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A WORD-AND-PARADIGM APPROACH TO REDUPLICATION

DISSECRATION

Presented in Partial Fulfillment of the Requirements for the Degree Doctor of Philosophy in the Graduate School of The Ohio State University by

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ABSTRACT

Most recent treatments of reduplication assume the notion of the morpheme. In this study, I describe the phenomena of reduplication from the standpoint of Word-and-Paradigm morphology, in which the notion of the morpheme plays no role. Instead, for each lexeme, there exists an indexed set of formally distinct, yet semantically identical, lexical stems. Morphological rules realize morphological properties upon these lexical stems by the application of various morphophonological operations.

I begin this study by outlining the conceptual distinctions necessary to a principled discussion of reduplication. I then sketch the principles of Word-and-Paradigm morphology, establishing the theoretical concepts which bear crucially on my analysis. After surveying recent treatments of reduplication, I undertake several case studies, in which I analyze reduplication from a Word-and-Paradigm perspective. In these case studies, I treat all actual instances of reduplication as resulting from one of two types of operations. Variable affixation, in which an operation affixes a syllabically defined partial copy of a given lexical stem to a stem of that same lexeme, accounts for all instances of partial reduplication. Intralexical compounding, in which two entire stems of the same lexeme are concatenated to form a new lexeme, accounts for all instances of complete reduplication.

In the first case study, I examine reduplication in Tagalog, in which, I claim, morphological rules widely employ reduplicative operations to create distinct lexical stems. These stems are in turn available to the application of
further morphological rules. I then treat reduplication in Sanskrit, in which my analysis crucially depends on the distinction between morphophonological operations and morphological rules, as well as on the notion of the lexical stem. I argue that all reduplicative operations in Sanskrit are used to form either distinct lexical stems or derived lexemes. Finally, I analyze several cases of complete reduplication, in which my conclusions crucially depend on the notion of intralexical compounding.

I conclude the study by addressing several lesser issues regarding both formal and functional dimensions of reduplication, and by proposing several avenues for future research.
For Jesus Christ,

and

for my wife, Kathy,

who,

except for Him,

is the chief agent of His kindness to me in this life
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# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstract</td>
<td>ii</td>
</tr>
<tr>
<td>Dedication</td>
<td>iv</td>
</tr>
<tr>
<td>Acknowledgements</td>
<td>v</td>
</tr>
<tr>
<td>Vita</td>
<td>vii</td>
</tr>
<tr>
<td><strong>Chapters:</strong></td>
<td></td>
</tr>
<tr>
<td>1. Reduplication: What it is and what it isn't</td>
<td></td>
</tr>
<tr>
<td>1.1 Scope of the work</td>
<td>1</td>
</tr>
<tr>
<td>1.2 Definitions</td>
<td>8</td>
</tr>
<tr>
<td>1.3 Pretheoretical concerns</td>
<td>12</td>
</tr>
<tr>
<td>1.3.1 Apparent versus actual reduplication</td>
<td>12</td>
</tr>
<tr>
<td>1.3.2 Syntactic recursion versus morphological reduplication</td>
<td>14</td>
</tr>
<tr>
<td>1.3.3 The issue of productivity</td>
<td>15</td>
</tr>
<tr>
<td>1.3.4. &quot;Allolinguistic&quot; uses of reduplication</td>
<td>16</td>
</tr>
<tr>
<td>1.3.5 Segmental separability</td>
<td>19</td>
</tr>
<tr>
<td>1.3.6 More details on actual reduplication</td>
<td>21</td>
</tr>
<tr>
<td>1.4 Terminology and formal classification</td>
<td>22</td>
</tr>
<tr>
<td>1.4.1 Introductory remarks</td>
<td>22</td>
</tr>
<tr>
<td>1.4.2 Objects</td>
<td>22</td>
</tr>
<tr>
<td>1.4.3 Relations between objects</td>
<td>24</td>
</tr>
<tr>
<td>2. The theoretical framework: Words, stems,</td>
<td></td>
</tr>
<tr>
<td>operations, paradigms, and rules</td>
<td>29</td>
</tr>
<tr>
<td>2.1 Introductory remarks</td>
<td>29</td>
</tr>
<tr>
<td>2.1.1 The Word-and-Paradigm approach</td>
<td>29</td>
</tr>
<tr>
<td>2.1.2 WP history and motivations</td>
<td>30</td>
</tr>
<tr>
<td>2.1.3 Paradigms and rules</td>
<td>33</td>
</tr>
<tr>
<td>2.1.4 Rules, operations, and operation types</td>
<td>37</td>
</tr>
<tr>
<td>2.2 Some WP conceptual and terminological distinctions</td>
<td>38</td>
</tr>
<tr>
<td>2.2.1 Introduction</td>
<td>38</td>
</tr>
<tr>
<td>2.2.2 Morphophonological operations</td>
<td>38</td>
</tr>
<tr>
<td>2.2.3 Lexically determined and phonologically determined classes</td>
<td>42</td>
</tr>
<tr>
<td>2.2.4 Semantic, Morphosyntactic, and Indexing Properties (SMIPs)</td>
<td>46</td>
</tr>
<tr>
<td>2.3 More on morphological stems</td>
<td>49</td>
</tr>
<tr>
<td>Section</td>
<td>Title</td>
</tr>
<tr>
<td>---------</td>
<td>-------</td>
</tr>
<tr>
<td>3.</td>
<td>Approaches to reduplication</td>
</tr>
<tr>
<td>3.1</td>
<td>Introductory remarks</td>
</tr>
<tr>
<td>3.2</td>
<td>Typological accounts</td>
</tr>
<tr>
<td>3.2.1</td>
<td>Moravcsik (1978)</td>
</tr>
<tr>
<td>3.3</td>
<td>Transformational accounts</td>
</tr>
<tr>
<td>3.3.1</td>
<td>Wilbur (1973)</td>
</tr>
<tr>
<td>3.3.2</td>
<td>Carrier (1979)</td>
</tr>
<tr>
<td>3.3.3</td>
<td>Carrier-Duncan (1984)</td>
</tr>
<tr>
<td>3.3.4</td>
<td>Steriade (1988)</td>
</tr>
<tr>
<td>3.4</td>
<td>Affixational accounts</td>
</tr>
<tr>
<td>3.4.1</td>
<td>Marantz (1982)</td>
</tr>
<tr>
<td>3.4.2</td>
<td>Bell (1983), Broselow (1983), and Broselow and McCarthy (1983)</td>
</tr>
<tr>
<td>3.4.3</td>
<td>McCarthy and Prince (1995)</td>
</tr>
<tr>
<td>3.5</td>
<td>Conclusions</td>
</tr>
<tr>
<td>4.</td>
<td>Stems and reduplication in Tagalog</td>
</tr>
<tr>
<td>4.1</td>
<td>Introductory remarks</td>
</tr>
<tr>
<td>4.2</td>
<td>The Tagalog verb system</td>
</tr>
<tr>
<td>4.3</td>
<td>Reduplication in Tagalog</td>
</tr>
<tr>
<td>4.4</td>
<td>Some concluding diachronic observations</td>
</tr>
<tr>
<td>5.</td>
<td>Stems, operations, rules, and features in Sanskrit reduplication</td>
</tr>
<tr>
<td>5.1</td>
<td>Introductory remarks</td>
</tr>
<tr>
<td>5.2</td>
<td>Recent approaches to Sanskrit reduplication</td>
</tr>
<tr>
<td>5.3</td>
<td>Some basic claims regarding Sanskrit reduplication</td>
</tr>
<tr>
<td>5.4</td>
<td>Some facts regarding Sanskrit reduplication</td>
</tr>
<tr>
<td>5.4.1</td>
<td>Reduplication in the Sanskrit verb system</td>
</tr>
<tr>
<td>5.4.2</td>
<td>Reduplication in the present, perfect, aorist, and desiderative</td>
</tr>
<tr>
<td>5.4.3</td>
<td>Intensive reduplication</td>
</tr>
<tr>
<td>5.4.4</td>
<td>Phonologically determined classes and reduplicative MOs</td>
</tr>
<tr>
<td>5.5</td>
<td>Concluding remarks on Sanskrit</td>
</tr>
<tr>
<td>6.</td>
<td>Compounding and complete reduplication</td>
</tr>
<tr>
<td>6.1</td>
<td>Complete reduplication as a type of compounding</td>
</tr>
<tr>
<td>6.2</td>
<td>Complete reduplication in Ndyuka</td>
</tr>
<tr>
<td>6.3</td>
<td>Echo compounding in Uzbek</td>
</tr>
<tr>
<td>6.4</td>
<td>Truncated compounding in Madurese</td>
</tr>
<tr>
<td>7.</td>
<td>Concluding issues and future prospects</td>
</tr>
<tr>
<td>7.1</td>
<td>Introductory remarks</td>
</tr>
<tr>
<td>7.2</td>
<td>A sampling of further issues</td>
</tr>
<tr>
<td>7.2.1</td>
<td>The role of reduplication in inflection</td>
</tr>
</tbody>
</table>
7.2.2 Reduplication in shape-formation .............................................. 163
7.2.3 Fixed consonantism in reduplication ........................................ 163
7.2.4 Non-reduplicative variable affixation ......................................... 165
7.2.5 Single-segment reduplication ...................................................... 167
7.2.6 Further matters concerning morphophonological operations ...... 168

7.3 More future prospects ........................................................................ 170
7.3.1 The need for typological treatments .......................................... 170
7.4 Concluding remarks ........................................................................... 171

APPENDICES

Summary of Morphophonological Operations,
Morphological Rules, and Stems with Regard
to Sanskrit Reduplication .............. 172

Bibliography ............................................................................................... 174
CHAPTER 1

REDUPLICATION: WHAT IT IS AND WHAT IT ISN'T

1.1 Scope of the work

The term "reduplication" has been widely used by students and scholars of language to refer to a broad range of phenomena, all of which have something to do with words or other sub-constituent items that appear to have part or all of their phonological substance repeated. In this study, I approach this body of phenomena with two essential aims. The first and lesser of these aims is to eliminate, on multiple grounds, some of what has been treated as reduplication in the literature. Having done so, I propose a distinct analysis for what remains, working within the confines of a Word-and-Paradigm approach to morphology.

As the word-and paradigm tradition suggests, I treat reduplication not as a morpheme, but as a morphophonological operation, numbered among a range of other such operations, including plain affixation, ablaut, metathesis, etc. Such a treatment eliminates the substantial embellishments to the theory of the morpheme which have arisen in attempts to describe reduplication and other less than clearly affixal phenomena in morphology.

Furthermore, I draw a sharp theoretical distinction between partial reduplication and complete reduplication. I claim that partial reduplication results from the application of variable affixation operations to phonological
representations by morphological rules. Such operations serve to describe the phonological dependence of reduplicative affixes on the stems to which they attach without reference to the morpheme. I claim that complete reduplication, on the other hand, results from a compounding operation, in which stems of the same lexeme are compounded to one another. While certain instances of variable affixation may resemble instances of so-called "reduplicative compounding", I claim that the two are to be formally distinguished.

Towards these ends, in this first chapter I lay the groundwork for the discussion to follow in later chapters. I begin by discussing the range of phenomena treated as reduplication in the literature on the subject, addressing important pretheoretical matters of definition, classification, and general linguistic theory which are relevant to a responsible treatment of the phenomena. Having first surveyed definitions of reduplication found in the literature, I address the difference between apparent reduplication, on the one hand, and actual reduplication, on the other, with the aim of eliminating from the ensuing discussion those data which appear to be reduplicative in nature, but are not. I then propose two distinct definitions of reduplication, taking into account the important distinction between apparent and actual reduplication.

In establishing these distinctions, I discuss the differences between syntactic recursion and morphological reduplication. I go on to discuss the importance of considering the meanings and grammatical functions with which reduplication is associated, as opposed to its formal aspects, which are the focus of most studies. Accordingly, I address the issue of morphological productivity, which cannot be determined apart from such reference to
meaning and function. Relatedly, I then address the difficult question of the role that expressive and ideophonic uses of reduplication, which are also only determinable with reference to semantics and grammatical function, should play in our descriptions. I then establish the terminological and classificatory distinctions needed to describe and discuss reduplication in the world's languages and to distinguish the formal types of reduplication to which I refer throughout this study.

In Chapter 2, I present the theoretical framework in which I will be working by discussing work such as Robins (1970), Matthews (1972, 1974, 1991), Zwicky (1985, 1992, etc.), Pullum and Zwicky (1991), Stump (1991, 1993, etc.), and Anderson (especially Anderson (1992)), all of which favor a process-based "Word-and-Paradigm" (WP) approach to morphology (cf. Hockett (1954)). I also discuss in Chapter 2 important work by Aronoff (1976, 1992, 1994, etc.) and others regarding other relevant matters of morphological theory, such as the status of morphological stems, which play an important role in several aspects of my analysis. I take the position that every lexeme possesses an indexed set of formally distinct, yet semantically identical stems which are selected as the domain of application by particular morphological rules.

I go on in Chapter 2 to argue for and sketch the reasons for a WP approach, and also to motivate, illustrate, and discuss the conceptual and terminological distinctions which are crucial to the approach I take in this study. I elaborate upon the distinction between morphological rules and morphophonological operations, and discuss some of the benefits of describing morphological structure in terms of morphophonological operations as opposed to morphemes. I also discuss the distinctions between
word-formation and inflection, between derivation and compounding, between stem-formation and other rules, etc. The fundamental aim of Chapter 2, then, is to navigate the theoretical terrain in which we will be travelling throughout this study.

In Chapter 3, I survey the significant treatments of reduplication in the literature, focusing on work beginning with Wilbur (1973) and including a discussion of Moravcsik (1978), Carrier (1979), Marantz (1982), Carrier-Duncan (1984), Steriade (1988), Prince and Smolensky (1993), and McCarthy and Prince (1993a, 1995), as well as other works. My aim in Chapter 3 is to make a neutral presentation of such previous treatments of reduplication and to briefly introduce some potential problems which they entail. While not attempting a comprehensive survey of the literature on the subject, I do attempt to outline the basic approaches to the phenomena of reduplication, dividing them into those with a transformational orientation and those without.

In the next four chapters, I elaborate on the problems I have indicated with such previous treatments of reduplication in light of the theoretical framework I discuss in Chapter 2, offering alternative analyses which largely have to do with an attempt to describe reduplication by assuming only the existence in the lexicon of lexemes and not morphemes. In proposing such alternative analyses, I will describe reduplication in terms of the several different types of morphological rule discussed in Chapter 2.

First of all, rules of compounding and derivation, both of which are types of word-formation rule, describe relations between stems of distinct lexemes. Reduplicative compounding is illustrated by so-called echo-compounding in Uzbek; e.g. toş ‘rock, stone’, toş-moş ‘stones and that sort of thing’; čoy ‘tea’, čoy-moý ‘tea and that sort of thing’, etc. Reduplicative
derivation is illustrated in Karok itératives; thus taxvuk 'to hook', taxvuku-vuku 'to hook (repeatedly)'; pačup 'to kiss', pačup-čup 'to kiss repeatedly', etc. (Bright (1957)). Then there are inflectional rules, which describe relations between distinct inflectional forms of one lexeme, which are illustrated by data from Nimboran, a language of Papua New Guinea, in the formation of the so-called Final Infinitive (Anceaux (1965:114 ff.)). Thus, we find reduplicative inflection in examples like bie 'to open, etc.', bebie 'in order to open', muo 'to make, etc.', memuo 'in order to make', in which the reduplicated forms are required in certain syntactic constructions.

Finally, there are stem-formation rules, which describe relations between distinct formal stems of one lexeme, and are illustrated in Tübatulabal, where most verbs have both an unrepeated and a reduplicated stem, the latter exhibiting the typologically unusual reduplication of the initial stem vowel. For one verb class, the reduplicated stem is used for telic aspect and the unrepeated form is used for atelic aspect; e.g. ük 'to eat (atelic)', üük 'to eat (telic)', etc. For another verb class, this situation is exactly reversed; the unrepeated stem is used for telic aspect and the reduplicated stem is used for atelic aspect (Voegelin (1937:95)); e.g. nag 'to cry (telic)', anag 'to cry (atelic)', etc. In such a case, we are better off viewing reduplication as a purely formal effect on stems, yielding alternative stems which can be used in a variety of different ways, rather than striving to assign a fixed meaning to a reduplicated item. In any event, different rule types may be associated with identical phonological effects, yet may pair such effects with very different functions, a fact which only becomes clear when reduplication is studied in relation to its semantic and grammatical role within entire linguistic systems.

5
I also apply in these chapters the important distinction between morphophonological operations on the one hand and morphological rules on the other, as it bears on the analysis of reduplication in selected languages. Morphophonological operations serve as the set of formal relations that morphological stems can bear to various other morphological objects. Morphological rules pair various morphophonological operations with various semantic, morphological, or indexing properties, but are distinct from the morphophonological operations they employ. I conclude that much of the apparently opaque behavior of reduplication in some languages can be clarified if we observe and maintain the distinction between rules and operations in morphology.

Finally, throughout Chapters 4 through 6, I integrate the notion of the morphological stem, also discussed in Chapter 2, in my analysis of reduplication in various languages. I argue that further descriptive challenges in the analysis of reduplication can be solved by observing the notion of the morphological stem. My analysis, I also argue, more adequately takes into account the semantics of reduplicative constructions than do many other accounts.

Toward these ends, Chapters 4 through 6 consist of a series of case studies, some short, some longer, all of which discuss important features of reduplication. In each of these case studies, I examine reduplication in one or more languages, considering in each case some particular aspect or aspects of the data as they bear on the approach to reduplication I am taking here.

With these aims in view, Chapter 4 consists of an examination of reduplication in Tagalog, with an emphasis on the role of reduplication in stem-formation. Chapter 5 examines partial reduplication in Sanskrit with an
eye towards understanding the nature of reduplicative operations and the way in which they are incorporated into morphological systems to accomplish stem formation and derivation. I also discuss the way in which the notion of morphological features contributes to an elegant treatment of Sanskrit reduplication. Chapter 6, which focuses on complete reduplication as compounding, looks at complete reduplication in Ndyuka, a Caribbean creole language; echo compounding in Uzbek, a Turkic language of Central Asia; and truncated compounding in Madurese, an Austronesian language of Indonesia.

