prevalence in this model as the most significant factor to determine Creativity confirms that neither register nor time alter the fact that suffixes whose members are more prevalent in the language tend to be less creative as a result. However, the addition of Distinguishability to the model is quite interesting; hitherto, this factor has been of little significance, albeit one that is consistently negatively associated with Creativity, but in the case of the more formal CG94 data, it appears that the Distinguishability of a suffix plays a more important role in determining its Creativity. This finding highlights that suffixes that have a more unique presentation (e.g. *-itude*, *-osis*, *-ulent*) – that is to say, their form appears in words only where it is a genuine example of the suffix – are less likely to be creative when compared to those whose forms appear in many words in which they are not instances of suffixes (e.g. *-er*[1-6], *-ine*[1-2], *-y*[1-6]). The reason for this is likely to be that these less distinguishable suffixes tend to be those that are more polysemous, attested by the fact that there are multiple entries in the databases for the non-distinguishable examples given, such as *-y*, which has six interpretations. Likewise, those that are more creative tend to be those that are more polysemous as there is a wider range of available meanings that apply to a wider range of PoSs when coining a new word. These two facts together make it likely that the less distinguishable suffixes are also those that are more creative, since both are due to the suffix's polysemy. The reason for the exaggerated significance of Distinguishability as a factor in more formal register may be simply that there is a higher concentration of complex words in the CG sub-corpus of the BNC: 55.4 complex word tokens per thousand versus 25.4 in EAS and 20.8 in DS (based on the 145 suffixes used in this study). This allows for greater exposure to complex words from a wider range of suffixes, including those that are polysemous, such that they are presented with several different meanings for the same form. Given that many of the polysemes of a particular form deal with creating or altering different PoSs, this has interesting implications relating to the awareness of speakers of PoSs; if, for

Table 4.17: *Hierarchical regression model for Derivative Factors in CG94*.

Factors Entered	R^2	**Adjusted** R^2	**Sig.** F **Change**	**Overall Sig. of Model (*p*)**
Prevalence	0.230	0.217	<0.001	<0.001
+ Distinguishability	0.319	0.295	0.009	<0.001
+ Opacity	0.341	0.306	0.171	<0.001
+ Regularity	0.342	0.295	0.748	<0.001
+ Convertibility	0.343	0.283	0.791	<0.001

example, adjectival forms of *-y* (*-y*[1], *lengthy* / *-y*[2], *jingly* / *-y*[3], *yellowy*) have an influence on the Creativity of nominal forms of *-y* (*-y*[4], *jealousy* / *-y*[5], *delivery* / *-y*[6], *armoury*), it may be that speakers' understanding of PoS relating to the formation and parsing of complex words is more fluid in nature, since they can apply similar meanings across this word class boundary (see §8.1.3 for further discussion on this point).

Hierarchical regression analyses revealed that, although only the two factors entered significantly into the model to predict Creativity, the model overall nevertheless remained highly significant ($R^2 = 0.343$, $F(5,54) = 5.646$, $p < 0.001$, adjusted $R^2 = 0.283$), emphasizing the strength of the prediction value of Prevalence and Distinguishability. Furthermore, although the addition of Opacity to the model did not constitute a significant change, it nevertheless increased the adjusted R^2 value (Table 4.17), representing the total variance explained by the model; hence, the model that took into account Prevalence, Distinguishability and Opacity reliably explained 30.6% of the variance in Creativity. Both Regularity and Convertibility, as well as being non-significant additions to the model, detracted from the adjusted R^2, indicating that they are not useful predictors of Creativity in the case of the CG94 data.

4.3.2 Base Factors in CG94

Table 4.18 shows the means and standard deviations for the seven Base Factors across the non-creative and creative groups. Mann-Whitney *U* tests were performed in the usual way on each of the factors; in this case, none of the factors were shown to be significantly different between the two groups. This suggests that, for the CG94 data, suffixes in neither group show especially high tendencies when compared to the other towards any particular feature when it comes to the likelihood that they will be non-creative or creative.

Table 4.18: *Means and standard deviations for Base Factors across non-creative and creative groups in CG94.*

Factor	Non-creative[1]		Creative[2]		
	μ	σ	μ	σ	Sig.
Stress Transfer	0.082	0.145	0.098	0.189	-
Sound Change	0.162	0.198	0.082	0.102	-
Truncation	0.171	0.292	0.098	0.130	-
Semantic Shift	0.031	0.064	0.021	0.037	-
Atypical PoS	0.022	0.050	0.008	0.013	-
Complexity	0.203	0.306	0.184	0.207	-
Allomorphic Variant	0.042	0.119	0.027	0.066	-

[1] N = 81
[2] N = 60
* $p < 0.05$, ** $p < 0.025$, *** $p < 0.01$, **** $p < 0.001$

Although this result is somewhat disappointing, a multiple regression analysis was able to give more in-depth results relating to the factors that determine greater or lesser Creativity within the creative group of suffixes. The correlation matrix in Table 4.19 shows a much higher number of significant correlations between the Base Factors and Creativity, especially with regard to the factor of Complexity, which correlated significantly with all but Atypical PoS; this suggests a greater amount of interplay between the Base Factors in the CG94 data. Nevertheless, a step-wise analysis entered only Complexity into the model, which reached statistical significance ($R^2 = 0.154$, $F(1,58) = 10.569$, $p < 0.01$, adjusted $R^2 = 0.140$), although it accounted for only 14% of the variance.

The concept of Complexity as a factor reducing Creativity is not in itself overly surprising; it may be expected that, where a suffix is often attached to words already containing other

Table 4.19: *Correlation matrix for Base Factors and Creativity in CG94.*

	Creat.	ST	SC	TC	SS	AP	CX	AV
Creat.	1.000	-0.104	-0.086	-0.082	0.270[2]	-0.139	-0.393[3]	-0.337[3]
ST	-	1.000	0.490[4]	0.208	0.162	0.208	0.233[1]	0.657[4]
SC	-	-	1.000	0.283[2]	0.037	0.279[2]	0.240[1]	0.383[3]
TC	-	-	-	1.000	0.168	-0.011	0.226[1]	0.033
SS	-	-	-	-	1.000	0.233[1]	-0.338[3]	-0.110
AP	-	-	-	-	-	1.000	-0.001	0.070
CX	-	-	-	-	-	-	1.000	0.348[3]
AV	-	-	-	-	-	-	-	1.000

[1] $p < 0.05$, [2] $p < 0.025$, [3] $p < 0.01$, [4] $p < 0.001$

suffixes (e.g. *departmentalization* from *depart* + *-ment* + *-al*[2] + *-ize* + *-ation*), it is more complicated to parse, especially in terms of its semantics, than one that is more often attached to simplex bases (e.g. *handful* from *hand* + *-ful*[3]), and that this added difficulty would discourage its use in neologism creation. The reason for its more notable significance in the CG94 data may again be related to the higher concentration of such forms here than in the other databases: while 17.6% and 15.3% of EAS14 types and DS94 types respectively are made up of those with complex bases, for CG94 types the figure is higher for CG94 at 22%. Since Complexity was not significant in the Mann-Whitney *U* test between the two groups, but is significant in the multiple regression analysis of the creative suffixes, this suggests that it is not a factor that is associated especially with either group, but that too high a concentration of such words in creative suffixes may discourage Creativity. This is especially true in the more formal register because there is a higher concentration of such words to begin with.

Once again, a hierarchical regression gave further insight into the behaviour of the factors and how they interact. Including all seven Base Factors provided a model that remained statistically significant ($R^2 = 0.285$, $F(7,52) = 2.960$, $p < 0.025$, adjusted $R^2 = 0.189$) and explained 18.9% of the variance. Both Sound Change and Truncation reduced the adjusted R^2 and hence the variance explained (Table 4.20); all other factors increased this figure, Semantic Shift in particular, although again not enough to reach significance. Nevertheless, it is interesting to see that a model containing all seven factors remains statistically significant, given that no factors showed significant differences between the non-creative and creative groups; this implies again that, while the two groups do not differ significantly in their variation in these factors, the variation within the creative group is still relevant to the degree of Creativity to a certain extent. While this is true to a statistically significant degree of only

Table 4.20: *Hierarchical regression model for Base Factors in CG94*.

Factors Entered	R^2	**Adjusted** R^2	**Sig.** F **Change**	**Overall Sig. of Model (*p*)**
Complexity	0.154	0.140	0.002	0.002
+ Allomorphic Variant	0.200	0.172	0.077	0.002
+ Atypical PoS	0.215	0.173	0.301	0.003
+ Semantic Shift	0.249	0.194	0.121	0.003
+ Stress Transfer	0.268	0.200	0.237	0.004
+ Sound Change	0.273	0.191	0.541	0.007
+ Truncation	0.285	0.189	0.366	0.011

Complexity, the additional information highlighted by the hierarchical regression analysis sheds some light on the factors' interaction.

4.3.3 Combined Factors in CG94

All twelve factors were taken together in a further regression analysis to determine the overall effects and associations of Derivative and Base Factors; the correlation matrix for the remaining interactions is given in Table 4.21, and again shows a much higher number of significant correlations when compared to the other two databases. Step-wise and hierarchical regressions both showed that only Prevalence and Distinguishability were entered into the model with statistical significance, but that the model overall with all twelve factors remained significant ($R^2 = 0.435$, $F(12,47) = 3.018$, $p < 0.01$, adjusted $R^2 = 0.291$) and accounted for a good amount of the variance (29.1%).

Table 4.21: *Correlation matrix for Combined Factors in CG94*.

	P	**O**	**R**	**C**	**D**
ST	0.282[2]	0.230[1]	-0.078	-0.192	0.133
SC	0.276[2]	0.317[3]	0.058	-0.260[2]	-0.057
TC	0.016	0.329[3]	0.034	-0.029	-0.240[1]
SS	-0.126	-0.089	0.157	0.023	-0.368[3]
AP	0.250[1]	0.140	0.456[4]	-0.038	0.155
CX	0.297[2]	0.270[2]	-0.024	-0.066	0.362[3]
AV	0.318[3]	0.189	-0.061	-0.127	0.284[2]

[1] $p < 0.05$, [2] $p < 0.025$, [3] $p < 0.01$, [4] $p < 0.001$

The effect by which only the significant Derivative Factors(s) were entered significantly into the model in which all twelve factors were considered is consistent over both EAS14 and CG94 (DS94 produced no significant factors of either type); this suggests that there may be a dominant effect of Derivative Factors over Base Factors, whereby the significance of the latter is nullified by that of the former. This implies that Derivative Factors – those that are applicable to the complex word after the suffixation process is complete – are the more important arbiters of Creativity, and that this fact is maintained over time and across differing registers. Hence it may be that, although a suffix's Creativity may indeed be influenced negatively by Base Factors such as Sound Change (EAS14) and Complexity (CG94), more explanatory power is provided about a suffix's Creativity by examining its Prevalence in particular, as well as its Opacity and Distinguishability. Speakers' interest in creating new

words with a suffix is therefore based heavily on their exposure to its form, whether as a genuine or pseudo-suffix, in conjunction with the amount of times this occurs with extractable or non-extractable bases.

As a final analysis for the CG94 data, a PCA was conducted to identify any remaining underlying associations of all factors considered together. In this case, only Convertibility was found to violate the requirement of having at least one correlation of ±0.3 with another factor, and so it was removed from the analysis, leaving a total of 11 factors. Four components were again identified that explained a total of 68.399% of the variance; the rotated component matrix is provided in Table 4.22. A Kaiser-Meyer-Olkin Measure of Sampling Adequacy gave in this instance a more satisfactory figure of 0.658, and again a Bartlett Test of Sphericity verified a suitable sample size of 141 suffixes with a significance of $p < 0.001$).

Interestingly, despite the strength of Prevalence, Distinguishability and Complexity in the regression analyses that revealed their strong influence over Creativity, it is the same three factors that appear in the first component, accounting for the most amount of variance (26.783%): Stress Transfer, Allomorphic Variant and Sound Change. The implication here is that each factor is individually not statistically significant in its influence over Creativity, but that there is a combination effect when all three are taken into consideration. This tendency is present across all three databases, showing perhaps that Component 1, taken as a whole, is a

Table 4.22: *Rotated component matrix of four components identified for Combined Factors in CG94.*

Factor	**Component**			
	1	**2**	**3**	**4**
Stress Transfer	0.901			
Allomorphic Variant	0.821			
Sound Change	0.619			0.415
Semantic Shift		0.780		
Distinguishability		0.744		
Complexity		0.641		0.391
Prevalence	0.345	0.445	0.409	
Regularity			0.819	
Atypical PoS			0.816	
Truncation				0.833
Opacity				0.676
Total Variance Explained:	26.783%	16.743%	13.824%	11.049%

Table 4.23: *Hierarchical regression model for PCA Components in CG94.*

Factors Entered	R^2	**Adjusted** R^2	**Sig.** F **Change**	**Overall Sig. of Model (*p*)**
Component 2	0.271	0.258	<0.001	<0.001
+ Component 1	0.297	0.272	0.153	<0.001
+ Component 3	0.341	0.305	0.059	<0.001
+ Component 4	0.360	0.314	0.197	<0.001

reliable indicator of Creativity. The three significant factors in the regression analyses appear in the second component alongside Semantic Shift; this is unusual since, with the exception of Convertibility, which was removed from the PCA, Semantic Shift is the only factor that has a positive association with Creativity in the correlation matrices. It may simply be the case that this factor's positive influence was not strong enough to be considered a component of its own; however, it is also possible that there is some kind of further interaction between this factor and the others within Component 2, perhaps of a reciprocal nature similar to Prevalence and Opacity in the EAS14 analysis, but which would require much further study before any more reliable conclusions could be drawn.

The four components were considered in a final multiple regression analysis. A step-wise regression entered only Component 2 significantly into the model to predict Creativity ($R^2 = 0.271$, $F(1,58) = 21.566$, $p < 0.001$, adjusted $R^2 = 0.258$), but further analysis revealed that the model remained significant with the enforced addition of all four components ($R^2 = 0.360$, $F(4,55) = 7.746$, $p < 0.001$, adjusted $R^2 = 0.314$). Hierarchical tests showed that all four components added to the adjusted R^2, even though only Component 2 was statistically significant in doing so (Table 4.23). This is likely because, even though Component 1 by definition explains a greater amount of variance than Component 2, this does not necessitate that the individual factors that comprise it are the most influential. The two factors of Prevalence and Distinguishability were found to be highly influential in predicting Creativity when only Derivate Factors were considered and when they were taken alongside Base Factors; for this reason, their combined weight in Component 2 may be having a greater amount of influence over Creativity despite the relative strength of the association between the individual factors in Component 1.

4.4 Conclusions to Chapter 4

It is clear from conducting these analyses that, to a certain extent, there is a limit to how much information can be gained from examining the data in this way. It is not the case that a multiple regression lists categorically the order in which each factor influences Creativity, such that a hierarchy of features could be built. Like a great many aspects of language, the reality is much more disordered and the data are messy, resulting in a lot of extrapolation and interpretation on the part of the analyst in order to discern what the results may be revealing about which factors are most and least influential on Creativity, in what way, and how they interact. Nevertheless, certain conclusions can be reached, some more tentative than others, but all of which certainly prompt further study along these lines.

To consider all the data in general terms, there appears to be a tendency for Derivative Factors to be more dominant than Base Factors in influencing Creativity when all are taken together. In both EAS14 and CG94, where there were clear significant factors of each type, multiple regressions of all 12 factors showed significant influence from only the Derivative Factors, while the Base Factors were relegated and no longer significantly adding to the prediction model. In real terms, this means that speakers' Creativity with a suffix is more influenced by the way it presents within the language than the underlying processes that take place during suffixation and which must be parsed during recognition. Of these Derivative Factors, it is the Prevalence of a suffix that is particularly influential: those suffixes whose members occur more frequently in language are much less likely to be creative, whereas those whose members are on average less frequent tend to be more creative. It is suggested here that this is because the more prevalent a word is, the more likely it is to be recognized solely by a direct route; on the other hand, those that are less prevalent are more likely to be broken down into their constituent parts to aid recognition, and this allows speakers to get a better understanding of the mechanics of the suffix and hence how to apply it to coin neologisms.

In terms of the older data from the original BNC, this is more or less the clear conclusion, and it is noted that suffixes that tend to have a greater concentration of non-transparent members are also less likely to be creative; while this fits with the notion of availability (Corbin 1987) – or a lack thereof – it is noted strongly in §2.3.2 that this is a poorly-defined concept, and this is evidenced by the repeated coinage of complex words using suffixes that are

supposedly unavailable for a variety of reasons. In contrast to the older data, it is clear that, in the present-day data from the Spoken BNC2014, there is more to be said in terms of the relationship of Prevalence and Opacity. It seems that there is something of a reciprocal relationship, in that each affects the influence of the other on Creativity. Where a complex word is less prevalent but opaque, it is argued that an attempt is made to parse the word despite the fact that no Modern English base can be identified; this could be explained by the Parallel Dual-Route Model (Schreuder & Baayen 1995; Baayen, Dijkstra & Schreuder 1997) in which both the direct and parsed routes are activated and, for less prevalent words, the direct route is slow enough that there is time to linger over the rules governing a particular suffix even if the derivative is opaque. Contrastingly, where the Prevalence of a word is high, there is no opportunity to break down an opaque complex word, and so the influence of this factor is lost. There is also some relation here to changes in the sound of the base, in that the positive influence of Opacity on Creativity appears to be lessened where there is also a higher concentration of words that alter the sound of a base, even if such sound changes can be quite regular.

Additionally, while it may be accurate to say that Derivative Factors have a dominating effect over Base Factors when all are considered together, it is worth remembering that PCAs for all three databases showed that the strongest component, accounting for the most variance in each case, was made up primarily of the Base Factors of Stress Transfer, Sound Change and Allomorphic Variant. This suggests that, while Derivative Factors can be greatly influential on their own, the importance of Base Factors should not be underestimated when they work together to predict Creativity. Clearly a single Base Factor tends not to have a significant level of influence on the overall Creativity of a suffix – a few Allomorphic Variants, for example, will not cause speakers to discard a suffix as too complex to create neologisms – but in combination with stress and sound changes, the process of parsing, and hence constructing, complex words in this way becomes much more demanding and complicated. There is a clear relationship here with cognitive economy, in that there is a preference on the part of speakers' cognition to create new words using the least energy possible – those with simple rules that are regularly practised through parsing existing forms.

The diachronic analysis in particular highlighted the importance of having a suitable sample size from which to draw conclusions. The sample size for DS94 was relatively small, not just in that the pool of neologisms was less than half that in EAS14, but also that these were

concentrated into only 32 suffixes, providing a much smaller set of means to take into account in the analyses. Of course, this in itself is of interest, since there is clearly a vast increase in the number of neologisms being created in present-day speech compared to twenty years ago; there is a great deal more to be said here, and it is the subject of much greater focus in the chapter that follows.

An analysis of register differences brought to light that there are some similarities between the present-day conversational data and the older more formal data, in that the effects of Prevalence that are discussed above are clearly at play to a highly significant level in both registers, and that in both cases the neologisms are spread across a much wider number of suffixes. However, certain differences did arise, such as the fact that the sheer number of complex word tokens in the formal registers produced a more significant effect of factors such as Distinguishability and especially Complexity, which were not great enough to reach significance in the present-day conversational data. Additionally, while there are similarities in the distribution of neologisms across many suffixes, the EAS14 data again showed almost twice as many actual types as the CG94 data, indicating a dramatic change in the frequency with which speakers approach derivational word-formation. Given that, despite this fact, the formation of words through derivational means is not one of the leading methods used (blending, for example, as noted earlier, remains much more popular), this implies a much greater freedom with language as a whole, as speakers are vastly increasing the degree to which they form words with even the less popular methods. This, again, is the subject of some discussion in Chapter 5, which continues to look at the corpus data in terms of the creation of neologisms specifically across the databases to discern further features about present-day English and how this has differed over time and in different registers.

5 ANALYSIS AND DISCUSSION OF NEOLOGISMS

In this chapter, the neologisms obtained from the corpus analysis are scrutinized and considered in terms of the suffixes they embody and their meaning within the groups determined in §3.2.5 (see Appendix 2). While that chapter examined the data from a quantitative and abstract standpoint, Chapter 5 looks deeper into how the suffixes behave in actuality and whether or not this behaviour reflects that of the individual factors in relation to Creativity. The EAS14 data are examined first as before, in terms of both the suffixes and groups that generate the most neologisms and how the Derivative and Base Factors are reflected in them. Then, the DS94 and CG94 datasets are compared and contrasted to these findings to further determine diachronic and register-based differences in Creativity. Some further observations are made before drawing conclusions that seek to inform the second part of the project.

Neologisms were identified in each of the databases and coded based on which suffix had been used to coin them; full details of neologism plemma and token counts for each suffix in each database can be found in Appendix 5. Table 5.1 below shows the same data condensed by part-of-speech (PoS), as well as the token/plemma ratio (TPR) of each; index pages listing the same information as Appendix 3 are also found in Appendix 6 separated by the PoS that each suffix forms (adjective, noun or verb). Throughout this chapter and in those that follow,

Table 5.1: *Neologism information for each database split by PoS*.

Database		Adjectives	Nouns	Verbs	Total
EAS14:	Creative Suffixes	23	38	2	**63**
	Plemmas	226	115	3	**344**
	Tokens	345	200	3	**548**
	TPR	1.53	1.74	1.00	**1.59**
DS94:	Creative Suffixes	13	18	1	**32**
	Plemmas	87	60	2	**149**
	Tokens	112	135	2	**249**
	TPR	1.29	2.25	1.00	**1.67**
CG94:	Creative Suffixes	23	35	2	**60**
	Plemmas	83	81	5	**169**
	Tokens	108	124	6	**238**
	TPR	1.30	1.53	1.20	**1.41**

definitions can be found for each neologism in Appendix 7 (accompanying CD), which were extrapolated from the original context that can be found in the EAS, DS or CG corpora.

5.1 Creative and Highly-Creative Suffixes

Table 5.1 shows that the EAS14 data contained a total of 344 neologisms accounting for 548 tokens, giving a TPR of 1.59. The vast majority of neologisms were used once only, although there were also a handful of two- and three-token examples that were repeated either due to ongoing context or through repetition by interlocutors, most often in amusement or for clarification of the invented word. Two notable outliers were *woodling* (17 tokens, from *wood* + *-ling*, meaning 'member of a fictional race of forest-dwellers'), repeated often through the telling of a fantasy tale, and *lolzy* (13 tokens, from *lolz* + *-y*[1], meaning 'funny', i.e. 'eliciting LOLs') said frequently by one particular speaker who appeared to have a certain affinity for it.

The neologisms were spread across 63 creative suffixes (43%) of the 145 total, split between 23 adjectives, 38 nouns, and 2 verbs. Although here "creative" includes any suffix that created at least one neologism, there was a set of "highly-creative" suffixes, defined as those that were responsible for a very large number of neologisms that was notably beyond the typical figures for other creative suffixes: *-y*[1] (105), *-y*[2] (37), *-ness* (24), *-y*[3] (18), and *-ie*[2]

(17). In addition to this, further highly-creative suffixes could be found that produced large numbers of neologisms in proportion to their total plemma count, i.e. their Creativity score: these were *-esque* (0.600), *-er*[6] (0.500), *-ist*[4] (0.500), *-like* (0.462), *-ism*[3] (0.400), *-ite*[2] (0.375), *-arium* (0.333), *-ish*[1] (0.257), *-age*[2] (0.250), *-ish*[3] (0.240), and *-manship* (0.200).

5.1.1 Part-of-Speech Effects

Although the greater part of the creative suffixes are noun-forming (76%), they account for only about a third of the neologistic plemmas (Table 5.1); adjectives, on the other hand, constitute the remainder of the plemmas, with the exception of 3 from verb-forming suffixes, and a greater percentage of the adjective-forming suffixes (roughly half) are creative at all. This shows a divergence from the typical ratio of nouns and adjectives in the EAS14 database and EAS corpus as a whole (Table 5.2). Where these datasets show a domination of nouns over adjectives, there is a clear switch to a dominance of adjectives in the neologisms that are created out of them. This is reflected in some particular suffixes; for example, the three adjective-forming suffixes *-y*[1-3] endings produce a total of 160 neologisms between them, whereas the three noun-forming suffixes *-y*[4-6] create only one between them (*bantery*, from *banter* + *-y*[4], meaning 'talk that is characteristic of banter').

Table 5.2: *Distribution of adjectives and nouns in EAS datasets*.

Source	Adjectives*	Nouns*	Adjs/Ns	Total*
EAS14 (Neologisms)	226	115	1.97	**344**
EAS14 (All Derivatives)	2,695	3,500	0.77	**6,420**
EAS**	9,401	23,300	0.40	**34,482**

* NB: Each figure is included in the total of successive figures below it in each column.
** Figures taken for lemmas due to the unavailability of plemma information.

This is particularly interesting considering the fact that noun-forming suffixes cover a much wider range of meanings, with ten groups (in addition to an 'other' group of unique suffix meanings), while adjective meanings span across only seven groups (see Appendix 2). This suggests that there are more gaps in adjective vocabulary that can be accounted for by disposable words; that is, the occasions when derivational morphology is most useful to speakers in conversation is when they are trying to be descriptive and not when they are naming specific objects or concepts, since the nominalizations in this study were not used in pre-modification. In some ways this makes sense: although many of the new words that enter

the language are nouns, reflecting rapidly changing times and the constant introduction of new objects and concepts, it is perhaps less frequent that a method of describing something becomes so commonplace that speakers 'latch on' to the term and it becomes part of the language. There may however be influential effects due to the overrepresentation of social grades A and B in the EAS corpus; this is discussed further in relation to the DS and CG data in §5.3.1 and §5.3.2.

Verb-forming suffixes constitute only a very small part of the EAS14 database, with only the four members *-ate*, *-en*[1], *-ify* and *-ize*. It is unsurprising, therefore, that they represent a very small proportion of the neologisms created; however, there are nevertheless some interesting observations that can be made from examining Table 5.1 and Appendix 2. Although these four suffixes have been categorized under a single Group V1, they cover a wide range of meanings, distinguished by Plag (1999, 2004) into the seven semantic categories of locative, ornative, causative, resultative, inchoative, performative and similative. While it is beyond the scope of this study to examine such subtle semantic distinctions in depth, it is worth noting that only *-ify* and *-ize* are identified as being versatile enough to cover all seven of these semantic categories, and indeed do so to such a similar extent in nearly complementary distribution that Plag (1999: 197) suggests they are phonologically-conditioned allomorphs of each other. For this reason, it is reasonable to expect that these suffixes together are the more creative verb-forming suffixes, since they have more semantic options for speakers to draw from in coining new words and are likely to demonstrate very similar behaviour. Accordingly, two of the three verb neologisms in EAS14 employ the suffix *-ify*: *popify* (from *pop*, meaning 'to make more like a pop song') and *wintrify* (from *winter*, meaning 'to apply the effects of winter weather to'). Interestingly, despite the versatility of the semantic role of *-ify* described above, these example neologisms are respectively causative and ornative – categories that are also covered by *-ate*[3] and *-en*[1]. The suffix *-ize* accounts for a single neologism, *inoculize* (with the same meaning as *inoculate*), which is an example of a suffix substitution; it can be presumed that the speaker suffered a memory lapse when trying to access *inoculate*, and so the ending was replaced with a suffix that was able to take on the same meaning.

5.1.2 Group Effects

An examination of the neologisms in terms of their semantic group (as identified in §3.2.5 and Appendix 2) provides some useful observations about the behaviour of certain suffixes in

relation to their levels of Creativity. Table 5.3 below summarizes the distribution of the 63 creative suffixes in EAS, as well as identifying the number of those in each group that are of a particularly high Creativity. While the distribution of creative suffixes seems to be across almost all groups roughly according to their size, it is interesting to note that, in the majority of cases, the most highly-creative suffixes are unique within their particular group in carrying most of the neologistic weight. This implies the possibility of blocking (§2.3.4) in that, for a particular meaning group, one suffix is preferred vastly above others by creative speakers.

While the reasons for and against individual suffixes achieving this "preferred" status are considered further in §5.2, at this stage it can be said that this phenomenon would seem to block a number of suffixes from being likely to form neologisms; for example, in Group A2, the suffix *-y*[2] (*floppy*, *runny*) is highly-creative in forming adjectives from verbs with the

Table 5.3: *Summary of creative and highly-creative suffixes by group in EAS14*.

Group	Meaning(s)	Size	Creative / Highly-Creative Suffixes	Total
A1	relating to / concerning / from	13	8/-	8
A2	performing or provoking an action	8	2/1	3
A3	causing / showing / full of	11	3/1	4
A4	adhering to / believing in	4	1/-	1
A5	similar to / resembling	6	1/3	4
A6	can perform / must be subjected to	3	1/-	1
A7	somewhat / to a lesser degree	2	-/2	2
N1	entity related to / concerning / from	13	5/-	5
N2	entity performing/provoking the action	8	3/-	3
N3	condition / state of / rank of	21	5/2	7
N4	adherent of / believer in	5	-/1	1
N5	instance of / group that performs action	14	6/-	6
N6	[diminutives]	10	4/1	5
N7	place for the entity/action	5	-/1	1
N8	[occupations]	4	2/-	2
N9	[feminine forms]	3	-/-	0
N10	[medical terms]	3	2/-	2
N11	[miscellaneous]	8	2/4	6
V1	(cause to) become / be affected by	4	2/-	2
	Totals	**145**	**47/16**	**63**

meaning ‘performing or provoking an action’, such as *collapsy* and *sharey*, which may discourage Creativity with similar suffixes in that group such as *-ent*[1] (*absorbent*, *persistent*), *-ive*[2] (*deceptive*, *responsive*) and *-ory*[1] (*contradictory*, *regulatory*).

However, there are a handful of exceptions to this rule; the most notable of these is Group A5, in which half of its six members are categorized as highly-creative. This group covers the meanings of ‘similar to’ or ‘resembling’ the base, and its most creative members are *-esque* (*Jeremy-Kyle-esque*), *-ish*[1] (*grannyish*) and *-like* (*ranch-like*), with *-ly* (*saccharinely*) also somewhat creative. Both the members of Group A7 are also highly-creative, and this may be linked to the point above in that its meaning of ‘somewhat’ or ‘to a lesser degree’ is in many ways close to that of Group A5; indeed, one of its members, *-ish*[3], is phonetically and graphemically identical to *-ish*[1] in Group A5. This suggests that one of the primary purposes of creating new words, at least disposable words, is to label concepts as analogous to others, either as a means of developing the understanding of existing concepts, or, increasingly likely as changes occur in society, understanding new concepts by reference to old.

Other more minor exceptions also prove to be of interest. Group N3, the largest at 21 members, also contains more than one suffix that could be considered highly-creative – *-ness* and *-age*[2] – as well as several that are less creative. The reason for the dominance of both suffixes could be that members of this group tend to form words from either adjectives or nouns (or both); since *-ness* tends towards the former and *-age*[2] the latter, it is likely that they are preferred separately for each suffixation process. This is reflected in the fact that the types of neologisms they create seem to attend to slightly different meanings, although each is still covered under the heading of ‘condition/rank/state of’. While *-ness*, conventionally, is used to refer to qualities of adjectives and phrasal adjectives (*flirtiness*, *cash-in-handness*), *-age*[2] neologisms more often describe degrees of the base, such as *fattage*, (from *fat*) referring to the percentage of body fat, and *tannage*, describing the amount or darkness of an artificial tan. This difference is highlighted where *-ness* is used unconventionally with noun bases to produce words referring to degrees similar to typical *-age*[2] forms: *Liverpoolness* (from *Liverpool*) refers to the extent that one embodies stereotypes of Liverpudlian culture, while *kilogramness* generally means the same as ‘weight’, with a focus on metric measurement. However, a third meaning is discernible and is used by both of these suffixes: *beddage* (from *bed*), *mouthness* (from *mouth*) and *Navyness* (from *Navy*) each refer to objects connected with or areas and details surrounding the base word:

S0041: Yeah (.) snuggle (.) snuggle on down in **bedage**

S0041: all the mouth (.) all the **mouthness**

S0041: and like the when we're going away like **Navyness** and whatever I kinda think like he doesn't care that he's not going to see me

The emergence of this meaning across more than one suffix may indicate the lack of an existing suffix that is deemed suitable for the task; while some other suffixes, such as *-ery*[1], may produce words with meanings that are close to this definition (such as *gadgetry*), they do not appear to explicitly capture the inclusiveness of the *-age*[2] and *-ness* neologisms listed above as they refer more to objects that are hyponyms of the base rather than things that are related to it in a more general sense. Although suffixes such as *-ery*[1] may get closer to the required meaning, it is otherwise an uncreative suffix, and perhaps the overwhelming tendency to use *-age*[2] and *-ness* for the purposes of Group N3 neologism creation leads these to instead take on the mantle of the newly-required meaning.

Group N1 also shows evidence of changes in meaning to one or more of its members. The majority of the creative load in this group is carried by *-er*[2], forming animate non-agentive nouns such as *foreigner* and *Londoner* as well as neologisms in *randomer* and *Teessider*, under the umbrella of 'entities related to, concerning or coming from' the base. However, there also appear to be a surprisingly high number of *-ie*[1] neologisms, in particular relating to entities that are in vague or varying ways 'related to' their base word; examples include *flattie* (from *flat*, meaning 'a flat-soled shoe'), *sparkie* (from *spark*, meaning 'an electrician'), and the doubly-suffixed *beardy-strokey* (from *beard* and *stroke*) used as a noun to mean 'something that makes one think [i.e. stroke one's beard in thought]'. While this meaning of *-ie*[1] is already established by compilers of affix dictionaries such as Stein (2007) and in existing words such as *groupie* and *lefty*, the OED tends to consider such forms as having diminutive force. The above examples, both new and existing, do not seem to reflect this and instead bear resemblance to the usage of *-er*[2]; as such, it may be that the Group N1 meaning of *-ie*[1] has hitherto been a more minor variant, whereas now it is gaining momentum. This could be due to certain very popular recent creations, in particular *selfie* and *onesie*, the former of which is apparently unique in that the meaning of *-ie*[1] here is 'a photograph of', which may give rise to a changing understanding of the meaning of *-ie*[1] as a suffix that can be used with vague reference to entities that are related to the base. However, as mentioned in §2.3.4, that in August 2017 the phone company Nokia announced the capacity of its phones

to take photographs using both the front- and rear-facing cameras simultaneously, in a new type of image dubbed the *bothie* (Gibbs 2017); the "unique" status of the meaning of the suffix found in *selfie* may therefore be in question, and studies that concern *-ie*[1] in years to come may yet have more to say on its changing semantics.

A final point of note concerning the grouping of the suffixes in EAS14 is that only one group, N9, produced no neologisms for any of its members; this group concerns feminine forms of base words, with the three members *-ess* (*stewardess*), *-ette*[1] (*suffragette*), and *-trix* (*dominatrix*). Although this group contains relatively few members, it has been seen earlier in this discussion through groups such as A7 and N10 that this is not necessarily a determining factor in a lack of Creativity. Instead, it is possible that the need for new feminine forms is being reduced due to increasing awareness of gender stereotyping issues and gender fluidity, which in turn lead to the neutralization of language to remove all unnecessary reference to gender. For example, the term *actor* is becoming increasingly popular as a gender-neutral term to cover the traditional meaning of *actress*, although the issue is hotly contested and a range of articles can be found in which differing opinions are presented on this usage. It is even the case that some consider there to be a greater difference between the terms *actor* and *actress* than the gender of the reference: in one online article (Shenton 2017), the stage and screen veteran Whoopi Goldberg claims, 'An actress can only play a woman. I'm an actor – I can play anything', while Denise Gough calls for women to reclaim the term, disagreeing with the notion that *-ess* suggests weakness, as she 'would be no less afraid of a lioness than a lion'. With such strong and varied opinions on feminine forms that already exist, it is perhaps unsurprising that the creation of new forms that employ *-ess*, *-ette*[1] and *-trix* is effectively suspended – perhaps indefinitely – until there is greater consensus regarding the social acceptability of their use.

5.1.3 Animacy

There is a clear discrepancy between animate and inanimate forms of the six *-er* suffixes in the EAS14 neologism data. Suffixes *-er*[1] and *-er*[2], which both describe animate entities but respectively address agentive and non-agentive forms, are both highly-creative members of their respective groups, N2 and N1; agentive neologisms include *critiquer* and *piggybacker*, while non-agentive *-er*[2] includes examples such as *blinger* ('one who wears gold jewellery') and *randomer* ('a stranger'). Contrastingly, their inanimate counterparts *-er*[3] and *-er*[4] are notably less creative, forming only one neologism each: *air-flosser* ('an electronic device that

flosses using puffs of air') and *one-to-one<u>r</u>* ('a meeting with only two participants') respectively. Initially this implies a strong preference for animacy in the creation of new forms, which, given the similarity in meaning and form with inanimate counterparts, is necessarily in response to those terms that are required in conversation rather than the underlying suffixation processes. This supposition is supported by the fact that the remaining two *-er* suffixes are also both animate and produce a larger number of neologisms than *-er*[3] and *-er*[4]; *-er*[5] represents occupations and includes the neologism *Youtube<u>r</u>* (meaning 'one whose profession is to produce videos on YouTube'), and the highly-creative *-er*[6] creates derogatory terms such as *knobbe<u>r</u>* that are used non-literally and non-agentively.

However, other similar suffixes within these groups bring further observations to light. In the same way as the *-er*[1] and *-er*[2] suffixes above, the suffixes *-or*[1] and *-or*[2] produce animate and inanimate agentive forms respectively. In this case, the EAS14 contains examples of inanimate *-or*[2] neologisms (such as *dehydrato<u>r</u>*), while there are none for animate *-or*[1]. Since the data in this corpus come from speech that has been transcribed for the purposes of analysis, and the fact that both sets of suffixes are realized with the identical pronunciation /ə/, it can be assumed that this distinction between *-er* for animate neologisms and *-or* for inanimate is due more to the transcription process than the conscious choice of the speakers. However, the transcribers in this case are entirely legitimate English listeners, and the fact that each form is preferred in a different situation nevertheless speaks to differences about the way in which their usage is perceived. This therefore suggests a link between the spoken pronunciation of a suffix and its written form, since the latter is influenced even though it is not distinguished in the former. It is unclear, however, from this evidence alone whether or not speakers themselves are aware of and consider the graphemic difference when using the suffix creatively, or whether the phonemic form /ə/ is selected for both animate and inanimate uses with the graphemic decision-making left to the listener. In the latter case, this further raises the question of whether the listener considers the graphemic form merely upon hearing the neologism, or if it is only considered when the speech is to be transformed into writing.

5.2 Adherence to Factor Effects

Having considered some of the prevailing characteristics of the neologisms themselves, it is also prudent to consider more generally how this relates to the conclusions of the analysis of

factors in Chapter 4. As before, the Derivative Factors of the resultant complex words are considered first and relate to the behaviour of the suffix overall in terms of its Prevalence (P), Opacity (O), Regularity (R), Convertibility (C) and Distinguishability (D); the Base Factors are then considered, relating to the processes that the base words undergo as the complex word is formed, specifically in terms of Stress Transfer (ST), Sound Change (SC), Truncation (TC), Semantic Shift (SS), Atypical PoS (AP), Complexity (CX) and Allomorphic Variants (AV).