To conclude this study, Chapter 7 briefly addresses a range of lesser issues, including the resemblance that reduplication bears to other phonologically stem-dependent operations, such as those encountered in vowel and consonant alternations in Turkish suffixes; single-segment reduplication in Levantine Arabic; the issue of vowel reduplication with fixed consonants in Tübatulabal and Klamath; and the distinction between lengthening and vowel reduplication. I comment further on several problems related not only to the description of reduplication, but of other morphophonological operations. The issue of how morphophonological sub-operations group together in relation to lexically and phonologically determined classes is one such issue. The components of phonological structure to which different morphophonological operation types refer is another. The limits regarding the way in which instances of distinct morphophonological operation types may be concurrently applied by morphological rules is yet another. The apparent crosslinguistic rarity with which inflectional rules employ reduplicative MOs is still another. Finally, to complete Chapter 7, I discuss what I see as other likely areas for fruitful research regarding reduplication and I briefly review my findings.
1.2 Definitions

My purpose in this and the following sections is to lay the conceptual and terminological groundwork for the extended discussion of reduplication which follows. A brief survey of the definitions of reduplication in the literature is a good place to start, and it is to that that I now turn.

Within the modern linguistic tradition, the phenomena of reduplication have been recognized and discussed as a matter of some theoretical significance since at least Sapir. Sapir (1921:61) classes reduplication among the six basic types of "grammatical processes", by which he means the formal devices with which meaning distinctions are encoded in language. "Nothing is more natural than the prevalence of reduplication", by which he means "the repetition of all or part of the radical element" (Sapir (1921:76)). Sapir's angle is that reduplication is indeed a grammatical process, yet he cites non-productive examples in his discussion. Sapir also includes syntactic iteration among the examples he cites, and also recognizes the frequency with which reduplication is used to express what he calls "sound-imitative or contemptuous" meanings (1921:76). He also discusses the distinction between partial reduplication and complete reduplication (in his terms "simple duplication"), observing the broader range of uses for which the former is employed.

Bloomfield (1933:218) claims that reduplication "is an affix that consists of repeating part of the underlying form", and goes on to recognize that the amount of repeated material may vary from affix to affix, even within the same language, citing reduplicative patterns in Fox, e.g. waqama:wa 'he looks

---

1 By "radical element", Sapir refers, roughly speaking, to the same notion as do the terms "root" or "stem", used non-technically. See Sapir (1921:25 ff.) for further discussion.
at him', wa:-wa:pame:wa 'he examines him', wa:pam:-wa:pame:wa 'he keeps looking at him', etc.. He also recognizes the existence of systematic formal variation between the reduplicative affix and the copied item, citing examples from Ancient Greek (e.g.'phajnej 'it shines, it appears' and pam:-phajnej 'it shines brightly', etc.), as well as from Sanskrit. Of some significance is the fact that Bloomfield, following the Sanskrit grammarians, counts at least certain types of complete reduplication as 'repetitive compounds' (1933:235). His definition for reduplication above also indicates that he intended to draw a formal distinction between partial reduplication, which to him was the only true reduplication, and complete reduplication, which he viewed as a subtype of compounding.

Elson and Pickett (1968:45), in their tagmemic account of morphology and syntax, describe reduplication as a “type of allomorphic alternation in which an affix is of exactly the same form as part or all of the stem or is the same plus an additional phoneme or phonemes”. Their definition clearly subsumes partial and complete reduplication under one cover and treats both as affixal in nature. They characterize reduplication as an underspecified morpheme, defined in terms of a combination of consonants, vowels, and fully specified segments. They allow for the possibility that the reduplicative affix may possess phonological material not found in the stem to which it attaches.

Wilbur (1973:5 ff.) defines reduplication as “a morphological process (underlining hers) whose actual phonological shape is directly dependent on the stem to which it applies”. Citing the resemblance of reduplication to other phonological rules, Wilbur, as do many subsequent researchers, treats reduplication from a fundamentally formal standpoint, a fact which Zhang (1987:384) notes and I later critique. Wilbur, while acknowledging the
distinction between syntactic repetition and reduplication proper, does not formally distinguish between partial and complete reduplication, attributing both to the same process.

Moravcsik (1992:323) offers a prose definition of reduplication which closely parallels the more formal definition she offers in her classic earlier work on the same subject (Moravcsik (1978:300-301)). Reduplication, she claims, is

a pattern where the double or multiple occurrence of a sound string, syllable, morpheme, or word within a larger syntagmatic unit is in systematic contrast with its single occurrence, with the iterated elements filling functionally non-distinct positions.

Moravcsik's definition subsumes partial and complete reduplication under one category, as it also does in regard to syntactic repetition and morphological reduplication. She appears to support the idea that only productive instances of reduplication can truly be treated as reduplication at all.

Marantz (1982:437) defines reduplication as

a morphological process relating a base form of a morpheme or stem to a derived form that may be analyzed as being constructed from the base form via the affixation (or infixation) of phonemic material which is necessarily identical in whole or in part to the phonemic content of the base form.

---

2 By syntactic repetition (or recursion), I mean the repetition of components of syntactic structure, not morphological structure, e.g. a very, very, very dark night; Pick it up! Pick it up!, etc. Syntactic repetition, then, refers to the recursion of syntactic words or phrases.
In Marantz (1994:3487), he defines reduplication as "the affixation of a morpheme whose phonological form depends in whole or in part on the phonological form of the stem to which it attaches". In keeping with his approach to reduplication, Marantz, in both of the above definitions, treats reduplication as the affixation of a morpheme with variable form to a stem. He draws no distinction between partial and complete reduplication, but appears to distinguish productive from non-productive reduplication, in that he counts as reduplication only those items that have arisen via affixation.

Huttar and Huttar (1992:1) define reduplication as "the repeating of all or part of a word (more than a single segment), the result still being a phonological word, with its pitch and stress pattern". Huttar and Huttar are clearly concerned with excluding syntactic iteration of any kind from their definition, and are limiting their approach to morphological reduplication. They are also interested in excluding processes like lengthening from their definition of reduplication, as their stipulation regarding the number of segments indicates.

Researchers on child language acquisition (e.g. Schwartz, et al (1980), Fee and Ingram (1982), Ferguson (1983), etc.) take a fundamentally different approach to the subject of reduplication from that taken by researchers within the tradition of formal linguistics, as we might expect from the distinct research aims of their discipline. Within this tradition, reduplication refers to "the tendency to produce multisyllabic words with repetitive syllable structure" as a phonological acquisition strategy used by children to produce certain mono- or polysyllabic words (Fee and Ingram (1982:41-42)). As such, reduplication is in this tradition never associated with systematic meaning differences, but is rather a purely phonological strategy used to aid in the
pronunciation and acquisition of language. For this reason, I will also exclude apparent reduplication of this type from this present study, in that it appears to have no particular morphological significance.

In a sense, researchers working within the language acquisition tradition deal with reduplication in its purely phonological sense. As an acquisition strategy employed by children, reduplication is used for several distinct purposes, at least two of which clearly have to do with increasing ease of pronunciation (Ferguson (1983:241)). First, among children who frequently employ it, reduplication appears to be a strategy used to master the challenge of polysyllabicity without dealing with greater phonetic complexity at the same time. The classic child's pronunciation *wowo* for the adult word *water* illustrates precisely such a use of reduplication (Schwartz, et al (1980:79)). Secondly, reduplication is used as a means of dealing with syllable-final consonants, as evidenced by the child's pronunciation *keke* for the verb *take* (Schwartz, et al (1980:79)). While interesting, this type of apparent reduplication clearly falls outside the range of data we will be considering here, in that it is clearly not connected with the regular realization any clearly morphological properties.

1.3 Pretheoretical concerns

1.3.1 Apparent versus actual reduplication

In considering the definitions of reduplication above, a number of important matters arise. One of the most significant concerns has to do with the distinction between the phenomena of reduplication on the one hand, and the means by which those phenomena arise, on the other—a distinction which has not always been adequately maintained. Some of the definitions above
make the assumption that everything that appears on the surface to be reduplication must have arisen by the same means, which is clearly not the case. In this study, I will thus make the distinction between what I call *apparent reduplication*, on the one hand, and *actual reduplication*, on the other.

Apparent reduplication refers to any construction which appears to contain the repetition of phonological material within its boundaries. As such, apparent reduplication is simply a pretheoretical cover term for a broad range of phenomena which may or may not be related to one another in any particular way. I will, in fact, argue that the data that fall within the range of apparent reduplication must be described in a range of different ways. Some of the data, it turns out, warrant no particular discussion at all. Some are better treated in the syntax. Some properly belong in a discussion of morphology. And among that which belongs in the morphology, there are yet further distinctions to be drawn.

An instance of actual reduplication, on the other hand, refers to any word which contains the phonologically separable repetition of some or all of its phonological substance by means of a productive operation of plain morphology. As the discussion below will make clear, such a definition excludes many instances of apparent reduplication from our consideration. First of all, it removes all instances of repetition which yields something bigger than a word. Second, it eliminates from our consideration any instances of apparent reduplication which are simply frozen expressions and are not the result of a demonstrably productive operation. Third, it calls into question any instances of apparent reduplication that are not part of morphology proper, i.e. that function solely within the morphological
margins of expressive speech, ideophonic language, secret language, play language, or the like. Fourth, it excludes any instances of productive apparent reduplication in which, as with rules of segmental lengthening, the repeated material is never segmentally separable from the rest of the word.

In the next sections, I attempt to elaborate on the distinctions between apparent reduplication that warrants further discussion and that which requires none. As becomes clear, most of the concerns I raise have been raised before, as the survey of definitions above reveals; my aim in what follows is simply to systematically remove from our collection of apparent reduplications those phenomena which require no morphological explanation.

1.3.2 Syntactic recursion versus morphological reduplication

In differentiating between apparent and actual reduplication, it is important to maintain the distinction between syntactic recursion and morphological reduplication—a distinction which has not always been clearly maintained among researchers. Syntactic recursion, which effects the repetition of a word or phrase outside of existing word or phrasal boundaries, can be adequately explained by syntactic rules, and thus requires no reference to word-internal morphological structure, which is the focus of this study. It is true that syntactic recursion may, diachronically speaking, give rise to morphological reduplication, as suggested by the crosslinguistic prevalence of iterative and augmentative semantics in words having undergone reduplication. But there is no good reason, synchronically speaking, that we should refer to both constructions as morphological.

3 See also Keesing (1991).
Additionally, morphologically reduplicated words are different from repeated words in a number of ways. Morphological reduplication, for example, need not involve the repetition of entire words (though it sometimes appears to), but often repeats only part of a word, or a modified version of a word. Unlike syntactic recursion, morphological reduplication tends to modify the prosodic patterns of the repeated material. Also, the number of repetitions permitted in instances of syntactic recursion is in principle unconstrained, while the number of repetitions permitted in cases of morphological reduplication is quite restricted. In short, then, syntactic recursion will be treated as a purely syntactic phenomenon, while reduplication will be treated as a morphological matter.

1.3.3 The issue of productivity

Furthermore, many instances of apparent reduplication clearly do not result from productive morphological operations. To begin with, productive reduplication, as Moravcsik (1978:300-301) indicates, necessarily involves the presence in a language's lexicon of pairs of distinct words, one member of which is unreduplicated and one member of which is reduplicated. Words such as English hurdy-gurdy or flim-flam can clearly not be analyzed as instances of productive reduplication for a couple of reasons, one of which being the fact that they do not derive from existing unreduplicated English words (i.e. neither hurdy nor gurdy nor flim nor flam is a word in its own right), and thus do not warrant any particular morphological explanation.

The existence of such word pairs is not, however, by itself sufficient to demonstrate the existence of productive reduplication in a language. Even if an apparently reduplicated word, such as English hokey-pokey, appears to be
derived from an existing word (in this case both *hokey* and *pokey* happen to be words for most English speakers), there is nonetheless no demonstrable process by which speakers can derive other similar reduplicated words from existing unreduplicated counterparts. In such cases, I will not consider there to exist a genuine reduplicative process. The exclusion of such forms as instances of reduplication is well-motivated, in that if a so-called operation is not productive, it really is no operation at all. Such examples of non-productive apparent reduplication are, however, widely reported in the literature as instances of actual reduplication, as Steriade's citation of Madurese *pin-pun* 'pin pong' (Steriade (1988:74)) bears witness. While nothing critical to Steriade's argument hinges on this example, it illustrates that we cannot always accept at face value data presented as reduplication. We must rather determine whether the occurrence of an apparent morphological reduplication is the consequence of a productive morphological operation; if it is not, then I will not treat it as reduplication at all. While it may be necessary to discuss instances of non-productive apparent reduplication at various junctures in this study, the fundamental concern of this work will nonetheless be limited to describing productive morphological reduplication.

1.3.4 “Allolinguistic” uses of reduplication

It is very common for instances of apparent reduplication to fall within the domain of what Wescott (1980) refers to as “allolinguistics”, that domain of language that is “alienated from conventionally structured speech” (Wescott (1980:19). Crosslinguistically, the meanings which reduplication is often used to express are highly marked stylistically and often associated with onomatopoetic, ideophonic, humorous, or expressive meanings. Relatedly,
reduplication is frequently associated with so-called “secret languages” or linguistic play (see, e.g. (Yip (1982))).

A typical example of such an allolinguistic use of reduplication occurs in Temiar, an Austroasiatic language of Malaysia, in which a range of reduplicative operations are used to create certain expressive verbs from real or imaginary verb roots (Benjamin (1972:35)). Thus, we find, among several reduplicative patterns, the pattern exemplified in boguy ‘to waft’ and beyboguy ‘to waft (EXPRESSIVE)’; raweig ‘to stand conspicuously upright’ and regraweig ‘to stand conspicuously upright (EXPRESSIVE)’, etc. This pattern is a striking one, as Anderson (1988a:60) points out, inasmuch as it appears to involve the copied portion of the word as consisting of the first and last consonant of the stem with a stipulated e between them. Such instances require a significant increase in the power of a grammar if they are to be adequately described, and, as Anderson observes, stand as evidence that morphemes, as classically conceived, are inadequate to account for the way in which meaning is paired with form in language.

But while I am in agreement with Anderson’s conclusions regarding the status of the morpheme, I take a conservative position in this study, choosing not to use clear cases of allolanguage as the sole basis for revising our linguistic theorizing about reduplication or any other linguistic phenomena. While Wescott admits the gradient, rather than discrete distinction between allolanguage and plain speech, he nonetheless aptly draws the distinction, characterizing archetypal plain speech as gestureless, conceptual, symbolic, grammatical, businesslike, standardized, denotative, specific, etc., and archetypal allolanguage as co-gestural, perceptual, iconic, grammarless, playful, privatized, connotative, polysemic, etc. (Wescott
(1980:20)). We repeatedly find allolinguistic constructions that do not occur elsewhere in the languages in question, and to expand our grammars to accommodate such constructions will clearly lead to significantly increase the descriptive power of grammar for the sake of linguistic behavior which speakers clearly set apart from the bulk of linguistic expression. It is clearly the case that interesting linguistic generalizations are to be found within the realm of allolanguage, and that such speech is frequently productive and rule-governed (though Wescott (1980:20)) appears to claim otherwise, calling it "grammarless"), but it is unwise to expand the descriptive apparatus required for what Pullum and Zwicky call "plain" speech (Pullum and Zwicky (1987)) merely to accommodate the idiosyncrasies of allolanguage. Rather, at least on an initial pass, it is better to limit our inquiry to the narrower sphere and to treat allolanguage as falling outside the range of "plain" speech, as Pullum and Zwicky (1987) suggest.

This being said, the discussion with which Benjamin introduces Temiar reduplication reveals much about its role in Temiar grammar. His introduction to "expressives" in Temiar is as follows:

This is a heterogeneous category of adjuncts formed from real or imaginary verb roots by what can only be described as 'reduplicative play'. Syntactically they stand in apposition to the whole verb phrase, or even to the whole sentence. Semantically they serve as a kind of expressive mirror-phrase, summing up in a word or two the 'feelings' that are stereotypically supposed to be aroused in the interlocutors' minds. It is extremely difficult to find satisfactory translation labels for these forms because, even though they are standardised phrases, they are concerned more with connotational than denotational meaning. They are very common in ordinary conversation, and in stories and song-lyrics they are essential elements of the style. (1972:35)
The fact that Temiar reduplication is best characterized as "linguistic play" would appear to place it in the domain of expressive speech, as defined by Pullum and Zwicky (1987), or in the realm of allolanguage, as proposed by Wescott (1980). Also, its semantics are playful and affective and it is associated with special syntax—both typical features of language within the allolinguistic domain.

In the end, the frequency with which reduplication appears to be associated with allolanguage requires us to make judgements as to the place that reduplication holds in specific languages. In cases where its function is clearly and purely allolinguistic, we would do well not to modify our theory of morphology merely to accommodate it.

1.3.5 Segmental separability

Finally, we want to have at our disposal some means by which to distinguish productive reduplication from other productive morphological operations that exhibit phonological variation based on the phonology of the stem upon which they act. This is precisely the aim of Huttar and Huttar (1992:1) in their stipulation that reduplication involve more than one segment, in that they desire to distinguish reduplication from other quantitatively-oriented operations like lengthening. Turkish vowel harmony is another example of a phonologically stem-dependent operation, in that the effect of the operation varies in relation to the quality of the final vowel of

Clearly, there will be debate regarding where to draw the line between allolanguage and plain speech (called "microlanguage" in Trager (1955)), or, for that matter, whether to draw it at all. Joseph (1994) provides an interesting discussion concerning the place that the dental affricates [ts] and [dz] play in Modern Greek, pointing out the difficulty in separating allolanguage from microlanguage in linguistic analysis. Differences in such judgments will lead to a correspondingly smaller or larger set of data to be described by a theory of language, as the case may be.
the stem upon which it acts. In such cases, however, it appears to be phonetic features, and not prosodic units, as in the case of reduplication, that are copied.

From the standpoint of this study, some phonologically stem-dependent operations will turn out to be reduplication, and some will turn out to be something else. The distinction ultimately rests on the nature of the operation which yields the instance of apparent reduplication. As I mention above, if the repeated material is never segmentally separable from any word in which it occurs, then it should not count as reduplication. Consequently, examples like Finnish *laula 'sing' versus laulaa 'sing (3 SG Present Indicative) (Whitney (1973:27)), though analyzable as monosegmental reduplication, will not be treated as reduplication at all, in that in no instance of the application of this operation is the resulting material phonologically separable from the word in which it occurs; it is always a matter of increased duration, not a clear case of stem-dependent affixation.5

Conversely, all cases which apparently involve segmental lengthening, and in which the lengthening can be shown to be related to a broader reduplicative operation, will be treated as instances of reduplication. In Nimboran, for example, vowel-initial stems appear to form their so-called final infinitives by means of lengthening, but when viewed in a broader morphological context, this apparent lengthening emerges as the counterpart to a reduplicative operation whose effects are transparent in consonant-

5 Sam Rosenthall (personal communication) suggests that Finnish may, in fact, be exhibiting templatic length to fulfill a presumably morphological requirement for a heavy syllable. From the standpoint of the present study, this could be accomplished by means of an operation which stipulates such a requirement, much as other operations may stipulate the affixation of particular material, the effecting of stem-internal vowel changes, etc. towards morphological ends. See 2.2.2 below for further discussion of such operations.
initial stems. Thus, in Nimboran we find bie 'to open, etc.' versus bebie 'in order to open' and iro 'to fill' versus iiro 'in order to fill' (Anceaux 1965:114 ff.)). I further discuss this pattern of complementarily distributed sub-operations in my treatment of Sanskrit reduplication in Chapter 4. In Chapter 7, I also briefly examine instances of monosegmental actual reduplication and the way in which such examples contrast with other, only apparent, instances of monosegmental reduplication.

1.3.6 More details on actual reduplication

So, actual reduplication is what remains when we eliminate from cases of apparent reduplication all instances of syntactic recursion, all demonstrably unproductive examples, all instances which are purely expressive in nature, and all instances which arise by means of other types of operations. This still leaves, however, a body of data which is not homogeneous in origin. I argue in this work that, once we have determined which instances of apparent reduplication are indeed actual reduplication, we must divide what remains between two basic sources--variable affixation and compounding. This means that even the term actual reduplication is a cover term for phenomena which arise in different ways. The term reduplication, it turns out, is merely a convenient name for a range of theoretically unrelated phenomena.⁶

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⁶ Zwicky (1990b) discusses the utility of such “pretheoretical umbrella terms”, citing terms such as clitic and serial verb as other well-known examples. In both of these cases, the terms are used to refer to a broad range of phenomena, which, when teased apart, are actually best accounted for as resulting from several unrelated causes. This, it turns out, is also the case in regard to the term reduplication.
1.4 **Terminology and formal classification**

1.4.1 Introductory remarks

Having addressed the pretheoretical issues outlined above, I now present the terminological and classificatory framework for reduplication which I will use throughout my study, presenting clear examples of the classificatory distinctions I propose. This framework is designed to be purely descriptive and theory-neutral. It is designed to facilitate the discussion of all instances of apparent reduplication in the literature, though it will turn out in the end that some such instances may better be treated as something other than reduplication.

1.4.2 Objects

To begin with, I propose names for the different objects to which I refer in the course of this study. For any instance of apparent reduplication, there are four primary and three secondary objects to which we will find occasion to refer. First of all, I refer to the *foundation stem*, which is the basic version of the lexeme to which a reduplicative construct is related. Second, there is the *attachment stem*, which is the version of the foundation stem to which the reduplicant is affixed. Third, there is the *reduplicant*, which is the part of a given reduplicative construct which is affixed to the attachment stem as a consequence of a morphological rule employing reduplication. Its substance includes at least some material directly borrowed from the reduplicating stem, and possibly some material which may not have been. In the event that the reduplicant includes both borrowed material and non-borrowed material, as is the case in non-exact reduplication, the borrowed

\[\text{foundation stem, which is the basic version of the lexeme to which a reduplicative construct is related. Second, there is the attachment stem, which is the version of the foundation stem to which the reduplicant is affixed. Third, there is the reduplicant, which is the part of a given reduplicative construct which is affixed to the attachment stem as a consequence of a morphological rule employing reduplication. Its substance includes at least some material directly borrowed from the reduplicating stem, and possibly some material which may not have been. In the event that the reduplicant includes both borrowed material and non-borrowed material, as is the case in non-exact reduplication, the borrowed}\]

\[\text{This is often the element cited in standard grammars, e.g. Whitney's Sanskrit Grammar (1889), and in dictionaries, and is often called the "root" in the same.}\]
portion will be called the *reflection* and the non-borrowed portion will be called the *stipulation*. Fourth, I refer to the *reduplicating stem*, which is the version of the foundation stem to which the reduplicant owes its phonology. Relatedly, I also refer to the *substem*, which designates the phonological piece of the reduplicating stem mirrored in the reduplicant. In the default case, the reduplicating stem and the attachment stem are phonologically identical. Finally, I refer to the *construct*, which is the object consisting of the concatenation of the attachment stem and the reduplicant.\(^8\)

The above conceptual distinctions are well-illustrated by reduplicative plural noun formation in Pipil, an Uto-Aztecan language of El Salvador, in which we find *kal* 'house', *kahkal* 'houses'; *masat* 'deer (SG)', *mahmasat* 'deer (PL)', etc. (Campbell (1985:52)). In these examples, *kal* 'house' and *masat* 'deer (SG)' are the foundation stems; formally unchanged, *kal* and *masat* also serve as the reduplicating stems, with *ka-* serving as the substem in the former and *ma-* serving as the substem in the latter. In this case, *kal* and *masat* also serve as the attachment stems within the constructs *kahkal* 'houses' and *mahmasat* 'deer (PL)', respectively.\(^9\) Finally, within these same constructs, *kah-* and *mah-*,
respectively, are the reduplicants, which consist of the reflections _ka_- and _ma_- respectively, plus the stipulation _h_ in both cases.

It is important to recognize that within the above-described reduplicative world, there is nothing to require that the reduplicant be based on the attachment stem itself; i.e. the reduplicating stem and the attachment stem may, in fact, be two different stems of the same lexeme, and in principle neither has to be the same as the foundation stem. In later chapters I argue that some instances of non-exact partial reduplication arise as a consequence of the reduplicating stem and the attachment stem being distinct. Sanskrit perfect reduplication is a good case in point.

1.4.3 Relations between objects

Apart from naming the objects to which we will refer, we will also be concerned with the kinds of relations which hold between these objects. Building on the classification proposed by Mel'cuk (1982), I propose several such relational distinctions to be considered when describing reduplication. First of all, we must distinguish between complete and partial reduplication. In complete reduplication, the reduplicant minimally contains a complete repetition of the reduplicating stem, sometimes with various formal changes; in partial reduplication, the reduplicant must obligatorily contain a reflection minimally consisting of one entire segment borrowed from the substem, as not be the case.

To preview the discussion of 5.4.3, an example from Sanskrit involves the formation of the intensive, in which, I argue, the reduplicant is taken from one distinct morphological stem, while the attachment stem, in some cases, is taken from another distinct stem. Thus, one version of the intensive for the Sanskrit verb _mṛ/māṛ_ 'die' is _mṛmṛ_ (Whitney (1885:124)), in which case the reduplicant (_māṛ_) is based on one distinct stem, and the attachment stem (_mṛ_) is based on another.
well as an optional stipulation.\textsuperscript{11} Next, there exists a distinction between exact and non-exact reduplication, the former being a relation of exact identity between the reduplicant and the reduplicating stem or substem, the latter being a relation of partial identity between the reduplicant and the reduplicating stem or substem. Finally, we must distinguish between prefixal, suffixal, and infixal reduplication. Prefixal reduplication involves the attachment of the reduplicant to the position immediately preceding the attachment stem; suffixal reduplication involves the attachment of the reduplicant to the position immediately following the attachment stem;\textsuperscript{12} infixal reduplication involves the attachment of the reduplicant to a position within the attachment stem.

In cases of partial reduplication, it is also necessary to classify the reduplicant as either adjacent or non-adjacent. The reduplicant will be said to be adjacent if it immediately precedes or follows the part of the attachment stem corresponding to the substem, with no other phonological material from the attachment stem intervening. The reduplicant will be said to be non-adjacent if it is separated from the part of the attachment stem corresponding to the substem by intervening phonological material belonging to the attachment stem.

The above distinctions interact with one another to give rise to a

\textsuperscript{11} Part of the aim of this study will be to describe in more detail the dimensions of identity which languages require and/or permit between the reduplicant and the foundation or subfoundation, as the case may be. The definitions of complete and partial reduplication given here should therefore be seen as in need of elaboration, which I will undertake in later sections. In the case of complete, non-exact reduplication, for instance, it initially appears that the entire prosodic structure of the foundation must also occur in the reduplicant, though it is not so clear the extent to which their respective segmental compositions must be identical.

\textsuperscript{12} In the case of complete exact reduplication, Mel'cuk implicitly recognizes the impossibility of determining whether preposing or postposing has taken place; he consequently does not classify complete exact reduplication in this regard.
number of categorial divisions, as the tables below indicate. The classification below predicts seventeen formally possible types of reduplication, only twelve of which I have been able to attest. The pattern of occurring and non-occurring types of reduplication is likely of theoretical significance; I discuss this matter briefly in Chapter 7.
<table>
<thead>
<tr>
<th>Type</th>
<th>Language</th>
<th>Word</th>
<th>Meaning</th>
<th>Language</th>
<th>Word</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Exact</strong></td>
<td>Tagalog</td>
<td><em>sulat</em></td>
<td>'a writing'</td>
<td>Ancient Greek</td>
<td><em>graph-o</em></td>
<td>'I write'</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>susulat</em></td>
<td>'one who will write'</td>
<td></td>
<td><em>ge-graph-a</em></td>
<td>'I have written'</td>
</tr>
<tr>
<td></td>
<td>Madurese (Stevens 1968:82)</td>
<td><em>garudus</em></td>
<td>'fast, quickly'</td>
<td></td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>dus-garudus</em></td>
<td>'fast and sloppy'</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Suffixal</strong></td>
<td>Chamorro</td>
<td><em>cago</em></td>
<td>'far'</td>
<td>Somali</td>
<td><em>tug</em></td>
<td>'thief'</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>cagogo</em></td>
<td>'very far'</td>
<td></td>
<td><em>tugag</em></td>
<td>'thieves'</td>
</tr>
<tr>
<td></td>
<td></td>
<td>n/a</td>
<td></td>
<td></td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td><strong>Infixed</strong></td>
<td>Dayak</td>
<td><em>karak</em></td>
<td>'rest'</td>
<td>Quileute (Broselow and McCarthy 1983:44)</td>
<td><em>t'axdax</em></td>
<td>'tail (of a bird)'</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>kararahak</em></td>
<td>'a little rest'</td>
<td></td>
<td><em>t'at'e:dax</em></td>
<td>'tail (of a bird) PL'</td>
</tr>
<tr>
<td><strong>Non-Adjacent</strong></td>
<td>Levantine Arabic</td>
<td><em>barad</em></td>
<td>'shaved'</td>
<td>(Broselow and McCarthy 1983:36)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>barbad</em></td>
<td>'shaved unevenly'</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(1) **Formal types of reduplication**

13 Examples cited in the table are claimed to be instances of reduplication in the sources from which they are cited, though some may not qualify for inclusion according to
### Exact

**Prefixal/Suffixal**

Walpiri (Nash (1986:130))

*mardukuja*  
'woman, female'

*mardukujamardukuja*  
'women, females'

**Infixal**

n/a

---

### Non-exact

**Prefixal**  

Some echo-words in Tamil  
(Mel'cuk 1982:55)

**Suffixal**

Uzbek  
(personal data)

**Infixal**

Sanskrit  
(Janda and Joseph (1986:89))

*ćoy*  
'tea'

*ćoy-moy*  
'tea and the like'

*arh-*  
'deserve'

*ar-ji-h-isa*  
'deserve (desiderative)'

---

(2) Formal types of reduplication—Complete reduplication

the criteria which I apply in this study. I have chosen, however, to include them here for illustrative purposes. For further discussion, see 1.3.1 below in regard to apparent and actual reduplication. Gaps in the tables indicate that I have found no examples of the particular type of reduplication in question. All examples are from Mel'cuk (1987), unless otherwise noted.
CHAPTER 2

THE THEORETICAL FRAMEWORK: WORDS, STEMS, PARADIGMS, OPERATIONS, AND RULES

2.1 Introductory Remarks

2.1.1 The Word-and-Paradigm approach

The framework in which I will conduct this study is generally referred to as "Word-and-Paradigm" morphology (WP), in that it proposes that words, and not morphemes, are the basic elements of morphological structure, that all words hold a place in paradigms, and that the relationships within these paradigms are best stated in terms of certain morphophonological operations (or processes), rather than in terms of the concatenation of morphemes (see e.g. Hockett (1954), Robins (1970), Matthews (1991), Janda (1994)).

I also argue for the central role of morphological stems (following e.g. Aronoff (1992, 1994), Zwicky (1988, 1992), Anderson (1988b)), which are formally, but not semantically, distinct versions of particular lexemes, and which can qualify to serve as the objects upon which particular morphological operations are brought to bear by morphological rules. Stems also hold a place in paradigms, most notably with the other stems of a given lexeme. It is within the framework of WP morphology, joined with Aronoff's

14 I will, however, avoid the term process as regards morphophonological operations, reserving it only for automatic phonological effects unrelated to morphology.
notion of morphological stems, in which I will discuss the phenomena of reduplication.

2.1.2 WP history and motivations

Among Western approaches to word structure, WP is clearly the oldest tradition, having existed since the time of the early Greek and Latin grammarians. It was with the rise of structuralist approaches to linguistics earlier this century that the WP approach began to wane significantly—with the attainment of significant degrees of formalization within the structuralist framework; with the increasing prominence given to the notion of the morpheme in the work of Nida (1948 and 1949), Harris (1947, 1951, etc.), and others; and with the accompanying sociological momentum within the field in the direction of such an approach, linguists came to view word structure almost exclusively in morphemic terms. The cursory mention of WP in Hockett (1954) testifies to the powerful hold which the notion of the morpheme held over the discipline at that time—a hold which, by and large, still exists.

It is the case, however, that the morpheme is not without its theoretical difficulties, as the recent resurgence of the WP approach indicates. In recent years, the benefits of a WP approach have been clearly articulated since at least Robins (1959), and I outline in this section some of the benefits of a WP approach over those approaches which involve the concatenation of morphemes.

Since Hockett (1954), WP has stood as the least discussed of three distinct approaches to word structure--Item-and-Arrangement (IA), Item-and-Process (IP), and WP. As these abbreviations indicate, IA and IP share the central
notion of 'items' at the core of their descriptive apparatus. It is these items, namely morphemes, which crucially distinguish these approaches from that of WP. In the case of IA, the morpheme is a distinct pairing of form and meaning, which, when concatenated with other such items, ultimately gives rise to words. In IP, the morpheme is a more abstract object than it is in an IA approach; in IP the morpheme is essentially a discrete property-bearing object which combines linearly with other such objects to form words. The assumption in IP is that for every distinct unit of meaning within a given word, there is a corresponding process. Thus, for both IA and IP, it is assumed that morphemes and their allomorphic or processual correspondents exist in a one-to-one relationship.

This insistence that form, whether allophonic or processual, and meaning exist in a one-to-one relationship stands as the greatest difficulty for IA and IP approaches to word structure, and the WP approach is designed to address it. WP predicts that many-to-many pairings of form and meaning should be common in the languages of the world, which they turn out to be. Thus, the \(-s\) (phonetically \([-z]\)) of third person singular verbs like English \textit{runs} is paired with at least three distinct morphosyntactic features, namely third person, singular number, and present tense. An IA or IP account is forced to say that at least two of these features are realized as a zero. The preponderance of zeroes in IA and IP accounts stands as a matter of some concern, particularly given that examples like that above, which Matthews (1972:67, 1991:179) calls 'cumulative exponence', turn out to be very common crosslinguistically.

Relatedly, there often exist, in Matthews' terms, instances of 'extended exponence' in which one bit of meaning appears to be linked to more than
one formal element (Matthews (1991:180 ff.)). Thus, the past tense of the English verb sell is sold, in which the past tense appears to be marked by both a stem-internal vowel change and by a suffix. Such examples are particularly common in highly inflected languages like Ancient Greek, and raise the spectre of many-to-many pairings of form and meaning from yet another angle.\textsuperscript{15}

Janda (1994:5000) aptly summarizes the "many-to-many" problem as follows:

Given that WP is thus specifically designed to account straightforwardly for such many-to-many relationships between features and their realizations in word structure, this approach clearly predicts that many-to-many matchings between morphological properties and morphological processes should be quite common in the languages of the world. That this prediction can be empirically verified provides strong motivation for WP, and constitutes one of its major advantages vis-à-vis the two item-based alternatives IA and IP, which base their breakdown of words into linear sequences of elements on the ultimately untenable premise that the relationship between morphemes and their allomorphic or processual realizations is normally one-to-one.

The above-mentioned problems are compounded in the case of the IA approach, which is far more easily applied to highly agglutinative languages, a classic example of which is Turkish. In such languages, there is a preference for clearly separable, affixal morphology, in which form and meaning generally exist in a one-to-one relationship. In languages which employ what has come to be called 'nonconcatenative morphology' (McCarthy (1981:373)), the situation becomes much more complicated. Thus, in the common instances of reduplication, ablaut, subtraction, stress changes, tonal

\textsuperscript{15} It turns out that the recognition of morphological stems, which I discuss below, sheds light on some instances like English sold.
changes, etc., where something different from classic affixation is involved, it
becomes impossible to isolate a constant segmental string with which meaning
is associated. Such a scenario has stretched the limits of the notion of the
"recurrent partial"¹⁶, and has forced the proponents of IA to define
morphemes in increasingly abstract ways, pairing meaning with distinct
levels of form (cf. autosegmentally-based treatments like McCarthy (1981),
Marantz (1982), etc.). Both WP and IP, which are comfortable with processual
accounts, tolerate the dissociation of form from meaning and are not forced to
go to such lengths to preserve formal constants.

2.1.3 Paradigms and rules

In general, the term "paradigm" has been used to refer to "sets of
related words" (van Marle (1994: 2927)), though I will extend its use to refer to
sets of other related morphological objects, such as stems and shapes (see also
Bybee (1985), especially Ch. 3). A given item may participate in a number of
distinct paradigms, each of which recognizes different kinds of associations
which hold among its members. In inflectional paradigms, for instance, each
word in a paradigm crucially shares a large set of properties with the other
members of its paradigm, but crucially differs from the other members of its
paradigm in possessing certain distinct morphosyntactic properties, such as
person and number, which have presumably been realized by means of an
interconnected set of morphological rules. The relations which hold within
derivational paradigms may, among other things, involve the sharing of a

¹⁶ The term "recurrent partial", to my knowledge, is first used by Hockett
(1947:242), though the concept clearly predates his use of the term. Briefly, the concept,
employed in classical structuralist morphemic analysis, involves the occurrence of
certain parallel occurrences of formal material in multiple morphological expressions,
each occurrence of which is associated with the same semantic content. Thus, run- is a
recurrent partial in the expressions runner, runs, running, etc.
common lexical stem among the paradigm members. Thus, a lexeme and all of its first-order derivatives would, by this account, fall within the same paradigm; e.g. \textit{inflate}, \textit{inflatable}, \textit{inflation}, etc. would be part of the same derivational paradigm. In a stem paradigm, each stem crucially shares with all other members of its paradigm an identical set of semantic and morphosyntactic features, but differs from the other members of its paradigm in its indexing concerning the set of morphological operations which it is eligible to undergo, and often in certain formal dimensions, as well. Thus, the lexeme \textsc{INFLATE} has, by such an account, (at least) two stems, one of which ends with \textit{-t} and is indexed for affixation of \textit{-able}; the other of which ends in [\textit{-1}] and is indexed for affixation of \textit{-ion}.