5.2.1 Derivative Factors in Neologisms

Clearly the most major of these factors in the analysis in Chapter 4 was the Prevalence of the suffix overall as a mean average of the words produced in EAS14. Looking specifically at the most creative suffixes, there is a clear association between these and the least prevalent suffixes, with *-er*[6] (P = 2.250), *-ish*[3] (P = 2.947) and *-ie*[1] (P = 3.156) being the least prevalent creative suffixes. Note however that this does not mean that all non-prevalent suffixes below a certain threshold are necessarily creative, since a number produced no neologisms in the database for a variety of potential reasons: *-o* (P = 3.000) and *-ock* (P = 3.500), for example, are both blocked on the grounds discussed in §5.1.2, in that they are part of Groups N1 and N6 respectively and are therefore submissive to the suffixes *-er*[2]/*-ie*[1] and *-ie*[2], while *-ette*[1] (P = 3.333) is part of the non-creative Group N9 forming feminine nouns, which are likely to be on the decrease as discussed. Yet for the most creative suffixes found in the EAS14 data, there is a clear link to low Prevalence, as predicted by the findings of the previous chapter.

While the factor analysis showed a general link between increased Creativity and decreased Distinguishability, this is not entirely reflected in analysis of neologisms here. Instead, the most creative suffixes in EAS14 seem to be spread evenly across the spectrum of Distinguishability, with creative suffixes with forms such as *-y*, *-ie* and *-er* highly non-distinguishable, and those such as *-esque*, *-ness* and *-like* much more highly distinguishable; others, such as *-ism*[3] and *-ist*[4], tend more towards a median level of Distinguishability among the 145 suffixes. Where the association between Prevalence and Creativity is observable from the neologism data, this is not the case for Distinguishability, where the set of creative and highly-creative suffixes cover a wide range of scores.

In the EAS14 analysis, Opacity was of particular interest as a factor that seemed to increase the likelihood of neologisms, albeit chiefly in tandem with low Prevalence. Accordingly,

when Opacity is examined in its raw form, the spread of creative suffixes (that do not have an overall score of 0 for Opacity) tends towards those with a lower score rather than higher; however, when examined as a factor of Prevalence, obtained by multiplying it by an inverse Opacity score, the creative suffixes more clearly tend towards the lower scores – i.e., those that symbolize a low Prevalence and a high Opacity, such as *-arium* (2.250), *-y*[3] (2.368) and *-esque* (2.375).

Unexpectedly, there were a few opaque neologisms in the EAS14 list; at first glance, this would seem highly unusual, since speakers are unlikely to create words that do not attach to clear and transparent bases. However, some argument could be made as to whether or not these words represent 'true' opaque forms. Two such neologisms are *inoculize* and *Nordish*, which are each defined in the same way as an existing word with an alternative suffix – *inoculate* and *Nordic* respectively – implying that the speaker has experienced a lapse in memory that has enabled them to retrieve the correct base, but not the suffix to which it attaches. Since these bases are themselves opaque in the existing words, they could be considered likewise in the neologisms; on the other hand, it could be argued that the neologistic bases are truncated forms of the existing complex word that was the original target, and that the truncation has occurred of *-ate*[3] and *-ic* in favour of their fellow group members *-ize* and *-ish*[4]. In either case, it is clear that speakers demonstrate an ability to identify the boundary between an opaque base and a suffix, since the latter has been successfully replaced despite the lapse in memory of the correct realization.

Another opaque neologism, *dobber* (from derogatory *-er*[6]), is labelled as such due to the non-existence of *dob* in the OED in any form that is explicable given the context of the word:

> 0043: Cheeky you had to put your weight down as well don't want some big **dobber** in the back do you

Although the OED lists two entries for *dobber*, neither appears to fit the context used in the EAS corpus, as they do not refer to a derogatory term. However, examination of a number of online or open-source references (Wiktionary, Urban Dictionary, Cambridge Dictionary) show a range of entries pertaining to Scottish, Irish or Australian English, defining *dobber* as either an uneducated working-class person (similar to *chav*), a term for the male genitalia, or a person who informs on another's wrongdoings. Given the context of the word in the EAS

corpus, coupled with the fact that Speaker 0043 above is listed as coming from Yorkshire, it seems likely that the first of these definitions from Scottish slang is the target in this case. Although this means that its usage is not strictly neologistic in the sense that it is dialectal and may have been heard previously by Speaker 0043, it comes under the definition of a new word in this project since it is not common enough to have gained an entry in the OED and is likely therefore to still be formed and interpreted in the same way as a disposable word, as argued in §2.3. In either case, the presumed base (*dob*) of this word cannot be found in any of the sources in a way that conforms to the meaning of the complex word *dobber*. This implies that the word is indeed opaque, and speaks to the strength of the semantics of *-er*[6], in that a neologism formed using this suffix does not require a clear base element to be understood as a derogatory and insulting term. In this sense it could be considered less like a typical suffix and more like a combining form or, perhaps more appropriately, a splinter of the kind discussed by Lehrer (1998); however, it is not clear in this case which existing term forms the basis of *-er*[6] as it is in other splinters such as *-thon* and *-holic* from *marathon* and *alcoholic*. In any case, again, the majority of the meaning of the complex word *dobber* and others like it must be carried by the suffix; evidence was not found for this behaviour in any of the other suffixes observed in this study, making this an interesting unique characteristic of *-er*[6].

The other Derivative Factors of Regularity and Convertibility prove of little influence, providing further support to the findings of Chapter 4 in which they had little bearing in the regression analyses or PCAs. One interesting feature relating to Convertibility is in the suffix *-ist*[4] (*ageist*, *racist*), which was excluded from the statistical analyses due to being an outlier in which its converted plemmas outnumbered non-converted forms 2:1. This suffix and that of *-ism*[3] (*racism*, *sexism*) with which it broadly corresponds create a high number of neologisms (*gayist*, *gingerist*, *postcodeism*) given their relatively few non-converted plemmas, as well as some neologisms that enter directly as forms converted to adjectives (*reddist*, *voiceist*). It is likely that this anomaly reflects the changing of attitudes similar to the reasons behind the lack of Creativity in Group N9 nouns: in modern times, awareness of prejudice against particular groups is ever-increasing, and as such new terms are likely to be needed to account for differing types of prejudice, as well as requiring the versatility to be used as both nouns and adjectives in equal measure. Although, in the case of Group N9, shifting attitudes towards equality result in a reduction of new forms, for *-ist*[4] and *-ism*[3] there is instead an increase as the very concepts of prejudice against various groups have come about in only recent years and therefore have not had suitable labels to identify them.

Original terms in *-ess*, *-ette*[1] and *-trix*, therefore, are no longer required as gender-neutral terms are coming to replace them, whereas the new concept of 'someone prejudiced against those with ginger hair' requires a suitable label *gingerist* that mimics existing forms in *-ist*[4]. Although it is not clear from the transcription of the context, it is of course possible or even likely that this term is coined in jest, since being against those with ginger hair is rarely a sincere form of prejudice; however, this too nevertheless reflects the changing discourse surrounding such terms, and in turn the changing preference in society towards equality that are discussed above.

5.2.2 Base Factors in Neologisms

Factors of the base are especially relevant when examining the neologisms as each can be examined in terms of the individual words and the bases from which they have been constructed as well as of the tendencies of the suffix as a whole to have marked or unmarked variants.

For example, marked Sound Change (e.g. *north* → *northern*) was found in Chapter 4 to carry strong influence in reducing the Creativity of a suffix, and as such it may be expected that neologism-forming suffixes are those that tend towards unmarked Sounds Change (e.g. *east* → *eastern*), as well as that the neologisms themselves do not exhibit marked versions of their base words. Indeed, examination reveals that the most creative suffixes in EAS14 have very low Sound Change scores: *-esque* (SC = 0.000), *-er*[1] (SC = 0.003), *-ness* (SC = 0.007). Looking at the individual neologisms, 10 (roughly 3%) contain some kind of sound change to the base, and even this is perhaps slightly higher than might have been expected. However, upon closer inspection, it is clear that these follow established patterns of sound changes that occur within existing words for the suffix in question. For example, the neologism *influention*, from *influence* + *-ion* (SC = 0.994), mimics similar-sounding *-ion* words such as *attention* and *pretention*, even though these are from bases with different-sounding endings to *influence*; similarly, *decomposure*, from *decompose* + *-ure*[1] (SC = 0.471) and *torrentious*, from *torrent* + *-ous* (SC = 0.277), mimic similar-sounding existing words (*exposure*, *pretentious*) from their respective suffix categories. This suggests that, although changes in the sound of the base are not favoured in the formation of neologisms, they are not entirely avoided if they follow patterns that are established by the inventory of existing words within a suffix category; rather, it is unique or innovative sound changes that do not occur in such cases.

The use of allomorphic variants was also found to reduce the potential for Creativity in suffixes under some circumstances. Again, as a whole the suffix scores for Allomorph reflect this, since almost all creative suffixes have a score of 0; however, a total of 18 neologisms (5.3%) employ some form of variant to their root suffixes. A number of these are of the format that appear to be taken from other members of the suffix's inventory; examples include *cheesarific* (*cheese* + allomorph of *-fic* from *terrific*), *chavtastic* (*chav* + allomorph of *-ic* from *fantastic*), and *Easterlicious* (*Easter* + allomorph of *-ous* from *delicious*). The variants *-arific* and *-tastic* are listed in the OED as combining forms, yet they conform quite highly to the characteristics of other splinter forms, such as *-holic* (from *alcoholic*) and *-thon* (from *marathon*), described by Lehrer (1998). The variant *-licious* follows the same pattern, and as such the example of *Easterlicious* – along with its co-neologisms *boobilicious* and *carbolicious* – could be seen as the "birth" of a new splinter form. Another common allomorphic variant occurs exclusively with the suffix *-y*[1] – although it has the potential to occur in other cases – and involves only a change in sound in the form of an intrusive /r/ where the base word ends in a schwa: *pizza-y* /piːtsəri/, *salsa-y* /sælsəri/, *vodka-y* /vɒdkəri/. This is perhaps a testament to the extremely high Creativity of *-y*[1] that typical phonological restrictions are ignored in favour of the creation of neologisms using this suffix. Finally, a number of more standard allomorphs are present in the EAS14 data that follow variants in the body of existing suffixed words, with such coinages as *homonymical* (from *homonym* + *-ical* allomorph of *-al*[2]), *insufferability* (from *insufferable* + *-ability* allomorph of *-ity*), and *habituous* (from *habit* + *-uous* allomorph of *-ous*). As with changes to the base's sound, although allomorphic variants may discourage Creativity at the suffix level, individual words may still be coined if they adhere to the conventional patterns of existing variants, with the notable exception of forms such as *-licious* that are modelled on other established splinter forms.

The factor of Atypical PoS, where the PoS of the base does not match that to which the suffix typically attaches, was found to have had detrimental effect on the Creativity of a suffix, although the change in adjusted R^2 for regression analyses involving this factors was not statistically significant. From examining the individual AP scores of suffixes in relation to their Creativity, it is clear that it is a rare phenomenon, since most suffixes have no marked examples; where there is a positive score for these factors, the more creative suffixes tend towards the lower end. This is consistent with the findings in Chapter 4, that attachments of a

suffix to atypical PoSs results in reduced Creativity, likely to be in part due to the same effect seen for Sound Change, where there is a violation of the expected outcomes of parsing the complex word. For examples from the database of neologisms whose base PoS is atypical, a number of imaginative forms can be found, such as *bindary* (from *bind* (v) + *-ary*[1], meaning 'given to binding'), and *musication* (from *music* (n) + *-ation*, meaning simply 'music'). It is interesting that such examples should be permitted, since their creation arguably requires an initial process in which the base word changes its PoS before the suffix is attached; for example, *bind* must first become a noun that presumably has a meaning similar to 'an instance of binding' before it can be acceptably attached to denominal *-ary*[1]. This is similar to the process that occurs with many prefixes as discussed in §2.2.1 and is distinct from a single change in PoS that occurs as part of the suffixation process.

It was suggested in §4.2.2 that truncating the base during suffixation has some correlation with increased Creativity in DS94 as it mirrors a tendency to coin words by blending, although this was not found to be the case in the modern data. Observation shows that indeed the majority of the most creative suffixes in EAS14 had very low scores for Truncation, such as *-y*[1] (TC = 0.007), *-ness* (TC = 0.007) and *-ie*[1] (TC = 0.045). A handful of exceptions to this tendency were the highly-creative suffix *-y*[3] (TC = 0.250), as well as *-ous* (TC = 0.255) and *-ie*[2] (TC = 0.667), each of which also has a high number of neologisms in the data. These latter examples show that Truncation is not necessarily an obstacle to Creativity and may even be a standard part of the suffixation process in some cases, since two-thirds of the *-ie*[2] entries are marked. Examples of neologisms that are produced with this feature in the data are *daffie* (from *daffodil* + *-ie*[2], with diminutive meaning), *douchey* (from *douche* + *-y*[1], meaning 'foolish'), and *zombling* (from *zombie* + *-ling*, meaning 'a baby zombie').

The remaining Base Factors, Stress Transfer, Complexity and Semantic Shift, were fairly unremarkable in the factor analysis, and the analysis of neologisms reflects this. Although there are generally lower Stress Transfer scores for creative suffixes, these are far less striking than in other factors and show that in general this factor neither increases nor decreases a suffix's capacity to be creative. Roughly 5% of neologisms exhibited a change in the stress pattern of the base; examples include *Afghanistáni* (from *Afghánistan* + *-i*[1]), *exotícity* (from *exótic* + *-ity*), and *Swindónian* (from *Swíndon* + *-ian*[1]). Similarly, the set of creative suffixes in EAS14 were spread evenly throughout the array of scores for Complexity of base words, and a total of 48 (roughly 14%) of neologisms in the data were from bases that

were already suffixed. This indicates that Complexity of all the factors is the least influential when it comes to Creativity, since speakers do not appear to have any difficulty in coining forms such as *babyfication* (from [*baby* + *-ify*] + *-ation*), *designery* (from [*design* + *-er*[1]] + *-y*[1]), and *Chinese-like* (from [*China* + *-ese*[2]] + *-like*). Examples of Semantic Shift in the neologisms were also very rare, limited to examples such as those already discussed in *-er*[6], as well as a handful in derivational *-ed*, all of which have the meaning of 'drunk' or 'ruined' in some way: *fuckered, Proseccoed* and *wankered*). The comedian Michael McIntyre once observed, 'You can actually use any word in the English language and substitute to mean drunk as a posh person' (McIntyre 2008), coining his own examples of *gazeboed* and *car-parked*; given the often accuracy of this observation when compared to the real examples from the EAS14 data, it would perhaps be worthy of further research to examine the truth of this statement in relation to the class of the speaker.

5.3 Diachronic and Register Comparisons

5.3.1 General Observations in DS94

One of the most noticeable differences between the EAS14 and DS94 datasets is in the raw number of neologisms and the relation of this to their size: EAS14 contains 344 neologisms (accounting for 5.09% of the complex word plemmas), while DS94 contains only 149 (2.91% of complex word plemmas); to view it another way, a division of the total plemmas by neologistic plemmas in EAS14 gives a figure of 18.66 – i.e. there is a neologism for every 18.66 real words – whereas for DS94 this figure is almost doubled to 33.35. These normalized values show that, while there is a clear size difference between the two source corpora, and hence the databases as whole, this is not great enough to account for the discrepancy in the neologistic data; the number of plemmas in the EAS corpus is roughly 1.1 times that of DS, while the neologisms in EAS14 outnumber those in DS94 by a factor of 2.3. This suggests that, for similar registers, speakers are much more creative today than they were twenty years ago, in terms of their use of derivational morphology for the purpose. Table 5.1 at the beginning of this chapter shows that there were also only 32 creative suffixes in the DS94 database, half those in EAS14 and accounting for only 22% of the total. These were split between 13 suffixes that form adjectives, 18 nouns and 1 verb, and had a token count of 249 giving a TPR of 1.67, suggesting that each DS94 neologism is used on average slightly more often than those in EAS14.

As before, there are a number of highly-creative suffixes that stand out as having created a noticeably large set of neologisms in the DS94 data: *-y*[1] (37), *-ie*[2] (25), *-y*[3] (13) and *-ish*[1] (11); similarly, those that have an especially high neologism count for their total plemmas are *-itis* (0.300) and *-ian*[1] (2.86), for a total of 6 highly-creative suffixes.

Table 5.4 shows the distribution of the neologisms across adjectives and nouns, along with the data from Table 5.2 reproduced here for clarity in drawing comparisons. There is again a disparity between the ratio of adjective to noun neologisms on the one hand against the typical ratio within the whole of the DS94 database or DS corpus. However, the degree of this ratio (1.45), is clearly less extreme than that of EAS14 (1.97), suggesting that the tendency to favour adjective-forming suffixes over noun-forming ones in neologism creation is itself increasing. This increase in the proportion of adjectives can still be seen when looking at the entire database, in which the EAS14 figure (0.77) is still somewhat higher than that of DS94 (0.69); the difference is less pronounced again when considering the entire corpus (0.40 versus 0.30). This implies that, while adjective use may be generally on the increase, this is more pronounced in derivationally suffixed words, and more pronounced still in the neologisms that people create. However, it should be remembered that there is a discrepancy in the social grade distribution of speakers in EAS when compared to DS (Table 3.2, §3.2.1). It has been shown in studies such as those of Macaulay (2002, 1995) that middle-class speakers use more adjectives than working-class speakers, and in the EAS data the top two social grades (A and B) comprise over half of all utterances; it may be, therefore, that the presence of a greater number of adjective neologisms in the more recent data could be influenced by this discrepancy.

Table 5.4: *Distribution of adjectives and nouns in DS and EAS datasets*.

Source	Adjectives*	Nouns*	Adjs/Ns	Total*
DS94 (Neologisms)	87	60	1.45	**149**
DS94 (All Derivatives)	1,991	2,889	0.69	**5,036**
DS**	5,481	18,127	0.30	**31,901**
EAS14 (Neologisms)	226	115	1.97	**344**
EAS14 (All Derivatives)	2,695	3,500	0.77	**6,420**
EAS**	9,401	23,300	0.40	**34,482**

* NB: Each figure is included in the total of successive figures below it in each column for each corpus.
** Figures taken for lemmas due to the unavailability of plemma information.

Since the suffixes and groups remain the same between corpora and databases, there are again only four verb-forming suffixes that lie within the same semantic group for the purposes of this investigation. Interestingly, however, while there are two verb neologisms in DS94, both make use of *-en*[1] rather than the more versatile and productive *-ize* and *-ify*: *hotten* (from *hot*, meaning 'to become hotter') and *loaden* (with the same meaning as *load*). It may be that the size of the database is too small to gather reliable data on verb neologisms, and studies that have begun since the release of the full Spoken BNC2014, such as Laws & Ryder (2018), have been able to utilize a larger corpus for this purpose; however, it is also a potential sign of register changes in modern everyday speech, since it is known that the remaining three verb-forming suffixes, from classical origins, are more likely to occur in formal contexts over informal ones (Laws & Ryder 2018).

Table 5.5: *Summary of creative and highly-creative suffixes by group in DS94*.

Group	**Meaning(s)**	**Size**	**Creative / Highly-Creative Suffixes**	**Total**
A1	relating to / concerning / from	13	2/1	3
A2	performing or provoking an action	8	1/-	1
A3	causing / showing / full of	11	3/1	4
A4	adhering to / believing in	4	-/-	0
A5	similar to / resembling	6	1/1	2
A6	can perform / must be subjected to	3	1/-	1
A7	somewhat / to a lesser degree	2	1/1	2
N1	entity related to / concerning / from	13	6/-	6
N2	entity performing/provoking the action	8	2/-	2
N3	condition / state of / rank of	21	4/-	4
N4	adherent of / believer in	5	-/-	0
N5	instance of / group that performs action	14	-/-	0
N6	[diminutives]	10	-/1	1
N7	place for the entity/action	5	1/-	1
N8	[occupations]	4	1/-	1
N9	[feminine forms]	3	-/-	0
N10	[medical terms]	3	-/1	1
N11	[miscellaneous]	8	2/-	2
V1	(cause to) become / be affected by	4	1/-	1
	Totals	**145**	**26/6**	**32**

In terms of group differences, the DS94 suffixes broadly follow the pattern of EAS14 in that, while there may be several creative suffixes to any particular group, there is only ever one dominant highly-creative suffix if any (Table 5.5). Yet certain differences can be observed in the spread of the suffixes in more specific terms, such as the fact that Group N3 no longer exhibits any highly-creative suffixes, with no sharing of neologisms between *-ness* and *-age*[2] for different meanings that are not captured by other existing suffixes. Indeed, *-ness* is now responsible for only four neologisms – *blasé<u>ness</u>*, *fizzi<u>ness</u>*, *scratchi<u>ness</u>* and *zombie<u>ness</u>* – with none found for *-age*[2]. Similarly, the majority of neologisms for Group N1 employ *-er*[2] (e.g. *Italian<u>er</u>*, meaning 'one who is learning to speak Italian'), and there is no evidence of the increasing use of *-ie*[1], although a small number of new terms exist in the data (e.g. *green<u>ie</u>*, meaning 'something that is green').

Other groups reflect the diachronic changes already observed. A greater number of groups, for example, contain neither creative nor highly-creative suffixes in DS94 when compared to EAS14; in particular, Group N5 seems currently to be an especially creative group (Table 5.2), whereas no neologisms can be found for its members in DS94. As this group forms nouns from verbs, this may be further evidence of changing register, since deverbal nominalization is a common feature of more formal registers (Cowie 1999) and is more prevalent in the newer data. Group N6 also supports the earlier findings in that only one diminutive suffix is creative in DS94, showing that the spread of creative suffixes is much smaller and that the neologisms are concentrated into fewer suffixes in general. Likewise, Group A5 in the EAS14 data showed an unusually large set of highly-creative suffixes, in that three of its six members produced several new words each. In the case of DS94, this group is now dominated by the single suffix *-ish*[1] forming neologisms such as *headache-<u>ish</u>*, *octopus<u>ish</u>* and *Paul-McCartney<u>ish</u>*; again, Creativity here is spread less widely between suffixes, but there is also a change in focus from the classical *-esque* (from Latin *-iscus*) in EAS14 to a suffix that derives instead from Old English *-isc*.

There is also a notable change in the findings regarding animacy. In the EAS14 data, it appeared that *-er* suffixes were most often being used for animate forms, while *-or* was reserved for inanimate forms – albeit with the caveat that, in the case of speech, this is the responsibility of the listener or transcriber since the two suffix forms are phonologically identical. In the older data, there are no neologisms using *-or* forms, while there is also a much more even spread between both animate and inanimate *-er* suffixes, with *-er*[3] and *-er*[4]

producing neologisms such as *crunch-you-upper* (meaning 'a thing that crunches you up') and *grubber* (meaning 'a restaurant') respectively. It is possible, therefore, that the effect seen in EAS14 could be a result of an event or technological innovation that has occurred between the two time periods, leading to the preference of *-or* for inanimate coinages and *-er* for those that are animate; further study into this phenomenon could provide more information on this subject than is available in this thesis.

5.3.2 General Observations in CG94

The more formal older data is similar to that of DS94 in that the number of neologisms appears to be dramatically lower than in EAS14, especially when the difference in corpus size is accounted for. Table 5.1 at the beginning of the chapter shows that 169 neologisms were found in CG94 totalling 238 tokens, giving a TPR of 1.41; therefore, while plemmas in CG94 outnumber those in EAS14 by a factor of 1.34, there are less than half as many neologisms in the older data to each one in the newer. Interestingly, CG94 shares this difference with DS94 in that both demonstrate a much lower number of neologisms than might be expected from looking at EAS14 alone, but it also shares with EAS14 the degree of spread of creative suffixes, since 60 (41%) of the total 145 produced at least one new word, split in this case between 23 adjective-, 35 noun- and 2 verb-forming suffixes. Figure 5.1 below shows each database in terms of the percentage of the 145 suffixes that were creative,

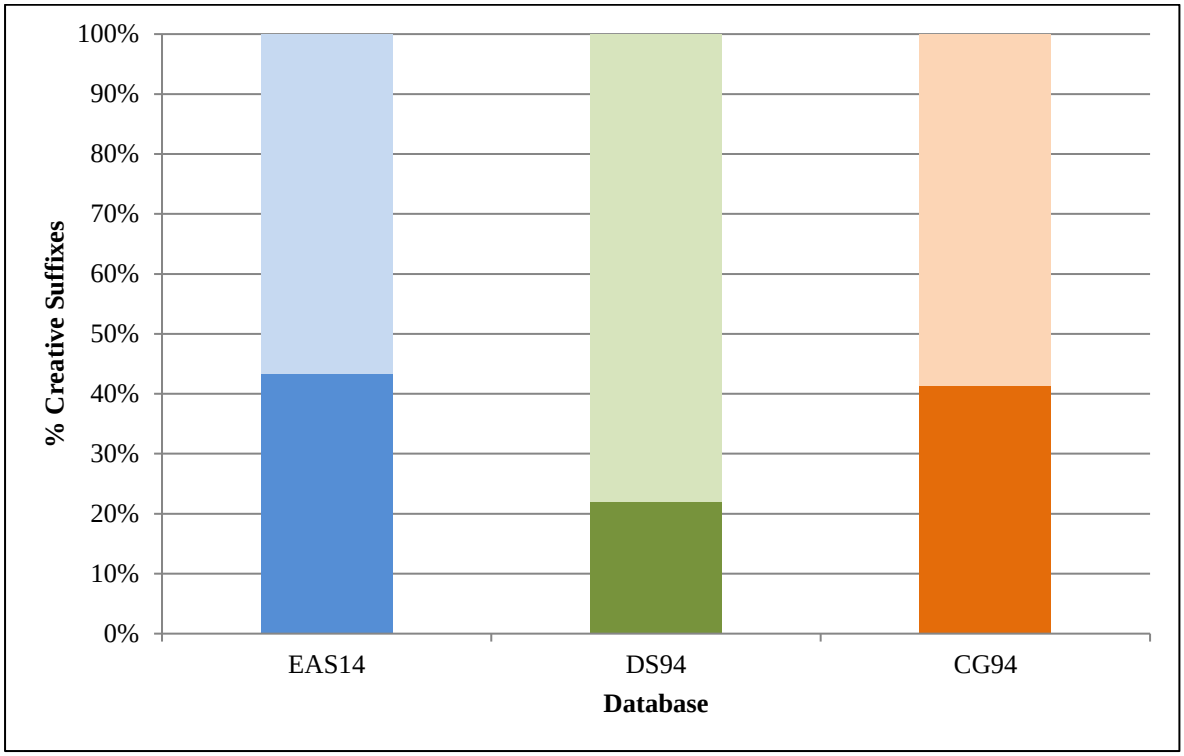

Figure 5.1: *Diversity of creative suffixes in each of the three databases*.

where the lighter shading represents non-creative suffixes and the darker shading represents those that produced at least one neologism; this shows visually how the EAS14 and CG94 databases are more closely related to each other than DS94 in terms of the diversity of creative suffixes.

The conclusion to draw from examining all three sets in this way is therefore that modern-day conversational speech resembles more formal speech in the sense that derivational neologisms cover a much wider range of suffixes than conversational speech of twenty years ago, but that its Creativity in terms of the sheer number of new words that occur is a new phenomenon that is reflected in neither register of older speech data.

Examining the data in terms of the part of speech provides further revelations. Table 5.6 shows the same part-of-speech data for adjectives and nouns as before, with the data from DS94 and EAS14 (Table 5.4) repeated for comparisons. In terms of the whole corpora, there is clearly more of a relationship between CG and EAS than either of those with DS; when the complex word databases are considered, the implication is instead that CG94 and DS94 have more in common with each other, while the newer set demonstrates a higher number of adjectives. Taken together, these facts suggest that there is indeed a trend by which modern conversational speech is coming to resemble more formal contexts in its distribution of adjectives and nouns, and this could be largely due to changes in complex word behaviour since the ratio of adjectives to nouns has increased when looking at the whole database.

Table 5.6: *Distribution of adjectives and nouns in CG, DS and EAS datasets.*

Source	Adjectives*	Nouns*	Adjs/Ns	Total*
CG94 (Neologisms)	83	81	1.02	**169**
CG94 (All Derivatives)	3,107	4,676	0.66	**8,068**
CG**	9,774	25,087	0.39	**46,287**
DS94 (Neologisms)	87	60	1.45	**149**
DS94 (All Derivatives)	1,991	2,889	0.69	**5,036**
DS**	5,481	18,127	0.30	**31,901**
EAS14 (Neologisms)	226	115	1.97	**344**
EAS14 (All Derivatives)	2,695	3,500	0.77	**6,420**
EAS**	9,401	23,300	0.40	**34,482**

* NB: Each figure is included in the total of successive figures below it in each column for each corpus.
** Figures taken for lemmas due to the unavailability of plemma information.

Taking the neologistic data alone confirms this notion, since the representation of each part of speech is virtually equal in CG94 – as may be expected given the tendency towards nominalization in more formal registers (Biber 1988; Biber et al. 1999) – but there are almost twice as many new adjectives as new nouns in EAS14. This information is represented more clearly in Figure 5.2, which shows how the data converge as the databases are expanded to include more of the data from the whole corpora. It seems then that, although it is possible that there is some influence from the discrepancies in social grade representation in EAS and DS, there is nevertheless a greater use of adjectival neologisms in the more formal than in the less formal register; in this case, the difference in use between EAS14 and DS94 cannot be completely attributed to this sampling discrepancy. Clearly there is some effect whereby adjectival Creativity is increasing in everyday speech and, while this is dissimilar to CG94 in that this older database prefers nominalization in complex word creation, the effect in speech overall, represented by the three parent corpora, is that the ratio of adjectives to nouns comes to resemble the CG corpus data more closely.

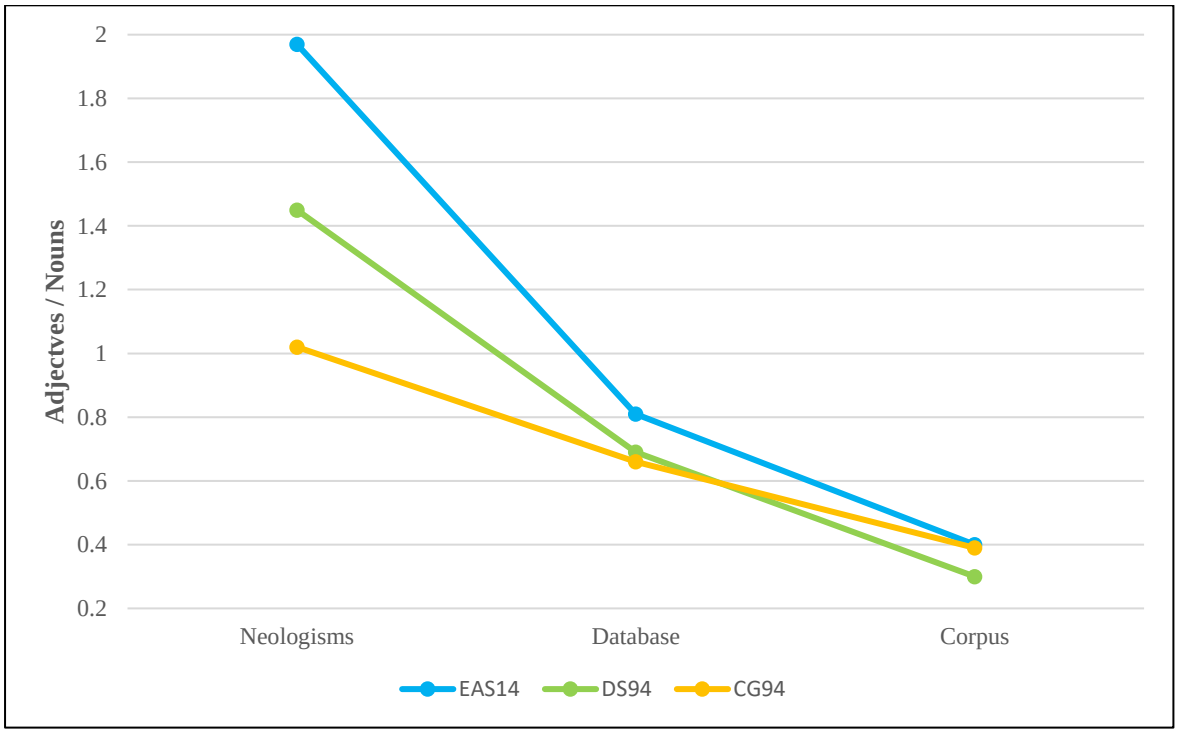

Figure 5.2: *Adjective/noun ratios at differing levels across all three databases and corpora*.

While verb-forming suffixes in CG94 follow the expected pattern in that the only two creative examples are classical in origin, it is interesting that one of these is *-ate*[3], which is

generally quite restricted in its polysemy (Plag 1999, 2004; Laws & Ryder 2018; Laws & Ryder in preparation); in this case, the term created is *qualitate* (from *quality*), modelled on the existing form *quantitate* (from *quantity*). The remaining four verb neologisms are all *-ize* words: *corpusize* (meaning 'to be preserved in a corpus'), *germanicize* (meaning 'to give [a language] more Germanic features'), *sanctionalize* (meaning 'to permit') and *assassinize*. This last example is especially interesting as, although it has the same meaning as *assassinate* and is likely coined by an error of commission, it allows for an interpretation of *-ize* that is akin to *cannibalize* in that it does not conform to any of the conventional readings of the suffix in existing models; instead, in both these examples, the semantic implication is 'to expose X to the behaviour of the subject' – in these cases, an assassin or a cannibal.

Relative to the rest of the creative suffixes, there were only very few that stood out as highly-

Table 5.7: *Summary of creative and highly-creative suffixes by group in CG94*.

Group	Meaning(s)	Size	Creative / Highly-Creative Suffixes	Total
A1	relating to / concerning / from	13	4/2	6
A2	performing or provoking an action	8	5/1	6
A3	causing / showing / full of	11	3/1	4
A4	adhering to / believing in	4	1/-	1
A5	similar to / resembling	6	2/1	3
A6	can perform / must be subjected to	3	1/-	1
A7	somewhat / to a lesser degree	2	2/-	2
N1	entity related to / concerning / from	13	7/-	7
N2	entity performing/provoking the action	8	4/-	4
N3	condition / state of / rank of	21	7/1	8
N4	adherent of / believer in	5	3/-	3
N5	instance of / group that performs action	14	5/-	5
N6	[diminutives]	10	2/-	2
N7	place for the entity/action	5	-/-	0
N8	[occupations]	4	1/-	1
N9	[feminine forms]	3	1/-	1
N10	[medical terms]	3	-/	0
N11	[miscellaneous]	8	4/-	4
V1	(cause to) become / be affected by	4	2/-	2
	Totals	**145**	**54/6**	**60**

creative either in terms of their raw number of neologisms – *-y*[1] (13), *-al*[2] (11), *-ness* (10) – or their Creativity score – *-like* (0.250), *-i*[2] (0.200) and *-ish*[2] (0.200). These follow a pattern similar to the DS94 creative suffixes in that they are spread thinly between a number of suffixes, mostly adjectives, and are not 'doubled' in any one group (Table 5.7). Generally, this trend is followed throughout the rest of the CG94 data: the suffixes are spread more widely among the groups than the DS94 data, but with fewer neologisms per suffix due to being less creative overall than the EAS14 data. For example, Group N3 again contains a high number of creative suffixes (8) that it has in common with EAS14 and contrasts with DS94 which demonstrated only 4 creative members for this group; yet the number of neologisms accounted for by this group is only 20, compared with 40 in EAS14. Only two groups in Table 5.7 do not contain any creative members – N7 and N10 – and there is an example of a feminine form in Group N9, *chapess* (from *chap* + *-ess*, meaning 'a woman'), suggesting the increased likelihood of male and female distinctions in morphology in the older data.

Group A5, which has been of interest in that it showed an unusually high concentration of highly-creative suffixes in EAS14, mirrors instead its contemporary data in that there is only one highly-creative suffix present. In this case, the suffix is *-like*; this is interesting in that it too is of Germanic origin rather than classical as might be expected from more formal data. It may be that, within the bounds of this particular group, there is a certain degree of hypercorrection taking place in modern speech, in that, the classical suffix *-esque* is preferred when creating neologisms of this type in an effort to sound more educated and of a higher register, to reflect the way in which it is coming to resemble more formal registers to a greater extent. However, this is a notion that would require a more in-depth examination than the current methodology allows for before satisfactory conclusions could be drawn.

Regarding higher-register trends in the animacy of creative suffixes, there is further evidence to suggest that this reflects a change that is occurring over time rather than one that is down to register differences. In the DS94 data, there was no evidence of the tendency in EAS14 to create animate forms with *-er* suffixes and inanimate forms with *-or*, and this lack of evidence is maintained in CG94. Here, the most creative of all such suffixes is *-er*[4], creating inanimate non-agentive forms such as *eighter* ('a marble that has won eight times') and *steeler* ('a sharpening steel'); there are also two neologisms for animate *-or*[1], in *recollector* ('one who recollects') and *urinator* ('one who urinates'). This again implies that, if a trend

does indeed exist in a wider range of contexts in modern English, it is not the result of the move towards a more formal register, but rather some alternative factor; again, further research could shed light on the driving force behind this trend.

5.3.3 Factor Comparisons

§5.2 provided an examination of the EAS14 data in relation to how closely it adhered to the principles obtained from the factor analysis of Chapter 4; this sub-section now provides a comparison of this to the factorial trends in the two older databases.

Prevalence, one of the most influential factors across all three databases in terms of Creativity, was found in EAS14 to reflect this fact by having most of its creative and highly-creative suffixes grouped around the lowest scores. This trend is repeated in the DS94 data, although it should be noted again that, while creative suffixes tend to score low for Prevalence, it does not follow that all suffixes with low Prevalence scores are creative, as there is some degree of blocking by more highly-creative examples within the same groups. Nevertheless, certain distinctions of the older conversational data that have already been recorded are clear again; for example, there is in this data a neologism with the suffix *-o* (*nerdo*), reflecting the lesser influence of *-ie*[1] at this point in time. In CG94 however, there is something of a difference to the other two databases: here, although generally speaking there are more creative suffixes towards the lower end of the Prevalence scores, there appears also to be more of a spread towards some higher-end scores as well. In addition, the suffix *-al*[2] (meaning 'relating to / concerning the base'), classed as highly-creative in this dataset, has a very high Prevalence score of 5.209; this suffix created only one neologism in EAS14 (*homonymical*, from *homonym* + *-ical* allomorph), whereas 11 can be found in CG94, such as *concentrational*, *projectural* (from *project* + *-ural* allomorph), and *reproductional*. It is possible that this difference is due to the fact that much of the genres of speech in CG94 (lectures, sermons, etc.) is more planned than that of conversational data, such that choosing a suffix for neologism formation is a much more considered process and therefore has more potential to be selective about which suffix is chosen. This makes sense from the point of view that much of the evidence shows a tendency for modern conversation to be growing more similar to formal speech, since this is not a feature that is easily changed, consciously or otherwise. The spontaneity of the EAS14 data is a reality of the methodology by which it was collected, and as such speakers may be restricted to choosing the suffixes that first come to mind, which, as it has been suggested in the factor analysis in Chapter 4, may be those

suffixes that are less prevalent due to the decreased frequency with which such words are recognized via the direct pathway.

In terms of Distinguishability, the data from both DS94 and CG94 are similar to that of EAS14 in that there appears to be something of a spread of creative suffixes across the spectrum of scores, rather than any bunching towards the lower end as might have been expected from the factor analysis, which suggested that less distinguishable suffixes produced fewer new words. In CG94, for example, there are plenty of examples of distinguishable suffixes creating neologisms, such as *swiftitude* (from *swift* + *-itude*, meaning 'speed'), *saccharinous* (from *saccharine* + *-ous*, meaning 'containing a sugar substitute'), and *dejective* (from *deject* + *-ive*[2], meaning 'depressing, bringing down a good mood'); equally, there are many from more non-distinguishable suffixes such as *hashing* (from *hash* + *-ing*, meaning 'a series of hash symbols'), *aircrafter* (from *aircraft* + *-er*[5], meaning 'a person who repairs aircraft'), and *Tebbitite* (from *Tebbit* + *-ite*[1], meaning 'relating to the principles of Norman Tebbit'). Similarly, both Convertibility and Regularity mimic the EAS14 data in both the other two databases by having seemingly no noteworthy effects on or relationships with Creativity.

Opacity, on the other hand, provides some interesting comparisons that can be made between the databases, particularly in terms of register differences. The spread of creative suffixes among Opacity scores is much the same as in EAS14 in that those that are creative and have a score above zero tend towards the lower scores. Conversely, the creative suffixes in CG94 seem again to be more widely spread, with certain outliers of very high Opacity scores nevertheless producing new words: *-itude*, for example, has only two transparent forms (*aptitude* and *ineptitude*) to twelve opaque forms (an Opacity score of 0.857), yet still creates a neologism (*swiftitude*). This is likely to be a repetition of the same phenomenon that has been discussed above, that there is more time for a considered choice in the more planned speech of the CG corpus, and as such those suffixes that are more opaque can be selected more deliberately; however, this in turn implies that more opaque suffixes (which often tend towards more classical origins, such as *-itude* from Latin *-itūdō*) are a more common feature of formal registers. Bearing this fact in mind, it is interesting that in EAS14 the factor analysis showed a positive relationship between Opacity and Creativity, whereby the former encouraged the latter, that was not present in DS94 despite the fact that the spread of creative suffixes in each of these databases is very similar. Taken into consideration with the already-

established principle that modern conversational speech is growing more formal in its presentation, it may be that speakers attempt to increase the formality of conversation by opting for suffixes that produce opaque forms, but that this is limited within the confines of that kind of speech's spontaneity. That is, speakers are desirous of more formal-sounding suffixes, but those that are too highly opaque – such as *-ent*[1] (O = 0.631), *-et* (O = 0.806) and *-ule* (O = 0.800) – are not as easily available in spontaneous speech, meaning that only those with fairly low opaque scores – such as *-ian*[2] (O = 0.118), *-ie*[2] (O = 0.049) and *-y*[2] (O = 0.034) – become creative. This would account for the discrepancy between EAS14 and DS94, as well as suggesting a possible reason for the presence of a handful of opaque neologisms in the newer data. Errors of commission in suffixation occur in the DS94 and CG94 data as well, but these are only in transparent examples such as *markist* (for *marker*), *fulfilness* (for *fulfilment*) and *bory* (for *boring*); the fact that such errors occur in EAS14 with opaque bases (*inoculize* for *inoculate* and *Nordish* for *Nordic*) demonstrates that speakers are aware of opaque examples in suffix categories and are hence aware of rules and meanings of those suffixes in spite of a lack of input from the base because they are broken down by the parsing route in addition to being ultimately recognized via the direct route.

Turning the attention to Base Factors, further instances of differences between the databases can be seen, which serve largely to confirm the theoretical explanations discussed so far. To compare these seven factors, scores from the neologisms themselves were taken and the mean of each dimension was calculated in each database; these were then plotted in Figure 5.3 to show visually the difference between each database in relation to the other two. Chi-square tests of homogeneity were conducted between the databases and each factor individually; the only difference found to be statistically significant was that of Complexity, which was significantly higher in CG94 than in the other two databases ($\chi^2(2,657) = 25.045$, N = 658 $p < 0.001$, $\eta^2 = 0.0381$). Although this factor has not shown any sign of having an influence on Creativity – and this is clear from the fact that it appears to be a common feature of the neologisms across all databases – it is nevertheless worthy of note, if unsurprising, that this is shown to be a more common feature in the more formal register of CG94. The fact that the mean Complexity of neologisms for EAS14 sits between this and DS94 is perhaps another indication of the move towards more formal characteristics in modern everyday speech.

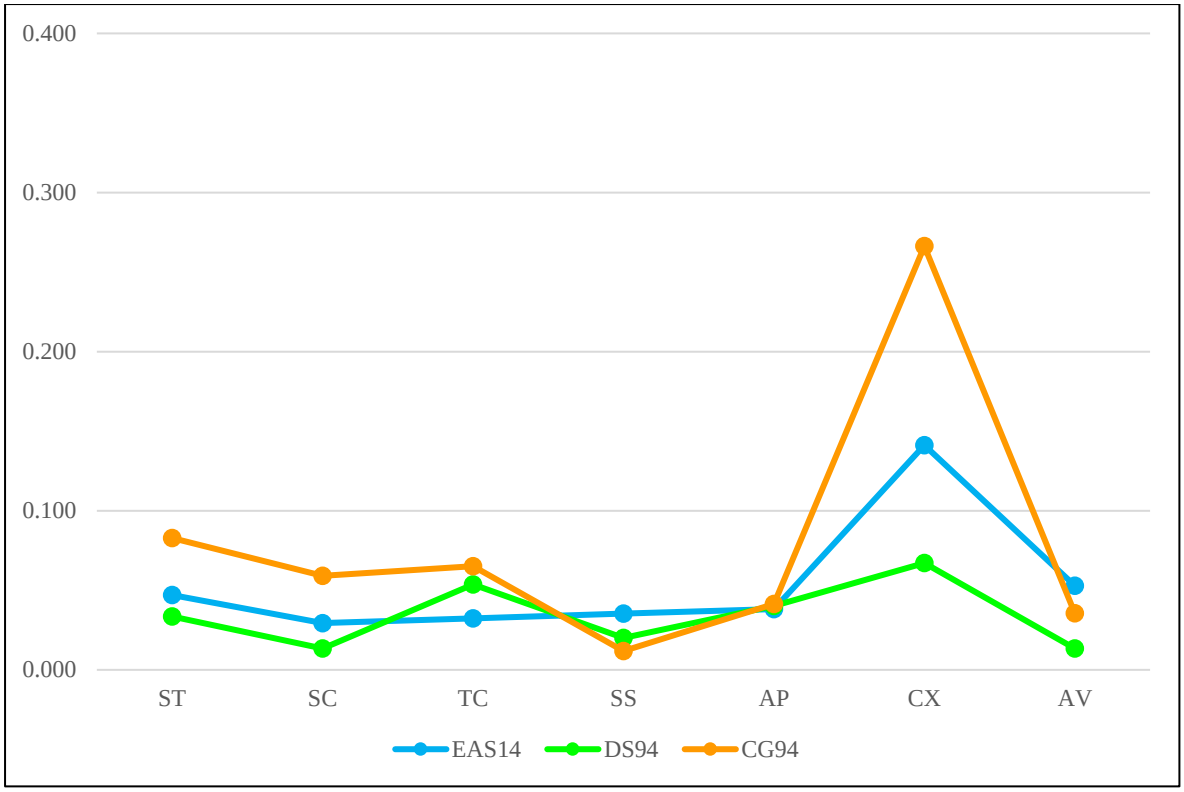

Figure 5.3: *Neologistic Base Factor differences across all three datasets*.

The general trend for each of the seven factors seems to be that CG94 neologisms exhibit each to a larger extent than DS94, and that the newer data of EAS14 sits somewhere in between. However, there are some exceptions to this that are interesting within the context of the findings thus far. Most notably, neologisms marked for Semantic Shift – whereby there is no clear link between the meanings of either the base or the suffix with the resultant complex word – are more common in EAS14, while instances of Atypical PoS seem to be more or less identical across all three sets of data. The latter of these is consistent with both §5.2.2 and Chapter 4, as it no significant differences were found between the databases relating to instances of Atypical PoS, which was generally slightly detrimental to overall Creativity and is therefore unlikely to present in neologisms. In terms of instances of Semantic Shift, it is likely that the reason for a higher number of these in the EAS14 neologisms reflects changes in meaning of the suffix over time; for example, as dictionaries of suffixes stand, there is no entry for the meanings of *-ness* and *-age*[2] as identified in §5.1.2.

Curiously, the factor of Truncation appears lower in the EAS14 neologisms in comparison to the other two databases; this is unexpected given that, although it was negatively associated with Creativity in this dataset, blending is on the increase as a means of forming new words

in general. However, there may be other factors at work that can account for this, and these are different for each of the older databases. Firstly, the DS94 contains a high number of *-ie*[2] neologisms, which has a high Truncation score (TC = 0.565) since this suffix is frequently attached to clipped bases; this suffix accounts for half of the 8 neologisms in DS94 that are marked for Truncation. Secondly, while there are a number of truncated forms in the neologisms in CG94, these tend to follow fairly regular patterns of truncation among particular suffixes, such as *qualitate* (from *quality*, on the model of *quantitate* from *quantity*) and *depreciable* (from *depreciate*, on the model of *appreciable* from *appreciate*). Conversely, many of the truncated forms in EAS14 are fairly novel in form; examples include *ethnicicism* (from *ethnicity*), *componist* (from *compose*), *Larkyite* (from *Larkman*) and *zombling* (from *zombie*). The only example in CG94 comparable to this is *Moseism* (from *Moses*), likely coined in this way due to the sharing of the /ɪz/ phonemes in both the base and the suffix; this is similar to a kind of blending that takes advantage of shared phonemes such as *screenager* (where both elements share /iːn/) and *staycation* (where both share /eɪ/). Perhaps, then, it is more accurate to say that Truncation is increasing in conversational speech not simply because the process mirrors the increase of blending, but because blending encourages a greater amount of imagination in the way in which forms can be truncated in the first place.

5.4 Further Observations

Before concluding this chapter, there are a handful of other observations that can be made regarding the data from a more qualitative examination, which provide insight into the behaviour of certain suffixes in relation to neologism creation.

5.4.1 "Double" Neologisms

Firstly, an interesting phenomenon occurs where not only the resultant word is a new word, but also the base to which it is added is itself a neologism through derivational morphology. Only one such example exists in EAS14 – *boobiliciousness*, the base of which also appears from the same speaker in the corpus as *boobilicious* (*booby* + *-licious* allomorph of *-ous*), with the meaning '[of a garment] affording ample view of the bosom'. Curiously, the phenomenon seems to occur more often in the older data, including in the DS94 database in which some relatively complex forms occur, such as *regurgitatarianism* (from *regurgitate* + *-arian* + *-ism*[1]) and *interconnectionalism* (*interconnection* + *-al*[2] + *-ism*[2]); there is also an

example that is attached to a non-existent neo-classicism in *lumbatologist* (*lumbatology* + *-ist*[1], meaning 'a lazy person'). In CG94, these 'double' neologisms tend to be of a kind in that they are used to form verbs in *-ify* or *-ize* and then further developed into nouns: *contractorization* (*contractor* + *-ize* + *-ation*), *profitization* (*profit* + *-ize* + *-ation*), and *toxification* (*toxic* + *-ify* + *-ation*).

Stein (2007) anticipates certain pairings of suffixes in this manner to go from one part of speech to another via a third, including an entry for *-ization*; however, no such entry exists for *-ification*, and it is possible that this is in some ways a variant of *-ization* given the semantic overlap between the two verb-forming components involved here. Her dictionary also does not contain entries for *-ousness* and *-arianism*, although it is reasonable to assert that many examples can be found of each that could potentially be mimicked. Nevertheless, it is interesting to consider why the verb *regurgitate* is nominalized to *regurgitarian* for the purpose of appending it to *-ism*[1] when a noun from already exists in *regurgitation*; the semantic importance of suffixes is highlighted by this, since the meaning of *regurgitatarianism* ('the practice of repeating a phrase or mantra') is strengthened by the presence of a base with the implied meaning of 'a believer in / adherent of', which necessarily implies a kind of deliberate and considered action by the person to whom the noun is being attributed.

5.4.2 Re-occurring Neologisms

A total of 15 neologisms were found to occur in more than one corpus with the same meaning. A majority of eight of these were created both in EAS14 and DS94: *roastie* (*-ie*[1]), *beddie* and *cakey* (*-ie*[2]), *hippyish* (*-ish*[1]), *diamondy*, *farty* and *saladу* (*-y*[1]) and *dossy* (*-y*[2]). A further five were found to be shared between both EAS14 and CG94: *Boltonian* (*-ian*[1]), *desking* (*-ing*), *mentalness* (*-ness*), and *projecty* and *ticky* (*-y*[1]). The remaining two – *fluey* (*-y*[1]) and *huggy* (*-y*[2]) – occur in all three databases.

It is unsurprising that the majority should be shared between EAS14 and DS94 given the register overlap between these two sets of data; additionally, the suffixes used to create these re-occurring neologisms all tend to be very low scorers for Prevalence, Opacity and Distinguishability, and could therefore perhaps be considered of lower formality given the findings earlier in this chapter. However, the same could be said for the suffixes used in re-occurring neologisms in both EAS14 and CG94: here, the only suffix that violates any of

these principles is *-ness* (in *mental*ness), which is a highly distinguishable suffix; the dominance of this suffix within Group N3 has already been discussed (§5.1.2), and this is further reinforced by the fact that *mental*ness already has existing counterparts in *mad*ness and *mental-ill*ness, which have been overlooked in favour of a new term with the same suffix. It is particularly interesting that no neologisms are shared solely between the two older corpora; this implies that there are different requirements for these different registers and that the same lexical gap is unlikely to occur in both, since they are not covering the same topics of conversation. This in turn has implications for the fact that EAS14 shares neologisms with both, since it can be taken that it therefore does indeed cover the same topics of conversation as each, strengthening the notion of a shift in register of modern conversational speech. The two neologisms that occur in all three corpora are of interest too because, like *mental*ness, they do not fill a lexical gap since the forms *flu-like* and *hugging* (in its adjective form) already exist in the OED; these coinages therefore further support findings relating to the dominance of particular suffixes over others within certain groups, since both *-y*[1] and *-y*[2] were found to be highly-creative and share with *-ness* the ability to trump other suffixes in existing forms where they would be equally as applicable.

5.4.3 EAS14-Specific Neologisms

Finally, another phenomenon worthy of note is in the fact that several neologisms within the EAS14 database could not possibly have occurred in the older data since the bases to which the suffixes have been attached did not exist in the English language at that time. A total of 13 such words were identified under this heading, with examples including *Google*able, *Youtub*er, *chav*tastic, *Facebook*y and *Hunger-Games*-esque; the earliest of these bases to enter the language was *Google* when the website was launched in 1998, well after the completion of the original BNC project. Although, with only 13 instances, these entries could not be said to have a significant influence on the fact that more neologisms were found in EAS14, it is nevertheless interesting to consider that, as the English language expands to include a greater number of simplex words of varying origins, so too does the pool of words from which derivational neologisms can be constructed, and it is perhaps unsurprising then, at least in principle, that more such neologisms should be found in the newer data compared to the old.

5.5 Conclusions to Chapter 5

Perhaps the most striking feature of this analysis of neologisms, before any deeper analyses are taken into account, is that the conversational speech of the present day is quite clearly a great deal more creative than speech from twenty years ago of either formal or informal register. Despite allowances for the size differences between the corpora and datasets, as well as for words which may have been new at the time of the compilation of the BNC (see §3.3.2), the number of new forms in the EAS14 was more than double that in either DS94 or CG94.

One of the most recurrent and significant findings of this chapter is that the way in which this increase in Creativity is occurring is through or alongside formality, as concluded from the fact that many features are characteristic more of the formal CG94 data than the informal DS94. Firstly, there is, for example, a great diversity of creative suffixes in EAS14 that reflects the pattern of formal data from the original BNC, even though the density of plemmas within these suffix categories shows more similarities between the two older corpora. Secondly, there is the fact that nominalization, which is highly common in formal registers, is clearly more frequent in EAS14 than DS94 despite the similarity with which the data for each were collected. There is also the fact that DS94 and CG94 share no neologisms (save those that occur in all three corpora), whereas EAS14 has new words that are common to both, indicating lexical gaps that may be relevant to topics of conversation in both registers. Finally, there is a greater tendency in modern speech for speakers to opt for suffixes that demonstrate a certain degree of Opacity, which are reflected more in the formal CG94 data and so may be seen to hold some kind of prestige over those that are common to the less formal conversation of DS94.

This relationship between Opacity and Creativity has provided some particularly interesting insights into the way in which complex words are recognized by listeners (i.e. whether they are processed as whole words via the direct pathway or whether their morphemic constituents are parsed) and the implications of that for neologism creation using particular suffixes. While suffixes with a low score for Opacity (but above zero) appear to be increasingly creative in modern conversation, this has limits in the sense that higher Opacity scores result in very few neologisms being created. This suggests that, when the concentration of opaque words within a suffix category reaches a certain threshold, there is a greater tendency to

recognize them via the direct pathway rather than by breaking them down into constituent parts; thus, the rules for a particular suffix, and perhaps even the suffix itself, become weaker and are forgotten. On the other hand, a small amount of Opacity can be beneficial to Creativity, since listeners are used to the notion of parsing words with the particular suffix and continue to attempt this when encountering an opaque example; while there is necessarily a failure in this process, doing so nevertheless makes the listener more aware of the suffix's abstract characteristics, since a link between the suffix's form and the resultant complex word's meaning can still be drawn. It should be remembered, however, that this is dependent on the Prevalence of the suffix: complex words that are too highly-prevalent come to be recognized via the direct pathway, and a high concentration of such words within a suffix category can again mean that the relationship between a suffix's form and the word's meaning are not considered, and hence Creativity is reduced. Nevertheless, it would be of great interest to the study of derivational morphology and Creativity to determine where this Opacity threshold lies, and how other factors such as Prevalence affect its position for particular suffix categories.

Prevalence is also linked to the behaviour of suffixes within semantic groups. The Creativity within these groups tends to be dominated by one particular suffix in each case, and those that dominate tend towards very low scores for Prevalence; in some cases, other low-Prevalence suffixes are to a large extent 'blocked' from creating new words after a certain point as the more dominant suffix almost always takes precedence. This is not always the case in the more planned realms of CG94 however, suggesting that, while there is a tendency towards increasing formality in conversational speech, this remains subject to spontaneity in the sense that there is less of a capacity to actively choose alternative suffixes for neologism creation. There are also clear exceptions to this rule: in particular, Group A5 ('similar to / resembling') has shown a dramatic increase in the number of neologisms created and this is spread across three out of its six members, and this too is not related to register. Taken with the fact that both members of Group A7 ('somewhat / to a lesser degree') were also highly-creative, this could demonstrate a tendency towards creating neologisms by likening new concepts to existing ones in the manner of similes and metaphors; equally, it could be a result of an increase in politeness or "political correctness", since suffixes in both of these groups may have a placating effect – it may be less offensive, for example, to refer to a group as *gang-like* (*-like*, Group A5) rather than to refer to them as a *gang* outright, or it may avoid the appearance of racial prejudice to describe someone as *East-Asian-ish* (*-ish*[3], Group A7) rather

than simply *East-Asian*. These hypotheses cannot be firmly concluded from this study alone, but it does conform to certain other suggestions throughout the analysis in relation to the lack of feminine forms and high Creativity of *-ist*[4] and *-ism*[3] in EAS14, which also reflect an increase in political correctness and a sensitivity to equality through language.

One thing that does seem clear, however, is that adjectives are much more commonly created using suffixes, and that the degree to which this is true is itself increasing. Despite the fact that there is more nominalization in EAS14, reflecting a move to a more formal register, the number of nominal neologisms is nevertheless dwarfed by adjectival forms. This difference is clear between the two registers from the older data, but even more so in the modern speech, suggesting that a preference for adjectives is not simply a result of register differences but a growing tendency in language as a whole. The reason for this is unclear, and further study involving the use of an updated version of CG94 to pair with EAS14 could provide greater insight. Likewise, it may be the case that nouns are becoming more frequently coined using methods other than derivation, and that this is less true for adjectives; further study into the full range of methods for Creativity may be able to confirm or refute this hypothesis.

It may also be the case that these alternative methods of creating new words are having an effect on the specific method of suffixation. It was found that truncating bases prior to adding suffixes occurred in all three databases, yet in EAS14 this was carried out in a more irregular way that did not reflect existing truncated forms in the language. This may be a result of the increase in blending, which could be permitting more flexibility when it comes to clipping a base. There was also some evidence of the creation of new splinter forms such as *-arific*, *-tastic* and *-licious*, which may be another result of changing methodological preferences in word-formation, since splinters occupy an uncertain space between the three processes of derivation, blending and compounding.

Finally, an unofficial consensus of sorts seems to be being reached regarding a narrowing of the definitions of *-er* and *-or* suffixes in relation to the animacy of the agent, as animate forms were found to have been much more consistently assigned to *-er* suffixes in the modern data and *-or* was used for inanimate forms. In the data from both DS94 and CG94, there appeared to be more flexibility in these suffixes to be used for both animate and inanimate agents, demonstrating that this too is not a feature of register but something else that has changed in the time period between the compilations of the corpora. It is possible that this reflects

technological advancements during this time and perhaps may be being led by a handful of specific examples that have gained attention. It should be remembered, however, that the distribution of these suffixes is not necessarily down to the speaker, since the data are transcribed by a third party who may be influenced by their own interpretation. While this is still relevant, as they take on the role of the listener in this context, it may be of interest to investigate this phenomenon further to get a more direct link between those who actually create such words using an agentive suffix and their own preference for either *-er* or *-or* in relation to animacy.

The findings listed above are used to inform the second part of this thesis. Where Chapter 4 took a very broad view of the data in analysing the influence of factors quantitatively, and Chapter 5 has taken a more intimate approach by looking at the neologisms directly, Part II goes on to look more closely still at speakers and listeners themselves and their acceptance of neologisms as "real" words, how they interpret meaning, and how this relates to factors that have been identified in Part I as relevant to the Creativity of a suffix.

PART II

NEOLOGISMS IN USE

6 METHODOLOGY FOR THE EXPERIMENTAL STUDIES

Part II of this thesis addresses Research Questions 3 and 4 (§2.4.2) and looks at experimental data collected in response to the findings of the corpus study in the previous part (Chapters 3-5). In this chapter, the methodological processes undertaken for these experimental studies are described. The scope is identified with regard to the corpus analysis, leading to the description of the materials developed for the three separate experiments, which are also detailed in terms of the participants and procedures involved.

While the first two Research Questions were addressed in Part I of the analysis, the third and fourth are the focus of this part and are reproduced here:

RQ3. How is the recognition and understanding of complex words by native English speakers affected by a manipulation of the suffixes based on the features identified as being the most influential?

a) Can differences be found based on the gender, age group or education level of the speakers?

RQ4. What differences can be found in the interpretation of the meaning of complex word neologisms by native English speakers and how does this relate to the features of the suffix identified as the most influential for neologism creation?

Using the findings from the previous chapters, the placeholders regarding the most influential features on neologism creation were replaced with the specific metrics of Prevalence and Opacity, identified in §4.1 as those features which were found to be most influential in affecting Creativity both individually and in combination in EAS14. The purpose of the following experimental studies, therefore, is to examine the relation of speakers' recognition and understanding of neologisms in relation to existing complex words, cross-referenced with Prevalence and Opacity as they vary between creative suffixes, as well as a consideration of the specific interpretations that participants extract from the neologisms. In order to do this, materials were developed for the undertaking of three types of experiment, elucidated in the sections that follow: a Semantic Decision Task (SDT), a Judgement Task (JT) and a Definition Task (DT).

6.1 Materials

6.1.1 Suffix Set

Before the specific words used in the experiments could be identified, it was first necessary to establish the set of suffixes from which they would be drawn, since using the full set of 63 creative suffixes in EAS14 would provide a word bank too lengthy for participants in each type of experiment. Equally, it was important to have an even spread across combinations of Prevalence and Opacity to reduce skewing effects in the results. To do this, the full set of suffixes (see Appendix 1; see also Appendix 3 on the accompanying CD for a full complement of scores for each suffix) were ordered by Prevalence score (P) and split in half; these halves were then each ordered by their Opacity score (O) and further halved, giving four "quadrants" representing high-P/high-O ([PO]), high-P/low-O ([Po]), low-P/high-O ([pO]) and low-P/low-O ([po]). Creative suffixes were selected from each of these quadrants based on those that produced transparent words, non-transparent words and neologisms that were suitable for use in the tasks. For example, the only neologism produced by *-fic* was *cheesarific*, which employs a form of the suffix that may be developing into a new splinter form, while *-ency*[2], though producing the satisfactory neologism *eloquency*, had no non-transparent plemmas; hence, neither of these suffixes were suitable for selection. Having established five suffixes to be used from each "quadrant", a total of 20 suffixes were selected for use in the word bank and are listed in Table 6.1.

Table 6.1: *Full suffix set with P and O scores, arranged by quadrant.*

Quadrant	Suffix	Example	Prevalence	Opacity
[PO]	*-al*[2]	*promotional*	5.354	0.287
	-age[2]	*voltage*	4.833	0.375
	-ify	*simplify*	4.974	0.513
	-ous	*gluttonous*	4.839	0.460
	-ity	*morality*	5.268	0.227
[Po]	*-ation*	*alteration*	5.296	0.027
	-ive[2]	*intuitive*	5.183	0.099
	-ly	*neighbourly*	5.098	0.122
	-ment	*enjoyment*	5.427	0.110
	-ory[1]	*statutory*	5.190	0.143
[pO]	*-esque*	*statuesque*	4.750	0.500
	-ette[2]	*rosette*	4.000	0.632
	-ism[4]	*organism*	4.455	0.545
	-ite[2]	*socialite*	3.400	0.400
	-ling	*duckling*	4.400	0.400
[po]	*-er*[1]	*shooter*	4.475	0.005
	- ish[1]	*snobbish*	3.720	0.077
	-less	*speechless*	4.232	0.058
	-ness	*randomness*	4.167	0.007
	-y[1]	*watery*	3.621	0.035

6.1.2 Word Bank

The suffixes identified in the set address the range of Prevalence and Opacity scores; using this as a base, a word bank was built to cover the range of possibilities in terms of transparent vs. non-transparent words, as well as real vs. non-real words. For each of the 20 suffixes, four words were added to the bank: a transparent real word ([TR]); a transparent non-word, i.e. a neologism ([Tr]); an opaque real word ([tR]); and an opaque non-word, i.e. a nonsense word ([tr]).

In this way, types of words can be identified using a code enclosed in square brackets, in which an upper-case letter indicates the presence of a feature, while a lower-case letter indicates its absence; for example, [TRPO] refers to transparent real words with suffixes of high Prevalence and Opacity (*promotional*, *voltage*, etc.), [TrpO] refers to transparent non-

real words (neologisms) with suffixes of low Prevalence and high Opacity (*Barbiesque*, *napette*, etc.), and [trPo] refers to non-transparent, non-real (nonsense) words with suffixes of high Prevalence and low Opacity (*manilation*, *raustitive*, etc.). Where a particular letter does not appear in the code, it is taken to mean that its presence or absence is not relevant to the condition that is being examined; for example, [Rp] refers to all real words of non-prevalent suffixes, regardless of the Transparency of the word or the Opacity of the suffix.

All words were matched as closely as possible for frequency, both in terms of their individual Prevalence (4 or 5), which was not related to the average of the suffix group to which they belonged, and their occurrence in EAS14 (fewer than 15 tokens, equivalent to less than 3 per million). Complex words were also matched as closely as possible for word length; however, it proved impractical to maintain this equivalence between suffixes, since in some cases very few neologisms were available for inclusion in the word bank.

Table 6.2: *Full word bank for all suffixes in the set.*

[P/O]	**Suffix**	**Word**			
		[TR]	**[Tr]**	**[tR]**	**[tr]**
[PO]	*-al*[2]	*promotional*	*homonymical*	*diabolical*	*binemetical*
	-age[2]	*voltage*	*snowage*	*courage*	*waldage*
	-ify	*simplify*	*wintrify*	*sanctify*	*demprify*
	-ous	*gluttonous*	*bargainous*	*boisterous*	*stoonerous*
	-ity	*morality*	*natality*	*calamity*	*peracity*
[Po]	*-ation*	*alteration*	*musication*	*sanitation*	*manilation*
	-ive[2]	*intuitive*	*immersive*	*tentative*	*raustitive*
	-ly	*neighbourly*	*saccharinely*	*dastardly*	*catronly*
	-ment	*enjoyment*	*relaxment*	*sediment*	*tegriment*
	-ory[1]	*statutory*	*instructory*	*derogatory*	*chastutory*
[pO]	*-esque*	*statuesque*	*Barbiesque*	*grotesque*	*frentesque*
	-ette[2]	*rosette*	*napette*	*gazette*	*mojette*
	-ism[4]	*organism*	*shortism*	*autism*	*ursonism*
	-ite[2]	*socialite*	*Corbynite*	*transvestite*	*golminite*
	-ling	*duckling*	*zombling*	*starling*	*tamsling*
[po]	*-er*[1]	*shooter*	*critiquer*	*butler*	*fleater*
	- ish[1]	*snobbish*	*grannyish*	*skittish*	*gleazeless*
	-less	*speechless*	*coffeeless*	*reckless*	*quoyish*
	-ness	*randomness*	*orangeness*	*wilderness*	*pittalness*
	-y[1]	*watery*	*guesty*	*feisty*	*prafty*

In order to help create nonsense words that were reliably similar to the existing words in form, the software Wuggy (Keuleers and Brysbaert 2010) was used. The non-transparent/real ([tR]) words from the word bank were entered into the program, allowing for similar pseudo-words to be created that matched them in terms of their vowel/consonant distribution, as well as the types of consonants used (plosives, fricatives, glides); this also helped to reduce any issues arising in terms of unrealistic or impossible letter combinations within the nonsense words. Nevertheless, small number of the generated pseudo-words were altered manually where the output too closely resembled the original words; in these cases, the same principles were adhered to in terms of consonant distribution and type.

The full list of these 80 words, cross-referenced with Prevalence and Opacity, is given in Table 6.2 above.

6.2 Semantic Decision Task

A Semantic Decision Task (SDT) was designed to measure the reaction time of participants to the words in the bank, using the software Superlab 2.0 (Cedrus Corporation 2003). This is a modification of the traditional Lexical Decision Task (LDT) and is rising in usage, especially in the fields of psycho- and neurolinguistics (Sela, Ivry & Lavidor. 2012; Räling et al. 2017; Nettekoven et al. 2018). It is essentially the same task as the LDT, with the exception that participants are required to react only when they have made a judgement about whether or not they have understood the meaning of the word, rather than basing judgements purely on the recognition of the form. It was judged that and SDT would be appropriate for this part of the study, since the focus is on participants' ability to extract the meaning of new words in comparison to existing and nonsense forms.

6.2.1 Further Materials for the SDT

As well as all 80 words from the bank, a further 20 were added in the form of simplex words for use as a baseline for drawing comparisons against complex words. 10 of these were real, selected by finding unrelated words in the EAS that were of roughly the same frequency as those in the word bank, and checking their Prevalence in the OED Online in the same way; the remaining 10 were developed using the Wuggy software by entering the 10 real simplex words as before. In addition to this, since natural reaction time was to be measured, 20

practice words were included at the beginning of each test to allow participants to adapt to the format of the task before the test proper began; these were broadly split proportionally to match the rest of the words in the test, with complex words selected from non-target suffixes so as to avoid priming participants for the target material. The full list of simplex and practice words can be found in Appendix 8.

The SDT itself was created in Superlab 2.0, in which all 120 words were presented in the form of 48-point black sans-serif text in the centre of a neutral background, on a laptop with a fourteen-inch screen. The 100 non-practice words were ordered manually so that no two adjacent words had properties that were too closely matched (e.g. non-real, prevalent, simplex, etc.); nevertheless, four different reaction time test lists were created with the words halved and inverted in various combinations in order to allow for possible influences of word order, and labelled A, B, C and D. To each of these lists, the 20 practice words were included at the beginning of the experiment. Each word was separated from the next by two + signs in the centre of the screen in order to give participants a moment to prepare between stimuli.

6.2.2 Participants for the SDT

A total of 32 participants took part in the SDT, split evenly across the four word lists to eliminate list effects, which were combined prior to analysis. Some participants were known to the principal researcher, while others were staff and students recruited at the University of Reading. The only demographic requirement of participants to qualify for taking part in the study was that they be native speakers of British English. However, information was collected on three demographics for the purposes of later analysis along these metrics; these demographics, and the categories for each, were:

Gender:	Male / Female
Age:	18-29 / 30-44 / 45- 59 / 60+
Highest Education level:	Doctorate / Postgraduate / Undergraduate / A-Level / AS-Level / GCSE / Other / None

Although an attempt was made to ensure that participants were recruited evenly across the demographics of gender, age and education level, the limitations of the recruitment time and process did not allow for a perfect distribution; full demographics for participants can be found in Appendix 9.

6.2.3 Procedure for the SDT

All participants were tested individually in a quiet room. Each was asked to sit in front of the laptop, whereupon they were given an Information Sheet detailing the aims of the project and the nature of the experiment; although they were told that it was to look into new words, they were not told that there was a focus on suffixes. They were then asked to read the instructions on the introductory page of the experiment, which were also read to them by the principal researcher; these instructions can be found in full in Appendix 10. They were told that the test would be measuring their reaction time to each of the words, and that they should only react based on their knowledge of the meaning of the word, rather than whether or not it constituted a real word.

Participants were required to press the "?" key at the point at which they felt they knew the meaning of the word, or otherwise the "Z" key if they decided they could not discern any meaning from the word. They were also informed that there would be two + signs between each word, during which they should not press any keys. All participants were required to sit the test through to completion in order for their results to be included in the analysis.

Following the experiment, each participant was required to complete a short paper questionnaire (Appendix 11) asking for information about their gender, age group and education level. At this time they were also asked if they would like to participate in a follow-up study (§6.4) and asked to provide their e-mail address for this purpose.

Ethical approval was gained from the Department of English Language and Applied Linguistics Ethics Committee prior to beginning any experimentation. Participants in the SDT were also asked to complete a Consent Form (Appendix 12) affirming that they were happy for their responses and data to be used in the project, and informing them that storage of their data would be both secure and anonymous, with access only to the principal researchers. They were also informed that they had the option to withdraw from the experiment at any time without having to give a reason.

6.3 Judgement Task

Similar to the SDT, the Judgement Task (JT) required participants to assess whether or not they felt they understood the meaning of certain words. In this case, however, they were given the words in context and were not timed, allowing them to consider their response more carefully.

6.3.1 Further Materials for the JT

For this experiment, an online survey was created using SurveyMonkey (2018). Only the 20 neologisms ([Tr]) and 20 nonsense words ([tr]) were used for this experiment, as it was felt that there was little of interest to be gained by assessing participants' semantic knowledge of existing words, especially since these were already selected for their relative Prevalence in English and that doing so would make the task too lengthy.

The 40 words were provided in context in order to give participants a baseline from which to infer the part of speech of the relevant word, since the various factor scores for suffixes with the same graphemic representation was not necessarily consistent across parts of speech (e.g. *-al*[1] nouns and *-al*[2] adjectives). The contexts used for the words were based on material from EAS14. For nonsense ([tr]) words, this was done by identifying a relatively common transparent/real ([TR]) example of the same suffix in each case in as neutral a context as possible and replacing the word with the [tr] version; for example, for the [tr] word *waldage*, an example of the suffix *-age*[2], the word *mileage* was searched in EAS14 and the following example identified:

S0336 I think probably hers has a lot of **mileage**

The italicized word was then replaced with the [tr] word to create the following stimulus used in the JT:

27. "I think probably hers has a lot of waldage"

For the neologisms ([Tr]), the context used was the original for the words themselves from the EAS14 database where they had been identified. However, it was again ensured in every case that the context provided was as neutral as possible, in that it did not give away any

semantic possibilities of the word; in the small number of cases in which the [Tr] words' own context betrayed their meaning, the same procedure was followed as for the [tr] words. All contexts used for the 40 words can be found in Appendix 13. In every case, the target words were underlined as in the above example to highlight to participants focus of each question.

6.3.2 Participants for the JT

A total of 52 participants took part in the JT, some recruited as those who were known to the researcher and others by word of mouth, all of whom were different to those who had taken part in the SDT. Again, the only demographic requirement was that the participants must be native speakers of British English, although the same demographic information was collected regarding gender, age and education level as in the SDT. Once again, although it was desirable to have an even distribution across all these metrics, it was not practical within the time constraints of the project and the resources available to ensure this to a perfect degree; full demographic information for the participants in the JT can also be found in Appendix 9.

6.3.3 Procedure for the JT

Each participant was individually sent an e-mail containing a URL, which linked them to the online survey. They were presented initially with a screen of instructions, which they were asked to read carefully and which explained the nature of the experiment as for the SDT; this can be found in Appendix 10. Clicking to begin the study presented them with 40 questions

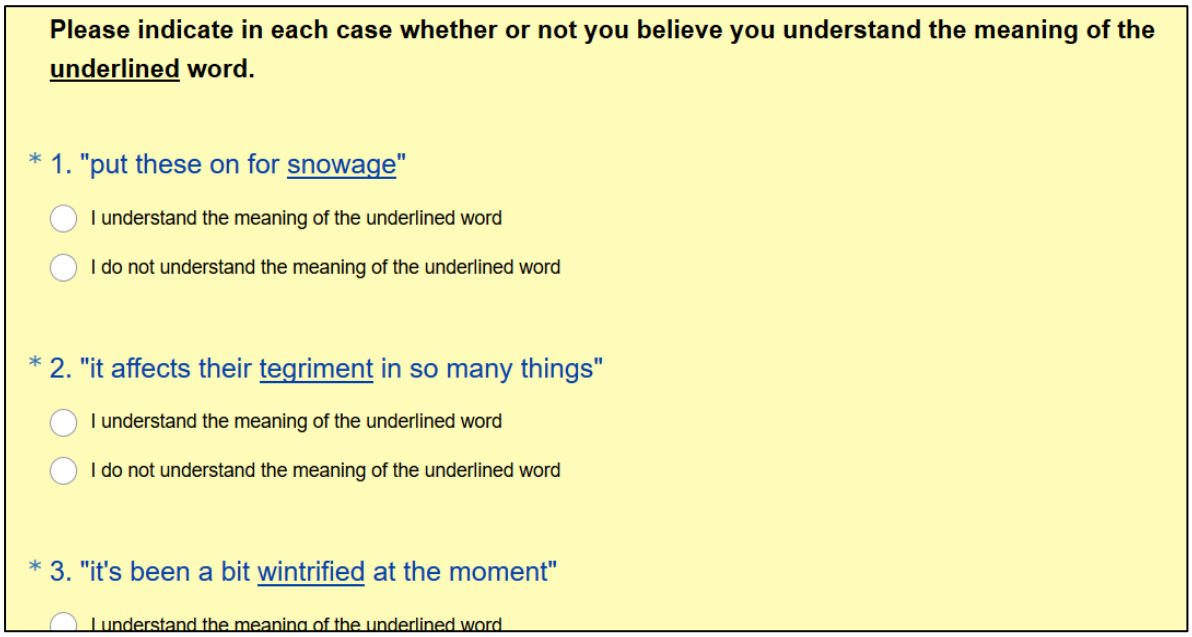

Figure 6.1: *Screenshot showing typical Judgement Task questions*.

to answer, each of which presented a different word in context as outlined above, and a choice of two radio buttons asking them to affirm "I understand the meaning of the underlined word" or "I do not understand the meaning of the underlined word"; all questions required an answer in order to complete the survey. An example of the presentation of this part of the survey can be seen in Figure 6.1 above.