In a shape paradigm, as in a stem paradigm, all items share an identical set of semantic and morphosyntactic features, but, rather than being uniquely indexed for morphological rule participation, they are uniquely indexed on purely formal grounds for selection to appear in particular positionally or phonologically defined locations in phrases or sentences (e.g. soft-mutation in Welsh).\footnote{In Welsh soft mutation, many lexemes appear in various phonological versions, each of whose distribution is determined on the basis of particular lexical or syntactic triggers in the syntactic constructions in which they occur. Thus, the word for 'cat' in Welsh, can appear as \textsc{gath}, \textsc{chath}, \textsc{nghath}, \textsc{cath}, etc. entirely on the basis of such syntactically distributed triggers. See Zwicky (1992:335) and Ball and Müller (199?:4 ff.) for discussion.}

Thus, all morphological objects, whether lexemes, inflected words, stems, shapes, etc. hold a place in at least one, and often a great many paradigms. The nature of the relations which hold in different paradigms varies significantly, e.g. the distinction between \textit{dreamer}, \textit{dreamy}, \textit{dreamily}, etc. involves a paradigmatic relationship holding between distinct lexemes; the distinction between the verbs \textit{dream}, \textit{dreams}, \textit{dreamed}, etc. involves a
paradigmatic relationship holding between distinct inflectional forms of a single lexeme; the distinction between the alternative stems appearing in the two past tense forms dreamed and dreamt ([drem] and [drem], respectively) involves a paradigmatic relationship holding between formally distinct, yet separately indexed objects which share identical semantics.

The nature of the similarities to and differences from the other members of the paradigms in which they occur are stated in terms of morphological rules; morphological rules in essence state the regularities of relations which hold within the morphological paradigms in a language. Thus, as we might expect, for each type of morphological paradigm there is a corresponding type of morphological rule. Word-formation rules, including both rules of compounding and rules of derivation, capture relations which hold between lexemes; the former involving combinations of multiple lexical stems, the latter involving various morphological operations upon individual stems. Inflectional rules capture relations which hold between the members of inflectional paradigms and the lexical stems to which they are related, e.g. between the case-marked forms of a Turkish noun paradigm and the stem to which they are related. Stem rules capture relations which hold between members of stem paradigms, such as those mentioned above for English inflatible versus inflation. Shape rules describe the relations which hold between distinct shapes of a given lexeme, such as the a/an shape distinction in English.

Thus, from a WP perspective, the overall structure of the lexicon consists of an interconnected list of interconnected lists. Each paradigm (i.e. interconnected list) that exists consists of words and/or stems, or of shapes, and the relationships within it are expressed by means of morphological rules.
These paradigms are then organized in the lexicon in interconnected ways; i.e. the fact that particular morphological objects exist in multiple paradigms predisposes the overall system (i.e. the lexicon itself) to permitting widespread cross-referencing, in that distinct paradigms may share items, such as stems. The lexicon, while possessing vast quantities of information which must be memorized, can nevertheless be managed by speakers precisely because it is not an undifferentiated list of items; morphological objects fit together with one another as a tightly woven fabric, not as an unwound thread.

The WP approach predicts that speakers may associate any particular morphological object with many different paradigms, each of which focuses on one dimension of relatedness which the object in question shares with other objects in the lexicon. It thus assigns to the notion of paradigm full theoretical status. The paradigm is one of the objects to which linguistic description, and most importantly, morphological description, must be able to refer.

WP morphology also assigns to the word a primary role, and asserts that affixes are not listed in the lexicon. Consequently, the notion of the morpheme, from a WP perspective, is neither necessary nor desirable in accounting for the morphology of any language. I will in this study adhere to the "no-morpheme" approach of traditional WP morphology, concurring with proponents of a WP approach that words consist of non-linear bundles of what Janda (1994:5000) refers to as 'morphosemantic', 'morphosyntactic', and 'morpholexical' features which do not exist in a one-to-one match with allomorph or processual correlates. It is to features of words, not morphemes, that the rules of syntax refer, from a WP perspective.
2.1.4 Rules, operations, and operation types

A source of much confusion in discussions of morphology in general and of reduplication in particular concerns the relationship between the phonological form (Saussure's 'signifiant') and the semantic or morphosyntactic content (Saussure's 'signifié') of morphological expressions. The tendency, particularly in recent treatments of reduplication, has been to neglect the semantic and morphosyntactic content realized by means of the formal device of reduplication. Thus, the phonological “stuff” of reduplicative morphology has frequently been considered without regard to the specific “work” that it is used to accomplish in morphological systems. The result has often been to erroneously treat distinct rules of reduplication as instances of the same phenomenon, to miss important generalizations regarding the nature of morphological rules, or to impose generalizations where they don’t belong (Janda (1982)).

This tendency, however, to separate the phonological dimension from the functional dimension of morphology is not entirely infelicitous. While it is the case that particular formal devices (i.e. particular affixes, particular types of reduplication, etc.) are often employed by languages to realize one and only one semantic or morphosyntactic property, it is also frequently the case that the same formal material is used to realize widely divergent meanings and morphosyntactic properties. The same phonological material (i.e. [-s/-z/-əz]) is used in English to realize categories as divergent as plurality on nouns, possessive of nouns, and third person singular present tense of verbs, for example. The fact that form and function can be quite freely mixed and matched is captured in approaches like that of Zwicky (1988), in which a clear distinction is maintained between morphophonological operations and
operation types on the one hand, and morphological rules on the other.

I will, following Zwicky (1988), also maintain such a distinction. This study is, in fact, the study of a particular operation type, in Zwicky's terms, in that I am investigating the ways in which a particular type of formal device—reduplication— is incorporated into morphological systems. While the particular operations classed as reduplication are widely divergent on formal grounds, they nonetheless all fall within the same operation type, even as the particular operations classed as affixation are widely divergent and yet fall within the same operation type.

2.2 Some WP conceptual and terminological distinctions

2.2.1 Introduction

As the preceding discussion makes clear, we need to have at our disposal some agreed-upon terminology if we are to handle the theoretical objects and concepts which will arise within a WP framework. Thus, for the sake of convenience, I briefly outline in what follows some of the important conceptual and terminological distinctions within the present WP treatment of reduplication.

2.2.2 Morphophonological operations

A morphophonological operation (MO) is any phonological function brought to bear on a phonological representation by a morphological rule (MR). The number of MOs available to the languages of the world is finite in number, and amounts to a list of possible formal effects that may be employed

The terms morphophonological operation and morphophonological operation type are variants of Zwicky's (1988) morphological operation and morphological operation type. I have opted for the former terms to emphasize their formal dimension. I have kept Zwicky's term morphological rule.
by the MRs of a language. As I mention above, there is nothing which
constrains a language to associate only one aspect of meaning with one MO--
one aspect of meaning may be associated with more than one MO at the same
time (extended exponence), or several aspects of meaning may be associated
with only one MO at the same time (cumulative exponence).

This approach to MOs reflects that of Stump (1991), in which the formal
relations between the members of a given paradigm are established by means
of paradigm functions. Paradigm functions, in Stump's terms, are the formal
component of morphological rules; the fact that he draws a separation
between the formal effects of the functions and the semantics with which
these functions are associated by MRs permits him to effectively deal with
classic problems of what he calls "morphosemantic mismatches", including
extended exponence, cumulative exponence, and so-called "bracketing
paradoxes".

I am also assuming, following Zwicky (1988), that there are
morphophonological operation types, also finite in number, which comprise a
list, in essence, from which all languages draw. Each operation in a language
is an instance of a particular morphophonological operation type, such as
ablaut, truncation, prefixation, etc., though I am not herein making any final
claims regarding the morphophonological operation types we ultimately
recognize. Each language possesses what Zwicky calls a morphological
operations inventory, which consists of a list of those MOs available for use by
that language19.

It is unclear whether prefixation, suffixation, and infixation should be
distinct morphophonological operation types, or whether they are all best

19 In this study, I will refer to the morphophonological operations inventory,
following my slight deviation from Zwicky's terminology.
treated as different subtypes of one morphophonological operation type, namely affixation. Similarly, it is unclear whether to group operations such as ablaut together with operations like segmental substitution, both of which may be seen, from one perspective, as instances of the same morphophonological operation type. Regardless, however, of how we divide MOs into morphophonological operation types, I am claiming that there is a finite list of MOs, albeit much longer than the list of morphophonological operation types, from which the languages of the world must choose.

Proposing the existence of a finite list of MOs and morphophonological operation types distinguishes this approach from truly transformational approaches, in which it is difficult to constrain the potential phonological effects which MRs may bring to bear on phonological representations. Also, we can expect there to be limits as to the operations available to specific rule types. Furthermore, limits certainly exist in regard to the elements of morphophonological structure to which MOs may refer, and, in the case of affixal operations, to the relative order of the affixed material in relation to the material to which it is affixed. This corresponds to the locational and ordering specifications which Zwicky (1988:328) assigns to the domain of universal grammar along with the operations themselves. Specifically, the set of structural components or abstract features, whether segmental, prosodic, syllabic, morphological, or otherwise, to which MOs may refer must be specified in universal grammar, as must the positional relation which the operational effects bear to the structural components in question. The

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This fact is evidenced, for example, by the apparently universal formal distinction between compounding, on the one hand, and inflection on the other. Compounding is never employed to realize inflectional categories, it appears, and we can expect to discover other such restrictions, or at least tendencies, in regard to the types of MOs which are used by particular classes of MRs. Compounding is further discussed later in this section, and in Chapter 6.
components of structure to which the MOs of a specific language refer are often merely a subset of those available in universal grammar.

To adequately develop this approach to morphological rules, all of these concerns will clearly need to be addressed, but it is beyond the domain of this study to do so in anything approaching a comprehensive way. I will limit myself to the examination of reduplication, investigating the makeup of reduplication as a morphophonological operation type, though not attempting to index all the possible formal types of reduplication which occur in the world's languages. That job, which certainly needs to be done, will need to wait.

This being said, I assume that the phenomena of reduplication must be explained in terms of two distinct morphophonological operation types—affixation and compounding. Partial reduplication results from one of any number of MOs, all of which can be described as variable affixation. Complete reduplication results from any number of MOs, all of which can be described as intralexical compounding.

Variable affixation simply involves the affixing of material which varies in relation to some stem of the lexeme to which it attaches. This phonological dependence of a reduplicative affix on the phonology of some stem of the lexeme to which it attaches has frequently been treated as traceable to some sort of copying operation, transformational or otherwise. Alternatively, the formal dependence of the reduplicant on the attachment stem has been attributed to a correspondence relation triggered by reduplicative morphemes. The nature of this copying operation and its place within the theory of grammar have led to a wide range of proposals, which I discuss in Chapter 3 and elsewhere.
From the standpoint of the present approach, however, the formal relation which the reduplicant bears to the attachment stem derives entirely from a MO which affixes prosodically defined material, at least some portion of which, also prosodically defined, varies in relation to the phonology of the stem to which it attaches. As discussed in Chapter 1, the fact that variable affixation is defined in terms of the components of the syllable, and not in terms of segmental or suprasegmental features, sets it apart from other operations which may at first glance appear to produce similar results.

As a subtype of the compounding morphophonological operation type, intralexical compounding involves the concatenation of morphological stems. Unlike interlexical compounding, which concatenates stems of distinct lexemes, intralexical compounding concatenates two stems, identical or otherwise, of the same lexeme. In the event that the two stems concatenated by means of intralexical compounding are not identical, then at least one of them must have undergone a stem rule yielding a distinct stem of the lexeme in question, making that stem available for the application of an intralexical compounding MO, as well as other MOs, by various MRs.

2.2.3 Lexically determined and phonologically determined classes

Many languages divide the members of their major lexical categories into subclasses, one of the most common scenarios being that encountered in gender class systems like those of Russian, French, and other languages. In such systems, and other systems that subdivide lexical categories (e.g. English, Yiddish, etc.—see Perlmutter (1988) and Saperstein (1995)), subclass membership may be determined on phonological, semantic, stratal, or more
arbitrary grounds. I refer to such groupings as *lexically determined classes*, each of which undergoes a distinct set of MRs.

In English, for example, certain nouns form their plurals by suffixing -s, e.g. *cats, dogs, buses*, etc.. Other nouns, namely certain nouns of Latinate origin (or those perceived to be so by speakers), form their plurals (for some speakers) by suffixing [-iz] (orthographically -es), e.g. *index/indices, matrix/matrices*, etc.\(^{21}\) Others form their plurals by means of distinct ablaut operations, e.g. *mouse/mice, louse/lice*, etc. Though often there are rough phonological patterns within these groupings, particularly the smaller ones, there is nothing about the phonology of a noun in English that forces it into any one lexically determined class. Thus, though the word *reflex* resembles the singular forms for most of the nouns that pluralize in [-iz], no English speaker forms its plural as *reflices*, but as *reflexes*; and though the word *house* shares the phonological pattern found in nouns that pluralize according to the *mice/lice* pattern, it pluralizes as *houses*.\(^{22}\)

In English, then, nouns fall into one of several lexically determined classes, determined on essentially arbitrary grounds. In each of these lexically determined classes, the members undergo MRs distinct from those which the members in other such classes undergo, and these distinct MRs are of necessity associated with distinct MOs. Yet within any particular lexically determined class, there may be several further subgroups, determined purely according to phonological factors, as is the case within the *-s*-plural lexically determined class in English. In this particular lexically determined class, the

\(^{21}\) For some speakers, words like *process* fall into this class.

\(^{22}\) For some speakers, *houses* follows the general pattern and is pronounced [*hawsaz*]. For others, it is pronounced [*hawzaz*]. These facts, however, have no particular bearing on the discussion at hand.

43
distribution of the variants of the regular plural (phonetically [-s, -z, -əz]) is
determined entirely according to the phonology of the final segment of the
stem to which they are suffixed. These divisions account for three distinct
phonologically determined classes within the -s-plural lexically determined
class in English, but given that the operations which apply to each distinct
phonologically determined class are, phonologically speaking,
complementarily distributed, we want to treat them not as resulting from
distinct MRs, but from clusters of related sub-operations grouped together and
employed by a single MR.

This grouping of related sub-operations according to phonological
determined class membership is one of the classically recognized forms of
"allomorphy", and is very widespread. In Uzbek, a highly agglutinative
Turkic language, for example, individual case-marking MOs appear in
complementarily distributed groupings, based on the final consonant of the
stem upon which they operate. Thus, the ablative case may be realized as -dæn,
-tæn, or -naen, depending on the voicing and nasality of the final consonant of
the stem upon which it is realized. Such examples, it is clear, are numerous.

Similarly, as regards reduplicative MOs, we often find a cluster of
several complementarily distributed operations acting upon members of the
same lexically determined class. It turns out, for example, that, in the
realization of the Sanskrit perfect, several distinct, but related, sub-operations
appear, all of which are reduplicative, but each of which is associated with a
particular phonologically determined class. I further address this issue in
Chapter 5.

One important question which arises here concerns the degree of
apparent relatedness of the operations which apply to distinct phonologically
determined classes. Two phonologically determined classes may be divided upon purely phonological grounds, for instance, and yet undergo entirely unrelated MOs in conjunction with the same semantic, morphosyntactic, or indexing properties. In such cases, we want to say that one MR employs distinct MOs for distinct phonologically determined classes.

Thus, there may be different kinds of relationships between the cluster of MOs employed by a given MR to realize particular semantic, morphosyntactic, or indexing properties on two phonologically complementary lexically determined classes. In one type of situation, there may be no phonological relationship between the MOs applied to distinct phonologically determined classes—e.g. to one phonologically determined class a reduplicative MO is applied, to another phonologically determined class an ablauting MO is applied, to yet another phonologically determined class a suffixal MO is applied, etc. In another type of situation, such as that of the Sanskrit perfect, all of the MOs, while applied to distinct phonologically determined classes (e.g. vowel-initial, back consonant-initial, aspirated consonant-initial, consonant cluster-initial, etc.), bear a natural phonological relationship to one another; e.g. they are instances of the same morphophonological operation type and their phonological effects differ from one another in ways which follow closely from the phonological representations upon which they are brought to bear. This is similar to phonologically sensitive affixation rules like those of Uzbek discussed above.

In the end, what is crucial here is not the formal relatedness of the MOs

23 In reality, Sanskrit divides the class of vowel-initial stems into more than one class, on apparently arbitrary grounds, though the vast majority of Sanskrit vowel-initial verbs behave as a single phonologically determined class. The point here is simply that Sanskrit, and many other languages, divide the lexicon into smaller groups on phonological grounds for morphological purposes.
involved, though there will often be a formal relationship between them. What is critical is the fact that they occur in phonological complementary distribution and are associated with the same MR. We can expect there to be frequently recurring patterns in regard to the sets of MOs that group together crosslinguistically, which is to say that the phonologically determined class divisions into which languages divide their lexicons have their origin in universal grammar.

2.2.4 Semantic, Morphosyntactic, or Indexing Properties (SMIPs)

MRs effect the association of certain semantic, morphosyntactic, or indexing properties (SMIPs) to phonological representations. They are the means by which phonological form is linked to meaning on the morphological level. Instances of different morphological rule types are responsible for linking different morphological properties with phonological form. Inflectional rules, for example, are responsible for linking sets of morphosyntactic feature values, such as those for PERSON, NUMBER, or TENSE, to phonological form, while stem rules are responsible for linking certain semantically empty indices to phonological form. Derivational rules and rules of compounding effect a broad range of semantic and morphological distinctions through their application. Even given the range of effects which morphological rules bring to bear on lexical stems, we will nonetheless often find it convenient to refer to the whole range of properties which morphological rules assign, and it is that whole range of properties which is covered by the label SMIP.

From the perspective outlined thus far, form and meaning enjoy a high degree of independence on the morphological level. Thus, it is conceivable
for two distinct MRs to make use of the same MO and yet pair the phonological effect with very different SMIPs. Examples of precisely this state of affairs are common, and occur in widely divergent languages. Thus, in Uzbek, the affixation of -siz is a MO employed by an inflectional rule to mark second person, and is employed by a derivational rule to encode the meaning 'without X'. E.g. kela-siz 'you come'; and pul 'money', pul-siz 'without money, broke', etc. In Farsi, an Indo-Iranian language of western and central Asia, the affixation of -i is used to encode SMIPs ranging from second person singular in verbs, to indefiniteness in nouns, to denominal adjectivization (Lambton (1963) and my own research data). Thus, we find mikon-i 'you come'; miz-i 'a table'; and xak 'dirt', xak-i 'dirt-colored', etc.