Following these 40 questions, participants were required to provide the same demographic information, including their e-mail address for those participants willing to continue to the follow-up study (§6.4). Ethical approval was again gained from the Department of English Language and Applied Linguistics Ethics Committee prior to beginning any experimentation and participants were informed that they would be affirming their consent to participate through submission of the completed survey, which they could exit at any time without having to provide a reason.

6.4 Definition Task

As well as asking participants to judge whether or not they believed they knew the meaning of words, it was also of interest to determine exactly what meaning or meanings they felt able to ascribe to these new words. To this end, a second part of each experiment was devised in which they were free to explain what meaning, if any, they could extract from these words in the form of a Definition Task (DT).

6.4.1 Further Materials for the DT

The DT took the form of an online survey (SurveyMonkey 2018) in the same way as the JT. For this task, it was originally intended that only the 20 neologisms ([Tr]) were to be used in this case, since there was again little reason to ask for definitions of existing words ([TR]/[tR]) and nonsense words ([tr]) would be impossible to define. However, following the results of the JT, it was observed that certain [tr] words were more often identified as understandable when compared to the majority; five such words (*quoy<u>ish</u>, fleat<u>er</u>, manil<u>ation</u>, gleaze<u>less</u>* and *chastut<u>ory</u>*) were included in the Definition Task (DT) in order to examine what meaning participants felt they were able to extract, and whether this reflected meaning contained within the suffix element even if the pseudo-base was necessarily incorrect. Hence, a total of 25 words were presented to participants for defining in isolation alongside a text

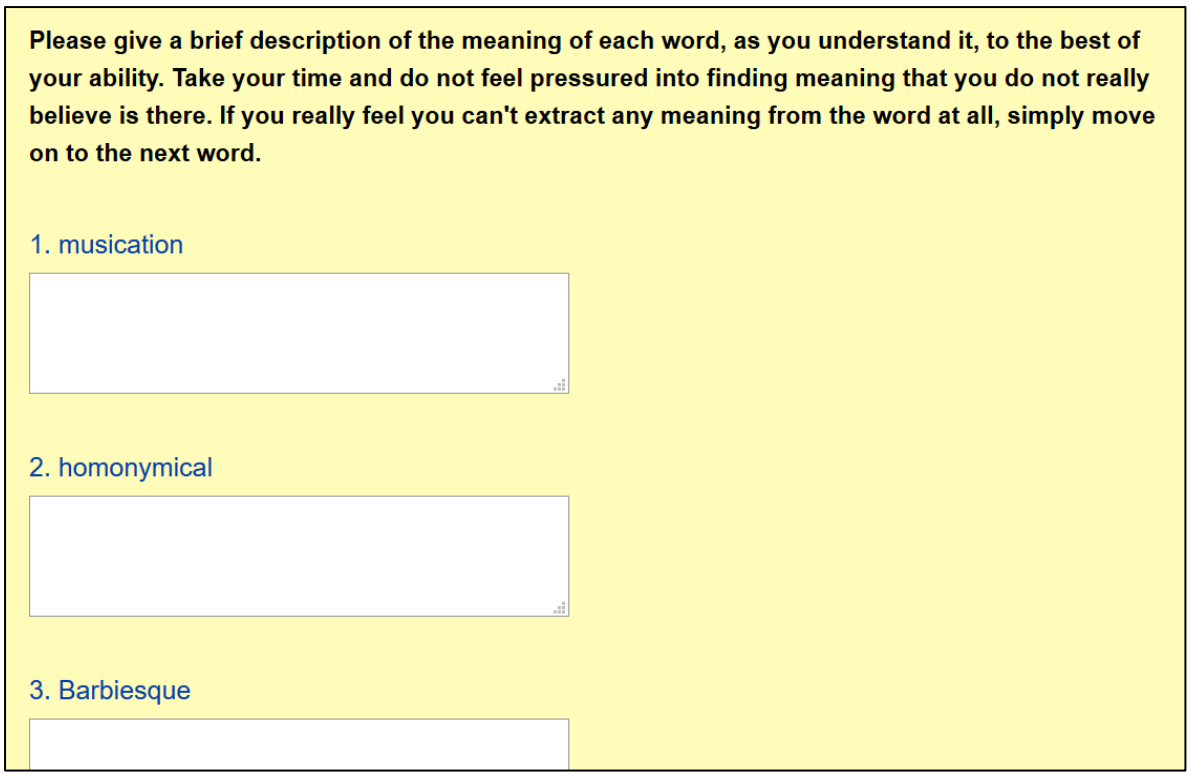

Figure 6.2: *Screenshot showing typical Definition Task questions*.

box in which participants were free to write whatever they wished with no word limit; an example of the presentation of these questions can be seen in Figure 6.2.

6.4.2 Participants for the DT

Participants in this experiment were recruited at the time of the SDT or JT as it formed part of a follow-up for those who had taken part in one of those experiments. Of the total of 84 participants in these initial tasks, 68 agreed to take part in the follow-up DT, of which 52 responses were received, 20 from the SDT and 32 from the JT; as such, it was not possible to control the demographics of the participants in this case. Because of this, and because the nature of the results required a greater number of participants in order to draw satisfactory conclusions between so many differing definitions, the results of this task were not analysed in terms of their demographics in Chapter 8; the demographic distribution for this task can nevertheless be found in Appendix 9.

6.4.3 Procedure for the DT

Those who had agreed to take part in the follow-up study were sent an e-mail with a URL link to the survey in the same way as for the JT. The screen of instructions presented to participants, which they were asked to read carefully and which explained the nature of the

experiment as before, can be found in Appendix 10. Beginning the study presented participants with the 25 words requiring definition; however, in this case, they did not have to answer every question to continue if they felt that there was no meaning they were able to discern from the word in isolation. Once again, demographic information was taken at the end of the survey in order to provide observations along such lines later in the analysis.

As always, ethical approval was gained from the Department of English Language and Applied Linguistics Ethics Committee prior to beginning the DT experimentation and participants were informed that they would be affirming their consent to participate through submission of the completed survey, which they could exit at any time without having to provide a reason.

6.5 Statistical Analysis to Part II

As with the Part I data relating to the factor scores and neologisms, the data in this part are not normally distributed; as such, appropriate non-parametric tests are employed to assess the significance of the findings throughout. In Chapter 7, the reaction time data from the SDT for each constituent are examined using Wilcoxon Signed-rank tests, as appropriate for situations where the same participants are measured on a continuous scale under different conditions of the words to which they are reacting (Brown 1992); to perform the same analyses between multiple constituents, Friedman tests are used, taking into account the appropriate Bonferroni correction for the examination of multiple groups simultaneously. In examining the yes/no responses from both the SDT and JT, Mann-Whitney *U* tests are used; this test is also employed in examination of demographic effects to study gender, while the Kruskal-Wallis *H* test is used for age group and education level as this again allows for more than two groups to be compared in this way.

In Chapter 8, a more qualitative analysis is undertaken of the definitions provided by participants in the DT, in relation to findings from both Chapter 7 and the Part I analyses. This is achieved through the use again of Mann-Whitney *U* or Kruskal-Wallis *H* as equivalent tests based on the number of groups in the data for each particular feature that is examined.

7 ANALYSIS AND DISCUSSION OF CONSTITUENTS

In this chapter, an analysis of the quantitative data emerging from the Semantic Decision Task (SDT) and Judgement Task (JT) is undertaken. Specifically, this takes the form of reaction time scores for the SDT as well as the yes/no responses to both tasks as to whether or not any meaning was understood from the neologisms. Each is also considered in terms of the demographic information collected relating to gender, age group and education level. All analyses that follow in this chapter were performed using IBM SPSS Statistics 22.

7.1 Reaction Time Data (SDT)

In the SDT, a reaction time (RT) in milliseconds (ms) was recorded for each of the 120 words for each participant. The RTs were analysed separately for each participant, and further divided to compare RTs for simplex and complex words; RTs for the 20 practice words were discarded. Complex words were identified by the constituent codes in square brackets, such as [TrPo] for a transparent/non-real word with a prevalent/non-opaque suffix (e.g. *immers<u>ive</u>*), and so forth (§6.1.2). A set of mean RTs was then taken based on each of these four constituents, whereby each had a mean RT for all the words in which they were present and another for all the words in which they were not present; in this way, for example, the total score for "real" words included all words with codes in which "R" featured ([TRPO],

[tRPO], [TRpO], [TRPo], [tRpO], [tRPo], [TRpX] and [tRpo]), while the score for "non-real" words included precisely the same codes where "R" is replaced with "r". A fifth pair of means was also taken to compare all complex word data to simplex as a means of establishing a baseline for the RTs and that the data were reliable and typical of such decision tasks.

Where possible in this section and thereafter, words and suffixes are identified by the long form of their constituents, but in some cases it is more convenient to identify them by their short-form codes. Additionally, a code presented with fewer than four elements can be assumed to refer to all of the words that fall within codes including the element(s) identified; as such, the set of codes in the above example could be succinctly identified as [R], indicating all codes that include Realness as a constituent, while [Tp] would refer to all transparent words of non-prevalent suffixes, regardless of their Realness or Opacity.

Typically of RTs, the data were not normally distributed, thus requiring non-parametric tests in the analyses that follow. Additionally, outliers were identified and replaced with mean values under the criterion that they were outside the range of three standard deviations above or below the mean. Although it is common to use the more conservative range of two standard deviations, it was felt that this criterion was too strict for a SDT, since certain items were likely to give participants more pause than may be typical of the traditional Lexical Decision Task (LDT). The total number of outliers identified and replaced in this way was less than 2% of the whole dataset for each of the constituents.

7.1.1 Individual Constituents

To analyse separately the RT between words that exhibited a specific constituent versus those that did not, Wilcoxon Signed-rank tests were performed as appropriate for the comparison of two sets of continuous data in which the measurements represent the same participant under different conditions. Eta-squared (η^2) effect sizes were calculated using the z score; thresholds were again taken from Cohen (1988) for small (0.02), medium (0.06) and large (0.13) effect sizes. All RT figures from the data are means unless otherwise stated; although median data from Wilcoxon tests can provide more robust indicators of central tendency as they are less sensitive to extreme scores, it was felt that the means (μ), along with standard deviations (σ), would nevertheless provide reliable measures given the less strict approach to outlying scores as described above. Initially the means of complex word RTs (μ = 1073ms,

σ = 228ms) were compared to those of simplex words (μ = 935ms, σ = 289ms) to establish that participants were demonstrating typical behaviour in the SDT as they would in an LDT, in that meaning took longer to extract from complex words. A Wilcoxon test revealed that complex words elicited an increase in RT in 30 of the 32 participants, with a statistically significant mean increase in RT (138ms) when participants were presented with complex words compared to simplex (z = 4.263, N = 32, $p < 0.001$, $\eta^2 = 0.568$). Naturally this result was confidently expected, but this mean figure for complex words overall is important in observing deviations in the constituent-specific analyses that follow.

It should be remembered at this stage that, although the data were of the same nature and hence treated the same in terms of the statistical tests performed, the four constituents are in effect split into two groups: the Transparency and Realness refer to constituents of the individual words themselves as either transparent or non-transparent (e.g. *speech*<u>*less*</u> vs. *reck*<u>*less*</u>) and as real or non-real (e.g. *volt*<u>*age*</u> vs. *snow*<u>*age*</u>); the Prevalence and Opacity scores, however, refer to constituents of the suffixes with which those words are formed and these are either prevalent or non-prevalent (e.g. *-ive*[2] in *possess*<u>*ive*</u> vs. *-ish*[1] in *fool*<u>*ish*</u>) and either opaque or non-opaque (e.g. *-ify* vs. *-ness*). It is necessary, therefore, to distinguish between terms that may at first glance appear to contrast with each other but which in fact refer to different constituents; for example, it is important to be clear that a word such as *reck*<u>*less*</u> is considered "non-transparent", but not "opaque", since the suffix *-less* is in fact "non-opaque" under the criteria identified in §6.1.1.

Table 7.1 presents the RT means and standard deviations for the four constituents, in each case where they are or are not present regardless of the presence of the remaining three;

Table 7.1: *Means and standard deviations of semantic processing times for the presence/absence of the four constituents.*

Constituent	**Constituent Present (RT)**		**Constituent Absent (RT)**		**Sig. (*p*)**
	μ (ms)	**σ (ms)**	**μ (ms)**	**σ (ms)**	
Transparent	1055	300	1090	302	-
Real	827	153	1337	477	****
Prevalent	1113	317	1025	233	****
Opaque	1100	271	1039	286	***

N = 32

* $p < 0.05$, ** $p < 0.025$, *** $p < 0.01$, **** $p < 0.001$

shading in this table and those that follow in this chapter again indicates statistical significance. Note that, although each row represents the total set of complex words (in that it is the combination of all complex words with the constituent present and all those with the constituent absent), it is not the case that finding the mean value results in exactly the same mean RT as for complex words above (1073ms). This is because of the method described above by which outliers were replaced: that which was an outlier for Transparency RTs, for example, was not necessarily so for Realness RTs, and therefore the overall mean values are close but not identical for each constituent.

A Wilcoxon Signed-rank test was performed on the participant means for transparent and non-transparent words; in this case, no statistically significant result was obtained, with 19 of the 32 participants showing a decrease and 13 an increase in RT for transparent (1055ms) over non-transparent (1090ms) words. To a certain degree this is an unexpected result, in that many previous approaches to measuring the psycholinguistic recognition of complex words assert that morphological transparency has a clear effect in reducing the RT of recognition (Frauenfelder & Schreuder 1991; Schreuder & Baayen 1995; Giraudo & Voga-Redlinger 2007). The non-significance of Transparency observed in this study may be a result of the emphasis on semantic over lexical recognition in the experiment; that is, while word recognition may be improved by Transparency, this may not necessarily be the case in the extraction of meaning from the words due to the influence of other constituents such as the overall Prevalence or Opacity of the suffix. Further observations regarding Transparency in relation to its interactions with these other constituents are below in §7.1.2.

It was expected that the RTs for real words would be much lower than non-real words, since participants would not have the benefit of a dual-route system for the latter, as no direct pathway could be employed, and it is a long-established property of models of word recognition that having two routes results in generally faster performance (Raab 1962; Schreuder & Baayen 1995; Baayen, Dijkstra & Schreuder 1997). The Wilcoxon Signed-rank test bore out this prediction: a robust statistically significant mean decrease in RT (510ms) was observed for real (827ms) compared to non-real (1337ms) words (z = -4.937, N = 32, $p < 0.001$, $\eta^2 = 0.762$); this trend was maintained for all 32 participants. This bears out the expectation that RTs are slower with only one available route, and highlights the additional thinking time required in extracting meaning from novel words where semantic features may be identified from a breakdown of morphemes. In addition, such a strong relationship is

useful in further observing the interaction of other constituents on the Realness of words (§7.1.2).

Wilcoxon Signed-rank tests performed on Prevalence and Opacity means showed similar behaviour between the two in terms of their effect on RT. In both cases, the test showed a statistically significant increase in RT in 26 of the 32 participants when each constituent was present in the word stimulus. In the case of Prevalence, this amounted to a mean difference of 88ms between prevalent (1113ms) and non-prevalent (1025ms) suffixes ($z = 3.796$, N = 32, $p < 0.001$, $\eta^2 = 0.450$); for Opacity, the significance of the difference was slightly less robust, with 61ms between opaque (1100ms) and non-opaque (1039ms) suffixes ($z = 3.441$, N = 32, $p = 0.01$, $\eta^2 = 0.370$). This is interesting given that these two constituents showed a certain amount of mutual interaction in the analysis of factors (§4.1.1), suggesting that a similar relationship may be observable in these results and thus prompting further analysis as to their interaction below.

From these individual constituent analyses, it was deemed appropriate to conduct all cases of two-way interactions, since the behaviour of each constituent individually showed patterns that were potentially of interest in their interaction with other constituents. For example, although the constituent of Transparency showed no significant trends, it was nevertheless concluded that this in itself was an interesting finding and worth further investigation to discover if this feature could be affected by the other constituents of Realness, Prevalence and Opacity.

7.1.2 Two-Way Constituent Interactions

Interactions between multiple constituents were measured using Friedman tests, as appropriate for related continuous scores across more than two groups. In each of these tests, there were four groups to represent the possible combinations in each interaction; for example, to compare Transparency with Prevalence, four mean scores were obtained for words in the groups of transparent/prevalent ([TP]), transparent/non-prevalent ([Tp]), non-transparent/prevalent ([tP]), and non-transparent/non-prevalent ([tp]). In each given group, therefore, there were a total of 20 words, 5 for each of the combinations possible of the remaining two constituents that were not under scrutiny (Realness and Opacity in this example). In each test, pairwise comparisons were performed; therefore, as well as an overall test for significance, six direct comparisons were generated in each test which also had the

potential to exhibit statistical significance. A Bonferroni correction for multiple comparisons (Dunn 1958) was used to ensure the reliability of the statistical significance: since there were six comparisons against a maximum tolerance of p of 0.05, the corrected alpha for these comparisons was 0.0083. For the sake of clarity and ease of comparisons between tests, the reports of statistical significance that follow use the adjusted p values provided by SPSS that take this correction into account, such that p remains significant below the usual threshold of 0.05. Additionally, since effect sizes cannot be carried out directly for Friedman tests, a Kendall's W test was used for this purpose and is reported alongside the χ^2, N and p values for each set of comparisons.

Transparency and Realness were first compared in this way; means and standard deviations for RTs in measures of Transparency paired with each other constituent are presented in Table 7.2 below; as before, overall mean values here would not be relevant, since these would simply reproduce information in Table 7.1 or in the value given for overall complex word RT (or an approximation thereof due to the method by which outliers were replaced). It was found that differences in RT ([TR] = 812ms, [Tr] = 1328ms, [tR] = 843ms, [tr] = 1404ms) were statistically significant between the different groups of words ($\chi^2(3,31) = 66.488$, N = 32, $p < 0.001$, $W = 0.693$). However, the post-hoc pairwise comparisons revealed that the only significant changes in RT occurred between real and non-real words, each reaching significance at the $p < 0.001$ level. By contrast, Transparency had little or no part to play: it resulted in a slightly decreased RT but to a degree that did not reach significance between transparent/real ([TR], e.g. *enjoyment*) and non-transparent/real ([tR], e.g. *sediment*), or between transparent/non-real ([Tr], e.g. *relaxment*) and non-

Table 7.2: *Means and standard deviations of semantic processing times for Transparency against Realness, Prevalence and Opacity*.

Comparison	**Transparent [T] RT**		**Non-transparent [t] RT**	
	μ (ms)	**σ (ms)**	**μ (ms)**	**σ (ms)**
Real [R]	812	149	843	175
Non-real [r]	1328	488	1404	719
Prevalent [P]	1113	363	1144	355
Non-prevalent [p]	1007	242	1053	274
Opaque [O]	1120	312	1099	303
Non-opaque [o]	1007	316	1154	485

N = 32

transparent/non-real ([tr], e.g. *tegri<u>ment</u>*). As such, the results suggest that, while there is certainly an increase in mental effort on the part of the listener/reader when it comes to non-real words, this is neither compounded nor mitigated by whether or not the words are transparent. Furthermore, while it is clearly the case that the meaning from both transparent and non-transparent real words can be extracted more or less equally well, this is also the case for non-words; that is, a nonsense word ([tr], e.g. *manil<u>ation</u>*) can be dismissed as efficiently as a neologism ([Tr], e.g. *music<u>ation</u>*) can be either understood or dismissed.

Transparency was then compared to Prevalence (Table 7.2) using the same Friedman test process, and again RT differences ([TP] = 1113ms, [Tp] = 1007ms, [tP] = 1144ms, [tp] = 1053ms) were statistically significant overall ($\chi^2(3, 31) = 19.162$, N = 32, $p < 0.001$, $W = 0.200$). Again, Transparency effects were not found to be significant in the pairwise comparisons, while the majority of cases in which prevalent suffixes were compared with non-prevalent ones were statistically significant. Nevertheless, it was found that Transparency had something of a mitigating effect on Prevalence, since the comparison of transparent/prevalent words ([TP], e.g. *glutton<u>ous</u>*) to non-transparent/non-prevalent words ([tp], e.g. *butl<u>er</u>*) was not significant. Furthermore, there appeared to be an increase in the significance of the difference between prevalent and non-prevalent suffixes where the example words were also transparent: the comparison of transparent/non-prevalent ([Tp], e.g. *shoot<u>er</u>*) to transparent/prevalent ([TP], e.g. *glutton<u>ous</u>*) was found to be significant to a high level ($z = 3.002$, N = 32, $p < 0.025$), and that of transparent/non-prevalent ([Tp], e.g. *shoot<u>er</u>*) to non-transparent/prevalent ([tP], e.g. *boister<u>ous</u>*) higher still ($z = -3.970$, N = 32, $p < 0.001$), whereas the difference in RT between non-transparent/prevalent ([tP], e.g. *boister<u>ous</u>*) and non-transparent/non-prevalent ([tp], e.g. *butl<u>er</u>*), although still statistically significant ($z = 2.808$, N = 32, $p < 0.05$), was so to a lower degree. This suggests that, when identifying the meaning of a complex word, it is more of a hindrance that the suffix is prevalent when the word is transparent. This may be because, although non-transparent may also employ the parsed route in tandem with the direct route (resulting in faster semantic processing), this nevertheless occurs less often than with transparent words, such that the effect of Prevalence in denying the option of the dual-route method is stronger for the latter category. On the other hand, the use of a prevalent suffix in non-transparent words was indeed still found to be statistically significant, even if less so, and so it can be concluded that the differences are minor. Essentially, transparent words are simple to parse, but participants are less skilled at doing so when the suffix is one that is more prevalent as they more frequently achieve

recognition directly; however, this effect is mitigated when the suffix is part of a non-transparent word which already cannot totally rely on parsing as a successful means of meaning recognition and for which the direct pathway may already be a stronger candidate.

Comparing Transparency with Opacity (Table 7.2) yielded similar results to those with Prevalence, in that the RT differences ([TO] = 1120ms, [To] = 1007ms, [tO] = 1099ms, [to] = 1154ms) were statistically significant overall ($\chi^2(3,31) = 22.950$, N = 32, $p < 0.001$, $W = 0.239$) and that this was mainly due to differences in RT between opaque and non-opaque words. Transparency again had a slight mitigating effect, reducing RT by a small amount between non-transparent and transparent words, although this did not reach significance. However, in this analysis, the effect of Opacity was not statistically significant unless the word in question was transparent; in the post-hoc pairwise comparisons, the difference in RT between non-transparent/non-opaque ([to], e.g. *tentative*) and non-transparent/opaque ([tO], e.g. *sanctify*) words was not significant, whereas significance was reached between transparent/non-opaque ([To], e.g. *intuitive*) and transparent/opaque ([TO], e.g. *simplify*) words ($z = 4.067$, N = 32, $p < 0.001$). In addition, and for the first time in any analyses thus far, the introduction of Transparency alone as a constituent was found to be significant ($z = 3.486$, N = 32, $p < 0.01$). These differences suggest that the minimal role played by Transparency is accentuated when comparing words with more highly opaque suffixes than with those that are more non-opaque; in other words, Transparency is a more important constituent in determining and decreasing RT in non-opaque suffixes (e.g. *-er*[1]: *builder*, *driver*, *thinker*) than in opaque ones (e.g. *-ism*[4]: *autism*, *rheumatism*, *rotacism*). This suggests that, for non-opaque suffixes, which by definition more often produce transparent words, the hindrance is all the greater when a non-transparent example (*butcher*, *butler*) is encountered and so recognition time for the meaning is increased; conversely, in opaque suffixes that produce a higher number of non-transparent forms, because the pattern is more common, the direct route is more readily available for use, thereby foregoing any attempt at parsing even for transparent examples (*alcoholism*, *organism*).

The similarity between Prevalence and Opacity RT patterns was reinforced by the comparison of each with Realness. While each was compared in separate Friedman tests as above, they are reported together here due to the fact that the findings from each were virtually identical; means and standard deviations for these comparisons are found in Table 7.3. Realness compared with Prevalence ([RP] = 853ms, [Rp] = 801ms, [rP] = 1417ms,

Table 7.3: *Means and standard deviations of semantic processing times for Realness against Prevalence and Opacity*.

Comparison	**Real RT**		**Non-real RT**	
	μ (ms)	**σ (ms)**	**μ (ms)**	**σ (ms)**
Prevalent	853	191	1417	542
Non-prevalent	801	129	1284	418
Opaque	826	138	1395	482
Non-opaque	826	182	1332	634

N = 32

[rp] = 1284ms) produced a statistically significant difference in RT across the groups of words ($\chi^2(3,31) = 75.262$, N = 32, $p < 0.001$, $W = 0.784$), and the Realness with Opacity ([RO] = 826ms, [Ro] = 826ms, [rO] = 1395ms, [ro] = 1332ms) yielded similar findings ($\chi^2(3,31) = 74.137$, N = 32, $p < 0.001$, $W = 0.772$). Additionally, in both cases the only significant constituent was Realness; despite the fact that both Prevalence and Opacity demonstrate significant influences on RT in the individual tests and the two-way interactions thus far, the strength of the influence of Realness is such that the effects of the other two constituents are completely overpowered. This means that the difference between recognizing a real word versus a non-real word is not affected by whether that word uses a suffix that is prevalent, non-prevalent, opaque or non-opaque; while these constituents may indeed have effects of their own within the category of either real or non-real words individually, the Realness of a word comes first in determining the amount of time taken to elicit meaning from it.

The final two-way comparison to be undertaken was that of Prevalence versus Opacity, looking this time strictly at features of the suffix rather than the individual words; means and standard deviations can be found in Table 7.4. In this case, the presence of each constituent resulted in longer RTs, and again this yielded a highly statistically significant difference between the groups of words in this analysis ($\chi^2(3,31) = 23.812$, N = 32, $p < 0.001$,

Table 7.4: *Means and standard deviations of semantic processing times for Prevalence against Opacity*.

Comparison	**Prevalent RT**		**Non-prevalent RT**	
	μ (ms)	**σ (ms)**	**μ (ms)**	**σ (ms)**
Opaque	1126	294	1081	272
Non-opaque	1120	363	975	234

N = 32

$W = 0.248$). Pairwise comparisons revealed that each constituent significantly increased RT, both individually, between non-prevalent/non-opaque ([po], e.g. *snobbish*) and prevalent/non-opaque ([Po], e.g. *alteration*) words ($z = 3.583$, $N = 32$, $p < 0.01$) and between non-prevalent/non-opaque ([po], e.g. *snobbish*) and non-prevalent/opaque ([pO], e.g. *statuesque*) words ($z = 3.002$, $N = 32$, $p < 0.025$), as well as together, between non-prevalent/non-opaque ([po], e.g. *snobbish*) and prevalent/opaque ([PO], e.g. *morality*) words ($z = 4.648$, $N = 32$, $p < 0.001$); however, interestingly no significant interactions were obtained when adding the second constituent once one was already a feature of the suffix. That is to say, when a suffix was prevalent, there was no significant difference between opaque and non-opaque suffixes, and, when a suffix was opaque, there was no significant difference between prevalent and non-prevalent suffixes; there was also no significant difference between prevalent/non-opaque ([Po], e.g. *alteration*) and non-prevalent opaque ([pO], e.g. *statuesque*) comparisons.

Given that both Prevalence and Opacity were also not found to be significant when the constituent of Realness was taken into consideration, there is an implication here that each of these three constituents adds to the difficulty in recognizing the meaning of complex words with roughly equal measure, and furthermore that the difficulty of each is not compounded by the addition of a further obstacle to recognition. It is possible therefore that participants reach a "maximum RT" with each constituent (non-real or prevalent or opaque), which indicates the longest possible time taken to recognize the meaning of a complex word via direct or parsed routes; that is, any additional complexity beyond one or the other does not affect the

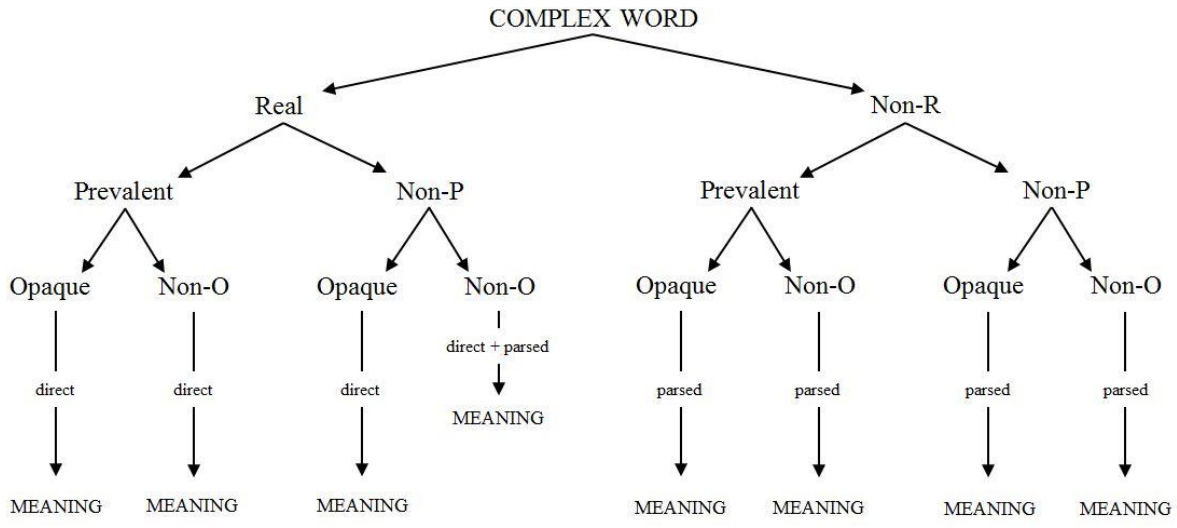

Figure 7.1: *Proposed diagram depicting single- and dual-route models for complex word recognition, dependent on the constituents present*.

RT as the longest possible route is already undertaken for recognition at this point and is carried out by only one route out of the direct and parsed possibilities. However, when the condition is met in which all three constituents are more favourable to recognition of meaning (real/non-prevalent/non-opaque), both the direct and parsed pathways are employed and thus recognition of meaning occurs faster. Figure 7.1 illustrates this point, where all non-real words are processed via only the parsed route and all real words are recognized via only the direct route except where the suffix is both non-prevalent and non-opaque; the *y*-axis – i.e., moving downwards in the diagram – indicates a longer amount of semantic processing time taken before the meaning is understood.

7.1.3 Demographic Effects on Reaction Time

As outlined in §6.2.2, demographic information concerning gender, age and education level was obtained from participants at the time of testing; the full split across the demographics can be found in Appendix 9. The reaction times from the SDTs were analysed according to each of these three factors and the findings are presented in this section. As the RT data was not normally distributed, non-parametric tests were again used throughout this analysis; the eta-squared (η^2) measure of effect size was used as appropriate for the variety of statistical tests that were undertaken here.

A Mann-Whitney *U* test was used to examine the role of gender on overall complex word means across all combinations of constituents; a significant difference between the two groups was not found. This test was then repeated for mean RTs across the different

Table 7.5: *Means and standard deviations of semantic processing times across gender*.

Constituent	**Male**[1]		**Female**[2]	
	μ **(ms)**	σ **(ms)**	μ **(ms)**	σ **(ms)**
Transparent	1100	242	1014	346
Non-T	1137	260	1049	337
Real	861	99	798	187
Non-R	1406	393	1276	546
Prevalent	1169	264	1064	358
Non-P	1048	146	1004	293
Opaque	1166	220	1043	305
Non-O	1064	198	1018	351
All	**1120**	**214**	**1032**	**326**

[1] N = 15, [2] N = 17

constituents, when each was both present (e.g. prevalent, [P]) and absent (e.g. non-prevalent, [p]). Table 7.5 below shows the means and standard deviations under each of these conditions, split by the gender of the respondents. As emphasized by the shaded row, the only circumstance under which a statistically significant result was obtained was for the set of real words ($U = 67.000$, $N_1 = 15$, $N_2 = 17$, $z = -2.285$, $p < 0.025$, $\eta^2 = 0.163$).

It is possible that this finding, although relatively highly significant, could be the result of chance, given that there is no clear reason why females should be faster than males for the set of real words in particular. However, it is worth noting that, although no other comparisons reached statistical significance, it is the case that the mean RT score for females is slightly lower than that of males under all eight conditions presented in Table 7.5, with an average difference of 86 milliseconds, although this did not reach significance, perhaps due to the greater standard deviation of RTs for female participants. Furthermore, when the conditions are ranked by the size of this difference in mean RT score, constituents such as non-prevalent [p] and non-opaque [o] (44 and 46 milliseconds respectively), which tend more towards the employment of both the direct and parsed routes of recognition, demonstrate much smaller differences between the two genders than those such as opaque [O], prevalent [P] and non-transparent [t] (123, 105 and 88 milliseconds respectively), which more often enable only the direct route to be used for recognition. It is possible that a trend is emerging from these data that suggests men and women perform similarly in complex word recognition when both pathways can be employed, but that women are more adept when use can be made only of the direct route. However, it should be stressed that much deeper study into this proposal is necessary before any reliable conclusions can be drawn, as the differences here are too small to reach significance, likely in part due to the relatively small sample size used for such an investigation.

To perform a similar analysis of RTs with respect to the age group of the respondents (with means and standard deviations for each in Table 7.6 below), a Kruskal-Wallis *H* test was used. It was found again that there was no significant difference in the overall complex word means across all combinations of constituents, nor in this case were any found for the comparisons between the RTs under any of the constituent conditions, suggesting that the way in which different pathways of complex-word recognition are utilized does not change with age; that is, the use of direct or parsed routes for recognition remains the same as age increases.

Table 7.6: *Means and standard deviations of semantic processing times across age groups*.

Constituent	18-29[1]		30-44[2]		45-59[3]		60+[4]	
	μ (ms)	σ (ms)	μ (ms)	σ (ms)	μ (ms)	σ (ms)	μ (ms)	σ (ms)
Transparent	988	245	1000	361	1031	272	1238	377
Non-T	1134	348	1098	522	1051	223	1049	159
Real	827	153	779	130	853	221	826	82
Non-R	1309	483	1320	806	1248	305	1501	483
Prevalent	1125	350	1062	463	1047	238	1196	292
Non-P	995	228	1040	410	1027	217	1069	185
Opaque	1115	312	1029	406	1051	191	1171	218
Non-O	1011	274	1063	477	1030	279	1089	251
All	**1064**	**292**	**1045**	**441**	**1039**	**225**	**1145**	**252**

[1] N = 13, [2] N = 4, [3] N = 8, [4] N = 7

However, as a general rule, it is usually accepted that RT will increase steadily alongside the age of the respondent, traditionally due to an expectation of cognitive decline (Salthouse 1996; Deary, Johnson & Starr 2010), although more recent thinking suggests that this is more accurately due to the way in which we learn and the increased associations between linguistic items that are inevitably stored as we age (Ramscar et al. 2014). Yet a strict adherence to this trend was found only for the Transparent constituent; of the remaining seven comparisons, the top age group (60+) did indeed perform the slowest under five constituent conditions, but the trend was much more uneven across the remaining three groups, with the 45-59 category often outperforming 30- to 44-year-olds, and the latter in turn sometimes demonstrate faster decision times than 18- to 29-year-olds. Taking all this into account, it is possible that the results are again coloured by the low number of participants, split relatively unevenly across the four age categories (see Appendix 9); alternatively, perhaps the focus on semantics produces trends that do not match the typical expectation of Lexical Decision Tasks. In either case, further experimentation is again needed with a specific focus on participant age and a more rigid methodology in terms of keeping other sociolinguistic factors constant.

Finally, the education level of the participants was analysed in the same way to determine RT differences that may emerge due to this demographic. In §6.2.2, a total of eight groups were identified for this measure; however, it was found that there were very few participants in the categories of ‘Doctorate’, ‘AS-Level’, ‘Other’ and ‘None’. For this reason, these groups were amalgamated into the nearest available based on that which was most appropriate; means and standard deviations can therefore be found in Table 7.7 for the resulting four groups, where

Table 7.7: *Means and standard deviations of semantic processing times across education levels*.

Constituent	Doc/Post-g.[1]		Undergraduate[2]		A/AS Level[3]		GCSE/O/N[4]	
	μ (ms)	σ (ms)	μ (ms)	σ (ms)	μ (ms)	σ (ms)	μ (ms)	σ (ms)
Transparent	1206	375	928	199	969	264	1109	291
Non-T	1202	352	1068	311	1062	307	1004	228
Real	810	77	784	158	823	150	910	216
Non-R	1618	616	1233	383	1217	436	1230	346
Prevalent	1268	355	1047	305	1045	315	1068	278
Non-P	1113	272	961	194	990	252	1028	223
Opaque	1208	305	1040	261	1069	302	1071	221
Non-O	1176	317	966	242	966	267	1031	311
All	**1204**	**316**	**1009**	**261**	**1010**	**273**	**1051**	**252**

[1] N = 9, [2] N = 9, [3] N = 7, [4] N = 7

'Doctorate' is included with 'Postgraduate', 'AS-Level' with 'A-Level', and 'Other' and 'None' with 'GCSE'.

Kruskal-Wallis *H* tests for each of the constituents again found that none of the comparisons reached statistical significance, nor was there an overall significant difference between the groups for complex words of all constituent combinations. Further observations prove similar to those in the comparison of age groups, in that there does not seem to be a general trend of increased or decreased RT as participants' education level increases or decreases. However, while this is especially true of the lower three groups, it is again worthy of mention that, under all eight constituent conditions, the Doctorate/postgraduate group reacted more slowly than Undergraduates, although not necessarily slowest of all four groups and not to a degree that reached statistical significance. It is possible that there is an underlying factor that increases RT alongside education level, as well as the potential for the effects of increased learning on information processing that occur in older participants (Ramscar et al. 2014) to be apparent in those with higher qualifications for the same reason. As with the comparisons of gender and age, this hypothesis could be developed and tested through continued study that focuses more directly on the education level of participants, with a particular adherence to the principles identified in the recent studies of age and the misconceptions of cognitive decline. Such studies could also consider the role of gender further, since there was some suggestion that women perform better when employing only the direct route; the figures for graduates and postgraduates for men (29%) and women (38%) were not too disparate, it is possible that

there is an underlying effect at work here that could be elucidated by research more controlled demographically.

7.2 Yes/No Response Data (SDT and JT)

In addition to the RT data taken during the SDT, the responses of "yes" or "no" regarding participants' comprehension of the meaning of the complex words were recorded, and are analysed in this section alongside the same such responses from the JT performed on an independent set of further participants (§6.3.2). Although in both experiments a range of complex words featuring varying constituents was presented, only the data for those that are both transparent and non-real ([Tr]) – i.e. the 20 neologisms – are examined here, since the 'correct' response to real words and non-transparent/non-real words (nonsense words) can be assumed, while any deviation can be taken as an error of judgement. Hence, in the analyses that follow, the only constituents of interest are the Prevalence and Opacity of the suffixes used in the neologisms, since the remaining two constituents are held constant.

A total of 52 participants took part in the JT, compared alongside the 32 from the SDT. The responses from each task were quantified by taking a 0 for "No" and a 1 for "Yes", from which a mean value between 0 and 1 could be obtained for each participant and each constituent. Data for these yes/no responses were observed to be not normally distributed, and so the following analyses make use of non-parametric tests as appropriate; effect sizes are presented alongside other statistical information where appropriate, and are again measured as eta-squared (η^2) calculated using the appropriate test statistic in each case.

7.2.1 Semantic Decision Task vs. Judgement Task

The neologisms were examined under each of seven different conditions: because the focus here is only on the constituents of Prevalence and Opacity, each was taken under specific conditions of both constituents as either present or not present in combination (i.e. [PO], [Po], [pO] and [po]); measures were also taken in isolation, where [P] represents the data from [PO] and [Po] together, while [O] represents that of [PO] and [pO] together; finally, a measure was taken for all neologisms together regardless of the Prevalence or Opacity of their suffixes, equivalent to an overall mean. The neologisms are presented again in Table

7.8, showing which were included under each of these seven conditions described; the neologisms can also be found in Table 6.2 (§6.1.2) under the [tR] column heading.

Table 7.8: *Neologisms included in each of the conditions examined for yes/no response analyses*.

Neologism	All	Prevalent	Opaque	PO	Po	pO	po
homonymical	✓	✓	✓	✓			
snowage	✓	✓	✓	✓			
wintrify	✓	✓	✓	✓			
bargainous	✓	✓	✓	✓			
natality	✓	✓	✓	✓			
musication	✓	✓			✓		
immersive	✓	✓			✓		
saccharinely	✓	✓			✓		
relaxment	✓	✓			✓		
instructory	✓	✓			✓		
Barbiesque	✓		✓			✓	
napette	✓		✓			✓	
shortism	✓		✓			✓	
Corbynite	✓		✓			✓	
zombling	✓		✓			✓	
critiquer	✓						✓
grannyish	✓						✓
coffeeless	✓						✓
orangeness	✓						✓
guesty	✓						✓

The means and standard deviations for all of these conditions for both the SDT and JT are presented in Table 7.9. Mann-Whitney *U* tests were performed on each of these seven conditions to determine differences between the two methods of experimentation; it was found that no comparisons reached statistical significance in this case. This is an interesting attestation to the reliability with which judgements about the semantic understanding of new words can be made, since participants' responses appeared to remain consistent whether they were required to respond as quickly as possible (in the SDT) or whether they were given an indefinite amount of time in which to consider their response (in the JT). Given the measurement in Table 7.2 (§7.1.2) of mean RT for transparent/non-real ([Tr]) words, this observation therefore indicates that the average time required to decide whether or not a new word's meaning is understood is about 1.3 seconds, and that the level of accuracy achieved

Table 7.9: *Means and standard deviations of yes/no responses for the SDT and JT experiments.*

Neologisms	**SDT**[1]		**JT**[2]	
	μ	***σ***	***μ***	***σ***
All ([PO]+[Po]+[pO]+[po])	0.768	0.184	0.801	0.111
Prevalent ([PO]+[Po])	0.757	0.160	0.750	0.156
Opaque ([PO]+[pO])	0.674	0.259	0.679	0.170
[PO]	0.680	0.236	0.617	0.220
[Po]	0.826	0.122	0.867	0.162
[pO]	0.713	0.252	0.732	0.175
[po]	0.913	0.131	0.948	0.111

[1] N = 32
[2] N = 52

within this time matches the longer and more considered judgements made with no time pressure involved.

7.2.2 Demographic Effects on Yes/No Responses

The demographic information taken during the SDT that was used for comparison in RTs was also taken in the JT, enabling further comparisons relation to the yes/no response. Since the above section found no difference between the two experimental frameworks, and that the demographic information gathered was identical in both cases, the data from the two are combined here to give a total number of 84 respondents; the split across each of the demographic groups can again be found in Appendix 9. The data were again analysed across the seven conditions involving Prevalence and Opacity as for the comparison of SDT and JT responses.

Table 7.10 shows the means and standard deviations across these seven conditions for male and female participants. A Mann-Whitney *U* test was performed on each to identify any statistically significant differences between the two genders in terms of their yes/no responses; no such results were obtained in this case for any of the ways in which the data were examined. However, as before, it is worth noting that, with the exception of only the non-prevalent/non-opaque ([po]) condition, women were consistently more positive in their understanding of the new words than men across the various types of neologism. This is interesting given that the RT data in §7.1.3 suggested the possibility that women generally responded more quickly to all types of complex word presented; the hypothesis put forward

Table 7.10: *Means and standard deviations of yes/no responses across gender*.

Neologisms	**Male**[1]		**Female**[2]	
	μ	***σ***	***μ***	***σ***
All ([PO]+[Po]+[pO]+[po])	0.777	0.135	0.804	0.154
Prevalent ([PO]+[Po])	0.732	0.159	0.782	0.150
Opaque ([PO]+[pO])	0.661	0.194	0.699	0.225
[PO]	0.620	0.223	0.671	0.232
[Po]	0.827	0.151	0.886	0.140
[pO]	0.703	0.212	0.755	0.199
[po]	0.949	0.102	0.914	0.140

[1] N = 49, [2] N = 35

for further study with respect to gender could be developed to include the notion that women have a greater propensity towards accepting new entries into a language, and that this explains both their higher number of 'yes' responses to whether or not they understand the meaning of neologisms, as well as their greater speed at responding in such a way. This is consistent with previous work on the subject of gender and language change, such as that of Labov (2001), who found that there may even be a generational lag between the acceptance of a new form by women and its use by men.

It is also interesting to note that, although no comparisons reached statistical significance (where $p < 0.05$), the comparisons of Prevalent and [Po] neologisms came close to reaching significance ($p = 0.084$ and $p = 0.079$ respectively). This suggests perhaps that Prevalence

Table 7.11: *Means and standard deviations of yes/no responses across age groups*.

Neologisms	**18-29**[1]		**30-44**[2]		**45-59**[3]		**60+**[4]	
	μ	***σ***	***μ***	***σ***	***μ***	***σ***	***μ***	***σ***
All ([PO]+[Po]+[pO]+[po])	0.801	0.135	0.808	0.162	0.758	0.166	0.779	0.123
Prevalent ([PO]+[Po])	0.744	0.172	0.795	0.142	0.731	0.153	0.755	0.150
Opaque ([PO]+[pO])	0.711	0.198	0.705	0.235	0.616	0.233	0.657	0.207
[PO]	0.651	0.238	0.677	0.221	0.590	0.232	0.643	0.227
[Po]	0.827	0.142	0.895	0.148	0.856	0.165	0.853	0.148
[pO]	0.777	0.186	0.781	0.221	0.662	0.225	0.653	0.207
[po]	0.936	0.106	0.927	0.122	0.939	0.133	0.934	0.119

[1] N = 32, [2] N = 15, [3] N = 18, [4] N = 19

may highlight differences between male and female responses more strongly when considered relatively to Opacity.

Table 7.11 shows the means and standard deviations for the same information across respondents' age groups, which was analysed in the same way using a Kruskal-Wallis *H* test. With regard to this demographic measure, again no statistically significant differences were found; however, some interesting trends emerge when examining the difference between means as age group increases. An assumption is often made, although perhaps more frequently by lay speakers than linguists, that older participants would be less accepting of modern innovations in language, and hence claim less often to understand the meaning of such words, due to more traditional prescriptivist attitudes to language; however, the evidence here shows that the oldest age group responded more often with 'yes' than the 45-59 group in the majority of cases; furthermore, in six out of seven conditions (all except the non-prevalent/non-opaque [po] condition), this latter group were less likely to respond positively than the 30- to 44-year-olds, who were then more likely to respond positively than the 18- to 29-year-olds, who are often regarded as those that drive linguistic innovation (Tagliamonte 2012). This shows some concordance with previous studies into similar phenomena, such as that of Laws, Ryder & Jaworska (2017), who found from studying verb-forming suffixes in the EAS that there tends to be a greater diversity in verb use in speakers in their 30s and 40s when compared to those in their 50s. There may also be a connection here to variationist literature, such as that of Holmes & Wilson (2017) and Cheshire (2005), in which it is often found that middle-aged participants tend towards socially accepted norms of speech and are less likely to innovate, while older participants who have retired are free of some of the pressures to conform to these norms and are therefore more accepting of new forms. Finally, as before, there is again a connection to the study of Ramscar et al. (2014), in that, if older participants respond more slowly to linguistic stimuli due having more experience of a language and thus a wider range of connections available, it is perhaps logical to suggest that they use the same experience to more easily find meaning in new forms with which they are presented.

On the other hand, it is clear that, under all conditions, more than 60% of neologisms were accepted by all age groups, so the differences here are indeed minimal and were not found to be statistically significant. They may nevertheless speak of wider trends in language that

could be observed in further experimentation in other areas of innovation and acceptance using the same age groups.

A final set of Kruskal-Wallis *H* tests was undertaken to identify differences in responses that could be related to the education level of the participants; means and standard deviations for these are presented in Table 7.12. Here, as with the RT data, certain education levels were amalgamated into more encompassing groups in order to avoid difficulties with groups that contained too small a sample size. It was found that there were statistically significant differences under three of the different types of neologisms: when all were considered ($\chi^2(3,31) = 8.840$, N = 84, $p < 0.05$, $\eta^2 = 0.073$), when only those that contained a prevalent suffix were considered ($\chi^2(3,31) = 9.883$, N = 84, $p < 0.025$, $\eta^2 = 0.086$), and when the same neologisms were considered with the specific requirement that they were non-opaque ($\chi^2(3,31) = 15.098$, N = 84, $p < 0.01$, $\eta^2 = 0.151$). In all three cases, the participants' responses tended more towards 'no' as the level of their highest qualification decreased; that is, those with lower levels of education claimed not to be able to discern meaning from the neologisms in these three groups.

Interestingly, both the statistical significance (p) and the effect size (η^2) appear to increase as the concentration of Prevalence into the neologistic set increases. The set of Prevalent neologisms effectively combines the means of the prevalent/opaque ([PO]) and prevalent/non-opaque ([Po]) sets, while the 'All' category further includes the non-

Table 7.12: *Means and standard deviations of yes/no responses across education levels*.

Neologisms	**Doc/Post-g.**[1]		**Undergraduate**[2]		**A/AS Level**[3]		**GCSE/O/N**[4]	
	μ	***σ***	***μ***	***σ***	***μ***	***σ***	***μ***	***σ***
All[a] ([PO]+[Po]+[pO]+[po])	0.855	0.120	0.821	0.111	0.763	0.125	0.708	0.182
Prevalent[b] ([PO]+[Po])	0.847	0.142	0.772	0.138	0.716	0.167	0.683	0.158
Opaque ([PO]+[pO])	0.769	0.199	0.711	0.179	0.655	0.189	0.573	0.137
[PO]	0.777	0.230	0.642	0.213	0.614	0.247	0.566	0.203
[Po][c]	0.916	0.100	0.902	0.122	0.800	0.146	0.760	0.167
[pO]	0.765	0.190	0.780	0.187	0.708	0.144	0.616	0.156
[po]	0.965	0.074	0.957	0.095	0.900	0.126	0.903	0.163

[1] N = 14, [2] N = 34, [3] N = 16, [4] N = 20

[a] $p < 0.05$, [b] $p < 0.025$, [c] $p < 0.01$

prevalent/opaque ([pO]) and non-prevalent/non-opaque ([po]) sets; as the concentrations tends towards those neologisms whose suffix is prevalent only, it is more likely that less highly educated participants will respond 'no' to the question of whether or not they understand the coinage. This speaks to the importance of the role of Prevalence that was found in Chapters 4 and 5 as far as the Creativity of suffixes is concerned; this analysis has consistently revealed that the same suffixes that are less creative due to their Prevalence are also those which are less clearly understood when neologisms are coined using them. The fact that this tendency is stronger in participants with lower qualifications also suggests that education is in some way responsible for increasing familiarity with more prevalent suffixes, thereby reducing the effect. This is also related to the findings of Chapter 5 that, while the spread of neologisms across different suffixes is wider in both more formal and more contemporary language, there is only a higher number of neologisms relative to the corpus size in the latter dataset, collected at a time when average education levels in the UK are higher than they were when the original BNC was compiled.

7.3 Conclusions to Chapter 7

It was generally found that Realness was a major factor in semantic processing time; this is a largely unsurprising conclusion but one that is directly related to neologisms in that these are by definition non-real complex words and hence promote longer RTs than their real counterparts. This is because neologisms can be understood only via the parsed route of recognition and cannot therefore benefit from the use of more than one pathway, which has been established to make recognition much faster (Raab 1962; Schreuder & Baayen 1995; Baayen, Dijkstra & Schreuder 1997). The use of single or multiple pathways is also apparent in the analysis of Transparency, which was found not to have a significant effect. This is counter-intuitive, in that it could reasonably be expected that transparent words should be recognized faster through making use of either route, while non-transparent words should be recognized more slowly as they can only make use of the direct route. Since the first of these propositions is undoubtedly true, it must instead be the case that non-transparent words are able to make some use of the parsed route as well as the direct route, thereby following a dual-route model for recognition even of words that cannot be successfully broken down into constituent parts. Therefore, a non-transparent word such as *autism* is broken down via the parsed route into its suffix *-ism*[4] as well as its non-English base *aut-*, even though the latter

does not aid understanding, before it is fully understood using the direct route. This helps to explain why a recurring finding of Part I was that Opacity did not detract as clearly from Creativity as might be expected: even a non-transparent occurrence of a suffix can be analysed to a sufficient extent that the characteristics of that suffix are highlighted and reinforced in the memory, making it a more familiar suffix and more available in neologism creation.

The overall Prevalence of a suffix itself as it appears in complex words was found to significantly increase semantic processing times, and this is consistent with the findings of Chapters 4 and 5, which revealed that suffixes that are more prevalent are less creative for the reasons outlined above relating to Transparency. In this case, a complex word with a highly-prevalent suffix, such as *simplify*, is likely to elicit a longer RT, showing that only a single route – in this case the direct route – is used in its identification. Contrastingly, a less-prevalent suffix, as it appears in a complex word such as *shooter*, benefits from a dual-route model, since its lack of familiarity prevents the direct route from succeeding before the parsed route has been utilized. Complex words in categories of less prevalent suffixes are therefore more often parsed, which means suffix in question is identified more often and, again, this leads to an increased understanding of the rules governing them and hence increases Creativity.

Despite the fact that non-transparent complex words are associated with an increase in Creativity, it was found that highly-opaque suffixes present in complex words such as *gazette* also promote longer semantic processing times. As observed in Part I, although it is the case that a non-transparent word in a suffix category that is largely non-opaque (e.g. *wilderness* in *-ness*, which has an Opacity score of 0.007) can aid Creativity, a high concentration of non-transparent forms within a suffix category results in a suffix that is less frequently identified as a separate morpheme from its base, and hence only the direct route is used. It was also found, however, that high Prevalence and high Opacity in a suffix (such as *-ous*, where P = 4.839 and O = 0.460) do not necessarily have a cumulative effect on the semantic processing time of words in its category, since each already employs only one route for recognition, which is not altered by the addition of a second constituent that has the same effect.

It is interesting to note that the findings of these individual and combined constituents remain relevant to neologisms when participants are able to consider their meaning for a longer period of time. Since the SDT and JT responses showed no statistical difference, it must therefore be the case that the constituent parts of a neologism and its suffix are entirely responsible for how readily its meaning is understood and hence its acceptability as a legitimate word in the language, with an average decision time in this study of roughly 1.3 seconds. The time pressure of the SDT means that a participant will respond "yes" or "no" as soon as they identify a single possible meaning for the neologism, while the JT allows for the possibility that a neologism may have one of several potential meanings; however, this has clearly not had an effect on the yes/no response given in the task. For this reason, responses to the DT (as examined in Chapter 8) are taken together as a total number of participants who took part in this second task, regardless of which of the first experiments they had undergone.

The study of demographics in relation to semantic processing time and yes/no responses showed generally that certain sociolinguistic features do not appear to have an effect on either measure. Nevertheless, a number of interesting associations are beginning to emerge from the data presented here, which may of course be purely down to chance, but which further study with more of a specific focus on the features in question could show to be legitimate trends. Further discussion of studies that can build on the data in this thesis can be found in §9.4, but, in particular, it is of interest that women seem to be both faster than men in terms of their semantic processing times and claim more often to understand the meaning of neologisms in both kinds of task, consistent with findings by other authors such as Labov (2001). Additionally, there are interesting observations to be made regarding the age group of participants in relation to their semantic processing time and their understanding of new forms, although this is suggested only weakly in this data as it pertains to a relatively small number of participants and neologisms. However, some of these trends appear consistent with recent literature (Ramscar et al. 2014; Holmes & Wilson 2017; Laws, Ryder & Jaworska 2017), demonstrating that ongoing research in this well-examined area can still provide new theories of semantic processing and linguistic innovation.

The level of education of the participants was also found to have an important role, not least in aiding the explanatory power of the findings of Chapters 4 and 5 relating to Prevalence, since it was found that more highly-educated participants were less sensitive to the role of this constituent when it came to understanding neologisms that employed such suffixes. It

could be said that the increase in education level across the UK is at least partly responsible for the increased use of complex word neologisms in the present-day data, since the more educated one is, the more likely one is to understand and accept neologisms that involve suffixes with high Prevalence, which is at other times of a considerable detriment to Creativity. Higher education levels, therefore, are in part responsible for the wider range of suffixes used in coinages in more formal registers, and the fact that participation in higher education has increased over the last twenty years means that this tendency has leaked into everyday conversational speech, in which the range of situations that require a neologism are more varied, and hence the capacity to draw on this wider range of suffixes is exploited to a much higher extent.

Chapter 8 continues the analysis by examining the qualitative results of the Definition Task undertaken by participants of both the SDT and JT experiments, and further determines the role of Prevalence in neologism recognition through the varied number and range of meanings that can be extracted from different types of suffix.

8 ANALYSIS AND DISCUSSION OF DEFINITIONS

This chapter presents and discusses the results of the Definition Task (DT) as outlined in §6.4, which served as a follow-up study for all participants in both the Semantic Decision Task (SDT) and Judgement Task (JT). 50 participants out of the total 84 responded to this part of the study, providing definitions to the 20 neologisms (transparent/non-real, [Tr]) as well as 5 nonsense words (non-transparent/non-real, [tr]) that participants frequently identified as 'understood' in the JT. Trends relating to the constituents of Prevalence and Opacity, as well as part of speech (PoS), are discussed in terms of the neologisms, as well as general features that were observed occurring in several of the definitions; finally, similar trends and features in the nonsense-word definitions are considered.

8.1 Constituent Trends in Neologism Definitions

As the constituents of Transparency and Realness are fixed in neologisms by definition, only those of Prevalence and Opacity are relevant to the analysis here; however, interesting differences were also found between the PoS that a suffix creates, and this is included in the analysis as a further suffix feature.

It will be recalled that, in the selection of neologisms for these studies (§6.1.2), five were chosen for each combination of Prevalence and Opacity (or lack thereof) possible, giving a total of 20 neologisms. These are presented in Table 8.1, alongside their actual Prevalence, Opacity and Creativity scores, separated by whether they were considered prevalent/opaque ([TrPO]), prevalent/non-opaque ([TrPo]), non-prevalent/opaque ([TrpO]) or non-prevalent/non-opaque ([Trpo]), as well as Creativity scores also provided as a guide; the full set of scores for all suffixes across all factors can be found in the index pages in Appendix 3 (accompanying CD).

Table 8.1: *Detailed summary of the relevant features of neologisms used in the DT*.

Neologism	Suffix	PoS	[P/p]	[O/o]	Prevalence	Opacity	Creativity
bargainous	*-ous*	n	[P]	[O]	4.839	0.460	0.033
homonymical	*-al*[2]	n	[P]	[O]	5.354	0.287	0.003
natality	*-ity*	adj	[P]	[O]	5.268	0.227	0.016
snowage	*-age*[2]	adj	[P]	[O]	4.833	0.375	0.250
wintrify	*-ify*	v	[P]	[O]	4.974	0.513	0.049
immersive	*-ive*[2]	n	[P]	[o]	5.183	0.099	0.007
instructory	*-ory*[1]	n	[P]	[o]	5.190	0.143	0.045
musication	*-ation*	adj	[P]	[o]	5.296	0.027	0.013
relaxment	*-ment*	adj	[P]	[o]	5.427	0.210	0.008
saccharinely	*-ly*	adj	[P]	[o]	5.098	0.122	0.047
Barbiesque	*-esque*	n	[p]	[O]	4.750	0.500	0.600
Corbynite	*-ite*[2]	n	[p]	[O]	3.400	0.400	0.375
napette	*-ette*[2]	n	[p]	[O]	4.000	0.632	0.050
shortism	*-ism*[4]	n	[p]	[O]	4.455	0.545	0.083
zombling	*-ling*	adj	[p]	[O]	4.400	0.400	0.167
coffeeless	*-less*	n	[p]	[o]	4.232	0.058	0.042
critiquer	*-er*[1]	n	[p]	[o]	4.475	0.005	0.018
grannyish	*-ish*[1]	adj	[p]	[o]	3.720	0.077	0.257
guesty	*-y*[1]	adj	[p]	[o]	3.621	0.035	0.186
orangeness	*-ness*	adj	[p]	[o]	4.167	0.007	0.139

In order to analyse the relationship of these constituents and features on the definitions given, the responses to each word were assessed and a set of five aspects were determined. Firstly, since participants were not required to give any definition of a word if they did not feel they could discern any meaning from it, the number of responses was divided by the total possible based on the number of participants (50) to give a "Response Rate" showing how often participants were able to discern any meaning. As the questions in this task were open-ended,

definitions were separated as "different" definitions based on two criteria: that the respondent's interpretation of the base was different (e.g. interpreting the base of *orangeness* as either the colour or the fruit), and/or that the interpretation of the suffix put it into a different group as defined in Appendix 2 (e.g. interpreting *-al*[2] in *homonymical* as Group A3 'causing / showing / full of' rather than Group A1 'relating to / concerning / coming from'), which included Group N11 for 'miscellaneous' meanings. The resulting number of different definitions based on these criteria was recorded as a second aspect.

Thirdly, as the neologisms were taken from real contextualized examples in the Spoken BNC2014, it was possible to determine the meaning of them intended by the speaker (provided in Appendix 7 on the accompanying CD); it was therefore possible to extract a figure for the so-called "correct" response to a particular word by dividing the number of definitions that matched the speaker's intended meaning by the total number of definitions given for that word. Finally, there were many instances where the definition given by participants did not match the suffix in terms of the PoS of the contextualized example (e.g.

Table 8.2: *Scores for various aspects of definitions identified for each neologism used in the DT.*

Neologism	Response Rate	No. of Definitions	Correct Rate	Wrong PoS	
				Types	Tokens
bargainous	0.860	8	0.465	0.625	0.442
homonymical	0.760	8	0.132	0.250	0.079
natality	0.660	9	0.121	0.000	0.000
snowage	0.900	9	0.378	0.111	0.022
wintrify	0.960	7	0.042	0.429	0.104
immersive	1.000	8	0.360	0.625	0.360
instructory	0.960	7	0.333	0.571	0.500
musication	0.980	10	0.041	0.100	0.020
relaxment	0.940	9	0.340	0.444	0.170
saccharinely	0.780	4	0.333	0.750	0.667
Barbiesque	0.960	6	0.813	0.667	0.167
Corbynite	0.900	3	0.911	0.333	0.022
napette	0.960	4	0.833	0.000	0.000
shortism	0.960	8	0.000	0.125	0.083
zombling	0.900	6	0.467	0.500	0.400
coffeeless	0.980	4	0.837	0.750	0.163
critiquer	0.900	1	1.000	0.000	0.000
grannyish	1.000	2	0.860	0.500	0.140
guesty	0.800	5	0.075	0.400	0.250
orangeness	0.960	11	0.417	0.364	0.188

where *shortism*, from noun-forming *-ism*[4], was given the adjectival definition 'brief'); these were recorded in two separate scores, one a concentration of types (the number of different wrong-PoS definitions divided by the number of different definitions for all PoSs), the other a density of tokens (the total number of wrong-PoS definitions divided by the total number of all definitions). The figures for these scores for each of the neologisms is given in Table 8.2 above, arranged again in terms of their association with Prevalence and Opacity.

8.1.1 Prevalence

Initially, the data were sorted by Prevalence score in order to examine any tendencies relating to the words with more prevalent suffixes; it was found that these tended towards having higher scores for Response Rate, but lower for Correct Rate. These observations were tested through Mann-Whitney *U* tests using the nominal constituent of prevalent/non-prevalent against each of the five definition scores; it was indeed found that participants gave a wider range of different definitions for neologisms whose suffixes were more prevalent, to a statistically significant degree ($U = 81.500$, $N_1 = 10$, $N_2 = 10$, $z = 2.399$, $p < 0.025$, $\eta^2 = 0.284$). That is to say, where a suffix such as *-ity* appears in words that are more frequent in English as a whole, there is less agreement between subjects as to the meaning of neologisms that employ it. This is consistent with the findings relating to the recognition of prevalent suffixes described in previous chapters: that they are more often identified using

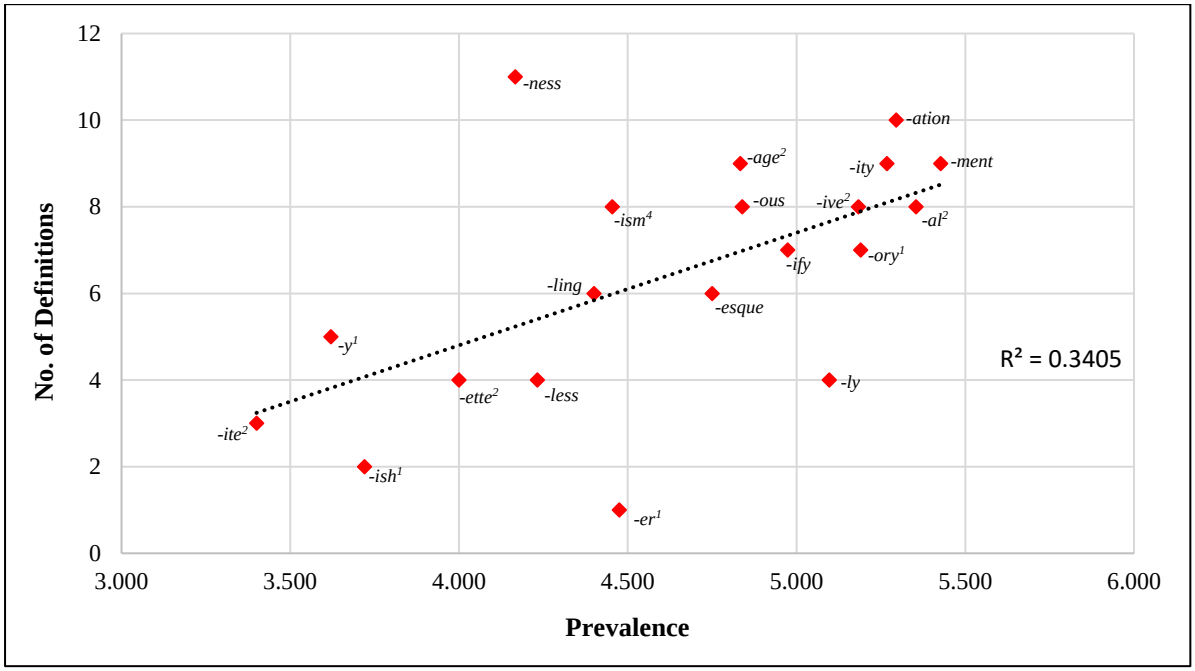

Figure 8.1: *Scatter diagram of Prevalence scores against number of definitions, with statistically significant direct relationship.*

only the direct pathway, and hence not broken down into base and suffix, which in turn hinders the distinctiveness of the suffix's grammatical and semantic rules. By extension, it appears that the result of defining a word that features such suffixes is less clear when they are out of context, since the suffixes' established or "usual" meaning is less familiar. The strength of this statistically significant trend can be observed in Figure 8.1, plotting Prevalence scores for each suffix against the raw number of different definitions given for their exemplifying neologisms; in this case, a linear trend line provided a good R^2 score (0.340) to explain the variance in the number of definitions that could be explained by Prevalence alone.

The tests also confirmed that the rate of correct responses in terms of the intended meaning was significantly lower for neologisms of suffixes with higher levels of Prevalence (U = 19.000, N_1 = 10, N_2 = 10, z = -2.344, $p < 0.025$, η^2 = 0.275); therefore, where a suffix is more prevalent, it is less likely that the intended meaning of a neologism coined using it will be correctly understood. This again aligns with the above, since the lack of reiteration of a suffix's semantics results in less familiarity with its typical role without the aid of contextual information. Equally, there may also be a secondary effect whereby the speaker coining the neologism is employing an atypical definition of the suffix for the same reasons; this can be seen in examples such as *musication*, which has a meaning little different to *music* itself, and

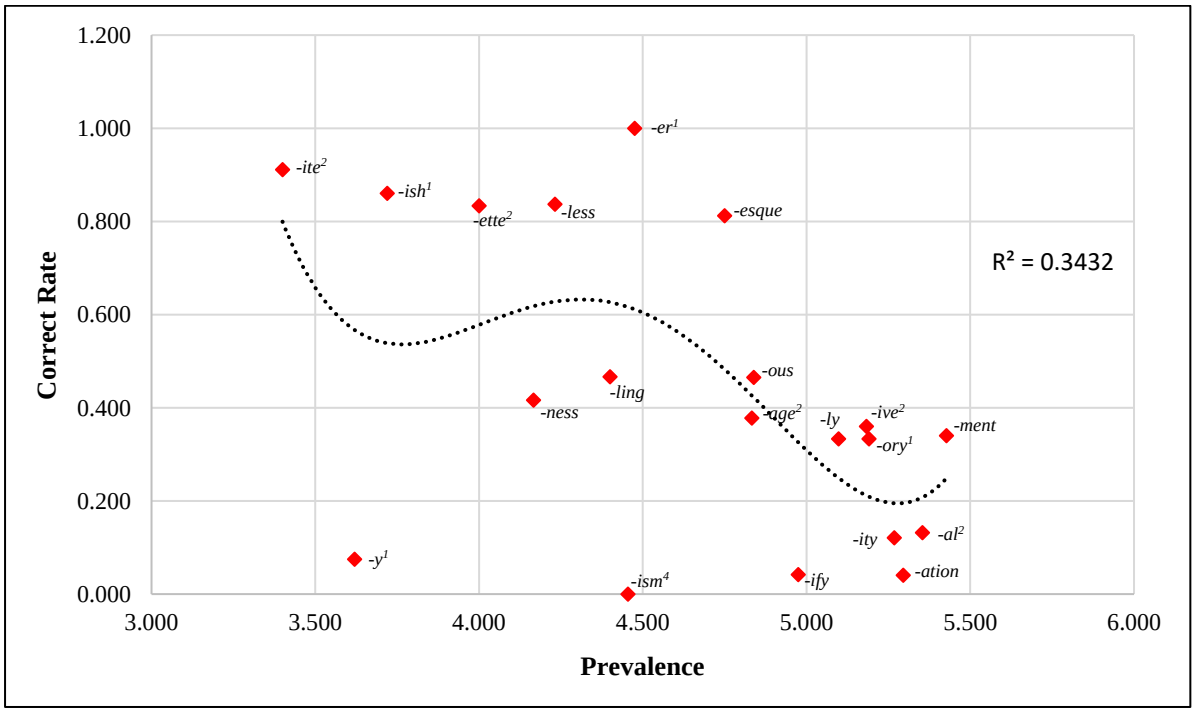

Figure 8.2: *Scatter diagram of Prevalence scores against number of "correct" definitions, with statistically significant indirect relationship.*

wintrify, which means 'to apply the effects of winter to' rather than 'to become/make more winter-like', which may be more expected based on the suffix *-ify* (Plag 1999; Lieber 2004). The inverse relationship between Prevalence and Correct Rate is again more clearly displayed through a scatter diagram, that can be seen in Figure 8.2 above, with a polynomial trend line (R^2 = 0.343) showing fluctuations in the way the Correct Rate is influence by Prevalence.

8.1.2 Opacity

In the same way as the analysis of Prevalence above, the data were initially observed for trends relating to the Opacity of suffixes; there appeared to be inverse relationships between Opacity and both Response Rate and the density of definitions that were for the wrong PoS. However, Mann-Whitney *U* tests on all measures showed that there were no statistically significant relationships with Opacity. Nevertheless, Response Rate and wrong PoS differences were notably more significant than the other three, suggesting that there may be something of a trend here that could be confirmed by a deeper analysis with a greater number of neologisms across a wider range of Opacity scores.

Figure 8.3 (below) shows Opacity scores for the neologisms plotted against their respective Response Rate, and Figure 8.4 against tokens for Wrong PoS definitions; in both cases, polynomial trend lines show fluctuations in the influence of Opacity on each score, which may be responsible for the lack of statistical significance. The relatively undramatic peaks

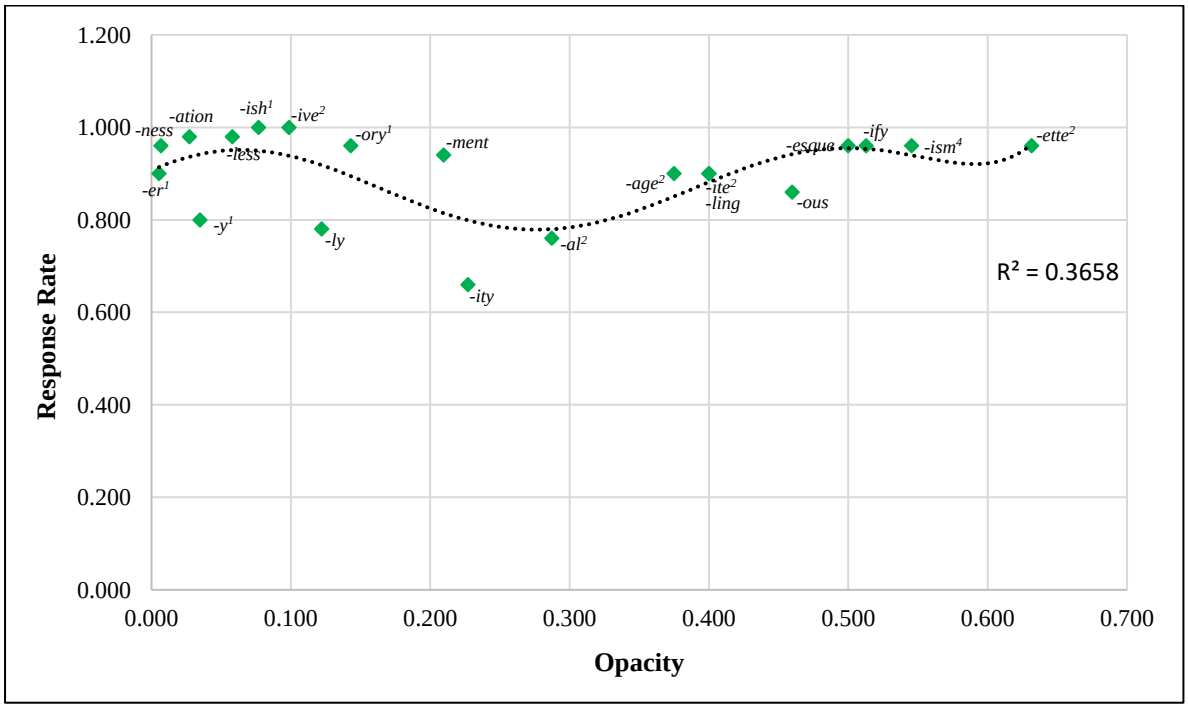

Figure 8.3: *Scatter diagram of Opacity scores against Response Rate, showing non-significant relationship*.

and troughs in Figure 8.3 (R^2 = 0.366) exemplify the fact that this was the more significant of the two scores, although it still did not reach significance; it is possible that there is a tendency for participants to be less able to extract meaning from neologisms when the suffixes used are more opaque, it is clear that this is not shown by the data here and should be the subject of further investigation. It is nevertheless a reasonable hypothesis, given that the recognition of complex words with highly opaque suffixes is undertaken primarily through the direct route alone. Speakers are more accustomed to seeing such suffixes attached to non-English bases from which meaning cannot be discerned, and so an attempt at parsing is not made; this in turn means that the presentation of a neologism using such a suffix is more likely to be judged based solely on whether or not understanding can be gleaned from the whole, and not from its constituent parts even if there is a clear English base. This is also consistent with the assessment of nonsense words (§8.3), in that none of those frequently judged to have discernible meaning in the JT were in the category of opaque suffixes, suggesting that the suffix itself is indeed notably responsible in making such a judgement.

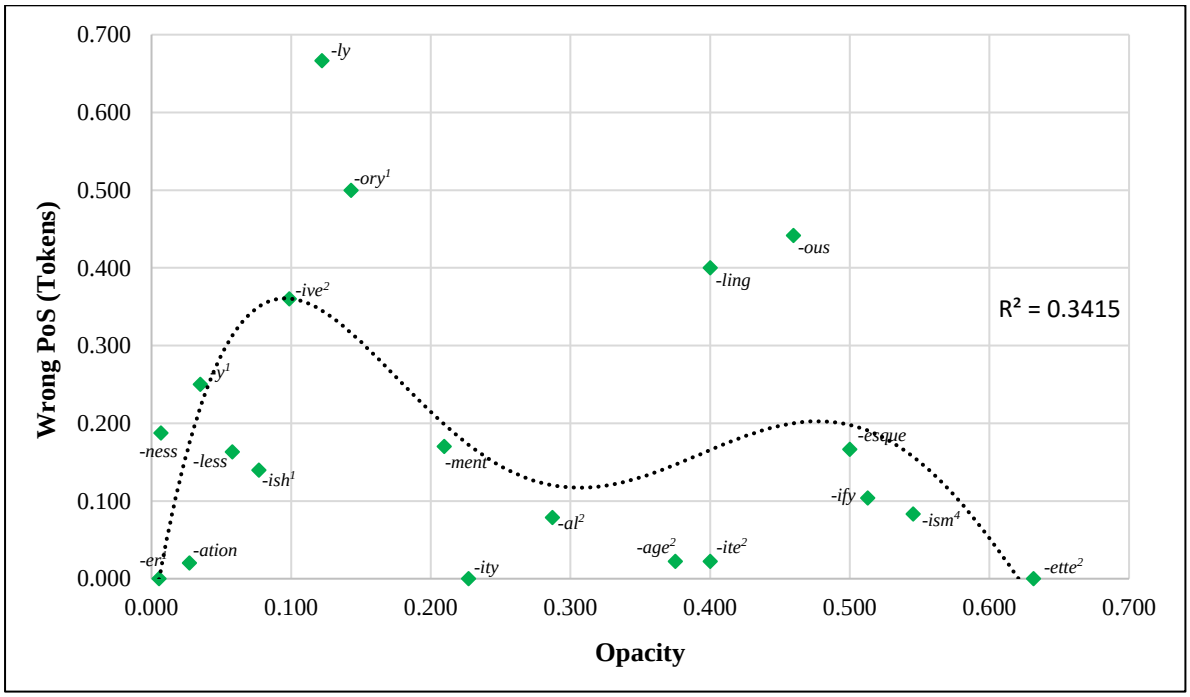

Figure 8.4: *Scatter diagram of Opacity scores against density of wrong-PoS definitions, showing non-significant relationship*.