Clearly, languages often give preference to certain operation types, and even to particular operations. In English morphology, for instance, affixation is dominant, and inflectional morphology is exclusively suffixal. And what is more, among the operations used in English to encode inflectional SMIPs, no less than three employ precisely the same morphophonological operation, namely the suffixation of -z. Such situations lead us to want to distinguish clearly between rules, operation types, and operations.

We certainly do not want to claim that the same rule has applied to effect pluralization, present tense inflection, and possessive case marking, though all three morphosyntactic properties are associated with the same phonological content. Far superior is the claim that all three morphological rules make use of the same morphophonological operation (i.e. "Suffix -s/-z/-əz") and that each of the rules assigns distinct SMIPs in conjunction with the same operation. Such a scenario captures the generalization to be had regarding the formal parallels between the three categories, yet separates
that form from the real semantic differences with which it is associated in each case.

Furthermore, it is often the case that not all members of a given syntactic category encode identical SMIPs in the same way. Instead, the lexemes within a given category are often further subdivided into groups defined along any number of lines. In Yiddish, for instance, there are distinct plural constructions for lexemes falling within distinct lexical classes generally divided along the line between vocabulary of Germanic versus Hebrew origin; e.g. *talmid* 'student' (from the Hebrew stratum) forms its plural as *talmidim*; *oyer* 'ear' (from the Germanic stratum), forms its plural as *oyern*, etc. ((Saperstein (1995)) and (Perlmutter (1988)))\(^24\). In Swahili, distinct paradigm classes among nouns are associated with distinct morphological constructions, e.g. *-tu* 'person' is in a paradigm class that forms its singular by prefixing *m-*; e.g. *m-tu*, and that forms its plural by prefixing *wa-*; e.g. *wa-tu*; *-cho* 'eye', on the other hand, is in a paradigm class that forms its singular by prefixing *ji*, e.g. *ji-cho*, and that forms its plural by prefixing *ma-*; e.g. *ma-cho*, etc. (Ashton (1944:10)).\(^25\) In many languages, the phonology of distinct lexemes is associated with distinct MOs used to encode identical SMIPs; in Warlpiri, the ergative marking is *-ngku* following disyllabic stems, but is *-rlu* following stems of three or more syllables (Carstairs (1987:21)), e.g. *kurdu-ngku* 'child-ERG' and *ngajulu-rlu* '1-ERG', etc. (Simpson (1991:55, 100)).

\(^24\) Lexical classes that broadly fall along lines of genetic origin must nonetheless be viewed as arbitrarily defined lexically determined classes, in that most speakers do not have access to knowledge of the historical origin of lexemes in a given class. Also, lexemes that differ in historical origin from the majority in a given class also often appear, confirming the ultimate arbitrariness of lexically determined class membership.

\(^25\) While Swahili noun classes are roughly associated with certain semantic tendencies (e.g. animacy, inanimacy, etc.), membership in any given class does not always conform to these tendencies. Thus, the classes must ultimately be viewed as arbitrary paradigm classes referenced by particular morphological rules.
In short, languages may divide their lexicon up in a range of different ways for morphological purposes, and the operations that a language uses to encode various SMIPs may also be employed in a range of different ways. On the one hand, a given operation may be dedicated to one and only one SMIP, as is the case with the prefixation of *mega-* to indicate large size or scope in English, e.g. *store/megastore*, etc. In such circumstances, I will refer to the MO as a *dedicated morphophonological operation*. Alternatively, a given MO may be employed by a number of distinct MRs to encode often widely divergent SMIPs, examples of which are given above from English, Farsi, and Uzbek. When a single MO is used by the MRs of a language for the realization of several distinct SMIPs, I will refer to it as a *shared morphophonological operation*. Finally, a particular SMIP may be encoded by means of several distinct MOs, as evidenced by distinct latinate and conventional plurals among English nouns (e.g. *antenna/antennae* versus *dog/dogs*, etc.).

2.3 More on morphological stems

Finally, we need to address the issue of morphological stems. The recognition of morphological stems as distinct morphological objects in their

26 Admittedly, for some speakers, this prefix is used in a technical sense, as well, referring to the idea of "a million", e.g. *megaton*, etc. For some speakers, however, the productive use of this prefix is limited to the single, non-technical sense.

27 While the example I give involves derivation, dedicated morphophonological operations are employed by other types of MRs, as well. Thus, in Persian (personal data), the third person plural (an inflectional category) is realized by the affixation of *-ænd* to verb stems, e.g. *kaerd-ænd* 'they came', *zæd-ænd* 'they hit', etc., and this same operation is limited in Persian to the realization of this category alone.

28 Brian Joseph points out (personal communication) that, for some speakers, there are actually two distinct plurals for *antenna*. The first, *antennas*, is limited to television and other electronically related antennas; the second, *antennae*, is limited to insect or other zoologically related antennae.
own right is motivated by two basic observations. First of all, it has long been recognized, often in instances of extended exponence, that particular morphemes (to speak in non-WP terms) appear to trigger certain changes in the stems to which they attach. Thus, in Uzbek, demonstrative pronouns, when they occur in the oblique cases, appear with a -n- attached between the nominative PR and the case suffix. For example, we find bu 'this (NOMINATIVE)', but in oblique cases, we find bundae 'this (LOCATIVE)', bundæn 'this (ABLATIVE)', etc. For no other class of nominals do we find the intrusive -n- in the oblique cases, and where the intrusive -n- occurs, there appear to be no additional associated SMIPs. Thus, this formal distinction is associated with no particular meaning or function, and occurs only in one arbitrary word class.

In other situations, we find a state of affairs in which a particular aspect of form appears in the realization of several categories which share nothing semantically. Thus, as Matthews (1972) observed, Latin future participles are nearly always based on perfect participles, even when the perfect participle is irregular. The future participle, however, is always active, while the perfect participle is usually passive, leading to the conclusion that it is merely a formal relationship, not a semantic one, that holds between the perfect and future participles of Latin. The following examples, from Aronoff (1992), illustrate this state of affairs.
(3) Latin participles

Aronoff (1992) concludes from data like the above that both the perfect and the future participles are based on the same stem, a distinctly indexed morphological object upon which various morphological rules may operate. Once we recognize stems as distinct morphological objects, categories which appear to exhibit extended exponence in their realization often can be analyzed in terms of a single MO applying to a distinct stem. Such may in fact be the case with English sold, which can be analyzed as the regular past tense MR applying to a distinct stem of the verb sell.

It turns out that reduplication, like other morphophonological operation types, is often used to distinguish stems of a given lexeme from one another. In Chapters 4 and 5 in particular, I discuss the relevance of morphological stems to the present treatment of reduplication, examining the prevalence of reduplicative stems in Tagalog and Sanskrit, respectively.

29 Matthews (1972 and 1991) provide useful discussions on this idea, to which he refers as 'parasitic formation'.

<table>
<thead>
<tr>
<th>Present Infinitive</th>
<th>Perfect Active</th>
<th>Future Participle</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>duec-re</td>
<td>duct-</td>
<td>duct-uur-</td>
<td>'lead'</td>
</tr>
<tr>
<td>preme-re</td>
<td>press-</td>
<td>press-uur-</td>
<td>'press'</td>
</tr>
<tr>
<td>loqu-ii</td>
<td>locut-</td>
<td>locut-uur-</td>
<td>'speak'</td>
</tr>
<tr>
<td>fer-re</td>
<td>laat-</td>
<td>laatuur-</td>
<td>'bear'</td>
</tr>
</tbody>
</table>

(3) Latin participles
CHAPTER 3

APPROACHES TO REDUPLICATION

3.1 Introductory remarks

Thus far I have attempted to lay the terminological and conceptual groundwork necessary for a principled discussion of reduplication from a WP perspective. Before I embark on a more detailed WP analysis of reduplication, it is necessary to consider the work, now rather substantial, that has already addressed reduplication in some detail. Towards that end, I attempt in this chapter to outline some of the more significant treatments of reduplication to be found in the literature and to address some basic questions in their regard. My purpose is not to provide a detailed discussion of each of these accounts, nor is it to assess everything of substance within them—the literature is readily available for in-depth inspection. Instead, I aim to outline the representative treatments in broad strokes, to enable us later to contrast these various approaches to reduplication with the approach of WP morphology advocated herein.

The issue of how best to account for reduplication, in whatever framework is being employed, has proven to be a particular challenge, as evidenced by the persistent discussion of the matter. Prior to Wilbur (1973), I know of no sustained theoretical examination of reduplication, the existing discussions for the most part occurring in the context of descriptive grammars
of individual languages, or in the context of survey treatments of linguistics, such as that of Bloomfield (1933). The few studies prior to Wilbur (1973) that focus on reduplication tend to be largely descriptive in focus, and, to their credit, give attention to the semantics of reduplication far more than most recent studies. They do, however, make little attempt at cross-linguistic analysis or statement of cross-linguistic generalizations. It is therefore Wilbur (1973) which marks the starting point for contemporary theoretical discussions of the phenomena.

Since Wilbur (1973), most major treatments of reduplication over the past nearly twenty-five years can be divided into two major groups. The first group consists of those accounts which are rooted in a transformational framework, the most notable of which are Wilbur (1973), Carrier (1979), Carrier-Duncan (1984), and Steriade (1988). I will refer to this group as the transformational group of accounts. Researchers within this group all claim that the phenomena of reduplication require the power of transformations to adequately account for them, though each of these researchers comes to the study of reduplication with a distinct set of concerns.

The second major group is what I will call the affixational group of accounts, in that all researchers working within this group treat reduplication as essentially the same as non-reduplicative affixation, though reduplicative affixes are associated with certain peculiarities, such as the fact that they trigger copying and/or are phonologically underspecified. Researchers in this group include McCarthy (1985), Marantz (1982), Bell (1983), Broselow (1983), Broselow and McCarthy (1983), McCarthy and Prince (1993, 1995), etc. Within this group there is wide variation as to how

Churchill (1908) provides an interesting glimpse into turn-of-the-century views of reduplication, as well as some useful Samoan data.
reduplicative morphemes come to obtain their phonology, but none of the researchers within this group admit the need for transformations to account for it.

Occasionally studies, such as the typologically oriented Moravcsik (1978), have fallen outside of these major groups, but such treatments are uncommon. Treatments like Moravcsik's aside, however, what researchers within both major groups agree upon is that reduplication is best described in terms of a type of morpheme that is radically underspecified in terms of its phonology. The extent to which such a morpheme is underspecified, and the means by which it obtains the specification that it inherently lacks, are the matters regarding which there is a wide range of disagreement, but the profoundly dominant trend, regardless of theoretical orientation, has been to describe reduplication in terms of the morpheme, and to almost exclusively focus on the formal aspects of the proposed reduplicative morphemes.

In contrast to these two theoretical directions, I take an approach to reduplication that does not hinge on the morpheme. My approach is transformational, in a sense, in that it depends on operations which act upon phonological representations, but, I claim, the number of possible operations is finite, and thereby listable. My approach is also, in a sense, affixational, in that it treats certain types of reduplication as instances of variable affixation, resulting from the application of affixational operations which are sensitive to the stems upon which they act. Such operations, however, are wholly distinct from the notion of the morpheme to which most researchers adhere, in that there is no insistence on a one-to-one pairing of form with meaning, and no listing of morphemes in the lexicon.
3.2 Typological accounts

3.2.1 Moravcsik (1978)

Edith Moravcsik, working under the umbrella of the Stanford Project on Language Universals, takes a distinctly typological perspective in her approach to reduplication, seeking formal, semantic, and distributional patterns within the reduplicative data available to her. Consequently, Moravcsik investigates such formal matters as the number of repetitions permitted in reduplicative constructions, the placement and phonological makeup of the reduplicant as it relates to the attachment stem, and other such matters.

As regards the semantics of reduplicative constructions, Moravcsik observes that the typical relation of a reduplicative construction to its unreduplicated counterpart is one of proper inclusion—i.e. the meaning of the reduplicative construct is equivalent to that of the corresponding unreduplicated construction, plus something (1978:316). Also, she points out the strong tendency for reduplication to be accompanied by a sense of increased quantity, varying, of course, with the category of the lexeme to which it applies.

One of Moravcsik's aims that has demonstrably influenced subsequent work on reduplication concerns the way in which languages define the relevant portion of the string to be copied by the reduplicant. The following passage (part of which is cited by Marantz (1982:440)), is worth quoting here (Moravcsik (1978:307-308)).
whereas the relevant string could in principle be defined by any phonetic property (segmental or suprasegmental) or in terms of absolute linear position, or in terms of simply the number of adjacent segments involved; and it could also be left undefined (i.e. "reduplicate any one or more segments in the total string"), reduplicated phonetic strings I found invariably defined in reference to consonant-vowel sequences and absolute linear position. In other words, all such specifications are of the type: "reduplicate the first C and V of the word" or "reduplicate the middle C" and never of the type: "reduplicate the first two segments (regardless of whether they are consonants or vowels)" or "reduplicate the second voiced fricative".

The above claim, followed up by Marantz, states that, within the realm of partial reduplication, the only way that languages define the reduplicant is in terms of CV strings. Moravcsik considers two other possibilities, namely that reduplicants may be defined in terms of syllables, and that reduplicants may be defined in terms of segments, irrespective of their status as vowels or consonants. She ultimately dismisses both (Moravcsik (1978:310-312)). I further discuss Marantz's angle on this claim below.

In the end, Moravcsik (1978) stands as an initial pass at the type of typological study of reduplication that, to my knowledge, has not been seriously undertaken since. Nonetheless, her essentially theory-neutral approach to the data has yielded observations still under consideration.

3.3 Transformational Accounts
3.3.1 Wilbur (1973)

Ronnie Wilbur, in her 1973 dissertation, initiates a discussion surrounding reduplication that continues today. Her most enduring observations concern certain apparently exceptional behavior surrounding reduplication in a number of languages. While aspiring to carve out a place for morphology as a separate component in grammar, Wilbur nonetheless
operates within the confines of generative phonology (as characterized in Chomsky and Halle (1968)), pointing out in her discussion both the benefits and the drawbacks of treating reduplication as a primarily phonological phenomenon.

Citing the resemblance that rules of reduplication, unlike so-called "simple-addition" rules (such as affixation), bear to phonological rules, Wilbur reiterates the justification circulating at the time for including reduplication as part of the phonological component of grammar. She goes on to briefly outline some of the formal types of reduplication, providing data from Salishan languages, Madurese, Agta, Tagalog, and other languages. She recognizes two distinct objects to which she regularly refers, the first being $R_0$, and the second being $R_r$. $R_0$ refers to, in her terms, "the portion of the unreduplicated form (word, morpheme, etc.) of which a copy is made". $R_r$ refers to the actual copy of $R_0$ (Wilbur (1973:7)).

One important assumption in Wilbur (1973) concerns the nature of reduplication itself, and is summarized in her statement that "[p]resumably, the application of Reduplication results in a copy which is identical, in the underlying representation, to the original" (Wilbur (1973:11)). Within her framework, this is to say that reduplication is assumed to produce exact copies of some part of the attachment stem, an assumption almost universally embraced up to the present day, but which I challenge in later sections.

In the second chapter of her study, Wilbur focuses on apparently exceptional behavior of reduplicated forms (1973:15 ff.). She notes two basic types of irregular behavior among reduplicative constructs, the first being what she calls failure of rule, and the second being what she calls overapplication. Failure of rule, referred to by later researchers as
underapplication (e.g. McCarthy and Prince (1995:250)), refers to a state of affairs in which a phonological rule fails to apply in an environment where it is expected to apply, in this case an environment within the reduplicant or the attachment stem of a reduplicative construct. Overapplication refers to a state of affairs in which a phonological rule appears to have applied, in this case in the reduplicant or the attachment stem of a reduplicative construct, though its triggering environment has not been met.

To illustrate underapplication, Wilbur presents examples from several languages. One such example occurs in Luiseno, an Uto-Aztecan language of California. In Luiseno, according to Wilbur (following Munro and Benson (1973)), there are a number of generally applicable phonological rules which interact to yield surface phonological forms. Claiming that \( c \) and \( s \) are in complementary distribution in Luiseno, Wilbur, again following Munro and Benson (1973), proposes the existence of a rule that changes \( c \) to \( s \) before a consonant or a word boundary. Thus, we find \( k\acute{i\acute{c}}a \) 'house (nom.)' and \( ki\acute{s} \) 'house (acc.)', etc. Among adjectives formed by means of reduplication, however, this purportedly general phonological rule fails to apply. Thus, Wilbur claims that an underlying \( \acute{c}ara + \acute{c}ara + i + \acute{c} \), in which the \(-i\) is a nominalizing suffix and the final \(-c\) an absolutive suffix, appears on the surface as \( \acute{c}ara\acute{c}ra\acute{s} \), whereas, given the operation of the proposed \( c \rightarrow s \) rule, we would expect \( \acute{c}ara\acute{s}ra\acute{s} \). One of the particular problems in accounting for the \( c \rightarrow s \) rule failure in Luiseno has to do with the fact that the second and third \( c \) in underlying \( \acute{c}ara + \acute{c}ara + i + \acute{c} \) behave differently, the former remaining unchanged and the latter appearing as \( \acute{s} \). This state of affairs leads Munro and Benson (1973) to shy away from their rather ad hoc solution, which involves the assignment of a special feature \(-c \rightarrow s \) rule only to the root portion of
the output of the reduplicative adjective-formation rule (Munro and Benson (1973:20)).

As regards overapplication, Wilbur also cites a number of examples. The first such case involves Tagalog, in which certain apparently assimilatory processes apply to both the attachment stem and the reduplicant, although it is only the latter which meets the conditions for the assimilation to apply. Thus, in Tagalog, when the prefix ma- is attached to the stem bigay 'give', it yields mamigay, which Wilbur calls the Modal; when the same prefix combines with the reduplicated form bibigay, it yields mamimigay, which Wilbur labels as the Future. In ma-mi-migay, both the b of the reduplicant and the b of the attachment stem assimilate to the -η of the prefix, though only the former is eligible to do so.

It is Wilbur's clear articulation and illustration of the problems of underapplication and overapplication which has proven to be the most enduring aspect of her work, though she spends some time in the last three chapters of her dissertation exploring possible ways to deal with these apparent anomalies. In Chapter Three of her dissertation, Wilbur explores the logically possible ways available within a classical generative framework to deal with the phenomena of underapplication and overapplication. Having investigated rule ordering, positive and negative exception features, and special reduplication boundaries, Wilbur suspects the existence of a missed generalization, which she spends the remainder of her dissertation pursuing.

The generalization which she claims to account for much of overapplication and underapplication is what she labels The Identity Constraint, which asserts the tendency to preserve identity between $R_s$ and $R_r$. After exploring the ways available to incorporate The Identity Constraint into
the existing generative framework, she proposes it as a global condition on morphological rules. She ultimately claims that reduplication belongs squarely in the morphological component of grammar, and that the Identity Constraint, which recognizes the mate relationship between the reduplicant and the attachment stem, will deal with the apparent anomalies.

3.3.2 Carrier (1979)

Jill Carrier, in her 1979 dissertation, undertakes a detailed analysis of reduplication in Tagalog. Her conclusions in this study involve several substantial claims surrounding how to treat reduplication in a theory of grammar. The most significant of these claims states that reduplication rules belong to a previously unrecognized subcomponent of the lexicon, which Carrier claims to be preceded by rules of allomorphy (morphological readjustment rules) and followed by phonological rules.

In her first chapter, Carrier outlines her conception of the lexicon, building substantially on the work of Aronoff (1976). Following the suggestions of Aronoff (1976) and Chomsky (1970), she proposes that the word-formation component of the lexicon contains a list of words, some of which are morphologically complex. It also contains a list of word-formation rules which both derive new words and capture redundancies within the lexicon by relating pairs of listed words. She also supports a distinction between inflection and derivation expressed along the lines of Halle (1973), in which inflectionally related words occur in full paradigms under a single lexical entry. Derivationally related items, from this perspective, are listed under separate lexical entries.

Furthermore, Carrier accepts the notion of allomorphy rules, also
following Aronoff (1976). Allomorphy rules, by her account, are not properly part of the word-formation component of the lexicon, in that their function is to alter in some way (i.e. by truncation, vowel laxing, or some other change in phonology) the phonological shape of some morpheme when it occurs in the presence of some other particular morpheme. Following Aronoff's terminology, as well as that of Chomsky and Halle (1968), Carrier refers to such rules as “readjustment rules”, in that they adjust the output of both inflectional and derivational word-formation rules, though they themselves are neither.\footnote{Allomorphy rules are the historical precursor to what I refer to as “stem rules”.
} In addition to their distinctness from true word-formation rules, readjustment rules are separate from rules of phonology, Carrier argues, in part because their environments are expressed solely in morphological terms.

Beyond this, I will not now go into all of Carrier's terminological and conceptual distinctions concerning the lexicon; the interested reader is referred to the first chapter of her dissertation for that discussion. I will rather focus on the basic claims she makes as regards reduplication, which she first articulates in any detail at the close of Chapter One of her dissertation.

Beyond her basic claim, mentioned above, that reduplication rules belong to a distinct subcomponent of the lexicon, Carrier also makes several further proposals, on which she elaborates in later chapters. First, she proposes that rules of reduplication must be expressed in transformational terms, in that their output is not of constant phonological shape. The nature of base-dependency which reduplication exhibits, Carrier argues, warrants the power of transformations to account for it. Thus, in describing Tagalog reduplication, Carrier proposes different reduplicative transformations to
account for the varying numbers of segments copied into the reduplicant as well as the varying vowel length of the reduplicant. Some of the examples she cites occur in (4) below, in which her labels for the distinct reduplication types are employed.

<table>
<thead>
<tr>
<th>Reduplication Type</th>
<th>Stem</th>
<th>Gloss</th>
<th>Construct</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1</td>
<td>lakad</td>
<td>'walk'</td>
<td>pag-la-lakad</td>
<td>'walking' (gerund)</td>
</tr>
<tr>
<td>RA</td>
<td>mag-linis</td>
<td>'clean'</td>
<td>mag-li-linis</td>
<td>'will clean'</td>
</tr>
<tr>
<td>R2</td>
<td>limis</td>
<td>'clean'</td>
<td>limis-limens-in</td>
<td>'clean a little'</td>
</tr>
</tbody>
</table>

(4) Tagalog reduplication types (Carrier (1979:189-193))

Secondly, reduplication rules differ from so-called “normal” affixation in that they sometimes infix material deep within existing words, such reduplicative infixation being particularly prominent in Tagalog, which also exhibits non-reduplicative infixation. As an example, Carrier (1979:196) cites the reduplicative pluralization of comparative adjectives formed with the complex affix ka-sig. Thus, Carrier points out, we find ka-sig-talimon 'as intelligent as (SG)' and ka-sig-tatalimon 'as intelligent as (PL)'. It turns out that Carrier ultimately proposes the non-existence of infixation, inasmuch as, from

32 R1 reduplication typically reduplicates the initial CV of the stem and stipulates a short vowel in the reduplicant. RA reduplication typically reduplicates the initial CV of the stem and stipulates a long vowel in the reduplicant. R2 reduplication reduplicates the entirety of disyllabic stems and the first CVCV of trisyllabic stems, stipulating a long V in the the second syllable of the latter.
her perspective, it intrudes into already complex morphological constructions, and thus creates serious problems for morphological bracketing. Rather, she treats infixation as affixation modified by subsequent affix metathesis, a rule which she suggests exists in the same component as does reduplication (1979:52). It may be that such apparent anomalies may best be treated as an instance of head inflection, along the lines of Stump (1995). In Chapter 4, I analyze some apparent Tagalog infixal reduplication as resulting from the interaction of distinct reduplicatively formed stems with further rules of inflection and derivation.

Third, Carrier points out that reduplication rules do not always make reference to the morphological identity of that which they copy, inasmuch as they appear to copy material across morpheme boundaries and copy partial morphemes. Thus, in Tagalog R2 reduplication, we find examples like mag-
maru-
ma-
runoij 'pretend to be rather wise', in which the reduplicant maru- apparently copies material from more than one morpheme, not to mention the fact that it copies only part of the second. In this example, the verb magmarunoi is derived from the adjective marunoij, which is itself derived from the noun dunoi.33 R2 reduplication apparently copies the adjectival prefix along with part of the nominal stem with which it combines.

Along with further evidence, Carrier claims that such a state of affairs points to a treatment of reduplication rules as readjustment rules, to be contrasted with classic WFRs. I later argue that while reduplicative operations are available for use by stem rules (the closest correlate within the present approach to the notion of readjustment rules), their appearance is not limited to such rules alone, but also to rules of inflection and derivation, and possibly

33 The initial -d- of the noun dunoi appears as -r- in the derived constructions due to a regular phonological operation affecting intervocalic -d-.
to shape rules. Reduplicative MOs are separate from the rules that make use of them, and are consequently available to them all.

3.3.3 Carrier-Duncan (1984)

In Carrier-Duncan (1984), the author defends her earlier proposals (Carrier (1979)) in the face of the work of Marantz (1982, discussed below), in which he claims to circumvent the need for transformational power in accounting for reduplication. Carrier-Duncan (1984:283) claims that Marantz's account simply does not explain all the reduplicative phenomena to be found in the world's languages. Focusing her discussion on the much-discussed reduplicative phenomena of Tagalog, Carrier-Duncan asserts the need for transformations to provide the descriptive adequacy which reduplication demands. She proposes to reserve such transformational power for the subclass of lexical rules which in her framework account for reduplication, also in an attempt to constrain the power of her descriptive apparatus. I argue that while reduplication in Tagalog is often employed for purposes along the lines of those claimed by Carrier-Duncan, this is by no means universally the case crosslinguistically—it does not appear to be possible to limit the operation of reduplicative operations to morphological readjustment (a species of lexical transformation), as Carrier-Duncan claims. And if reduplication can not be limited to this class of rules, as claimed in Carrier (1979) and Carrier-Duncan (1984), then one of the central benefits of her approach is removed.
3.3.4 Steriade (1988)

Donca Steriade (1988) makes the claim that all reduplication is total reduplication. All instances of partial reduplication, she claims, result from transformations involving, on the one hand, total reduplication, but also involving stem truncations and/or segmental insertions and substitutions. She also notes that non-exact reduplication and partial reduplication are independent of one another, and need not co-occur.

Interestingly, unlike Moravcsik (discussed above) and Marantz (discussed below), Steriade does not shy away from claiming that reduplicants are syllabically defined. But the way in which they are so defined stems not from the fact that rules of reduplication copy syllables—she denies that they do. Rather, she claims, it stems from the fact that the object of truncation operations can be syllables. Thus, when a rule of reduplication copies a given stem in its entirety, and a truncation operation removes a syllable from that stem, what is left as the reduplicant may, in some cases, appear to be a syllabically defined chunk of the initial stem.

Also contrary to Moravcsik (1978) and Marantz (1982) (as well as McCarthy (1985)), Steriade argues that “templates are not strings of concrete, fillable slots [i.e. Cs and Vs], but rather abstract conditions in the prosodic weight and syllabic organization of strings” (1988:146). This stands as a direct challenge to the copy-and-association approach to reduplication, and provides useful suggestions for defining the types of operations I suggest are available to morphology in general.

To Steriade, all reduplication begins with an exact copy of the attachment stem, followed by various truncations and insertions applied to the copy (in the case of partial and complete, non-exact reduplication), to yield
the reduplicant. While the approach I take does not depend crucially on a total copy of the attachment stem in all cases, as Steriade’s approach does (1988:78), the formal operations that she observes in Sanskrit reduplication are of clear interest to anyone working on the subject of reduplication, Sanskrit or otherwise. The approach in this study involves the “mining” of existing stems of the lexeme in question for the phonological material of the reduplicant, so a step of total copy is unnecessary, but the suggestion to describe reduplicative MOs in terms of truncations and insertions holds promise in the formalization of reduplicative MOs.

I discuss Steriade (1988) at more length in Chapter 5, along with Janda and Joseph (1986), in that they both stand as sustained attempts to account for the complexities of Sanskrit reduplication, which is the subject of that chapter.

3.4 Affixational Accounts

3.4.1 Marantz (1982)

Alec Marantz (1982:1) points out the recurring difficulty with which researchers have met in constructing a descriptively adequate yet reasonably constrained rule system to account for reduplication. Citing Wilbur (1973), Carrier (1979), and Munro and Benson (1973) as proponents of a descriptively adequate yet far too unconstrained transformational approach, Marantz suggests an alternative. Building on the notion of prosodic templates suggested by McCarthy (1985, the published version of his 1979 dissertation), Marantz proposes the existence of CV skeleton morphemes, listed in the lexicon and marked with the feature [+reduplication]. Such morphemes, Marantz claims, trigger the copying of the entire phonemic melody of the
stem to which they attach, and autosegmental association subsequently accomplishes the linking of the CV skeleton of the reduplicative morpheme with the copied phonemic melody. The copying process induced by the [+reduplication] feature, he claims (following McCarthy 1981:412, 413), is part of the universal grammar, and is therefore not a problem for restrictiveness, as is a transformational account. Marantz's insistence that the reduplicant is, in fact, a CV skeleton, stems from his analysis of reduplication in languages like Tagalog and Quileute, in which the reduplicants cannot always be defined in terms of any other prosodic constituent, such as syllable or metrical foot. An example of the way in which Marantz's approach works, drawn from Agta, appears in (5) below.

\[
\begin{array}{c|c|c|c|c|c|c|c}
\hline
& & & & & & & \\
\hline
\text{T} & \text{a} & \text{k} & \text{k} & \text{i} & + & \text{C} & \text{V} & \text{C} & \text{C} & \text{C} & \text{V} \\
\hline
\end{array}
\]

(5) Marantzian "copy-and-association" (Marantz (1982))

In (5), we observe what Marantz claims to be the affixation of the melodically unspecified reduplicative morpheme CVC. This morpheme triggers the "copying over" of the entire melody of the stem, as represented. Left-to-right autosegmental association links the first CVC of the copied-over melody to the prefixal skeleton. Unassociated material, in this case the final CV of the copied-over melody, is erased.

The primary appeal of Marantz's account is its apparent ability to deal
with the formal relations between the reduplicant and the attachment stem in a constrained manner, i.e. without resorting to language-specific transformations. As Carrier-Duncan (1984) points out, however, Marantz admits to the transformational nature of the melody-copying operation he proposes in his account, though he attributes it to universal grammar. This move requires theoretical justification, which Marantz does not provide.

Beyond this, it can be said, in a certain sense, that prosodic morphology, including the Marantzian treatment of reduplication, stands as an attempt to salvage the notion of the morpheme by extending it to include something other than mere fixed segmental strings. From this perspective (see McCarthy (1985)), a morpheme is structured as indicated in (6) below.

Normal affixation, according to Marantz, involves the affixation of a morpheme specified on all four tiers. Most reduplication involves the affixation of a morpheme specified on all but the phonemic melody tier. Some reduplication, apparently very uncommon, involves the affixation of a morpheme unspecified on both the C-V skeleton and the phonemic melody.
tiers. Finally, complete reduplication involves the affixation of a morpheme unspecified on all but the morphemic tier. Thus, the bulk of Marantzian reduplicative morphemes are "morphemes minus melody", in that they consist merely of fixed strings of consonants and vowels, whose full identity is ultimately realized by means of autosegmental association.

Among those morphemes that lack more than just the melody, all undefined tiers are, according to Marantz, realized by means of autosegmental association, too. In Yidîn, for instance, the reduplicant lacks both segmental and melodic definition, and is syllabically defined. He provides the following data, from Dixon (1977:156).

<table>
<thead>
<tr>
<th>Singular</th>
<th>Gloss</th>
<th>Plural</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>dîmurU</td>
<td>'house'</td>
<td>dîmudîmurU</td>
<td>'houses'</td>
</tr>
<tr>
<td>gindalba</td>
<td>'lizard'</td>
<td>gindalgindalba</td>
<td>'lizards'</td>
</tr>
</tbody>
</table>

(7) Yidîn reduplication

According to Marantz, the reduplicant in Yidîn cannot be defined in terms of a CV skeleton, in that the reduplicant contains a final consonant based on whether that consonant closes the second syllable of the attachment stem, or whether it opens the third syllable of the same. Thus, the $r$ of dîmurU does not reduplicate, while the $l$ of gindalba does, apparently because of the differences in their syllable membership. Interestingly, if we adhere to Steriade's conception of syllabically defined reduplication, in which
 truncation of syllables—not the copying of syllables—is central, then the Yidiŋ data poses no real problem.

Such examples aside, far more common, according to Marantz, are instances of what he calls “whole morpheme reduplication” (1982:453), by which he accounts for all instances of true complete reduplication. In such cases, a morpheme unspecified on all but the morphemic tier is affixed to a stem, from which it obtains its syllabic, skeletal, and melodic identity.

Marantz (1982) clearly stands as one of the most often discussed accounts of reduplication to date. Both from within the affixational tradition and from within the transformational tradition of approaches to reduplication, no major account since has failed to discuss it, and its influence is evident on both traditions.

3.4.2 Bell (1983), Broselow (1983), and Broselow and McCarthy (1983)

Three accounts that emerged soon after Marantz’s ground-breaking treatment of reduplication can be seen in large measure as a reaction to that account. In Bell (1983), Broselow (1983), and Broselow and McCarthy (1983), data is presented that either require elaboration of or pose problems for the Marantzian approach. All three of these accounts, however, can be seen as falling clearly within the affixational group of accounts of reduplication, along with Marantz.

Sarah Bell (1983) briefly addresses some problems in Shuswap and Samoan internal reduplication, in which the reduplicant appears not on the left or right edge of a word or stem, but inside it. Thus, in Shuswap, we find the initial consonant of the root reduplicating and appearing after the first vowel to form diminutives; e.g. sqéxe ‘dog’, sqeqxe ‘little dog’. In Samoan, we
observe the internal reduplication evidenced in the plurals of certain verbs; e.g. *galue* 'work', *galulue* 'work (PL)'. Such examples, Bell argues, show that reduplication in both languages requires some modifications of Marantz's account.

The most striking modification that Bell suggests involves the breaking of the association lines between the melody and the portion of the skeleton following the infix, in cases of infixal reduplication. Thus, we observe the approach she suggests in the example she cites from Shuswap, found in (8) below, in which a single C, copied from the stressed syllable, is infixed into the stem.

\[
\begin{array}{c}
\text{kəp} \\
\text{q} \\
\text{ı harvesting} \\
\text{CVCV} + C + CCC \\
\hline
\text{kəpqiınkn}
\end{array}
\]

(8) Shuswap reduplication (Bell (1983:336))

In (8) above, the reduplicating morpheme, C, is inserted between the two portions of the stem. The association lines of the portion of the stem to the right of the reduplicating morpheme are broken, as represented by the "=" placed over them. The entire melody is copied, and association proceeds from right to left. All remaining unassociated segments, following Marantz, are erased.

Beyond this, the details of Bell's suggestions (1983) are not necessary to
discuss here; what is perhaps of greatest significance is the attention which Bell pays to the complexities of internal reduplication and to which subsequent discussions make reference. Among such discussions are Broselow (1983) and Broselow and McCarthy (1983), both of which make reference to Bell’s work, though only the latter makes internal reduplication the focus of its discussion. In the case of the former, Ellen Broselow examines reduplication in Salishan languages, in which two distinct reduplicants, each associated with distinct SMIPs, can appear in the same word. Broselow argues that the behavior of reduplication in Salishan languages stands as evidence that the principles of subjacency evidenced in the syntactic domain also appear to hold in the morphological domain.

As with most researchers, Broselow is committed to the theoretical notion of the morpheme, and much of her discussion can be seen as an attempt to account for complexities in Salishan reduplicative morphology within a framework that recognizes morphemes. The whole notion of subjacency, for example, presupposes the existence of a hierarchical structure of morphemes within words, if it is to hold any meaning within a morphological context.

One noteworthy example of Broselow’s theoretical commitments in this regard involves so-called double reduplication in Lushootseed, a group of Salishan dialects in the Puget Sound region. Lushootseed expresses both the diminutive and the distributive by means of reduplicative operations. When these categories are expressed independently of one another, they are linked with distinct MOs, but when they appear together in the same word, both appear to be realized by the same operation. (9) below is representative of the pattern.

a.  bɔdáʔ  'child'
b.  bɔdbɔdáʔ  'children (distributive)'
c.  bíbɔdaʔ  'small child (diminutive)'
d.  bíbɔdbɔdaʔ  'dolls, litter (diminutive-distributive)'
e.  bibibɔdaʔ  'small children (distributive-diminutive)'

(9) Lushootseed reduplication (Broselow (1983:324 ff.))

In (9)b. above, the distributive, when it occurs in isolation, is realized as a copy of the initial CVC. The diminutive, found in (9)c., is realized as a prefixed CV, consisting of a copy of the initial consonant, followed by the stipulated vowel ɨ. In (9)d., the diminutive of the distributive is as we might expect, with the reduplicants of the doubly reduplicated item exactly matching their respective correspondents in the singly reduplicated items. It is in (9)e., the distributive-diminutive, that we see apparent anomalies, in that the distributive reduplicant follows the CV pattern that is used to realize the diminutive; specifically, we would expect to find bibibɔdaʔ, but we do not.