An interesting phenomenon appears to be occurring with the data in Figure 8.4, except that in this case the concern is with grammatical information about the suffix rather than semantic: a polynomial trend line (R^2 = 0.312) demonstrates here that more is happening with regard to

Wrong PoS Tokens scores than can be explained alone by Opacity. There is a high peak at relatively low Opacity scores, and another at relatively high scores, and a trough in the middle; this suggests that participants more readily associate grammatical information regarding PoS with suffixes that have mid-range levels of Opacity, but not with those that have higher or lower levels. Since it was not found to be statistically significant, it is likely that another factor is influencing participants' reaction to the suffixes beyond the factor of Opacity; it is possible that this too is Prevalence, since several of those that score very highly for Wrong PoS Tokens (ly, ory, ous) have also fairly high Prevalence scores. As before, further study relating to Opacity is essential before any firm conclusions can be drawn.

It is also worth noting here the special case of *zombling* (-*ling*), discussed further in §8.2.2, in which many participants erroneously identified the inflectional morpheme -*ing* and hence gave definitions for a progressive verb or adjectival/nominal conversions thereof (e.g. 'walking like a zombie'). This demonstrates the relative strength of grammatical knowledge relating to inflectional over derivational morphology, given that it was preferable to many participants to identify a "false" neologistic verb base *zomble*, itself presumably a combination of *zombie* and verb-forming -*le*, and to conjugate this into its progressive form, rather than extend the definition of the noun base *zombie* into the intended meaning of 'a baby zombie'.

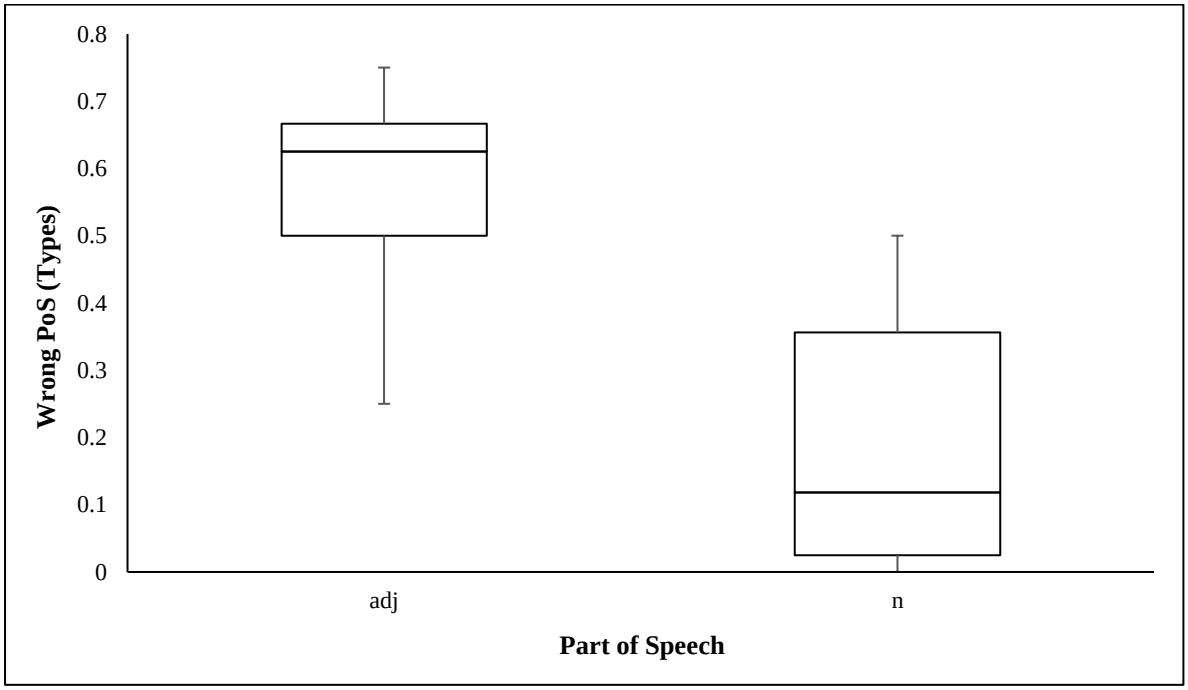

Figure 8.5: *Box plots for adjectives and nouns in relation to the range of different wrong-PoS definitions given*.

8.1.3 Part of Speech

The PoS of the resultant complex word neologisms following suffixation was also examined in relation to the definition scores presented in Table 8.2. In this case, there appeared to be an association between these categories and whether or not the correct PoS was identified in defining the word; this was confirmed with Kruskal-Wallis *H* tests on each of the scores, giving statistically significant results for Wrong PoS in both types ($\chi^2(2) = 10.319$, N = 20, $p < 0.01$, $\eta^2 = 0.518$) and tokens ($\chi^2(2) = 6.577$, N = 20, $p < 0.05$, $\eta^2 = 0.310$).

Figures 8.5 and 8.6 show box plots for adjectives and nouns for type and token Wrong PoS scores respectively; although the single verb neologism *wintrify* was included in the Kruskal-Wallis *H* test, it was not included in these diagrams as a plot cannot be drawn from only one data point. The comparison of these two diagrams, along with the significance levels and effect sizes, shows that the differences between adjectives and nouns in the PoS of the definitions given is more pronounced in terms of types than tokens. That is to say that, while participants do also give a greater number of definitions that are the wrong PoS when compared to nouns, the difference is more pronounced in terms of the variety of wrong-PoS definitions given. For nouns, even when some definitions are given that do not reflect the target PoS of the suffix, they tend towards the same meaning; for adjectives, on the other hand, the meanings of definitions that do not reflect the target PoS of the suffix are more

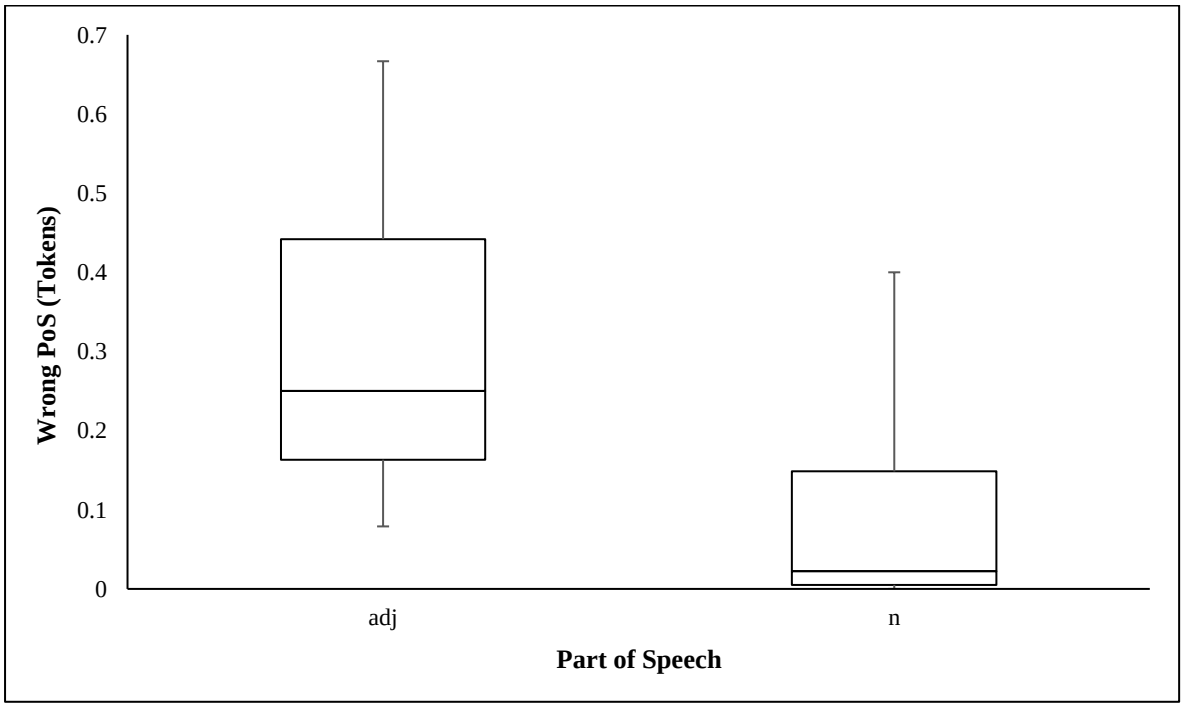

Figure 8.6: *Box plots for adjectives and nouns in relation to the density of wrong-PoS definitions given*.

varied. This is especially interesting as it contradicts the consideration that many of the adjective suffix have noun equivalents – for example, *-ive*[2] has a noun equivalent in *-ive*[3], *-ory*[1] in *-ory*[2] and *-y*[1] in *-y*[4] (see Appendix 1 for further details) – since, if this were the case, the wrong-PoS definitions of adjectives would tend towards a single noun equivalent. Further, the type/token difference is clear even for adjective neologisms where there is no standard noun equivalent, such as *-esque*, where 4 out of 6 definitions are the wrong PoS, or *-less*, where the same is true for 3 out of 4 definitions.

It was found in Chapter 5 that the nature of neologisms is changing, whereby there has been a great increase in the number of adjectival neologisms to the effect that they outnumber nouns at a ratio of almost 2:1 in the present-day data. It was suggested from the results of the analysis in §5.3.2 that this is because modern conversational speech is coming to more closely resemble that of the more formal registers in the past, since, although the ratio of adjectives to nouns in the CG neologisms is virtually 1:1, the ratio between the two PoSs overall in the CG corpus is very similar to that of the EAS, and differs from the DS. As such, the fact that adjective neologisms have been dramatically on the increase can be thought of as a natural result of an increase in register of everyday speech from the point of view of complex words. However, the data above suggests that, although word-formation has successfully adapted to this change, the interpretation of meaning out of context has not, since nominal definitions are provided for adjectival neologisms in a way that vastly outnumbers adjectival definitions provided for nominal neologisms. It should be remembered, however, that, while the neologisms were coined in conversation and therefore within a particular context, their recognition in this study is undertaken in isolation, and this may not reflect the frequency with which coinages are not understood by listeners in real conversations. Nevertheless, there is a clear discrepancy whereby word-formation is ahead of word-recognition in terms of the increase in register that is a feature of modern conversational speech.

8.2 Common Features of Definitions

The analysis above examines the DT data from the point of view of constituents and factors, mirroring the analyses that have come before. However, scrutinizing the definitions given by participants unearthed a number of interesting features that recur often throughout, and in this

section these are described in terms of the information they can provide about complex word formation, recognition and understanding. To avoid repetition throughout the rest of this section, it is mentioned again here that all in-context usages of the neologisms from which "correct" definitions have been drawn can be found in Appendix 7 (accompanying CD).

8.2.1 Base Misidentification

There are a number of instances in which the participant has clearly made an error in identifying the base word, even though the suffix appears to have been understood successfully. One such example is *homonymical*, from *homonym* plus an allomorphic variant of *-al*[2], with the meaning 'relating to homonyms'; here, although a number of definitions (whether correct or incorrect) refer to homonyms, 4 of the 8 definitions (accounting for 10 participants overall) are concerned with other topics, including humans (or, in some cases, men specifically), same-sex relationships, harmonies, or hormones. In each case it is clear where the misunderstanding has occurred, yet it is interesting that the focus in each case is on the first half of the base neo-classicism – the initial *homo-* morpheme – and appears to ignore the word-final *-nym*; this has implications for the way in which unknown neo-classicisms may be approached by speakers, which reflects other complex words in that there is an attempt to identify a "base" from the word-initial morpheme. It is also worth noting that the fact that the suffix is an allomorphic variant does not appear to have had an effect on the definitions given, supporting findings from other analyses in this thesis that this Base Factor does not discourage Creativity. Similar support can be found for the fact that Truncation does not discourage Creativity in the form of definitions for *napette* (*nap* + *-ette*[2], 'a short nap'). In this case, there are two alternative suggestions for the meaning of the base – *napkin* and *nappy* – the logic of both of which necessarily includes the truncation of the base and does not affect the understanding of the suffix. This demonstrates that truncation is a familiar process, as even the obvious base *nap*, present in its entirely, is overlooked in favour of the possibility of a truncated alternative, and this may be linked to the increasing tendency for speakers to generate blends (see §8.2.4 below).

Another misidentification of the base occurred with the neologism *Corbynite* from the name of the leader of the Labour Party and the suffix *-ite*[2], referring to followers and believers in the principles of the base, despite the fact that all participants were British and potentially familiar with UK politics. This is linked in part to a misidentification of the suffix in the same word (see the following section), as several definitions provided by participants referred to

minerals and explosives that would be more appropriate for an alternative form of this suffix, labelled *-ite*[3] in *MorphoQuantics* (Laws & Ryder 2014b), which forms such words as *graphite, meteorite* and *dynamite* and is not examined in this study. However, it is reasonable to conclude that this would be an unlikely interpretation of *Corbynite* if the base were correctly identified, since *-ite*[3] does not typically attach to personal names. Conversely, *-ite*[2] (as well as its adjectival form *-ite*[1]), not only commonly attach to personal names, but often to politicians in particular; it is quite likely, therefore, that those who did not recognize the intended meaning of this neologism are unfamiliar with the politician Jeremy Corbyn. Details such as this can provide useful reflections of the nature of politics in a culture, since the identification of *-ite*[3] in *Corbynite* necessitates a lack of awareness of Jeremy Corbyn, which may change over time alongside the political landscape. It can also provide a basis for studies that look in more detail into political opinion in the UK at a particular point in time, which could involve the comparison of reactions to *Corbynite* with other invented forms such as *Mayite* and existing forms such as *Blairite* and *Thatcherite*.

The above examples contrast with certain neologisms that were highly consistent in the theme of the definitions that were given, despite each nevertheless being different enough to the others to be categorized separately. For example, responses to the neologism *natality* (from *natal* + *-ity*, '(a) pregnancy') were categorized across 9 different definitions, all of which were in some way connected to pregnancy or birth (Table 8.3); this particular example is especially interesting in that, like *homonymical,* its base is itself both complex and opaque, having no ultimate Modern English form, yet the intended topic of meaning is not in dispute. Other examples that showed consistency in the topic of their definitions were *relaxment*, in which all definitions were connected to the base *relax*, and *Barbiesque*, the most vague

Table 8.3: *Definitions of* natality.

Neologism	**Definition**	
natality, n.	1.	(an instance of) pregnancy
	2.	(an instance of) birth
	3.	the place of one's birth
	4.	the time of one's birth
	5.	the birth rate
	6.	a new-born
	7.	the degree to which something is baby-like
	8.	the degree of motherly qualities something has
	9.	a party for babies

definition of which was simply ‘fashion’, but which can nevertheless be linked to the base *Barbie* given the typical paraphernalia related to the doll.

8.2.2 Suffix Misidentification

As well as the base, there are several instances in which the suffix itself is misinterpreted either as an alternative version or as a different suffix entirely. Some of these have been discussed already, such as cases where one suffix has an alternative version in a different PoS, or in the case of *Corbynite* in which the suffix is taken as *-ite*[3] (not part of the investigations in this project) instead of *-ite*[2]. There is also the case of *zombling*, unique in this study in that it is the only one whose suffix was misinterpreted as inflectional morphology attached to a completely different suffix. It is a fascinating case, since, as well as highlighting a natural tendency to identify inflections, it necessitates the acceptance of a different neologism, *zomble*, presumably created from *zombie* and the verb-forming suffix *-le*. This suffix did not form part of the investigations here, in part because of some dispute around its etymology and uncertainty about which words are genuine examples, but also because it forms verbs from words that are already verbs, and merely develops their meaning to have a durative element; for example, the telic sound *crack* becomes the iterative sound *crackle*. From the point of view then of many participants (15 of the 45 provided for *zombling*), the neologism here is *zomble*, with the meaning ‘to move around like a zombie’, which has been inflected into its progressive form.

Some other cases resemble that of *Corbynite* in that the suffix that has been identified in place of the correct one is another that has the same appearance but a different meaning. For example, *napette*, as well as the base misidentifications described above, was defined by one participant as ‘a child’s nappy, perhaps the female version’, reflecting the meaning of *-ette*[1] that forms feminine forms (*brunette*, *suffragette*), rather than that of diminutive *-ette*[2]. A more complex version of this occurred with the neologism *shortism*, with the obscure meaning of ‘a limited range of vocabulary’ which therefore falls under the suffix *-ism*[4], referring to medical conditions and deficiencies. Due to this obscurity, this was the only neologism that for which no participants gave the definition intended by the speaker in EAS14. However, no less than five versions of this suffix exist including *-ism*[4], and each of which is represented by the definition from at least one participant; this range of definitions is given in Table 8.4, along with an example definition from the responses recorded.

Table 8.4: *Examples of definitions for various interpretations of* short<u>ism</u>.

Base + Suffix	**Suffix Meaning**	**Example Definition**
short + *-ism*[1]	Patterns of action or behaviour characterized by the base	'A behaviour common to short people'
short + *-ism*[2]	A doctrine or belief system of the nature or person denoted	'obsession with all things short'
short + *-ism*[3]	Prejudice against the base	'Discrimination against short people'
short + *-ism*[4]	Medical conditions, deficiencies, and other scientific terms	'Being genetically short, like dwarfism'
short + *-ism*[5]	A kind of language showing elements of or typical of the base	'making things brief and to the point'

This demonstrates an awareness among participants of the full range of definitions available when presented with a particular form that could take on various meanings, as well as differences in the preferences of participants to prioritize one meaning over another. It may be, for example, that linguists favour *-ism*[5], while medical practitioners more often jump to *-ism*[4] first; this notion that one's professional background may prime one's recognition and interpretation of neologisms provides a fascinating area for future investigation. As mentioned in §5.2.1, there is also the growing interest in equality and an awareness of discriminatory ways of thinking that may lead more participants towards *-ism*[3] than would be the case in the past. Yet although *-ism*[1] and *-ism*[2] were not creative in the EAS14 data, they are nevertheless represented in participants' definitions, showing a continuing awareness of these uses despite the lack of Creativity.

There was also a single case in which the suffix of a neologism was misinterpreted in its form altogether. Although the context for *instruct<u>ory</u>* in the EAS shows that it is formed from *instruct* and adjective-forming *-ory*[1] with the meaning 'giving instruction', several participants broke this down instead into *instructor* and *-y* with various meanings, such as 'like an instructor' (*-y*[1]) or 'Words/text that provides instructions' (*-y*[4]). This shows that the breakdown of a word is not always intuitive, and perhaps that there is a preference to identify suffixes that have much higher Creativity (0.186 for *-y*[1] versus 0.045 for *-ory*[1]).

8.2.3 Degrees, Amounts and Measurements

In §5.1.2, it was noted that Group N3 nouns (Appendix 2), referring to degrees or amounts were among those that were fairly creative, containing two highly-creative members *-age*[2] and *-ness* rather than the single highly-creative member typical of most other groups. In the neologisms represented in the DT, only those of these two suffixes had "correct" definitions relating to amounts or degrees of the base; however, such definitions put forward by participants were found for a number of other neologisms, including some for which a noun definition was an instance of the wrong PoS. Table 8.5 lists the full range of suffixes that were ascribed this kind of definition: as well as *-age*[2] and *-ness*, noun-forming *-ity* was also used, and this too is a member of Group N3 and not an atypical example of how it may be used. It was also used for noun-forming *-ation* and *-ment*, which more typically fall into the category of N5, forming actions and instances of actions. Even more unusually, definitions of degrees and amounts were also found for adjective-forming *-ous* and *-ive*[2] as well as verb-forming *-ify*.

It is quite a curious phenomenon that there should be a pull towards Group N3 nouns, even extending so far as to include adjective- and verb-forming suffixes, and it is one that is hard to find an explanation for without further study. However, given the high level of Creativity of both *-age*[2] and *-ness*, which both belong to this same group, it is possible that their influence results in a fondness for creating or interpreting words to relate to degrees, amounts and measures in this way, bearing in mind that participants were aware in the first place that

Table 8.5: *Examples of respondent definitions referring to degrees/amounts of things*.

Neologism	**Suffix**	**Correct PoS**	**Actual PoS**	**Example Respondent Definition**
snowage	*-age*[2]	n	n	'The amount it's snowed'
orangeness	*-ness*	n	n	'How orange something is'
natality	*-ity*	n	n	'How baby like something is'
musication	*-ation*	n	n	'The level of music involved in a situation'
relaxment	*-ment*	n	n	'Measure of how relaxed one feels'
bargainous	*-ous*	adj	n	'How much of a bargain something is'
immersive	*-ive*[2]	adj	n	'How captivating or involving something is'
wintrify	*-ify*	v	n	'a measure of how cold and wet it is outside'

the study in which they were taking part examined new words in the language. It could provide interesting and more detailed findings to study neologisms from a wider range of definitions from all groups to see if this tendency continues to be applicable.

8.2.4 Other Common Features

As well as the larger categories of commonality among definitions outlined above, there were also a handful of more minor tendencies which may nevertheless be worthy of note.

A number of definitions made reference to forms of blending, either by implication or by an explicit statement from the participant, which may allude to the increase in this methodology in word-formation. A few instances were of particular note as they appear to have been employed for different reasons. For example, the word *relaxment* was suggested as a possible blend of *relaxation* and *enjoyment*, which may be a way of addressing the fact (correctly identified by this participant) that the meaning of *relaxment* as intended by the original speaker is no different to that of *relaxation*; by positing the blend, it gives an extra dimension to the meaning and makes sense of its coinage when otherwise a suitable word would already exist. On the other hand, another participant made the suggestion that *napette* could be a blend of both *napkin* and *serviette*; in this case, the opposite appears to be true, in that two highly synonymous words have been put together to create a third. A more creative example, and one that was not specifically stated as a blend by the participant, was a definition of *musication* as 'a musical holiday'; although it is not entirely clear what this definition means specifically, it is quite possible that the participant was considering the word to be a blend of *music* and *vacation*. It is difficult however to be certain of this when it is not explicitly stated by the respondent, since it is instead an association made by the researcher; indeed, even in cases where a blend is suggested by the respondent, the meaning is not entirely clear, as in the case of one who suggested that *zombling* was a blend of *zombie* with *wombling*, despite the non-existence of the latter. In any case, as has already been discussed, the increase in blending as a technique for word-formation is something that could be the subject of further study alongside derivation to determine the influence it may have on the interpretation of neologisms, as well as the role of Truncation in determining Creativity (§4.2.2).

An area that has been briefly mentioned regarding the neologism *shortism* is the tendency for participants to favour the more "usual" meanings of a suffix. Besides this example, a handful of neologisms had rather obscure meanings intended by the speakers, determined by

Table 8.6: *Real vs. typical definitions of certain neologisms*.

Neologism	**Intended Definition**	**Common Definition(s)**
short<u>ism</u> [short + *-ism*[4]]	‘ a limited range of vocabulary’	- bias against short people - the condition of being short
guest<u>y</u> [guest + *-y*[1]]	‘suitable for a guest’	- resembling a guest - full of / having guests
wintr<u>ify</u> [winter + *-ify*]	‘to apply the effects of winter to’	- to make something more winter-like
music<u>ation</u> [music + *-ation*]	‘music’	- the adding of music to something - the making of something into music or more musical

examining them in context in the EAS sub-corpus. Table 8.6 shows these words along with their intended meaning and examples of the more common definitions provided by participants. As discussed in §8.1.1, the unusual usage of these may influence the Correct Rate greatly, since it is not the participant who is employing an unusual version of the suffix but rather the original speaker.

A final point of note is in the attitudes towards some of the neologisms as implied by the definitions that were given. The vast majority of definitions were neutral, and indeed the instructions for the DT did not suggest that opinions about the words were required; nevertheless, it is clear that some respondents felt strongly enough that their opinion came through in the definitions they gave. In some cases this did not relate directly to the neologism itself (*Corbyn<u>ite</u>*, for example, gave the opportunity for some to hint at their political persuasion), but in others there were clear negative opinions about the use of the words; for example, *relax<u>ment</u>* was described as ‘odd’ and ‘wrong’ by two respondents, while *music<u>ation</u>*, more extremely, was described by one as ‘appalling’. It is possible that these opinions relate to the usefulness of the word since, as has already been discussed, both of these cases do not as clearly fill gaps in vocabulary as many of the other examples of neologisms. On the other hand, other participants expressed their approval of some words, going so far as to say that they already considered some to exist or even claimed to use them already; this was true for *wintr<u>ify</u>*, *Corbyn<u>ite</u>*, and especially *immers<u>ive</u>*, with one participant saying ‘I can’t believe this isnt [sic] a real word’. This latter example is likely to have been familiar to a number of participants as its frequency has grown significantly since the 1990s in the Google Books *Ngrams* data, and is perhaps an example of a widespread term that has

not yet achieved the necessary criteria to be included in the OED as a part of the language. Curiously, this did not appear to correlate necessarily with those words that were defined either consistently or whose Correct Rate was especially high; for a number of examples, there were no claims of prior knowledge or use for *Barbiesque* (0.813), *coffeeless* (0.837), *grannyish* (0.860) or *critiquer* (1.000). Again, further study into the "usefulness" of neologisms in relation to attitudes towards them may be worthwhile to better understand these findings.

8.3 Definitions of Nonsense Words

As described in §6.4.1, the DT included 5 nonsense words alongside the 20 neologisms that were given an unusually high 'yes' response in the JT, meaning that participants claimed to be able to discern some kind of meaning from them. These are given in Table 8.7 along with their relevant scores (there is no score for Correct Rate in this case, since there were no original usages from which to determine intended meanings of the words).

Table 8.7: *Scores for various aspects of definitions identified for each nonsense word used in the DT.*

Neologism	Response Rate	No. of Definitions	Correct Rate	Wrong PoS	
				Types	Tokens
manilation	0.440	11	-	0.273	0.136
fleater	0.460	11	-	0.273	0.130
chastutory	0.460	9	-	0.667	0.391
quoyish	0.480	8	-	0.250	0.083
gleazeless	0.340	9	-	0.000	0.000

All three adjectives and both nouns exhibited suffixes that were non-opaque, and three of the five (*fleater*, *quoyish*, *gleazeless*) were non-prevalent. In general, the definitions that were given for each word strongly reflected the real words that the pseudo-bases most closely resembled; while this is unsurprising, it is of interest as it demonstrates the ability of participants to extract known suffixes even from words that are necessarily opaque. In addition, despite the lack of successful input from the base, responses frequently reflected legitimate definitions of the suffix, and indeed several respondents offered no meaning discerned from the base but instead gave "pure" definitions using the suffix only. This

phenomenon is explained in greater detail in the sub-sections below in terms of the individual words, as well as other interesting features of note from each.

8.3.1 'Manilation'

A number of the definitions given for *manilation* reflected the most obvious part of the nonsense base, in that they related to *man*/*men* and related topics; for example, 'the manly way of doing things' or 'make something involve men'. Others extended the base slightly further, relating it to *manipulation*: one respondent suggested it could be a shortened or slang form, while another merely defined it as having the same meaning. Two respondents combined both of these approaches, with definitions that reflected manipulation of or by men specifically; this may imply that these respondents were looking at the word from the point of view of a blend, combining the two elements together, although influenced by the fact that the whole of the word *man* appears in *manipulation*.

Other definitions also showed strong possibilities of being approached from the point of view of blends by those that provided them, although these were rarely stated explicitly and so the suggestions here are more speculative than examples given for neologisms §8.2.4. One definition of 'male happiness' may suggest a blend of *man* with *elation*; this is curious as, although the spelling does not reflect the initial part of the second word, the sound is identical, suggesting a degree of phonological influence on defining new words independent from the spelling even when the word is read rather than heard. Another definition, 'masculine rehabilitation', suggested a blend with this latter word, although it is unclear precisely what is meant by the whole; another combined with *mutilation* in a rather specific way to suggest 'a man who undergoes genital mutilation'. The connection with *mutilation* may also be present in 'Ruining one's manicure' provided by one respondent, although it is possible that this is not based on a blend but rather the Latin root of the base, since a number of other respondents gave definitions that were in some way linked to *hands* (Latin *manus*); however, it cannot be concluded from this alone that participants had knowledge of the Latin root, since other definitions relating to *hands* may be linked more directly to *manicure*, *manipulate*, and other modern English words in which this root appears. This nevertheless demonstrates the role the base has to play even in non-transparent words, since it may yet provide input from knowledge about non-English or obsolete bases, whether directly from the classical root or via other non-transparent English words.

A few definitions extended the base further, referring to some kind of process relating to the city of Manila in the Philippines; however, their identification of the base went further, as it was suggested that it was not just related to Manila, but rather 'the act of causing something or somewhere to resemble or become reminiscent of the city of Manila'. The base identified is therefore *manilate*, itself from a neologistic *Manila + -ate*[3], which has been nominalized through *-ion*. This is interesting as both of these suffixes were somewhat less creative than *-ation* in all three databases, with the single *-ion* neologism (*inflention*) caused by a lapse in memory of the correct word ending rather than a linguistic gap. A single "pure" definition took the same approach, where the respondent admitted to not knowing the meaning of the root word claimed the whole would mean 'a measure of how manilated something is'. This once again provides evidence to suggest that, although certain suffixes appear to be generally more creative than others, it is a mistake to assume that speakers do not have sufficient knowledge of less creative ones to generate and identify neologisms that employ them.

8.3.2 'Fleater'

Definitions for *fleater* were mostly split across two kinds of definition that broadly reflected the same pull towards the most obvious part of the base as in *manilation*. The first related to fleas, although this varied somewhat between referring to a flea itself or someone/thing that has fleas or 'regularly interacts with' fleas; like *manilation*, this is interesting in that it looks only at part of the base and ignores the 't' that comes before the base, perhaps suggesting acceptability of this form as an allomorph, although it occurs only once in all six *-er* suffixes examined in this study in an entry for derogatory *-er*[6]. The second large set of definitions related to quick movement or brevity in some way; this is likely to be related to the word *fleeting* (itself from an obsolete verb *fleet*), and highlights again that phonology may be superior to spelling given the difference here.

Almost all other noun definitions given were agentive in some way, including "pure" definitions that were generally given as 'one who fleats', even though no meaning of *fleat* was offered. Some of these again showed signs of the influence of blending, such as with *eater* ('eater of fleas', 'a quick eater'), with *theatre* ('a pop-up theatre', 'a theatre that shows films'), or with *sweater* ('fleece like sweater'). It is possible that, in the latter two examples, the word *fleater* is, to the respondents, pronounced /flɪətə/ and /fletə/ respectively (rather than /fliːtə/) to rhyme with the proposed blends; studies in which participants are required to read neologisms could form the basis of further research into the interpretation of neologisms in

this way. Interestingly, one definition referred to an alternative *-er* suffix: one respondent offered the definition 'A person. I don't know what they do, but feels like this is a job title/description.' This refers specifically to *-er*[5], forming occupations from nouns such as *astronomer*, *draper* and *photographer*, and which is shown to be fairly creative through the EAS14 examples *electrocutioner*, *resourcer* and *Youtuber*; despite the relatively low level of Creativity of *-er*[5] by comparison to *-er*[1] and *-er*[2], it is nevertheless still an available and plausible option when encountering *-er* neologisms where the base could reasonably be interpreted as a noun.

8.3.3 'Chastutory'

Once again the definitions of *chastutory* were mainly split across two interpretations of the base, both of which strongly reflected words that were near-matches; these related to the verb *chastise* and the adjective *chaste*, with most definitions along the lines of 'in a critical, corrective manner' or 'something that keeps one chaste is chastutory'. Although the graphemic and phonetic links between these interpretations are reasonable, and that there is no frame of reference for whether the initial syllable is pronounced /ʧeɪs/ or /ʧæs/, it is nevertheless a necessary stage of arriving at these definitions to overlook the entire pseudo-base, *chastute*, in favour of an alternative that requires an allomorphic variant of *-ory*[1] to be used in *-utory*. This variant does not exist in the EAS14 data, and in fact the forms *contributory* and *statutory*, from *contribute* and *statute*, would seem to suggest a basis upon which to extract the whole pseudo-base *chastute*; however, the allomorphic variant *-atory* is relatively common in both *-ory*[1] and *-ory*[2], and it may be that this is in some way influential in the identification of *-utory* as another alternative, as well as the strength of the association with either *chastise* or *chaste*.

This nonsense word was the only one out of the five for which no "pure" definitions were given, which may be linked to the fact that it also to a large degree had the highest proportion of definitions that were not of the correct PoS. Since, out of the five suffixes used in these nonsense words, it is the only one for which there is an equivalent noun version, this is perhaps not surprising; however, it should be remembered that the analysis in §8.1.3 showed a tendency towards wrong-PoS definitions even for adjectives that do not have such equivalents, such as *-esque*. It is possible therefore that its high Prevalence (5.190) combined with a relatively low frequency (21 plemmas) is in part responsible for both the lack of ability

in respondents to give "pure" definitions using only the suffix and the increased variety in identifying which PoS the word belongs to.

8.3.4 'Quoyish'

The nonsense word *quoyish* was the most consistently defined of the five, a fact which is especially curious given that its pseudo-base is not as clearly related to a word or words in English as perhaps *chastutory* or *fleater*. More than half of the respondents (62.5%) gave definitions that related to *shy* or, in some cases, *coy*; the latter of these may be more relevant as it is possible that the word was read as /kɔɪɪʃ/ rather than /kwɔɪɪʃ/, again providing a phonetic association rather than a graphemic one. Two respondents gave definitions that reflected a slightly different nature – 'careful or crafty' and 'cosy' – yet there is still a plausible link here to a similar theme given that all these words, as well as *shy* and *coy* have connections to small, delicate action or perhaps things that are comfortable and familiar. One definition related to *shy* included a negative opinion similar to that discovered for some neologisms in §8.2.4, describing it as a 'pretentious synonym'; it is difficult to discern exactly what should cause either *quoy* or *quoyish* to be regarded in such a way, but it is certainly interesting to note that even nonsense definitions can be the object of negative attitudes if they are perceived strongly enough to be in direct competition with an existing form with the same meaning.

Although there was a high level of consistency in definitions in terms of their interpretation of the base, this was less true of the identification of the suffix. In this case, *-ish*[1] forms part of a group of five graphemically identical suffixes, four of which are also adjectives and could thus be employed in the defining of *quoyish*. The high number of "pure" definitions reflects a handful of *-ish*[1] interpretations, such as 'a bit like a quoy' and 'something quoy-like', but also a number that reflect *-ish*[3], used in the formation of moderated adjectives (*biggish*, *highish*, *warmish*) – 'moderately quoy' and 'being quoy, but less obviously'; in these cases *quoy* is identified as an adjective rather than a noun. This was also the case for an alternative interpretation of *quoy* as a neologism formed from *quo* (as in *status quo*) and *-y*[1], to form a definition of *quoyish* given as 'at a level'. This is interesting given the fact that *quoy* would be phonologically demanding, likely requiring an intrusive /j/, and is perhaps more related to the adaptability and Creativity of *-y*[1] rather than being of note to the *-ish*[1] or *-ish*[3].

8.3.5 'Gleazeless'

The approach taken by most respondents to *gleazeless* was clearly different to the other nonsense words in that there was an attempt to define the pseudo-base *gleaze* prior to taking on the complex word as a whole; for example, one participants wrote 'Gleaze – something that is greasy and sly. Gleazeless – a lack of being gleasy.' Although there were 17 responses across 9 different definitions for this word, all of them (including five "pure" definitions) were clear and consistent in their inclusion of an element that stressed being 'without' whatever interpretation was made of the base. It is possible then that the meaning of the suffix *-less* is so universally familiar that the focus of the meaning rests on the base. This in turn may be because, although it is classified in this study as a Group A3 adjective ('causing / showing / full of', Appendix 2), it is unique in that it does so with negative force, a role that is more typically undertaken by prefixes (*un-*, *non-*, *ex-*, etc.). It is possible that the uniqueness of its role results in a much stronger association of its meaning with its form, and hence allows for consistent definitions to a much greater degree than many other suffixes.

Despite this consistency with the suffix, the definitions of the base are greatly varied. A handful, such as that given above, seem to imply a blend of *sleaze* with *grease* or, in some cases, *glee*; others are less clear, with six different definitions whose reasoning is much harder to identify and which were offered by only one respondent each, including 'without own agenda', 'without pasture' and 'without attachment to overt aesthetics'. In none of these cases is an explanation given as to the reasoning behind them or the English bases to which the respondents are connecting them; as such, there is a clear question raised here regarding those pseudo-bases that are associated clearly with an existing English base, and those that are defined without a clear reference, which could provide the basis of further study.

8.4 Conclusions to Chapter 8

Much of the statistical aspect to this analysis has provided reinforcements to conclusions already drawn earlier in the thesis, relating in particular to Prevalence and Opacity. It was again found that tendencies relating to the former were more statistically significant than the latter, but that there were clear indications of links between both and Creativity through a study of the definitions that were given to neologisms exhibiting suffixes with different levels of each. More prevalent suffixes are clearly associated with lower consistency in the way that

neologisms are interpreted, which naturally also results in more errors in the sense that the original speaker's intended meaning is not identified. This comes of course from the assessment of these neologisms in isolation rather than seeing and understanding them in context, and so the Correct Rates given do not necessarily reflect the degree to which failures in comprehension occur in real conversation; the purpose of these analyses is instead to explore how these phenomena can be related back to Creativity through the already-established characteristics of prevalent and non-prevalent suffixes in the earlier analysis.

Interesting statistical findings were however determined through examining the PoS of the complex words in relation to the definitions given, where it was found that this had a strong association with how often a definition was offered that matched the PoS that was intended by the speaker and the suffix. It is clear that adjective complex word neologisms are much more often defined by alternative PoSs than nouns, and this seems contrary to the findings of Chapter 5 that adjective neologisms are dramatically more common in present-day speech than in the two databases from the original BNC. This represents a discrepancy between the language used in speaking and the successful interpretation of meaning in listening, in that while the former leads register changes through the successful coining of complex words using adjective suffixes, this change has not yet filtered through to the latter, where the frequent nominal meanings interpreted reflect the fact that the ratio of adjectives to nouns was smaller in conversational speech from the past.

In addition to the above, a more qualitative analysis of the definitions provided has yielded a number of features that illuminate differences between individual words and the way they are interpreted. Most notably, it seems that the base and the suffix can be approached completely independently from each other when it comes to discerning meaning, but that both may also work together to provide a wider range of interpretations. It was the case that the base could be misidentified or even impossible to identify (in nonsense words), and yet the correct meaning of the suffix was extracted; equally, there were many cases where the range of definitions given all reflected the same interpretation of the base, but provided definitions with meanings that were different enough to be considered part of different suffix groups (Appendix 2) and hence separate from each other. Where the base and suffix are clear, but where there were multiple possibilities for the meaning of the suffix (such as *short<u>ism</u>*), the definitions given covered the full range of suffix interpretations while maintaining the clear theme of the base. "Pure" definitions, provided by some respondents to nonsense words,

highlight the fact that no input is required from the base to discern the relative meaning of the complex word to the simplex, well-established by long-standing methodologies such as the Wug Test (Berko 1958) for childhood inflectional morphological acquisition.

A number of instances showed that participants had no issue with creating their own neologisms that were not intentionally presented, if it gave way to a more robust aspect of morphological knowledge. For example, a great many participants were more prepared to independently coin *zomble* from *zombie* and conjugate it into its progressive form, a practice so commonplace as to trump the fewer processes required in breaking *zombling* down into the two morphemes *zombie* and *-ling*, since the productivity of inflectional *-ing* is so much the greater. Similar results were found in the nonsense words, where *manilation* was broken down into *Manila*, *-ate*[3] and *-ion* due to the high frequency of *-ion* words that are formed in this way, and *quoyish* was given an adjectival definition through first attaching *-y*[1] to *quo* due to the exceptionally high Creativity of this suffix. Certain features of the suffix, therefore – including Creativity – are strong drivers of the process by which neologisms (and nonsense words) are interpreted, greater even than the level of demand that this process might cause.