Broselow deals with this problem by proposing several assumptions, as found in (10) below.
a. Each reduplication affix involves a new cycle in the lexicon.

b. Phonemic material not associated with a C or V slot on any given cycle is erased at the end of that cycle.

c. Reduplication only copies that phonemic material which is uniquely contained in the cycle immediately adjacent to the affix with which the copied material is to be associated.

(10) Assumptions regarding reduplication (Broselow (1983:327))

Clearly, assuming the existence of morphemes has, in this case, necessitated a train of further assumptions, none of which prove necessary if we are willing to lay aside our commitment to morphemes. For example, if we permit the separation of MOs and MRs, as suggested in Chapter 2, it is perfectly reasonable to assume that Lushootseed diminutives form a lexically defined class that selects for the CV reduplicative MO to realize its distributive. All other nouns fall into a lexically defined class that selects for the CVC reduplicative MO in the realization of the distributive. Such an analysis, however, rejects the notion that morphemes are discrete one-to-one pairings of form and meaning that are hierarchically concatenated to yield complex words.

Though I will not further discuss Broselow (1983), the work stands as a useful discussion of the sorts of problems which an adequate theory of reduplication is forced to address. Similarly, Broselow and McCarthy (1983) addresses another such problem, namely that of internal reduplication, which they claim to be extremely rare, not to mention challenging, to researchers working within the family of affixational accounts of reduplication.

Broselow and McCarthy (1983) undertake a sampling of areally and
genetically diverse languages in their analysis of infixal reduplication, presenting data from Levantine Arabic, Temiar, Zuni, Washo, several Austronesian languages, Queleute, and various Salishan languages. Their survey is of particular value in the task of constructing a typological inventory of reduplicative operations, in that some of the operations they cite are particularly uncommon.

Beyond the presentation of noteworthy data, Broselow and McCarthy analyze their data with reference to Marantz (1982) and Bell (1983), each of which discuss, at least briefly, the matter of internal reduplication. Marantz (1982: 453n.) proposes to deal with internal reduplication using the copy-and-association approach he outlines for prefixal and suffixal reduplication. As Broselow and McCarthy point out, however, Marantz fails to recognize the embellishments required for his approach to adequately deal with infixal reduplication. Among the factors which Marantz fails to address, they claim, is the fact that infixal reduplication requires the copying of less than the entire phonemic melody, and the fact that Marantz provides no means by which the copied and associated portion of the phonemic melody is to be defined. An example, cited from Marantz (1982) and drawn from Samoan, is representative of the difficulties discussed in Broselow and McCarthy (1983), which Bell (1983) also recognizes.

\[
\begin{array}{c}
\text{a} & \text{l̥o-fa} & \text{l̥o-fa} \\
V & CV & CVCV \\
\end{array}
\]

(11) Samoan infixal reduplication

75
As is clear from (11) above, the CV reduplicant is placed between the initial vowel and the remainder of the stem. Only the portion of the stem to the right of the infixed CV is copied over. Marantz leaves no means of determining which portion of the divided stem is to be copied; nor does he provide any means of determining the direction of association in such cases, since infixation does not fit within his prefixal/suffixal framework.\(^{35}\)

As far as Bell (1983) is concerned, Broselow and McCarthy (1983: 33-35) raise several objections. First of all, they point out that Bell, like Marantz, fails to adequately define the means by which direction of association is determined in cases of infixal reduplication. Secondly, they point out that Bell's account, by her own admission, weakens Marantz's claim that reduplication is simply a type of affixation, in that, unlike non-reduplicative infixing, reduplicative infixing involves the systematic breaking of association lines. Finally, and more significantly, Broselow and McCarthy claim that Bell's approach is inadequate to account for certain types of reduplication that are found to occur. They cite several examples, ultimately proposing that Bell's account is simply too restrictive to account for the data.

3.4.3 McCarthy and Prince (1995)

Recently, working within the framework of Optimality Theory (Prince and Smolensky 1993), McCarthy and Prince (1995) address the phenomena of reduplication with specific regard to issues surrounding base-reduplicant\(^{36}\) identity and non-identity in reduplicative constructions. Their aim is to fully

\(^{35}\) Marantz (1982: 447) proposes that, in the unmarked case, reduplicating prefixes associate with their melodies from right to left, while reduplicating suffixes associate from left to right.

\(^{36}\) McCarthy and Prince use the term "base" as I use the term "attachment stem".

76
account for base-reduplicant identity relations by means of static conditions which hold between morphological objects. They accomplish this aim within the basic confines of Optimality Theory—i.e. by proposing the existence of a universal set of language-specifically ranked well-formedness constraints, thus accounting for crosslinguistic differences in morphophonological behavior. From this perspective, operations which produce a total copy of the attachment stem (along the lines of Marantz (1982) or Steriade (1988)) are rendered unnecessary, in that constraint interactions produce the same effects. This approach is crucially dependent on Gen, a mechanism which churns out an infinite number of fully-formed input-output pairings, from which the actually occurring item is selected by an evaluation mechanism, EVAL, according to the constraint ranking of the language in question.

From this perspective, reduplicative morphemes are entirely abstract entities, defined neither templatistically nor melodically. A reduplicative morpheme obtains its ultimate shape by means of correspondence relations determined by the ordering of relevant constraints. Some of the most frequently relevant constraints are listed in (12) below.
<table>
<thead>
<tr>
<th>Constraint</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Max-br</strong></td>
<td>Insures that every segment of the base has a correspondent in the reduplicant; i.e. insures total reduplication.</td>
</tr>
<tr>
<td><strong>Max-io</strong></td>
<td>Insures that every segment of the input has a correspondent in the output; i.e. insures against phonological deletion.</td>
</tr>
<tr>
<td><strong>Dep-br</strong></td>
<td>Insures that every segment in the reduplicant has a correspondent in the base; i.e. prevent the occurrence of default (prespecified) segments in the reduplicant.</td>
</tr>
<tr>
<td><strong>Dep-io</strong></td>
<td>Insures that every segment of the output has a correspondent in the input; i.e. prohibits epenthetic segments.</td>
</tr>
<tr>
<td><strong>Ident-br</strong>(f)</td>
<td>Insures that segments in the reduplicant bear the same value for feature (F) as their correspondent segments in the base.</td>
</tr>
<tr>
<td><strong>Ident-io</strong>(f)</td>
<td>Insures that segments in the output bear the same value for feature (F) as their correspondent segments in the input.</td>
</tr>
</tbody>
</table>

(12) Constraints frequently relevant in the evaluation of reduplication (McCarthy and Prince (1995))

In the case of reduplication, however, more is required than language-specific constraint hierarchies, according to McCarthy and Prince (1995: 265). Each reduplicative affix, they claim, is associated with its own correspondence relation; it is paired with its own particular constraint ranking. McCarthy and Prince (1995: 265) put it this way:

37 In the following, MAX-BR is a constraint that requires every segment in the reduplicant to have a corresponding identical segment in the attachment stem.
... each reduplicative affix has its own correspondence relation, so that in a
language with several reduplicative affixes there can be several distinct,
separately rankable constraints of the MAX-BR type, etc. This means that
different reduplicative affixes within a language can fare differently with respect
to constraints on correspondence—for example, one can be total reduplication,
obeying MAX-BR, and one can be partial, violating MAX-BR. It also means that
reduplicative morphemes can differ in how they interact with the phonology, in
one and the same language, as Urbanczyk (1995) argues. It must be, then, that
correspondence constraints are tied not only to specific dimensions..., but also,
in some cases at least, to specific morphemes or morpheme classes.

The upshot of this claim is that, from the standpoint of Correspondence
Theory, reduplicative morphemes do, in fact, require special theoretical
embellishments to account for them—they act differently from "regular"
morphemes, at least inasmuch as they are associated with morpheme-specific
constraint rankings, and, for that matter, with morpheme-specific
constraints. To account for the behavior of reduplicative affixes in particular
languages (cf. the discussion of reduplication in Axininca Campa (McCarthy
and Prince(1995:294-307))), McCarthy and Prince propose the addition of
certain affix-specific constraints to such frequently occurring constraints as
those listed in (12). It is the ranking of these affix-specific constraints in
relation to the more frequently occurring constraints that gives rise to the
outputs that actually occur, they claim.

The question arises, however, that if each reduplicative affix is
associated with a unique set of constraint rankings, and even with unique
constraints, how is this any different than defining a specific operation for
each type of reduplication? The apparent elimination of reduplication-
specific features of grammar would appear to be lost on this account. This,
then, is an aspect of the Correspondence Theory account of reduplication that
needs to be further addressed.
Finally, McCarthy and Prince (1995) close their discussion by considering the possibility of constraints that make reference to paradigmatically related forms, though they do not discuss the theoretical status of the paradigm. Clearly, their analysis is worthy of point-by-point comparison beyond the scope of this present study.

3.5 Conclusions

Virtually all detailed treatments of reduplication from Wilbur (1973) on (e.g. Moravcsik (1978), Carrier (1979), Marantz (1982), Broselow and McCarthy (1983), Carrier-Duncan (1984), Steriade (1988), Prince and Smolensky (1993), McCarthy and Prince (1993a, 1995), etc.) stand as attempts to describe reduplication in terms of morphemes or transformations, or both, and the criticisms I will raise in their regard will relate to this fact. Prosodic Morphology arose, in essence, as an attempt to preserve the notion of the morpheme, and its later elaborations within Optimality Theory share this commitment. Such attempts require the assignment of increasingly exotic features to morphemes; reduplicative morphemes, for instance, according to Marantz (1982) and others, not only are melodically unspecified, but they cause the total copying of any base to which they attach. Optimality Theoretical explanations also crucially depend on mechanisms such as Gen, which pose significant theoretical and computational problems. More transformationally-oriented accounts, such as Wilbur (1973), Carrier (1979), Carrier-Duncan (1984), and Steriade (1988) also assume the existence of morphemes. They admit the existence of difficult-to-constrain transformational operations by which reduplicated items are derived from underlying items, though they try to limit in various ways the contexts in
which such operations may be brought to bear. Transformational researchers share with researchers working within other frameworks the need to copy material, which in itself significantly increases the power of a grammar; Marantz (1982), for example, working within the influence of early Prosodic Morphology, gets around this apparent problem by proposing that copying is resident in universal grammar and therefore poses no constrainedness problems; Carrier-Duncan (1984), on the other hand, argues for the need for true tranformational derivation to explain the phenomena of Tagalog reduplication.

I take the position that neither transformations nor morphemes are required or desirable in accounting for reduplication. I rather claim that reduplication is best described in terms of a finite set (a list, if you will) of universal morphophonological operations, employed by any of the morphological rules types—i.e. stem rules, inflectional rules, derivational rules, and shape rule—discussed in Chapter 2. These rules in turn establish relations which hold between reduplicated items, and other morphologically related items, for that matter, in the various paradigms in which they occur.

As with most previous treatments, I make use of copying in my analysis, though not in precisely the same way as previous researchers have. In a certain sense, my account is like that of McCarthy and Prince (1995), in that the MOs I employ, including those that involve copying, are statements describing the formal relations between two distinct morphological objects—they are not statements of serial derivation. Unlike accounts such as Marantz (1982) and Steriade (1988), I permit operations beyond the mere exact copy of the entire attachment stem. Variable affixation, under which category, by my account, all actual instances of partial reduplication fall, involves the
affixation of prosodically defined chunks of material that reflect the phonology of the stem to which they attach, or of some other stem of the same lexeme. In a certain sense, they involve copying, in that variably affixal MOs always begin with an instance of an existing lexical stem for their phonology; but the lexicon already contains an infinite stock of instances of any particular lexical stem, so to say that variable affixation truly involves copying is not entirely accurate. Beyond this, unlike truly transformational accounts, the copying operations I permit (or, more accurately, the formal paradigmatic relations that look like copying), are limited to a finite number of types which, along with other non-reduplicative MOs, are listed in the Morphophonological Operations Inventory.

In the following chapters, I investigate specific cases of reduplication in a range of languages, hoping to shed light on the ways in which, from a Word-and-Paradigm perspective, we can reasonably account for the data.
CHAPTER 4

STEMS AND REDUPLICATION IN TAGALOG

4.1 Introductory remarks

This chapter is the first of several which consist of the examination of data selected to illustrate the ways in which reduplication is used to establish relations within paradigms. The data I discuss is drawn from several different languages, most of which have played a role, sometimes prominent, in previous treatments of reduplication. This chapter also contains a more detailed discussion of the virtues of and support for a WP approach to reduplication and the relative shortcomings of the previous approaches to reduplication outlined in Chapter 3.

The focus of this chapter is on reduplication in Tagalog, an Austronesian language of the Philippines. As mentioned in Chapter 3, Tagalog has played a significant role in discussions of reduplication since at least Bloomfield (1933), in which Bloomfield points out (p. 222) some of the peculiarities surrounding Tagalog reduplication that are still discussed today. In discussing Tagalog reduplication, I illustrate some of the ways in which a WP approach quite elegantly deals with the persistent descriptive challenges it displays.

Wilbur, in the second chapter of her 1973 dissertation, manages in nineteen pages to clearly lay out some of these persistent descriptive
challenges involving the interaction of reduplication with various phonological rules (Wilbur 1973:15-33); her presentation of the facts is still under discussion, as McCarthy and Prince's recent work bears witness (McCarthy and Prince 1995:251). One of the problems of rule interaction which she treats in some detail involves one of several types of reduplication in Tagalog. The problem involves what she terms "overapplication" (Wilbur 1973:26), in that a particular phonological rule, in this case a type of nasal assimilation, applies to the attachment stem38 of a reduplicative construct even when the phonological conditions for its application fail to be met. Thus, when, by her analysis, the prefix maŋ- is attached to the base bigay to form the verb mamigay 'give', the initial consonant of the base assimilates in nasality to the final nasal consonant of the prefix, which then deletes. The Contemplated39 form of the same verb, however, involves both the affixation of maŋ- and the occurrence of reduplication, of which there are several formal types in Tagalog. It is here that purported instances of overapplication occur. We thus find mamimigay (maŋ-bi-bigay), in which both the b- of the reduplicant and the b- of the attachment stem undergo nasal assimilation, though only the former is in the proper triggering environment.

Both Wilbur and McCarthy and Prince attribute such overapplication, in Tagalog and elsewhere, to the effects of a constraint prioritizing the formal identity of the base40 and the reduplicant in reduplicative constructs. On the basis of reduplication in Tagalog, I argue here that such is not, in fact, the

38 The attachment stem is the formal version of a given lexeme which occurs in the reduplicative construct. Cf. 1.4.2 above.

39 I use Schachter and Otanes' (1972) term "contemplated" for the aspectual distinction that Wilbur calls "future".

40 Attachment stem, in my terms
case, but that the apparently anomalous interaction of reduplication with phonological rules is better explained in terms of the existence of distinct morphological stems which themselves are subjected to reduplicative MOs by various MRs.

4.2 The Tagalog verb system

In order to understand the place of reduplication in Tagalog, it is crucial to have a basic understanding of the overall morphological system in which it fits. Towards this end, I will first discuss the essential structure of the Tagalog verb system, in which reduplication is widely employed. It will prove necessary in this section first to discuss in some detail several dimensions of Tagalog verb morphology which may not initially appear to be significant to the present study. This preliminary discussion is necessary, however, to the ensuing discussion, and given that Tagalog morphosyntax, like that of other Philippine languages, is notoriously complex and difficult to describe (Reid (1981:223)), the need for such preliminaries is not surprising.

Tagalog verbs can be divided into several major verb base classes\(^{41}\), each of which is defined according to the particular set of affixes with which its members occur.\(^{42}\) There are no formal or semantic grounds which generally correspond to all the verbs within a particular verb base class, though verbs within a particular verb base class do select for the same complement types. The affixes with which a given class occurs are themselves grouped into distinct sets (or classes), as well, of which each member combines with the

\(^{41}\) These classes correspond to the *lexically determined classes* discussed in 2.2.3 above.

\(^{42}\) Schachter and Otanes (1972) use the term "affix correspondence class" for what I have termed "verb base class". All Tagalog grammatical information in this section can be assumed to come from Schachter and Otanes (1972), unless otherwise stated.
same class of bases. A given class of verb bases, therefore, corresponds to a
given class of affixes, and vice versa, and a class of bases marked with a given
set of affixes requires particular complement types.

A particular verb base class is conventionally referred to by one of the
affixes of the affix set with which it occurs, namely the affix which occurs in
what Schachter and Otanes (1972:68 ff.) call the Basic Form of a verb. The
Basic Form of a verb consists of a verb base plus a so-called major affix (p. 69),
which, in combination with one or two other major affixes, constitutes one of
the affix sets mentioned above. The Basic Form of a verb may appear, formally
unchanged, as an imperative (p. 402 ff.) or as a nominalization (p. 153 ff.); in
one class of verbs (the -um- class), the Basic Form, also formally unchanged, is
used to stand for the perfective form of the verb. Once marked for aspect, a
Basic Form may occur in a basic sentence, defined as one of the set of
elementary sentences in Tagalog, on the basis of which more complex
sentence constructions may be described (p. 69). Thus, the major affix man-
plus the base anak 'child' yields the Basic Form of the verb mananak 'give birth
to', which, when marked for aspect by means of various combinations of
affixation and reduplication, yields a verb which may occur as the main verb
of a basic sentence.

The affixes within a given affix set may be prefixal, suffixal, infixal, or
circumfixal and are used to express different focus relations between the
predicate verb and the topic of a sentence. Among focus relations, the most
important are actor-focus, object-focus, and directional-focus; it turns out, in

43 It is, more precisely, the actor-focus affix which is conventionally selected
from among the affixes in a particular affix set to refer to a given verb base class. See the
following paragraph for further discussion.

44 The topic, sim, iy put, expresses the focus of attention in the sentence (p. 60),
and sometimes, but not always, corresponds to the subject of an English sentence.
fact, that for each distinct focus value for a given verb, there exists a distinct Basic Form. Given that every verb, regardless of its base class, has an actor-focus affix, it is this affix which is conventionally used to refer to the verb class as a whole. Thus, for instance, when we refer to the mag-class, we are referring to the class of Tagalog verbs which forms its actor focus Basic Forms by prefixing mag- (e.g. maganak 'give birth to', etc.). If we refer to the -um-class, we are referring to the class of Tagalog verbs which forms its actor-focus Basic Forms by infixing -um- (e.g. sumulat 'write' (i.e.-um- with sulat)), etc.