It is also worth reiterating here the influence of blending on alternative methods of neologism creation. Participants in this part of the study were told that the purpose was to examine new words, but not that there was necessarily a focus on derivational morphology and suffixes, and this appears to have left them free to identify blends that did not exist in the words they were asked to define. In some ways, this is the same phenomenon as that described above: blending is becoming so commonplace a method by which words are formed that it is sometimes trumping the alternative (and, in this case correct) approach that involves identifying the suffix element of a new word and developing meaning from it.

Relatively speaking, the qualitative part of this analysis has been small compared to the depth of the quantitative analyses of factors and constituents. However, this has been necessary as a means of creating a baseline from which such qualitative analyses can be made, since the establishment of such factors and constituents, as well as their relative behaviour and influence on Creativity, provides a novel perspective from which to view features such as those of the way in which participants define new complex words. As such, a great many directions for future research have been identified in this chapter; the following chapter goes on to draw together the findings from each stage of the analysis and consider in more detail

how such future research can or should be structured in order to build on the findings of this project.

9 CONCLUSIONS

The concept of the Creativity of a suffix has been examined from a variety of perspectives and approaches throughout this thesis, and in each analysis conclusions have been drawn as to what the data reveals about the ways in which speakers create new words using derivational morphology. The conclusions of these separate analyses have not been unrelated to each other, and so this final chapter seeks to synthesize the complete set of findings in order to determine the contributions of this thesis on the field of derivational morphology and neologisms overall. Creativity is examined first in terms of the ways in which speakers use it in real-life contexts, and the knowledge and skills they have in producing derivational neologisms; it is then considered in terms of the formality of conversational speech and the similarities and differences over the twenty-year time period from which the data were extracted; finally, Creativity is considered in terms of morphological processing, both from the point of view of the listener and the implications of this in the word formation process. The limitations of these findings are borne in mind throughout, and the chapter finishes with several proposals to develop the conclusions of this thesis through further research that takes these limitations into account.

It should be remembered that the term "Creativity" used throughout the analysis does not relate directly to notions of "productivity" as used in the literature (§2.3), but rather to the idea of non-productive innovation as put forward by Bauer (2001). It is not concerned with

any individual notion of productivity, whether this be the number of types in a suffix category, the raw number of new forms, nor features of the interaction between the morpheme and the base that result in the "availability" proposed by Corbin (1987; also Carstairs-McCarthy 1992). Instead, Creativity (in the sense used in this study and referred to by Bauer as creativity[3]) is something of a fusion of these first two notions, with the third examined separately though the lens of twelve factors that could potentially influence Creativity. Again, the Creativity score given to each suffix was calculated from a division of the number of neologistic plemmas by the total number of plemmas for that suffix (including those of the neologisms), thus resulting in a kind of "density" of new forms within a suffix category. It therefore represents the number of new forms that a suffix created in the databases as a function of its frequency, which was found to correlate extremely highly with the raw number of neologistic plemmas in every case.

9.1 Creativity and English Lay Speakers

This thesis began with the assertion that lay speakers are "experts" when it comes to derivational morphology whether they are aware of this fact or not, and in many ways this would appear to be undeniable from the data no matter which metric one is using. English speakers are simply very good at making new words, to the extent that they continue to do so even when presented with pre-coined neologisms to define; this was especially true in the case of *zombling*, in which many speakers confidently created the verb *zomble* from which they could infer an inflected form in the progressive construction. Although the focus throughout this thesis was on the creation of new forms by derivation, some evidence was brought to light of other methods, as many of the definitions given for neologisms included the possibility of blending; additionally, nominalization appears to be increasing in conversational speech, which may imply the creation of nouns by other methods too. Truncation, which is in many ways a similar process to blending involving suffixes, was shown to be evolving in the sense that, although it was found to be a more common feature in some of the older data, the ways in which it is applied in the newer data are more creative; it may be that the increase in blending as a method of word creation is in some way responsible for this. Some further evidence along these lines can be found in the formation of what appear to be new splinter forms, such as *-licious,* and the continued use of existing forms such as *-arific* and *-tastic*.

The reason for this high level of ability in creating new words using suffixes is, at least in part, due to the fact that speakers clearly have a good understanding of suffixes in the first place, in terms of both their grammatical and semantic rules. Evidence for this is in the fact that respondents often gave consistent definitions for the suffix part of a complex neologism where the base was ambiguous, such as in *orangeness* where the base could refer to either a colour or a fruit. To take this further, in instances of nonsense words in which no "correct" meaning could possibly be retrieved from the base, there was not only a consistency among the interpretation of the interaction between the suffix and the supposed base, but there were frequent "pure" responses that explicitly defined only the suffix, by explaining the relationship between the base and the complex word without defining the base. This harkens back to another point that was made in the Introduction (Chapter 1) to this thesis – that, although the meaning of a nonsense verb such as *bleem* may be impenetrable, the relative meanings of *bleemable*, *rebleem* and *bleemation* can be understood in terms of their relationship to the pseudo-base. This wide knowledge of suffix meanings is also demonstrated where the opposite phenomenon occurs – that is, where the base meaning is largely unambiguous, but where there are several possible interpretations of the suffix (i.e. it is highly polysemous). The clearest example of this in the data was the neologism *shortism*, which, although the intended definition of the speaker belonged to *-ism*[4] (Group N10 'medical terms' such as *autism* and *alcoholism*), interpretations were presented on all five *-ism* definitions used in these studies (see Table 3.1, §3.1). Speakers, therefore, clearly know and understand a wide range of suffixes, not as morphological elements of known and understood existing words, but as entities that carry grammatical and semantic information of their own even in isolation.

Although the ability of speakers to create and understand neologisms is extensive, there has been some evidence in this study of outside constraints that can be in place to hinder Creativity in certain areas. In general, this takes the form of social pressures, and in particular it has been suggested here that changing attitudes towards the prejudice of certain groups has played a part in changes to Creativity patterns for certain suffixes. For example, the feminine forms of *-ess* and *-ette*[1] were not found to be creative in the present-day data, despite the existence of one such neologism in CG94 (*chapess*) and no other clear reason why these should not produce new words; it is possible that a reduction in the use of existing feminine forms (such as *actress*) also discourages the creation of entirely new members of these suffix categories. This may be related to the increase in Creativity of the suffixes *-ism*[3] and *-ist*[4],

referring to prejudices against the group or quality identified by the base, since it is reasonable to suppose that a greater awareness of the principle of social equality creates the need for a wider range of terms with which to refer to different types of prejudice and those who adhere to it. It may furthermore be related to the surprisingly large jump in Creativity of Group A5 and A7 adjectives, which give comparisons of one concept to another or modify the description to be less definite; the desire, for example, to use the term *East-Asian<u>ish</u>* (*-ish*[2]), rather than simply *East-Asian*, may be a reluctance to commit to categorizing the object of description in too limited a way.

Pressures that may occur due to the demographics of a speaker – in particular, their gender, age group and education level – were not found to result in differences in responses to neologisms in these studies. However, tendencies were nevertheless apparent that might be borne out to more significant degrees in further study that attends to such differences with a greater focus and – as always – a greater number of participants. Some of these are consistent with recent literature on such topics, in particular Labov's (2001) proposition that women may be slightly ahead of men in terms of their use of new forms, as well as those that challenge notions that increased age results in a cognitive decline in language (Ramscar et al. 2014; Laws, Ryder & Jaworska 2017; Pichler, Wagner & Hesson 2018).

9.2 Creativity and Formality

It was stated in §9.1 that English speakers are highly adept at creating new words, and in some respects this appears to have been true in the data taken from twenty years ago, since it is clear that neologisms were still a key feature of both conversational speech and the more formal registers of the CG corpus. However, there are also undoubtedly a great many differences between the conversational speech of the two time periods, in particular relating to changes in register.

Direct diachronic comparisons of the DS94 data with that of EAS14 did not provide a huge amount of insight, except to observe that there is clearly a much wider range of creative suffixes in present-day speech and that these produce between them a much greater number of neologisms – indeed, more than twice as many. Although further conclusions could be drawn from an analysis of a larger amount of conversational data from each time period, this

finding is nevertheless relevant since the two base corpora were of virtually the same size, and that the data were normalized insofar as this is possible for plemma frequencies, which experience the same difficulties as type frequencies (Saïly 2011). However, the examination of the DS94 data proved invaluable in its comparison with CG94, enabling further insight into the relationship of the more formal register of the past with the conversational register of the present despite there currently existing no modern equivalent of the CG component of the original BNC.

There are a number of conclusions drawn from the analysis of all three databases together that suggest that conversational speech is increasing in formality, despite frequent commentaries to the contrary in mainstream media (Swan 2005; Brady 2013), in coming to more closely resemble characteristics of the CG corpus rather than the DS, even though the latter corpus was collected using the same methodology as the EAS. Interestingly, despite the fact that the density of neologisms is far greater in the newer data, the diversity of suffixes that are used to create them is very close to that of the formal older data; where, in the past, conversational speech tended to make use of a much smaller set of suffixes for the purposes of Creativity, it now seems to have branched out to those that were previously only found in more formal contexts. This includes a number of suffixes with Opacity scores higher than usual for the most creative suffixes, such as *-age*[1] (*book<u>age</u>*, *drive<u>age</u>*), *-age*[2] (*napp<u>age</u>*, *amp<u>age</u>*) and *-ary*[1] (*bind<u>ary</u>*, *migration<u>ary</u>*), and which may indeed therefore be associated with more formal registers. Furthermore, the topics of conversation themselves may be of relevance to drawing comparisons between the two sets of data, since there were a number of neologisms that occurred in both EAS14 and CG94, yet none that occurred in both CG94 and DS94 (without also occurring in EAS14); this suggests that, twenty years ago, the topics of conversation that revealed certain gaps in English vocabulary were different between the two registers, whereas now there is a larger amount of overlap.

On the other hand, there were certain differences between these two sets of data which suggest that there is more that can be concluded from further study; in particular, although the spread of suffixes that were "creative" (in the sense that they produced at least one neologism) was similar between EAS14 and CG94, the higher density of neologisms in the former tended to be spread across a smaller set rather than being evenly distributed, which was more accurately the case in the latter. It is possible that this is partly due to the spontaneity of the EAS14 speech: although speakers may wish to move towards more formal-

sounding conversational language, the fact that it is spontaneous, as opposed to the planning that might more typically go into formal speech, prevents speakers from consistently using as wide a range of suffixes in neologism creation as they might wish to. Beyond this, there appear to be mismatches between the neologisms created by the speakers and the interpretations of meaning by the listeners, in that, while speakers wish to appear more prestigious and mirror the language of more formal registers, the interpretation of the meaning of the neologisms that they create is somewhat lagging behind, in that there is less uniformity regarding the intended meaning in these more formal-sounding suffixes.

It is possible in fact that the speech of context-governed situations is also undergoing changes that could shed more light on the behaviour of the demographically-sampled speech. The fact that the factors of Complexity and Distinguishability significantly detracted from the Creativity of a suffix in CG94 suggests that, given the more careful planning involved in this kind of speech, speakers may be deliberately avoiding creating terms that are more difficult to understand, either because there are multiple suffixes involved or because they are more distinguishable and hence more readily associated with formal registers. It would be intriguing to discover that this trend was continuing into present-day context-governed speech, as it would suggest that the two registers examined are in fact coming together towards a mid-point at which they are very similar, rather than only one becoming like the other. The major obstacle in undertaking research of this kind is that there does not yet exist a modern equivalent of the CG corpus; however, were such a corpus to be compiled, it would certainly provide a great deal of potential for study in this area. In either case, it is possible that these changes are the result of an increase in average levels of education in the UK over the last twenty years; in 2017, for example, the Office for National Statistics reported a figure for the proportion of graduates in the UK population of 42%, up from just 24% in 2002. As well as being slightly linked to a decreased effect of Prevalence on reduced Creativity, this would explain the increase in knowledge of formal characteristics of derivational morphology and the way in which these are diffusing into conversational speech today.

9.3 Creativity and Morphological Processing

To anyone who has studied language from an academic standpoint, and, in particular, who has attempted to tame the beast that is morphology, it is not surprising to discover that the

data are not so simple as to conform to a clear list of the features that affect Creativity from most to least influential. Instead, more general trends were observed, which in turn led to more firm conclusions based on the further examinations that were derived from them in later analysis.

It appears to be the case that factors concerning the complex words as they present and behave in the language – here referred to as Derivative Factors – have stronger levels of influence over Creativity than those that are concerned with the base of the complex word and the changes that are undergone during the process of suffixation – the Base Factors. Although each was analysed separately and significant factors were uncovered, when all twelve were examined together, the Derivative Factors were consistently more significant. However, it was also observed that, while the above proved to be true for individual factors, there was a greater influence of Base Factors when more than one was taken together; specifically, sound and stress changes in the base, as well as the use of allomorphic variants of the suffix, served to explain a greater amount of the variance in Creativity than the combination of some of the Derivative Factors. This shows that, while the conclusion can be justified that factors relating to the derivative forms have more individual influence over Creativity based on the evidence presented in the analysis of factors, it is prudent to add the caveat that there is still a significant role played by those factors that are involved internally within complex words, especially as they appear in combination.

In spite of this qualification, the evidence in this thesis is abundant that the Prevalence of a suffix is strongly linked to its Creativity, in that a greater average Prevalence of the members of a suffix category results in a smaller degree of Creativity for that suffix. This is clear from its near-unique repeated significance throughout the analyses of influential factors, including the more formal CG94 data, which helps to account for the heavy presence of scientific texts in the Google *Ngrams* data on which the Prevalence score is based. It is also clear from the fact that the most creative suffixes in this study, spread more or less evenly throughout the various groups, were consistently non-prevalent; this is not to say, however, that all non-prevalent suffixes show signs of Creativity since a) there are many other factors involved in overall Creativity, and b) other non-prevalent members within the same group seem generally to be blocked by the more creative versions. It has been shown that the reason for this association between Prevalence and Creativity is that, the more prevalent the members of a suffix family are, the more often they are recognized through only the direct route, as

described in the Morphological Race Model (MRM) and the Parallel Dual-Route Model (PDRM) proposed in the literature (Frauenfelder & Schreuder 1992; Schreuder & Baayen 1995; Baayen, Dijkstra & Schreuder 1997). This also results in reduced consensus about the meaning of neologisms that employ prevalent suffixes, since the lack of the use of the parsed route reduces awareness of the grammatical and semantic rules of a given suffix, where they may otherwise have been identified and reinforced by a breaking-down of the complex word's constituent morphemes.

The Opacity of a suffix, too, plays an important role in terms of the route by which complex words are recognized and understood, and hence the Creativity of the suffix, although is important to distinguish it from Transparency as it relates to individual words within a suffix category as there is an important relationship between the two. An opaque suffix category is one in which there is a high concentration of non-transparent words relative to the whole set, but that does not mean that transparent members cannot be found; the reverse is true, where a non-opaque suffix category may nevertheless contain a number of non-transparent words among a larger concentration of transparent words. The fact that Transparency itself did not have a significant effect on recognition times is an extremely important one: it demonstrates the fact that non-transparent words may make use of both pathways to recognition, since this is certainly the case for transparent words and there would otherwise be a significant difference between semantic processing times for the two types; this notion is reinforced by the fact that nonsense words, which are necessarily non-transparent, are nevertheless broken down into constituent parts when an attempt is made to define them. This is relevant to the interpretation of the results for the interaction of Transparency and Opacity, since here it is the case that a high concentration of non-transparent words within a suffix category affects the processing only of members of that category that are themselves transparent; that is to say, while both transparent and non-transparent words may employ both pathways to recognition, this does not occur in opaque suffix categories – those that have a high concentration of non-transparent words. Since this is not the case for non-opaque suffixes, it can be inferred that there is a certain threshold that represents the point at which the concentration of non-transparent words in a suffix category is great enough that even transparent forms are no longer parsed and are instead recognized only via the direct route, resulting in a longer processing time. This threshold may be dependent on other factors that appear to have an effect on Opacity, such as Prevalence, which seems to be a stronger arbiter

of the pathways used in processing and could perhaps trump the relationship with Transparency.

While a number of the findings presented above support the notion of the PDRM, perhaps none do so as greatly as the fact that no cumulative effects could be found of multiple constituents in the processing of complex words. The constituents of non-real [r], prevalent [P] and opaque [O] each contributed significantly to an increase in semantic processing time, but under no circumstances was it the case that this processing time increased further with combinations of these constituents. Were processing time an open-ended phenomenon, it would be expected that an increase in the number of constituents that negatively affect it would have a cumulative effect, such that a non-real/prevalent/opaque [rPO] word would take much longer to process than one that featured only one of these constituents. Instead, a kind of "maximum processing time" is reached with only one of these constituents, and, taken with the other results throughout this thesis, this implies heavily that the presence of any individual constituent limits the range of processing methods that can take place in the recognition and understanding of a word. Only under the most favourable conditions, that of a real/non-prevalent/non-opaque [Rpo] word, is there an opportunity to make use of both the direct and parsed route in word recognition, and hence the semantic processing time is significantly reduced under these combined conditions. This is further supported by the fact that the yes/no responses given by participants were not significantly different between the Semantic Decision Task (SDT) and the Judgement Task (JT), implying that, even when participants are given an indefinite amount of processing time, there is nothing to be gained regarding judgements on whether or not meaning can be extracted from the word. It is therefore a conclusion of this thesis that the PDRM serves as a reliable model for the processing of complex words, as well as the further details of the factors and circumstances under which each pathway to recognition and understanding can be employed.

9.4 Limitations and Implications for Future Research

The analyses in this thesis have been somewhat successful in determining certain factors that are clearly linked to Creativity, whether those factors are associated with more or fewer neologisms, as well as the ways in which they interact with each other. However, it should never be assumed that the list of factors examined is exhaustive; although the most

comprehensive analysis to the author's knowledge, it remained subject to the limited time and resources that are the inevitable pitfall of any research project. Other factors – such as the polysemy of suffixes, their phonotactic constraints in the word-endings to which they can attach, and the family size of the base words – could be the focus of further analysis along the same lines as presented here. Additionally, some of the factors that were under scrutiny in this project were perhaps not as satisfactory as they could have been, were the ideal resources available: for example, in an analysis of spoken language, Distinguishability should be based on those word-endings that match the suffixes phonetically, not graphemically, yet a corpus of speech does not exist (and would be a project of unfathomable dimensions) that is presented in phonetic transcript of any depth; similarly, despite its clear links to Creativity, the measures of Prevalence were taken from written materials as equivalent spoken data was unavailable. In the same way that new opportunities have arisen between the compilation of the original BNC and the Spoken BNC2014, it is hoped that, as innovative resources are developed in the future, they will lead to further methods of continuing this research using more accurate measures.

Along similar lines, it has been made clear at several points throughout this thesis that the compilation of a present-day equivalent of the CG corpus in the origin BNC is nothing short of essential. The Spoken BNC2014, as a modern counterpart to the DS corpus, has already been a hugely successful endeavour, enabling research into changes in English on a scale that has rarely been achieved in the past, and has uncovered a great deal in terms of changing register features in conversational speech in this project alone. However, as has been noted, the clear downside is in the mismatch between the demographic split of the EAS corpus with that of the DS corpus; a correction of this, either such that the two corpora match or at least that the recent corpus reflects countrywide distributions, would be a welcome development to the final corpus. In addition, the completion of the square of speech corpora would help to solidify these invaluable findings through the examination of neologisms across all four datasets, and to explore the questions that have arisen in this thesis regarding the notion that, while conversational speech is coming to resemble more formal registers, perhaps context-governed speech is in turn coming to resemble more informal registers. Having these four corpora could of course also help identify patterns of convergence and divergence diachronically between registers of speech in areas beyond morphology.

Finally, it is clear from these experiments that the examination of the results in terms of gender, age group and education level – not to mention other demographic strands that were not considered – is incomplete. This is largely due to the fact that it was not the primary focus of this already comprehensive and broad project; future endeavours could not only include a greater number of participants with a more even demographic split, but also consider the implications of the sociolinguistic features on the results of the Definition Task, where currently there is not enough data to draw satisfactory comparisons. Gender, age group and educational level could also be examined from the point of view of the speakers themselves (using metadata from the corpora) and how they are associated with the types of neologisms that are produced, in terms of the factors that have been considered as well as conventional versus original meanings in the employment of suffixes.

Beyond studies that seek to address the limitations of the results of this thesis, there are those that can take advantage of the conclusions that have been reached; for example, findings regarding the "maximum processing time", which support the PDRM theory, can use the measurements herein as something of a standard to which further processing times can be compared as they are used to measure different conditions. Additionally, having established that Opacity can play an ambiguous role in its influence on Creativity, depending on whether or not it is above or below a certain threshold, further study could go deeper in order to determine where this threshold lies. In any case, whichever directions are chosen for further study, it is hoped that the findings in this project can serve as a baseline to continue the study of morphology in this way both in the near future and, perhaps, over the evolution of the English language during the next twenty-year period.

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GLOSSARY OF KEY TERMS

Allomorphic Variant (AV)
A Base Factor with a score of 0 or 1, determined by whether or not the complex word features an allomorph of the suffix. Also, a mean value of this for all words in a suffix category.

Atypical PoS (AP)
A Base Factor with a score of 0 or 1, determined by whether or not the complex word's base is of a standard part of speech for the suffix. Also, a mean value of this for all words in a suffix category.

Base Factor
One of eight factors involved in the suffixation process, determined by various qualities of the interaction between the base and the suffix. The set of Base Factors includes Stress Transfer (ST), Sound Change (SC), Truncation (TC), Semantic Shift (SS), Atypical PoS (AP), Complexity (CX) and Allomorphic Variant (AV).

Complexity (CX)
A Base Factor with a score of 0 or 1, determined by whether or not the complex word's base itself contains a suffix. Also, a mean value of this for all words in a suffix category.

Component
A set of Derivative and/or Base Factors, compiled together by a Principal Components Analysis as those that measure the same phenomenon.

Constituent
One of four features of a complex word that can be either present or absent. The set of components includes Transparency [T/t], Realness [R/r], Prevalence [P/p] and Opacity [O/o].

Convertibility (C)
A Derivative Factor with a score between 0 and 1, obtained by a division of the number of plemmas that have been zero-derived from a suffixed word to an alternative part of speech by the Frequency for that suffix.

Correct Rate
A score between 0 and 1, obtained from a division of the number of definitions of a neologism that match the intended meaning by the Number of Definitions for that neologism.

Creative
Of a suffix, having a Creativity score greater than 0, thus producing at least one neologism in the database in question.

Creativity
A score between 0 and 1 measuring the degree to which a suffix creates new words, obtained by a division of the number of neologistic plemmas by the Frequency of the suffix (including those neologistic plemmas).

Definition Task (DT)
A task in which participants are required to define neologisms based on any meaning they are able to extract.

Derivative Factor
One of five factors concerning features of resultant derivatives after suffixation. The set of Derivative Factors includes Prevalence (P), Opacity (O), Regularity (R), Convertibility (C) and Distinguishability (D).

Direct route
A method of processing a complex word in which its meaning is identified through its recognition as a single unit, without being broken down into its constituent morphemes.

Disposable word
A neologism that is created for a single use or single conversation and is then discarded, resulting in its lack of recognition in dictionaries of English.

Distinguishability (D)
A Derivative Factor with a score between 0 and 1, obtained by a division of the Frequency of a suffix by the number of words in which its form appears in English as a whole. Further specifics concerning the calculation of this score can be found in §3.3.5.

Frequency
The raw number of plemmas and tokens for each suffix in each of the three databases.

Highly-creative
Of a suffix, showing an especially high number of neologisms or having an unusually high Creativity score compared to other suffixes in the database in question.

Judgement Task (JT)
A task in which participants are required to make judgements as to whether or not they believe they can extract any meaning from a set of 40 words, including neologisms and nonsense words.

Morphological Race Model (MRM)
A model proposed by Frauenfelder & Schreuder (1992) in which the processing of complex words can be achieved by either a direct or parsed route, and in which there is a race between the two routes to achieve this processing.

MorphoQuantics
A freely-available database of complex word data from the DS and CG components of the BNC, constructed by Laws & Ryder (2014b) and available from http://morphoquantics.co.uk/

Neologism ([Tr])
A transparent/non-real word that has been created by a speaker in one of the databases studied, which is determined by its lack of entry in the OED.

Non-creative
Of a suffix, having a Creativity score of 0, thus producing no neologisms in the database in question.

Non-opaque ([o])
Of a suffix category, having a low number of non-transparent members relative to the complete suffix set.

Non-prevalent ([p])
Of a suffix category, having a low overall Prevalence score relative to the complete suffix set.

Non-real ([r])
Of a complex word, not being a legitimate member of the English language, determined by its lack of entry in the OED.

Nonsense word ([tr])
A non-transparent/non-real word invented for the purposes of study, assisted by the software Wuggy (Keuleers & Brysbaert 2010).

Non-transparent ([t])
Of a complex word, not having an extractable Modern English base.

Number of Definitions
The raw number of different definitions given for a neologism in the DT, determined by a combination of the interpretation of the base and the group (Appendix 2) to which the interpretation of the suffix belongs.

Opacity (O, [O/o])
A Derivative Factor with a score between 0 and 1, obtained by a division of the number of non-transparent plemmas by the total Frequency in a suffix category. Also, a constituent of a complex word referring to whether the suffix used is opaque or non-opaque.

Opaque ([O])
Of a suffix category, having a high number of non-transparent members relative to the complete suffix set.

Parallel Dual-Route Model (PDRM)
A model proposed by Schreuder & Baayen (1999) in which the processing of complex words can be achieved by either a direct or parsed route, or by both in parallel in a dual-route.

Parsed route
A method of processing a complex word in which its meaning is identified through a breakdown of its constituent morphemes and a combination of the recognition of each.

Plemma
A headword used to identify a set of entries in a database that include the form itself, as well as any inflected and prefixed forms.

Prevalence (P, [P/p])
A Derivative Factor with a score between 1 and 8, determined by a mean value of the frequency bands for each word in a suffix category based on those determined by the OED (2017) referring to the frequency of the word in the language as a whole. Also, a constituent of a complex word referring to whether the suffix used is prevalent or non-prevalent.

Prevalent ([P])
Of a suffix category, having a high overall Prevalence score relative to the complete suffix set.

Real ([R])
Of a complex word, being a legitimate member of the English language, determined by its entry in the OED.

Realness ([R/r])
A constituent of a complex word referring to whether the word itself is real or non-real.

Regularity (R)
A Derivative Factor with a score between 0 and 1, obtained from a division of the number of words in which the suffix is irregular in its pronunciation by the total Frequency in a suffix category.

Response Rate
A score between 0 and 1, obtained from a division of the Number of Definitions for a particular neologism by 50, representing the total number of participants who took part in the DT.

Semantic Decision Task (SDT)
A task in which participants must react as quickly as possible to word stimuli based on their judgement on whether or not they have been able to extract some meaning from the word.

Semantic Shift (SS)
A Base Factor with a score of 0 or 1, determined by whether or not the meaning of a complex word is discernible from a combination of the meaning of its base and suffix components. Also, a mean value of this for all words in a suffix category.

Sound Change (SC)
A Base Factor with a score of 0 or 1, determined by whether or not the base of a complex word has undergone a change in sound. Also, a mean value of this for all words in a suffix category.

Splinter
A type of morpheme defined by Lehrer (1998, 2007), created from an extraction of part of an existing word and applied to new words following similar patterns to suffixation, e.g. *-(a)holic* from *alcoholic* to form *work<u>aholic</u>* and *choco<u>holic</u>*.

Stress Transfer (TC)
A Base Factor with a score of 0 or 1, determined by whether or not the base of a complex word has undergone a shift in primary stress. Also, a mean value of this for all words in a suffix category.

Token/plemma ratio (TPR)
A division of the number of tokens in a suffix category by the number of plemmas, thus giving a score greater than 1 that shows the density of tokens per plemma for that category.

Transparency ([T/t])
A constituent of a complex word referring to whether the word itself is transparent or non-transparent.

Transparent ([T])
Of a complex word, having an extractable Modern English base.

Truncation (TC)
A Base Factor with a score of 0 or 1, determined by whether or not the base of a complex word has been truncated prior to suffixation. Also, a mean value of this for all words in a suffix category.

Wrong PoS (Types)
A score between 0 and 1, obtained from a division of the number of different definitions of a neologism that do not match the part of speech for the suffix by the total Number of Definitions for that neologism.

Wrong PoS (Tokens)

A score between 0 and 1, obtained from a division of the number of definitions of a neologism that do not match the part of speech for the suffix by the total number of responses given for that neologism.

APPENDIX 1: FULL SUFFIX SET

Table A1: *Full suffix set with pronunciation, part of speech and examples*.

Suffix	Pronunciation	Forms	From	Examples
-able[1]	/ əbl /	adj	v	*debatable, movable*
-able[2]	/ əbl /	adj	n	*comfortable, knowledgeable*
-ade	/ eɪd /	n	v	*crusade, renegade*
-age[1]	/ ɪdʒ /	n	v	*breakage, package*
-age[2]	/ ɪdʒ /	n	n	*shortage, wattage*
-age[3]	/ ɪdʒ /	n	n	*orphanage, vicarage*
-al[1]	/ əl /	n	v	*burial, upheaval*
-al[2]	/ əl /	adj	n	*exceptional, professional*
-an[1]	/ ən /	adj	n/prop-n	*dystopian, Russian*
-an[2]	/ ən /	n	n/prop-n	*Austrian, historian*
-ance[1]	/ əns /	n	v	*defiance, performance*
-ance[2]	/ əns /	n	adj	*brilliance, significance*
-ancy	/ ənsi /	n	adj	*infancy, redundancy*
-ant[1]	/ ənt /	adj	v	*malignant, observant*
-ant[2]	/ ənt /	n	v	*coagulant, participant*
-ar	/ ə /	adj	n	*circular, polar*
-ard	/ əd / ; / ət /	n	adj/n	*drunkard, Spaniard*
-arian[1]	/ ən /	adj	n	*humanitarian, utilitarian*
-arian[2]	/ ən /	n	n	*libertarian, vegetarian*
-arium	/ 'eəriəm /	n	n	*aquarium, planetarium*
-ary[1]	/ əri /	adj	n	*elementary, secondary*
-ary[2]	/ əri /	n	n	*dictionary, missionary*
-ate[1]	/ ət /	adj	n	*compassionate, fortunate*
-ate[2]	/ ət /	n	n	*certificate, doctorate*
-ate[3]	/ eɪt /	v	adj/n	*facilitate, pixelate*
-ation	/ 'eɪʃən /	n	v	*combination, taxation*
-cy	/ si /	n	adj/n	*bankruptcy, legitimacy*
-dom	/ dəm /	n	adj/n	*boredom, serfdom*
-ed	/ t / ; / (ɪ)d /	adj	n	*cultured, prejudiced*
-ee	/ 'iː /	n	v	*employee, interviewee*
-eer	/ 'ɪə /	n	n	*auctioneer, musketeer*
-en[1]	/ ən /	v	adj/n	*freshen, strengthen*
-en[2]	/ ən /	adj	n	*golden, woollen*
-ence[1]	/ əns /	n	v	*conference, preference*
-ence[2]	/ əns /	n	adj	*convenience, patience*
-ency[1]	/ ənsi /	n	v	*dependency, residency*

Suffix	Pronunciation	Forms	From	Examples
-ency[2]	/ ənsi /	n	adj	*consistency, solvency*
-ent[1]	/ ənt /	adj	v	*absorbent, persistent*
-ent[2]	/ ənt /	n	v	*deterrent, repellent*
-er[1]	/ ə /	n	v	*builder, juggler*
-er[2]	/ ə /	n	adj/n	*foreigner, pensioner*
-er[3]	/ ə /	n	v	*heater, silencer*
-er[4]	/ ə /	n	adj/n	*fiver, one-liner*
-er[5]	/ ə /	n	n	*geographer, roofer*
-er[6]	/ ə /	n	n	*plonker, poofter*
-erly	/ əli /	adj	n	*northerly, westerly*
-ern	/ ən /	adj	n	*eastern, southern*
-ery[1]	/ əri /	n	adj/n	*gadgetry, rivalry*
-ery[2]	/ əri /	n	v/n	*nunnery, rockery*
-ese[1]	/ 'iːz /	adj	n/prop-n	*Burmese, Vietnamese*
-ese[2]	/ 'iːz /	n	n/prop-n	*Chinese, Portuguese*
-esque	/ 'esk /	adj	n	*picturesque, statuesque*
-ess	/ es / ; / əs /	n	n	*countess, stewardess*
-et	/ ɪt / ; / ə /	n	n	*couplet, helmet*
-ette[1]	/ 'et/	n	n	*ladette, suffragette*
-ette[2]	/ 'et/	n	n	*cigarette, kitchenette*
-fic	/ fɪk /	adj	n	*horrific, scientific*
-ful[1]	/ fʊl /	adj	n	*hateful, powerful*
-ful[2]	/ fʊl /	adj	v	*forgetful, resentful*
-ful[3]	/ fʊl /	n	n	*cupful, roomful*
-hood	/ hʊd /	n	adj/n	*knighthood, priesthood*
-i[1]	/ i /	adj	n/prop-n	*Israeli, Yemeni*
-i[2]	/ i /	n	n/prop-n	*Bangladeshi, Omani*
-ian[1]	/ iən /	adj	n/prop-n	*Edwardian, reptilian*
-ian[2]	/ iən /	n	n/prop-n	*civilian, Parisian*
-ian[3]	/ iən /	adj	prop-n	*Darwinian, Orwellian*
-ian[4]	/ iən /	n	prop-n	*Christian, Keynesian*
-ible	/ əbl /	adj	v/n	*deductible, reversible*
-ic	/ ɪk /	adj	n	*hygienic, realistic*
-ice	/ ɪs /	n	adj/n	*cowardice, justice*
-ician	/ 'ɪʃən /	n	n	*dietician, politician*
-icle	/ ɪkl /	n	n	*icicle, particle*
-ie[1]	/ i /	n	adj/n	*brownie, selfie*
-ie[2]	/ i /	n	n	*brekkie, nightie*
-ier	/ 'ɪə / ; / iə /	n	n	*financier, lawyer*
-iety	/ 'ɑɪəti /	n	adj	*notoriety, sobriety*
-ify	/ ɪfɑɪ /	v	adj/n	*diversify, solidify*
-ile[1]	/ ɑɪl /	adj	v	*erectile, projectile*

Suffix	Pronunciation	Forms	From	Examples
-ile[2]	/ ɑɪl /	adj	n	*infantile*, *senile*
-ine[1]	/ ɑɪn /	adj	n/prop-n	*estuarine*, *masculine*
-ine[2]	/ iːn /	n	n	*figurine*
-ing	/ ɪŋ /	n	n	*flooring*, *towelling*
-ion	/ ən /	n	v	*dedication*, *narration*
-ish[1]	/ ɪʃ /	adj	n	*hellish*, *studentish*
-ish[2]	/ ɪʃ /	adj	v	*stand-offish*, *ticklish*
-ish[3]	/ ɪʃ /	adj	adj	*cheapish*, *warmish*
-ish[4]	/ ɪʃ /	adj	n/prop-n	*Cornish*, *Turkish*
-ish[5]	/ ɪʃ /	n	n/prop-n	*Polish*, *Swedish*
-ism[1]	/ ɪzm /	n	adj/n	*activism*, *hooliganism*
-ism[2]	/ ɪzm /	n	adj/n/prop-n	*Buddhism*, *spiritualism*
-ism[3]	/ ɪzm /	n	adj/n	*racism*, *sexism*
-ism[4]	/ ɪzm /	n	adj/n	*autism*, *rheumatism*
-ism[5]	/ ɪzm /	n	adj/n/prop-n	*truism*, *Yorkshirism*
-ist[1]	/ ɪst /	n	adj/n	*duellist*, *finalist*
-ist[2]	/ ɪst /	adj	adj/n/prop-n	*capitalist*, *Marxist*
-ist[3]	/ ɪst /	n	adj/n/prop-n	*feminist*, *Scientologist*
-ist[4]	/ ɪst /	n	adj/n	*ageist*, *racist*
-ist[5]	/ ɪst /	n	n	*cosmologist*, *novelist*
-ite[1]	/ ɑɪt /	adj	n/prop-n	*Canaanite*, *transvestite*
-ite[2]	/ ɑɪt /	n	n/prop-n	*socialite*, *Thatcherite*
-ition	/ ˈɪʃən /	n	v	*position*, *recognition*
-itis	/ ˈɑɪtɪs /	n	n	*conjunctivitis*, *sinusitis*
-itude	/ ɪtjuːd /	n	adj	*aptitude*, *solitude*
-ity	/ ɪti /	n	adj	*extremity*, *reliability*
-ive[1]	/ ɪv /	adj	n	*authoritative*, *massive*
-ive[2]	/ ɪv /	adj	v	*deceptive*, *responsive*
-ive[3]	/ ɪv /	n	v	*depressive*, *explosive*
-ize	/ ɑɪz /	v	adj/n	*idealize*, *randomize*
-kin	/ kɪn /	n	n	*lambkin*, *munchkin*
-less	/ ləs /	adj	n	*faceless*, *meaningless*
-let	/ lɪt / ; / lət /	n	n	*booklet*, *piglet*
-like	/ lɑɪk /	adj	n	*child-like*, *dream-like*
-ling	/ lɪŋ /	n	adj/n	*duckling*, *seedling*
-ly	/ li /	adj	n	*friendly*, *homely*
-manship	/ mənʃɪp /	n	n	*craftsmanship*, *workmanship*
-ment	/ mənt /	n	v	*payment*, *punishment*
-ness	/ nəs /	n	adj	*madness*, *usefulness*
-o	/ əʊ /	n	adj/n	*weirdo*, *wino*
-ock	/ ɒk /	n	n	*bullock*, *paddock*
-or[1]	/ ə /	n	v	*distributor*, *investor*

Suffix	Pronunciation	Forms	From	Examples
-or[2]	/ ə /	n	v	*incubator, simulator*
-ory[1]	/ əri /	adj	v	*contradictory, regulatory*
-ory[2]	/ əri /	n	v	*directory, repository*
-ose	/ əʊz /	adj	n	*comatose, varicose*
-osis	/ ˈəʊsɪs /	n	n	*neurosis, tuberculosis*
-our	/ ə /	n	v	*behaviour, saviour*
-ous	/ ʊs /	adj	n	*gluttonous, poisonous*
-ship	/ ʃɪp /	n	adj/n	*citizenship, usership*
-some[1]	/ səm /	adj	n	*awesome, troublesome*
-some[2]	/ səm /	adj	v	*loathsome, tiresome*
-ster	/ stə /	n	adj/n	*mobster, prankster*
-th[1]	/ θ /	n	v	*growth, stealth*
-th[2]	/ θ /	n	adj	*depth, width*
-trix	/ trɪks /	n	n	*dominatrix, matrix*
-ty	/ ti /	n	adj/n	*cruelty, subtlety*
-ule	/ juːl /	n	n	*granule, molecule*
-ulent	/ jələnt /	adj	n	*fraudulent, virulent*
-ure[1]	/ jə /	n	v	*exposure, sculpture*
-ure[2]	/ jə /	n	adj/n	*contracture, moisture*
-y[1]	/ i /	adj	n	*frosty, needy*
-y[2]	/ i /	adj	v	*floppy, runny*
-y[3]	/ i /	adj	adj	*cheapy, yellowy*
-y[4]	/ i /	n	adj/n	*difficulty, philanthropy*
-y[5]	/ i /	n	v	*assembly, recovery*
-y[6]	/ i /	n	n	*armoury, friary*

APPENDIX 2: SUFFIX GROUPS

A1:	***'relating to / concerning / coming from'***		
Suffix	**Forms**	**From**	**Examples**
-al[2]	adj	n	*exceptional, professional*
-an[1]	adj	n/prop-n	*dystopian, Russian*
-ar	adj	n	*circular, polar*
-ary[1]	adj	n	*elementary, secondary*
-erly	adj	n	*northerly, westerly*
-ern	adj	n	*eastern, southern*
-ese[1]	adj	n	*Burmese, Vietnamese*
-fic	adj	n	*horrific, scientific*
-i[1]	adj	n/prop-n	*Israeli, Yemeni*
-ian[1]	adj	n/prop-n	*Edwardian, reptilian*
-ic	adj	n	*hygienic, realistic*
-ine[1]	adj	n	*estuarine, masculine*
-ish[4]	adj	n/prop-n	*Cornish, Turkish*

A2:	***'performing or provoking an action'***		
Suffix	**Forms**	**From**	**Examples**
-ant[1]	adj	v	*malignant, observant*
-ent[1]	adj	v	*absorbent, persistent*
-ful[2]	adj	v	*forgetful, resentful*
-ish[2]	adj	v	*stand-offish, ticklish*
-ive[2]	adj	v	*deceptive, responsive*
-ory[1]	adj	v	*contradictory, regulatory*
-some[2]	adj	v	*loathsome, tiresome*
-y[2]	adj	v	*floppy, runny*

A3:	***'causing / showing / full of'***		
Suffix	**Forms**	**From**	**Examples**
-able[2]	adj	n	*comfortable, knowledgeable*
-ate[1]	adj	n	*compassionate, fortunate*
-ed	adj	n	*cultured, prejudiced*
-ful[1]	adj	n	*hateful, powerful*
-ive[1]	adj	n	*authoritative, massive*
-less	adj	n	*faceless, meaningless*
-ose	adj	n	*comatose, varicose*
-ous	adj	n	*gluttonous, poisonous*
-some[1]	adj	n	*awesome, troublesome*
-ulent	adj	n	*fraudulent, virulent*
-y[1]	adj	n	*frosty, needy*

A4:	***'adhering to / believing in'***		
Suffix	**Forms**	**From**	**Examples**
-arian[1]	adj	n	*humanitarian, utilitarian*
-ian[3]	adj	prop-n	*Darwinian, Orwellian*
-ist[2]	adj	adj/n/prop-n	*capitalist, Marxist*
-ite[1]	adj	n/prop-n	*Canaanite, transvestite*

A5:	***'similar to / resembling'***		
Suffix	**Forms**	**From**	**Examples**
-en[2]	adj	n	*golden, woollen*
-esque	adj	n	*picturesque, statuesque*
-ile[2]	adj	n	*infantile, senile*
-ish[1]	adj	n	*hellish, studentish*
-like	adj	n	*child-like, dream-like*
-ly	adj	n	*friendly, homely*

A6:	***'can perform / must be subjected to'***		
Suffix	**Forms**	**From**	**Examples**
-able[1]	adj	v	*debatable, movable*
-ible	adj	v	*deductible, reversible*
-ile[1]	adj	v	*erectile, projectile*

A7:	***'somewhat / to a lesser degree'***		
Suffix	**Forms**	**From**	**Examples**
-ish[3]	adj	adj	*cheapish, warmish*
-y[3]	adj	adj	*cheapy, yellowy*

N1:	***'entity related to / concerning / coming from'***		
Suffix	**Forms**	**From**	**Examples**
-an[2]	n	n/prop-n	*Austri<u>an</u>, histori<u>an</u>*
-ard	n	adj/n	*drunk<u>ard</u>, Spani<u>ard</u>*
-ary[2]	n	n	*diction<u>ary</u>, mission<u>ary</u>*
-eer	n	n	*auction<u>eer</u>, musket<u>eer</u>*
-er[2]	n	adj/n	*foreign<u>er</u>, pension<u>er</u>*
-er[4]	n	adj/n	*fiv<u>er</u>, one-lin<u>er</u>*
-ese[2]	n	n	*Chin<u>ese</u>, Portugu<u>ese</u>*
-i[2]	n	n/prop-n	*Bangladeshi, Omani*
-ian[2]	n	n/prop-n	*civil<u>ian</u>, Paris<u>ian</u>*
-ie[1]	n	adj/n	*brown<u>ie</u>, self<u>ie</u>*
-ish[5]	n	n/prop-n	*Pol<u>ish</u>, Swed<u>ish</u>*
-ist[1]	n	adj/n	*duell<u>ist</u>, final<u>ist</u>*
-o	n	adj/n	*weird<u>o</u>, win<u>o</u>*

N2:	***'entity performing/provoking the action'***		
Suffix	**Forms**	**From**	**Examples**
-ant[2]	n	v	*coagul<u>ant</u>, particip<u>ant</u>*
-ee	n	v	*employ<u>ee</u>, interview<u>ee</u>*
-ent[2]	n	v	*deterr<u>ent</u>, repell<u>ent</u>*
-er[1]	n	v	*build<u>er</u>, juggl<u>er</u>*
-er[3]	n	v	*heat<u>er</u>, silenc<u>er</u>*
-ive[3]	n	v	*depress<u>ive</u>, explos<u>ive</u>*
-or[1]	n	v	*distribut<u>or</u>, invest<u>or</u>*
-or[2]	n	v	*incubat<u>or</u>, simulat<u>or</u>*

N3:	***'condition of / state of / rank of'***		
Suffix	**Forms**	**From**	**Examples**
-age[2]	n	n	*short<u>age</u>, watt<u>age</u>*
-ance[2]	n	adj	*brilli<u>ance</u>, signific<u>ance</u>*
-ancy	n	adj/n	*inf<u>ancy</u>, redund<u>ancy</u>*
-ate[2]	n	n	*certific<u>ate</u>, doctor<u>ate</u>*
-cy	n	adj/n	*bankrupt<u>cy</u>, legitima<u>cy</u>*
-dom	n	adj/n	*bore<u>dom</u>, serf<u>dom</u>*
-ence[2]	n	adj	*conveni<u>ence</u>, pati<u>ence</u>*
-ency[2]	n	adj	*consist<u>ency</u>, solv<u>ency</u>*
-ery[1]	n	adj/n	*gadget<u>ry</u>, rival<u>ry</u>*
-hood	n	adj/n	*knight<u>hood</u>, priest<u>hood</u>*
-ice	n	adj/n	*coward<u>ice</u>, just<u>ice</u>*
-iety	n	adj	*notor<u>iety</u>, sobr<u>iety</u>*
-ism[1]	n	adj/n	*activ<u>ism</u>, hooligan<u>ism</u>*
-itude	n	adj	*apt<u>itude</u>, sol<u>itude</u>*
-ity	n	adj	*extrem<u>ity</u>, reliabil<u>ity</u>*
-ness	n	adj	*mad<u>ness</u>, useful<u>ness</u>*
-ship	n	adj/n	*citizen<u>ship</u>, user<u>ship</u>*
-th[2]	n	adj	*dep<u>th</u>, wid<u>th</u>*
-ty	n	adj/n	*cruel<u>ty</u>, subtle<u>ty</u>*
-ure[2]	n	adj/n	*contract<u>ure</u>, moist<u>ure</u>*
-y[4]	n	adj/n	*difficult<u>y</u>, philanthrop<u>y</u>*

N4:	***'adherent of / believer in'***		
Suffix	**Forms**	**From**	**Examples**
-arian[2]	n	n	*librt<u>arian</u>, vegt<u>arian</u>*
-ian[4]	n	prop-n	*Christ<u>ian</u>, Keynes<u>ian</u>*
-ist[3]	n	adj/n/prop-n	*femin<u>ist</u>, Scientolog<u>ist</u>*
-ite[2]	n	n/prop-n	*social<u>ite</u>, Thatcher<u>ite</u>*
-ster	n	adj/n	*mob<u>ster</u>, prank<u>ster</u>*

N5:	***'instance of the action / group that performs the action'***		
Suffix	**Forms**	**From**	**Examples**
-ade	n	v	*crus<u>ade</u>, reneg<u>ade</u>*
-age[1]	n	v	*break<u>age</u>, pack<u>age</u>*
-al[1]	n	v	*buri<u>al</u>, upheav<u>al</u>*
-ance[1]	n	v	*defi<u>ance</u>, perform<u>ance</u>*
-ation	n	v	*combin<u>ation</u>, tax<u>ation</u>*
-ence[1]	n	v	*confer<u>ence</u>, prefer<u>ence</u>*
-ency[1]	n	v	*depend<u>ency</u>, resid<u>ency</u>*
-ion	n	v	*dedicat<u>ion</u>, narrat<u>ion</u>*
-ition	n	v	*pos<u>ition</u>, recogn<u>ition</u>*
-ment	n	v	*pay<u>ment</u>, punish<u>ment</u>*
-our	n	v	*behav<u>iour</u>, sav<u>iour</u>*
-th[1]	n	v	*grow<u>th</u>, steal<u>th</u>*
-ure[1]	n	v	*expos<u>ure</u>, sculpt<u>ure</u>*
-y5	n	v	*assembl<u>y</u>, recover<u>y</u>*

N6:	***diminutives***		
Suffix	**Forms**	**From**	**Examples**
-et	n	n	*coupl<u>et</u>, helm<u>et</u>*
-ette[2]	n	n	*cigar<u>ette</u>, kitchen<u>ette</u>*
-icle	n	n	*ic<u>icle</u>, part<u>icle</u>*
-ie[2]	n	n	*brekk<u>ie</u>, night<u>ie</u>*
-ine[2]	n	n	*figur<u>ine</u>*
-kin	n	n	*lambk<u>in</u>, munchk<u>in</u>*
-let	n	n	*bookl<u>et</u>, pigl<u>et</u>*
-ling	n	adj/n	*duckl<u>ing</u>, seedl<u>ing</u>*
-ock	n	n	*bull<u>ock</u>, paddock*
-ule	n	n	*gran<u>ule</u>, molec<u>ule</u>*

N7:	***'place for the entity / action'***		
Suffix	**Forms**	**From**	**Examples**
-age[3]	n	n	*orphan<u>age</u>, vicar<u>age</u>*
-arium	n	n	*aqu<u>arium</u>, planet<u>arium</u>*
-ery[2]	n	v/n	*nunn<u>ery</u>, rock<u>ery</u>*
-ory[2]	n	v	*direct<u>ory</u>, repos<u>itory</u>*
-y[6]	n	n	*armour<u>y</u>, friar<u>y</u>*

N8:	***occupations***		
Suffix	**Forms**	**From**	**Examples**
-er[5]	n	n	*geographer, roofer*
-ician	n	n	*dietician, politician*
-ier	n	n	*financier, lawyer*
-ist[5]	n	n	*cosmologist, novelist*

N9:	***feminine forms***		
Suffix	**Forms**	**From**	**Examples**
-ess	n	n	*countess, stewardess*
-ette[1]	n	n	*ladette, suffragette*
-trix	n	n	*dominatrix, matrix*

N10:	***medical terms***		
Suffix	**Forms**	**From**	**Examples**
-ism[4]	n	adj/n	*autism, rheumatism*
-itis	n	n	*conjunctivitis, sinusitis*
-osis	n	n	*neurosis, tuberculosis*

N11:	***miscellaneous***		
Suffix	**Forms**	**From**	**Examples**
-er[6]	n	n	*plonker, poofter*
-ful[3]	n	n	*cupful, roomful*
-ing	n	n	*flooring, towelling*
-ism[2]	n	adj/n/prop-n	*Buddhism, spiritualism*
-ism[3]	n	adj/n	*racism, sexism*
-ism[5]	n	adj/n/prop-n	*truism, Yorkshirism*
-ist[4]	n	adj/n	*ageist, racist*
-manship	n	n	*craftsmanship,* workmanship

V1:	***'(cause to) become / be affected by'***		
Suffix	**Forms**	**From**	**Examples**
-ate[3]	v	adj/n	*facilitate, pixelate*
-en[1]	v	adj/n	*freshen, strengthen*
-ify	v	adj/n	*diversify, solidify*
-ize	v	adj/n	*idealize, randomize*

APPENDIX 3: ALPHABETICAL INDEX PAGES

Appendix 3 – Index Pages (Alphabetical) can be found on the attached CD.

APPENDIX 4: INDEX PAGES BY CREATIVITY

Appendix 4 – Index Pages (By Creativity Score) can be found on the attached CD.

APPENDIX 5: SUFFIX PLEMMA AND TOKEN COUNTS

Table A5: *Full suffix set with plemma and token counts for neologisms in each database*.

Suffix	EAS14 Neologisms		DS94 Neologisms		CG94 Neologisms	
	Plemmas	Tokens	Plemmas	Tokens	Plemmas	Tokens
-able[1]	8	9	2	2	9	19
-able[2]	0	0	0	0	2	2
-ade	0	0	0	0	0	0
-age[1]	1	1	0	0	1	11
-age[2]	8	15	0	0	1	1
-age[3]	0	0	0	0	0	0
-al[1]	0	0	0	0	1	1
-al[2]	1	1	0	0	11	12
-an[1]	0	0	1	1	2	2
-an[2]	0	0	1	1	3	5
-ance[1]	1	1	0	0	3	3
-ance[2]	0	0	0	0	0	0
-ancy	0	0	0	0	0	0
-ant[1]	0	0	0	0	1	1
-ant[2]	0	0	0	0	2	3
-ar	0	0	0	0	0	0
-ard	0	0	0	0	0	0
-arian[1]	0	0	0	0	0	0
-arian[2]	0	0	0	0	0	0
-arium	1	2	0	0	0	0
-ary[1]	1	2	0	0	3	3
-ary[2]	0	0	0	0	0	0
-ate[1]	0	0	0	0	0	0
-ate[2]	0	0	0	0	0	0
-ate[3]	0	0	0	0	1	2
-ation	2	2	0	0	3	3
-cy	0	0	0	0	0	0
-dom	0	0	1	2	0	0
-ed	6	7	2	3	0	0
-ee	0	0	0	0	0	0
-eer	0	0	0	0	0	0
-en[1]	0	0	2	2	0	0
-en[2]	0	0	0	0	0	0
-ence[1]	0	0	0	0	0	0
-ence[2]	0	0	0	0	1	1

Suffix	EAS14 Neologisms		DS94 Neologisms		CG94 Neologisms	
	Plemmas	Tokens	Plemmas	Tokens	Plemmas	Tokens
-ency[1]	0	0	0	0	0	0
-ency[2]	1	1	0	0	1	1
-ent[1]	0	0	0	0	0	0
-ent[2]	0	0	0	0	0	0
-er[1]	7	9	3	3	3	19
-er[2]	4	8	5	6	2	3
-er[3]	1	1	5	6	2	2
-er[4]	1	3	3	9	7	7
-er[5]	3	8	0	0	1	1
-er[6]	4	14	0	0	0	0
-erly	0	0	0	0	0	0
-ern	0	0	0	0	0	0
-ery[1]	0	0	0	0	0	0
-ery[2]	0	0	1	1	0	0
-ese[1]	1	1	0	0	0	0
-ese[2]	1	3	0	0	0	0
-esque	6	6	0	0	0	0
-ess	0	0	0	0	1	1
-et	0	0	0	0	0	0
-ette[1]	0	0	0	0	0	0
-ette[2]	1	1	0	0	0	0
-fic	1	1	0	0	0	0
-ful[1]	0	0	0	0	0	0
-ful[2]	0	0	0	0	1	1
-ful[3]	0	0	0	0	2	2
-hood	0	0	0	0	1	1
-i[1]	1	1	0	0	2	4
-i[2]	0	0	0	0	2	2
-ian[1]	3	6	2	2	4	5
-ian[2]	3	3	0	0	3	3
-ian[3]	1	1	0	0	0	0
-ian[4]	0	0	0	0	1	2
-ible	0	0	0	0	0	0
-ic	2	3	0	0	3	7
-ice	1	1	0	0	0	0
-ician	0	0	0	0	0	0
-icle	1	3	0	0	0	0
-ie[1]	5	10	2	5	1	3
-ie[2]	17	28	25	87	6	8
-ier	0	0	0	0	0	0
-iety	0	0	0	0	0	0

Suffix	EAS14 Neologisms		DS94 Neologisms		CG94 Neologisms	
	Plemmas	Tokens	Plemmas	Tokens	Plemmas	Tokens
-ify	2	2	0	0	0	0
-ile[1]	0	0	0	0	0	0
-ile[2]	0	0	0	0	0	0
-ine[1]	0	0	0	0	0	0
-ine[2]	0	0	0	0	0	0
-ing	1	6	1	1	5	14
-ion	1	1	0	0	0	0
-ish[1]	9	10	11	14	3	3
-ish[2]	0	0	0	0	1	1
-ish[3]	6	8	6	6	5	6
-ish[4]	1	1	1	1	0	0
-ish[5]	0	0	0	0	0	0
-ism[1]	0	0	1	1	0	0
-ism[2]	0	0	1	1	3	3
-ism[3]	2	5	0	0	0	0
-ism[4]	1	1	0	0	0	0
-ism[5]	1	1	0	0	1	2
-ist[1]	0	0	2	2	3	3
-ist[2]	0	0	0	0	0	0
-ist[3]	0	0	0	0	1	1
-ist[4]	2	3	0	0	0	0
-ist[5]	1	1	1	2	0	0
-ite[1]	0	0	0	0	1	1
-ite[2]	3	6	0	0	1	1
-ition	0	0	0	0	0	0
-itis	0	0	3	3	0	0
-itude	0	0	0	0	1	1
-ity	3	3	0	0	1	1
-ive[1]	0	0	0	0	1	2
-ive[2]	1	2	0	0	1	1
-ive[3]	0	0	0	0	0	0
-ize	1	1	0	0	4	4
-kin	0	0	0	0	0	0
-less	3	10	3	5	0	0
-let	1	1	0	0	1	1
-like	6	8	2	2	6	6
-ling	2	20	0	0	0	0
-ly	2	3	0	0	1	1
-manship	1	1	0	0	0	0
-ment	1	1	0	0	2	2
-ness	24	26	4	4	10	11

Suffix	EAS14 Neologisms		DS94 Neologisms		CG94 Neologisms	
	Plemmas	Tokens	Plemmas	Tokens	Plemmas	Tokens
-o	0	0	1	1	0	0
-ock	0	0	0	0	0	0
-or[1]	0	0	0	0	2	2
-or[2]	3	4	0	0	0	0
-ory[1]	1	1	0	0	4	4
-ory[2]	0	0	0	0	0	0
-ose	0	0	0	0	0	0
-osis	1	1	0	0	0	0
-our	0	0	0	0	0	0
-ous	6	15	2	4	2	2
-ship	2	2	0	0	4	4
-some[1]	0	0	0	0	0	0
-some[2]	0	0	0	0	0	0
-ster	0	0	0	0	0	0
-th[1]	0	0	0	0	0	0
-th[2]	0	0	0	0	0	0
-trix	0	0	0	0	0	0
-ty	0	0	0	0	0	0
-ule	0	0	0	0	0	0
-ulent	0	0	0	0	0	0
-ure[1]	1	2	0	0	0	0
-ure[2]	0	0	1	1	0	0
-y[1]	105	159	37	47	13	17
-y[2]	37	65	6	7	4	5
-y[3]	18	25	13	20	3	3
-y[4]	1	1	0	0	0	0
-y[5]	0	0	0	0	0	0
-y[6]	0	0	0	0	0	0
Totals	**344**	**548**	**151**	**252**	**171**	**243**

APPENDIX 6: INDEX PAGES BY PART OF SPEECH

Appendix 6 – Index Pages (By Part of Speech) can be found on the attached CD.

APPENDIX 7: NEOLOGISMS

Appendix 7 – Neologisms with Definitions can be found on the attached CD.

APPENDIX 8: SDT WORDS

Table A8.1: *Real and non-real simplex words used in the Semantic Decision Task, matched for CV distribution and consonant type using Wuggy (Keuleers & Brysbaert 2010)*

Real [R]	**Non-real [r]**
eagle	*orble*
comma	*peddo*
haze	*lyde*
landfill	*rastparn*
mercury	*tascony*
convict	*benfalt*
teacup	*gontab*
wrench	*yengz*
ivory	*azary*
pupil	*dadis*

Table A8.2: *Practice words for the Semantic Decision Task, separated by word type*.

[TR]	**[Tr]**	**[tR]**	**[tr]**	**Simplex [R]**
truth	*Googleable*	*feminist*	*acquinee*	*crowd*
ownership	*dehydrator*	*meridian*	*klagful*	*yellow*
aptitude	*molestance*	*position*	*estinant*	*sphere*
reversal	*Swindonian*	*schedule*	*happidency*	*elapse*

APPENDIX 9: EXPERIMENTAL STUDY DEMOGRAPHICS

Table A9.1: *Demographic split across gender, age group and education level for SDT and JT experiments*.

Demographic	SDT (32)	JT (52)	Total (84)
Male	15	34	**49**
Female	17	18	**35**
18-29	13	19	**32**
30-44	4	11	**15**
45-59	8	10	**18**
60+	7	12	**19**
PhD/Postgraduate	9	5	**14**
Undergraduate	9	25	**34**
A/AS Level	7	9	**16**
GCSE/Other/None	7	13	**20**

Table A9.2: *Demographic split across gender, age group and education level for DT experiment*.

Demographic	Original Study		Total (50)
	SDT (19)	JT (31)	
Male	9	13	**22**
Female	10	18	**28**
18-29	8	8	**16**
30-44	4	5	**9**
45-59	4	6	**10**
60+	3	12	**15**
PhD/Postgraduate	5	5	**10**
Undergraduate	8	11	**19**
A/AS Level	4	10	**14**
GCSE/Other/None	2	5	**7**

APPENDIX 10: INSTRUCTIONS FOR EXPERIMENTAL STUDIES

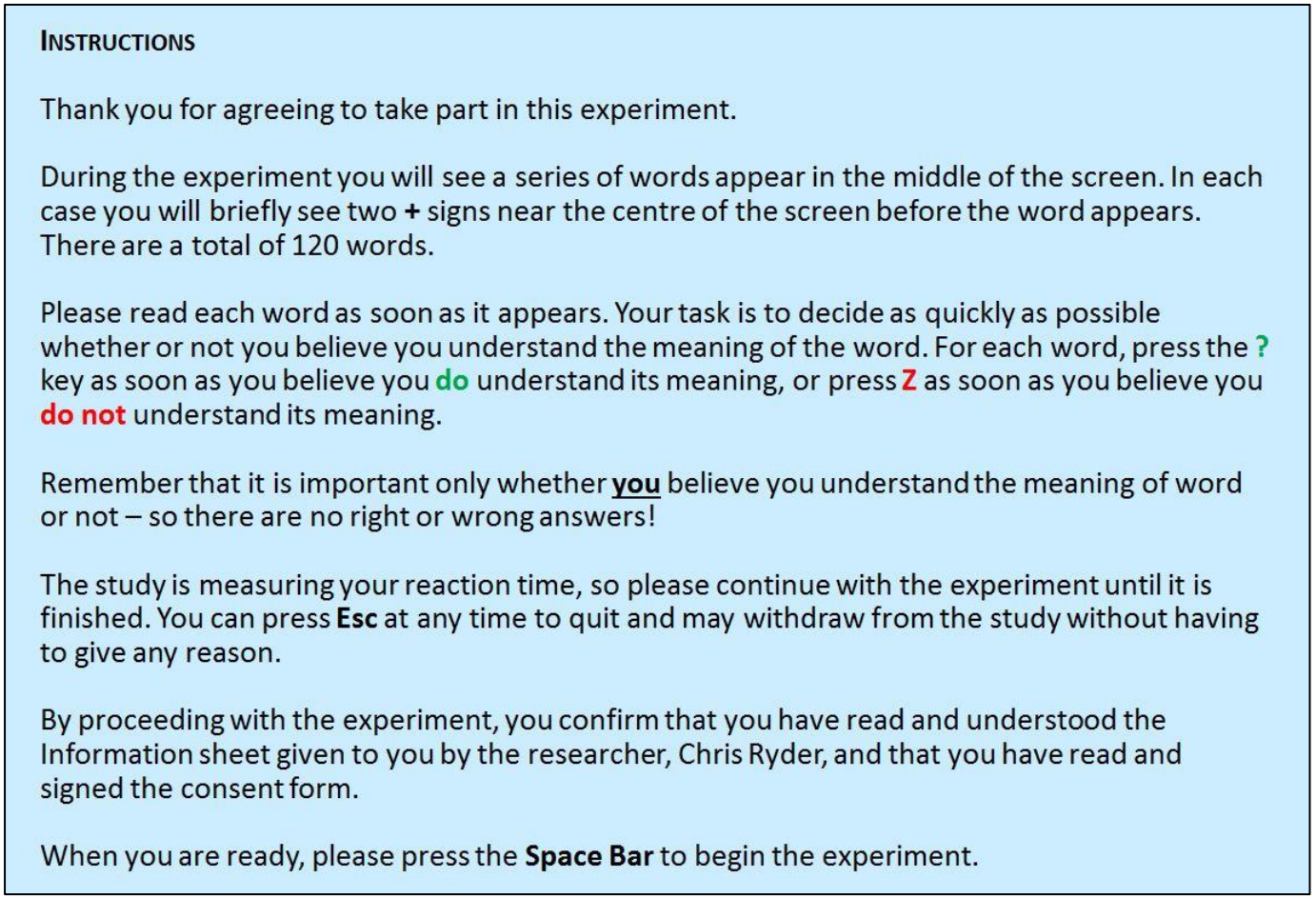

Figure A10.1: *Instruction page presented to participants for the Semantic Decision Task*.

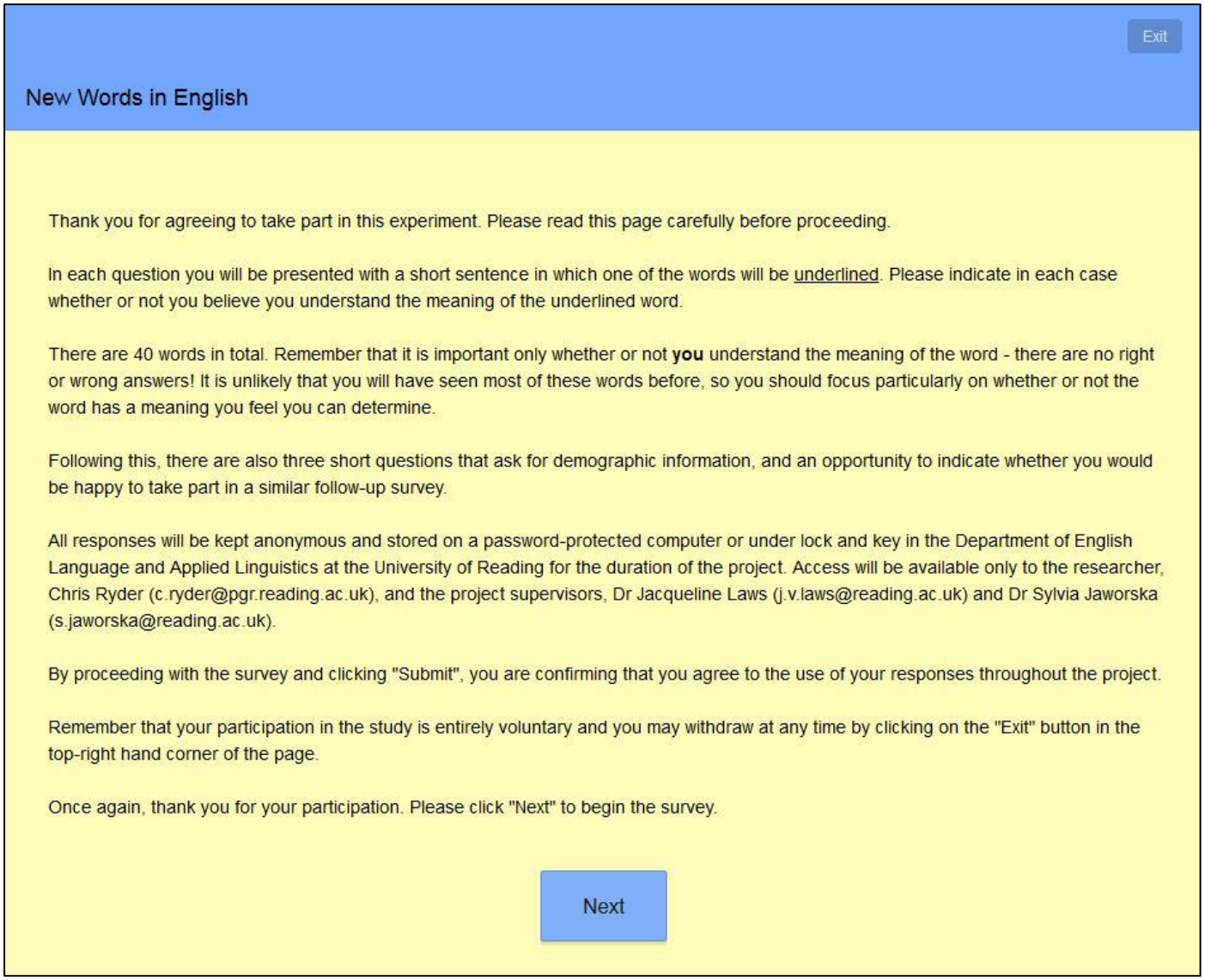

Figure A10.2: *Instruction page presented to participants for the Judgement Task*.

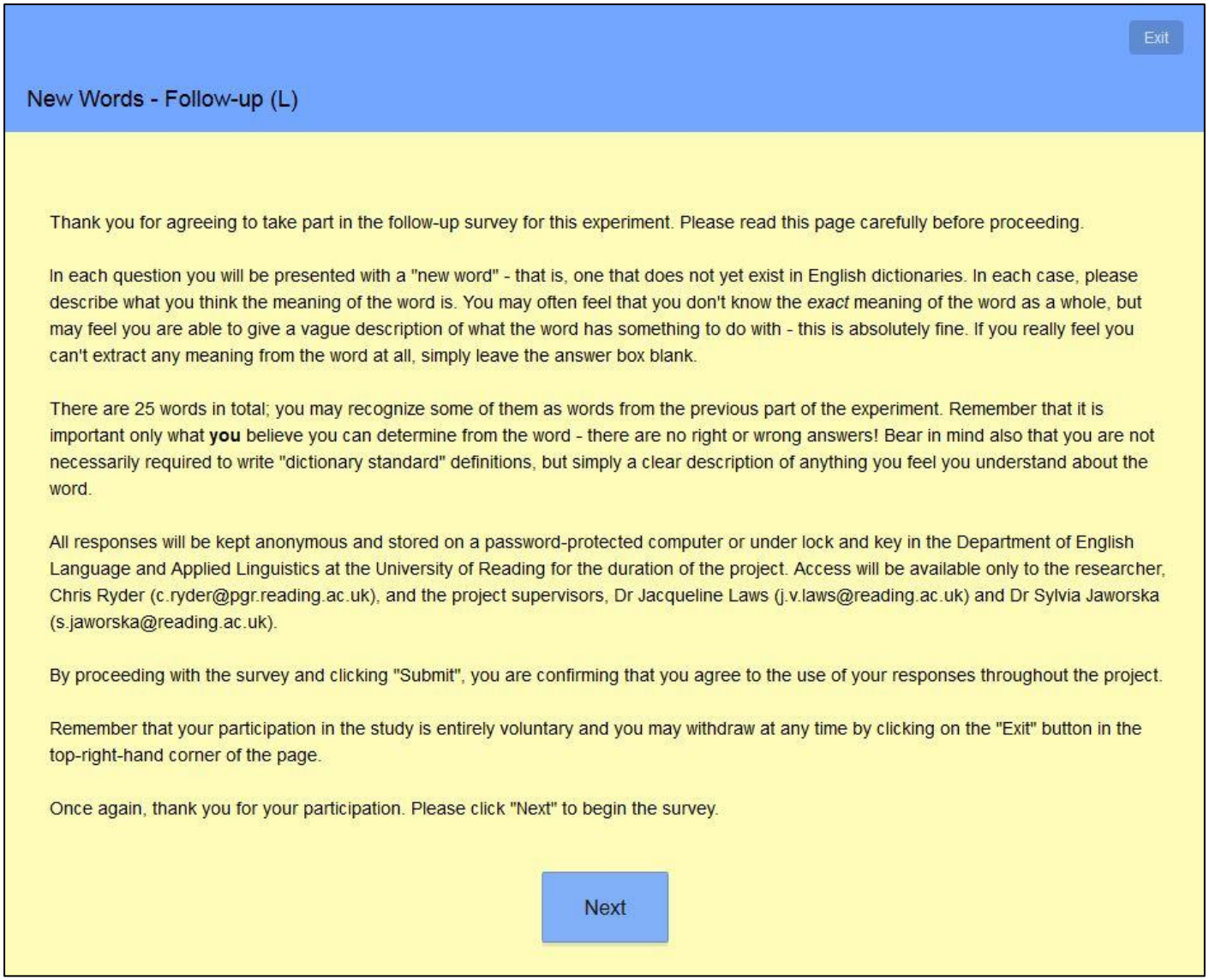

Figure A10.3: *Instruction page presented to participants for the Definition Task*.

APPENDIX 11: SDT QUESTIONNAIRE

Example questionnaire given to participants in the Semantic Decision Task:

School of Literature and Languages
Department of English Language and Applied Linguistics

University of Reading

1) What is your gender?

◯ Male ◯ Female ◯ Other

2) What is your age range?

◯ 18 to 29 ◯ 30 to 44 ◯ 45 to 59 ◯ 60+

3) What is your highest qualification?

◯ PhD (Doctorate)
◯ Postgraduate (Master's) degree
◯ Undergraduate (Bachelor's) degree
◯ A-Level
◯ AS-Level
◯ GCSE
◯ None
◯ Other: _____

4) Please indicate whether or not you would be happy to participate in a follow-up to this study. This will take the form of another short survey very similar to this one.

If yes, please also give your e-mail address so that you may be contacted for this purpose; your address will not be used for any other purpose or passed on to a third party.

◯ I would prefer not to participate in the follow-up study

◯ Yes, I am happy to participate in the follow-up study. My e-mail address is:

_____

APPENDIX 12: SDT CONSENT FORM

Example Consent Form given to participants in the Semantic Decision Task:

School of Literature and Languages
Department of English Language and Applied Linguistics

University of Reading

ETHICS COMMITTEE

Consent Form

Project title: *A Scrutinence of Newies: Corpus-Based Analyses of Derivational Word-Formation in British English*

I understand the purpose of this research and understand what is required of me; I have read and understood the Information Sheet relating to this project, which has been explained to me by Chris Ryder. I agree to the arrangements described in the Information Sheet in so far as they relate to my participation.

I understand that my participation is entirely voluntary and that I have the right to withdraw from the project at any time.

I have received a copy of this Consent Form and of the accompanying Information Sheet.

Name:

Signed:

Date:

APPENDIX 13: JT WORDS WITH CONTEXTS

Table A13: *Words used in the JT, including suffix, constituents, context used, and notes concerning replacements and editing*.

Word	Suffix	[T/R/P/O]	Context Used	Notes
snowage	*-age*[2]	[TrPO]	put these on for snowage	
tegriment	*-ment*	[trPo]	it affects their tegriment in so many things	Replaced: *development*
wintrify	*-ify*	[TrPO]	it's been a bit wintrified at the moment	
raustitive	*-ive*[2]	[trPo]	you can perhaps work with those raustitive ones	Replaced: *disruptive*
manilation	*-ation*	[trPo]	this was also based on the idea of quite regular manilation	Replaced: *observation*
bargainous	*-ous*	[TrPO]	that's the most bargainous flight in the world	
guesty	*-y*[1]	[Trpo]	I've been in one of them and it's all guesty and nice	
fleater	*-er*[1]	[trpo]	I used to be a fleater	Replaced: *builder*
tamsling	*-ling*	[trpO]	I completely ignored all the tamslings	Replaced: *underlings*
grannyish	*-ish*[1]	[Trpo]	it didn't look grannyish at all	
homonymical	*-al*[2]	[TrPO]	my main thing was about homonymical difficulties	
ursonism	*-ism*[4]	[trpO]	basically we thought he had ursonism	Replaced: *autism*
Corbynite	*-ite*[2]	[TrpO]	people will probably think I'm a Corbynite now	
napette	*-ette*[2]	[TrpO]	he always had a two hour napette in the afternoon	Edited for clarity
instructory	*-ory*[1]	[TrPo]	there are more instructory books	
orangeness	*-ness*	[Trpo]	I might just put more of the fake orangeness on	
prafty	*-y*[1]	[trpo]	maybe you should just make a prafty one	Replaced: *stripy*
frentesque	*-esque*	[trpO]	it's very frentesque isn't it?	Replaced: *picturesque*
zombling	*-ling*	[TrpO]	he visited my mum's house and left his zombling	
stoonerous	*-ous*	[trPO]	it's far more stoonerous in other cities	Replaced: *dangerous*
catronly	*-ly*	[trPo]	it's more catronly not to wait	Replaced: *friendly*

Word	Suffix	[T/R/P/O]	Context Used	Notes
immersive	*-ive*[2]	[TrPo]	computer games are more immersive than film	
demprify	*-ify*	[trPO]	I'm gonna demprify my home to such an extent	Replaced: *purify*
golminite	*-ite*[2]	[trpO]	we accommodate ourselves so we're all golminites now	Replaced: *Thatcherites*
critiquer	*-er*[1]	[Trpo]	I'm not a very good critiquer	
natality	*-ity*	[TrPO]	you're not a teenager in natality at least	
waldage	*-age*[2]	[trPO]	I think hers probably has a lot of waldage	Replaced: *mileage*
binemetical	*-al2*	[trPO]	but yeah it was a really binemetical thing	Replaced: *generational*
shortism	*-ism*[4]	[TrpO]	I haven't got shortism or whatever they're doing it for	Replaced: *rheumatism*
coffeeless	*-less*	[Trpo]	I'm having a coffeeless day	
quoyish	*-ish*[1]	[trpo]	it does seem a bit quoyish I have to say	Replaced: *foolish*
relaxment	*-ment*	[TrPo]	I have them boiling hot … relaxment!	
musication	*-ation*	[TrPo]	put on some instrumental musication	Edited for clarity
chastutory	*-ory*[1]	[trPo]	I don't think that it's chastutory is it?	Replaced: *compulsory*
Barbiesque	*-esque*	[TrpO]	She's very Barbiesque	
pittalness	*-ness*	[trpo]	unless it's my pittalness in trying to remember	Replaced: *laziness*
peracity	*-ity*	[trPO]	so many levels of peracity	Replaced: *complexity*
mojette	*-ette*[2]	[trpO]	mum said it was called a mojette	Replaced: *maisonette*
gleazeless	*-less*	[trpo]	we have gleazeless copies of it	Replaced: *endless*
saccharinely	*-ly*	[TrPo]	and then this one is saccharinely twee	Edited for clarity