Thus far, all of the verbs discussed have been transitive, but Tagalog also forms intransitive verbs by means of major affixes. Morphologically speaking, the major difference between transitive and intransitive verbs in Tagalog concerns the fact that intransitive verbs cooccur with mono-affixal sets, unlike the multi-affixal sets with which transitive verbs combine. Thus, each affix which forms an intransitive verb stands as the sole member of its own affix set. We can therefore speak of the ma-. . . -an class, which circumfixally forms verbs like malamigan (i.e. ma-lamig-an) 'feel cold', or the mag-class, which forms verbs like mamula (i.e. mag-pula) 'blush, redden', etc.

In addition to the so-called major affixes, however, there also exist in Tagalog several derived affixes, which in some cases are homophonous with, but functionally distinct from, the major affixes. Derived affixes, unlike major affixes, may generally be predicted to occur or not occur with a given base depending on what major affixes the base accepts, or, to put it differently, depending on the verb base class of the base. Thus the mag- in maganak 'give

45 This is essentially admitting, however, that derived affixes are just as arbitrary in their base selection as are major affixes. If major affixes cooccur with arbitrarily defined verb base classes, and derived affixes then correspond to these arbitrary pairings of affixes and bases, they are also arbitrarily paired. The only
Birth to' is a major affix and yields a major verb, while the *maŋ* in *maŋwalis* (i.e. *maŋ-walis* 'broom') 'hit with a broom' is a derived affix and yields a derived verb, in that its occurrence is predicted to occur, given the existence of the major verb *magwalis* (i.e. *mag-walis*) 'sweep with a broom'. A derived verb typically includes the semantics of the major verb to which it is related, plus some additional meaning, such as iteration of action, distribution of action to multiple objects, or, as in the example above, deliberately harmful or destructive activity. (13), (14), and (15) below illustrates the basic features of the Tagalog verb classes discussed above.

____________________________
generalizations that can be made regarding derived affixes are that they cooccur with certain major affixes on the basis of arbitrary verb base classes.
### Object Verbs

<table>
<thead>
<tr>
<th>Class</th>
<th>AF</th>
<th>OF</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>mag-</td>
<td>mag-walis</td>
<td>walis-an</td>
<td>'sweep'</td>
</tr>
</tbody>
</table>

### Directional Verbs

<table>
<thead>
<tr>
<th>Class</th>
<th>AF</th>
<th>OF</th>
<th>gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>mag-</td>
<td>mag-hati</td>
<td>pag-hati-an</td>
<td>'share'</td>
</tr>
</tbody>
</table>

### Double-Object Verbs

<table>
<thead>
<tr>
<th>Class</th>
<th>AF</th>
<th>OF</th>
<th>OF</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>mag-</td>
<td>mag-balibag</td>
<td>balibag-in</td>
<td>balibag-in</td>
<td>'throw at'</td>
</tr>
</tbody>
</table>

### Transitive Verbs

<table>
<thead>
<tr>
<th>Class</th>
<th>AF</th>
<th>OF</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>mañ-</td>
<td>mañ-anak</td>
<td>ipañ-anak</td>
<td>'give birth to'</td>
</tr>
<tr>
<td>-um-</td>
<td>l-um-unas</td>
<td>lunas-an</td>
<td>'cure'</td>
</tr>
</tbody>
</table>

(13) Representative Tagalog verb base classes* - Transitive verb classes

* Note: AF=actor-focus; OF=object-focus; DF=directional focus; LF=locative focus
<table>
<thead>
<tr>
<th>Base</th>
<th>Verb</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>mag- Class</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>abogado</td>
<td>mag-abogado</td>
<td>'become a lawyer'</td>
</tr>
<tr>
<td>hiwalay</td>
<td>mag-hiwalay</td>
<td>'separate from one another'</td>
</tr>
<tr>
<td>mabagal</td>
<td>mag-mabagal</td>
<td>'be slow (in)'</td>
</tr>
<tr>
<td><strong>man- Class</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>bãŋka</td>
<td>mamahaŋka</td>
<td>'go boating'</td>
</tr>
<tr>
<td></td>
<td>(maŋ-baŋka)</td>
<td></td>
</tr>
<tr>
<td>kimi</td>
<td>manjimi</td>
<td>'be hesitant to'</td>
</tr>
<tr>
<td></td>
<td>(maŋ-kimi)</td>
<td></td>
</tr>
<tr>
<td>pula</td>
<td>mamula</td>
<td>'blush, redden'</td>
</tr>
<tr>
<td></td>
<td>(maŋ-pula)</td>
<td></td>
</tr>
<tr>
<td><strong>-um- Class</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>bagyo</td>
<td>b-um-agyo</td>
<td>'storm'</td>
</tr>
<tr>
<td>datîŋ</td>
<td>d-um-atîŋ</td>
<td>'arrive'</td>
</tr>
<tr>
<td>sainyo</td>
<td>s-um-aînîyo</td>
<td>'be yours'</td>
</tr>
</tbody>
</table>

(14) Representative Tagalog verb base classes-Intransitive verb classes
<table>
<thead>
<tr>
<th>Base</th>
<th>AF Basic Form</th>
<th>Gloss</th>
<th>Derived Verb</th>
<th>Gloss/Focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>sulat</td>
<td>s-um-ulat</td>
<td>'write to'</td>
<td>pag-sulat-an</td>
<td>'write in/on' (LF)</td>
</tr>
<tr>
<td>banjka</td>
<td>mamanjka</td>
<td>'go boating'</td>
<td>pamanjkaan</td>
<td>'go boating in/on' (LF)</td>
</tr>
<tr>
<td>(maŋ-banjka)</td>
<td></td>
<td></td>
<td>(paŋ-banjka-an)</td>
<td></td>
</tr>
<tr>
<td>walis</td>
<td>mag-walis</td>
<td>'sweep'</td>
<td>magpa-walis</td>
<td>'permit/cause to sweep' (indirect action verb)</td>
</tr>
<tr>
<td>walis</td>
<td>mag-walis</td>
<td>'sweep'</td>
<td>mag-walis</td>
<td>'hit with a broom'</td>
</tr>
<tr>
<td>pitas</td>
<td>p-um-itas</td>
<td>'pick'</td>
<td>mamitas</td>
<td>'pick (a number of things)'</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(maŋ-pitas)</td>
<td></td>
</tr>
</tbody>
</table>

(15) Representative Tagalog verb base classes-Derived verbs
4.3 Reduplication in Tagalog

Having surveyed the basic features of the Tagalog verb system, we are now in a position to begin looking more closely at the role that reduplication plays within it. For our present purposes, I will discuss the interaction of reduplication with verbs which, by most accounts, attach the prefix *mañ-*, in that it is with this group of verbs that certain well-attested formal anomalies appear (cf. Wilbur (1973), Carrier (1979), Lieber (1981), Carrier-Duncan (1984), McCarthy and Prince (1995), etc.). The group of verbs which prefix *mañ-* is rather heterogeneous; there are several transitive verbs which appear with *mañ-* as one of their major affixes; there are many intransitive verbs which appear with *mañ-* in their Basic Forms; and there are many derived verbs in *mañ-* formed from verb bases from other classes.

Regardless, however, of the exact circumstances under which *mañ-* combines with a given stem, its phonological behavior is the same. With stems beginning with a vowel or with the consonants [g, h, w, y] ⁴⁶, we find *anak* 'child', *mañanak* 'give birth to' (apparently *mañ-anak*); *ako?* 'promise (N)', *mañako?* 'promise (V)' (apparently *mañ-ako?*); *guloh* 'disorder, disarranged (N and ADJ)'; *mañguloh* 'create disorder' (apparently *mañ-guloh*); *hiwi?* 'cut, slice (N), *mañhiwa?* 'cut, slice (V)' (apparently *mañ-hiwa?*); *walis* 'broom', *mañwalis* 'hit with a broom' (apparently *mañ-walis*); *yarih* 'manufactured, made, finished

⁴⁶ Technically speaking, vowel-initial stems always begin with a phonologically predictable glottal stop in Tagalog. Following Bloomfield (1917:136), I will not transcribe such predictably occurring glottal stops unless doing so is significant to the argument at hand, though I will transcribe word-final glottal stops, also following Bloomfield, in that they are contrastive. Schachter and Otanes transcribe neither. Also, the final -η of *mañ-* syllabifies with the stem to which it attaches; I will later argue that this fact, along with several others, points to an analysis in which -η is, in fact, part of the stem, and not part of the affix at all. The further fact that the -η reduplicates in vowel-initial stems also supports such an analysis. Thus, we find *-isda*/ *mañisda*/ *mañiinisda*, etc. I will discuss these facts in greater detail in later sections.
product (N and ADJ), *manyarih* 'happen' (apparently *mañ-yarih*), etc.\(^{47}\)

It is when *mañ-* (also some of the other Tagalog prefixes ending in \(-\eta\)) attaches to a stem beginning with \([p, b, t, s, k]\) that phonological effects appear. It is universally the case in Tagalog that with stems beginning with \(k\)-, prefixation of *mañ-* results in outcomes like *kailaajan* 'need (N)', *mañailaajan*, (apparently *mañ-kailaajan*)\(^{48}\) 'to need'. With stems beginning with the other consonants in this set, the outcome is not so unequivocal. Bloomfield claims that always in commonly used words and frequently in others we see the effects of assimilation and deletion associated with the prefixation of *mañ-* and other \(\eta\)-final prefixes (Bloomfield (1917:213)). It is unclear, however, whether the variation to which Bloomfield refers occurs within one stem or in distinct stems. Schachter and Otanes (1972:290) indicate that stems select one pattern or the other; i.e. some stems exhibit both assimilation and deletion while some stems exhibit only assimilation.\(^{49}\) In any event, neither scenario is problematic; if it turns out that individual speakers exhibit variation even within stems on a scale beyond that mentioned in the previous note, that can easily be encoded into the grammar, as can the state of affairs in which individual stems are invariant in their behavior. Examples involving stems

\(^{47}\) For some \(\partial\)-initial verbs, such as *atakeb* 'attack (N)', *mañatakeb* 'attack (V)', the \(\partial\) remains in the verb prefixed with *mañ-*.

\(^{48}\) I say "apparently", in that I ultimately analyze the situation as involving the affixation of something other than *mañ-*.

\(^{49}\) Wilbur (1973:29) points out, following Bloomfield (1917:215), however, that in certain reduplicated items there is found variation regarding the behavior of a single stem. Thus, for the verb base *umit* 'steal', we find both *pajumit* and *pajugumit* employed by the same speaker for the same word. This speaker apparently permits an analysis both in which the \(-\eta\) is part of the stem and in which it is part of the affix. This likely has to do with the existence of two variants of the root (which I later label *Stem 1*) for this verb for this speaker--i.e. a vowel-initial variant and a \(\partial\)-initial variant, each of which gives rise to distinct stem-forming patterns. See following discussion for more on morphological stems in Tagalog.
which exhibit the full effects are as follows: *piili?* 'selected, chosen (ADJ)', *mamili?* (i.e. *maŋ*-piili?) 'choose (several things)'; *bilih* 'buy', *mamilih* (i.e. *maŋ*-bilih) 'go shopping'; *taŋkot* 'fear, fright', *manakot* (i.e. *maŋ*-taŋkot) 'frighten (several people)', etc. Examples of stems which exhibit only assimilation include *bakiya* 'wooden shoe', *mambakya* (*maŋ*-bakiya) 'hit with a wooden shoe'; *mandukot* (i.e. *maŋ*-dukot) 'steal', etc. The apparent anomalies, which Bloomfield (1933:222) first noted and which Wilbur (1973) first discussed in detail, involve the interaction of *maŋ*- (and some of the other *ŋ*-final prefixes) with reduplication, leading to classic instances of "overapplication", in Wilbur's terms. The anomalous instances involve verb stems that are analyzed as beginning with an initial obstruent drawn from the set [p, b, t, d, s, k], discussed above. In *k*-initial stems, as we observed above, when *maŋ*- is prefixed, the resulting word appears with the *k*- missing from the stem and, according to Bloomfield (1917:213), the -q of the stem behaving as though it is part of the stem and not part of the prefix (cf. *kailajan* 'need (N)', *maŋailajan*, 'to need' (purportedly *maŋ*-kailajan).

This effect, and the similar effects which involve the other five consonants listed above, is clearly morphologically conditioned and not the result of automatic phonology\(^5\), in that other affixes that are nearly identical phonologically to *maŋ*- trigger very different phonological effects. Thus, when the denominal reservational adjective prefix *paŋ*- (cf. Schachter and Otanes (1973:218 ff.)) is added to a *k*-initial stem, the *k*- remains unchanged; e.g. *kasal* 'wedding' and *paŋkasal* (*paŋ*-kasal) 'for a wedding'. This pattern, however, is part of a larger assimilatory pattern in which the final -ŋ of the

\(^5\) I use this term to refer to exceptionless phonological rules which need make no reference to morphological categories. Aspiration of syllable-initial voiceless stops in English is a good example of such a rule.
affix assimilates in place to the initial consonant of the stem to which it attaches. Thus, we find *tenis* 'tennis' and *pantenis* (*paŋ*-tenis)'for (wear in playing) tennis', *parti* 'party' and *pamparti* (*paŋ*-parti), etc. This pattern is clearly distinct from that of the prefix *maŋ*- discussed above, which appears to trigger both place assimilation and initial stem consonant deletion (p. 218 ff.).

Furthermore, there also exists a distinct prefix *paŋ*- which is used to form instrumental adjectives from verbs. In contrast to both denominal reservational *paŋ*- and the major verb affix *maŋ*- , instrumental *paŋ*- occurs in two freely alternating patterns, one of which is similar, but not identical, to that of the major verb affix *maŋ*- and one of which is similar, but not identical, to that of the denominal reservational affix *paŋ*- . Thus, instrumental *paŋ*- , when prefixed to a verb base from the -um- or *maŋ*- class that begins with *p, t, s, or k*, may appear according to one of two patterns. For example, *paŋ*- prefixed to *suklay* 'comb', may appear as either *pansuklay* or *panuklay* 'for use in combing'; prefixed to *punas* 'wipe', it may appear as either *pampunas* or *pamunas* 'for use in wiping', etc. In the end, it is clear that affixes of nearly identical phonology trigger far from identical effects—a clear case of morphologically conditioned alternations which lead us to question the independent existence of affixal morphemes at all.

What is apparently anomalous is that in words exhibiting reduplication, both the reduplicant and the attachment stem exhibit the phonological effects purportedly triggered by the affixation of *maŋ*- , though only the reduplicant is in immediate proximity to the prefix. Thus, we find in Tagalog words like

51 Sam Rosenthal (personal communication) points out the similarities of this phenomenon to the prefixation of (orthographically) *in-*/*im-*/*ir-* versus *un-* . The former appears in far more formal variations (i.e. [*in-*/*im-*/*iŋ-*/*Ir-*]) than the latter (which only appears as [oun-] for most speakers).
maquajuha 'take (CONTEMPLATED)' (i.e. ma-\textit{j}u-\textit{juha}), from the stem -\textit{kuha} 'take', etc.

I propose to deal with such interactions involving reduplication and prefixation in the following way, which owes much to the suggestions of Aronoff (1976). Suppose that for the class of \textit{maq}- verbs (and for other verb classes, for that matter), there exist several distinct, yet semantically identical, stems, each of which participates in a distinct set of morphological rules. For stems of some verb classes, all stems could in principle be formally identical, while for other verbs distinct stems could differ from one another on purely formal grounds. In the case of a member of the \textit{maq}- verb class, a stem which begins with one of the consonants \{p, b, t, s, k\} forms an alternative stem that is identical to its Stem 1 except for the fact that it begins with a homorganic nasal consonant corresponding to the initial consonant of its Stem 1. Thus, for Stem 1 -\textit{kuha} 'take', there also exists another stem -\textit{juha}, which I will call Stem 2, and which differs only in form, not semantics or morphosyntactic features, from -\textit{kuha}. For other stems beginning with the relevant consonants, we find pairs that differ only in the initial consonant alternations, i.e. p-/m-, b-/m-, t-/n-, s-/n-, k-/q-.  

Three further facts about Tagalog lend support to this analysis.

Interestingly, for the class of \textit{maq}- verbs in Tagalog, Stem 1 never occurs in isolation, though stems of other affix classes do. Thus for most other verb classes, the bare stem can occur by itself as a bare nominalized verb base, in Schachter and Otanes' terms (1973:166 ff.), while for major transitive \textit{maq}- verbs, this is not the case. For example, the base -\textit{isda} of the major verb

\footnote{Carrier (1979) and Carrier-Duncan (1984) argues for a similar approach, attributing the nasal-initial Tagalog stems to "allomorphy rules" in the sense of Aronoff (1976).}
*magisda* (i.e. *mag-isda*) 'fish', cannot appear as a bare nominalized verb base, while the base *datinj* of the major verb *dumatiq* (i.e. *-um-* with *datinj*) 'arrive' can.\(^3\)

It is of additional interest that it is also the major transitive *mag-* verbs that do not appear in what Schachter and Otanes call the immediate imperative (1973:403 ff.), an imperative form that consists of the bare stem, plus an optional enclitic particle. Again, members of other affix classes do occur in the bare stem imperative.\(^4\) For example, we find *luto* 'cook!', the immediate imperative of the *mag-* verb *magluto* 'cook', while no such immediate imperative occurs for *mag-* verbs. Furthermore, the fact that the final -g of the prefix syllabifies with the stem, as Bloomfield observed, calls into question whether it was ever part of the affix to begin with, or whether it is better analyzed as being part of the stem.\(^5\)

The upshot of these facts is that, for major transitive *mag-* verbs, Stem 1 appears never to occur in isolation, leaving it to occur only as part of complex morphological structures, a status no different from Stem 2. Speakers, then, have at least as much reason to surmise that Stem 2 exists as they do that Stem 1 exists.

It is true that Stem 2 is more easily described in relation to Stem 1 than

\(^3\) It is, however, the case that several intransitive *mag-* verbs have bases that can occur unmarked as nouns or adjectives, though not as nominalizations *per se*.

\(^4\) Derived verbs formed by affixing *mag-* may appear to occur as bare nominalizations or immediate imperatives, in that their bases are not within the *mag-* class, though the nominalizations or imperatives will in such cases bear the semantics of the major verb from which the *mag-* verb is derived. What is crucial here is that, unlike other verb base classes, there exists a core of major transitive verbs formed with *mag-* whose bases do not occur in isolation.

\(^5\) This is not, however, a particularly strong argument, in that this reflects broader patterns of syllabification in Tagalog. Interestingly, though, such syllabification patterns in a sense "set the table" for diachronic morphological reanalysis, in that they provide a way by which affixal segments can be reassigned to the verb stem.
the reverse; both $p$- and $b$-initial Stem 1's correspond to an $m$-initial Stem 2, and both $t$- and $s$-initial Stem 1's correspond to $n$-initial Stem 2's. There is therefore no way on the basis of Stem 2 that the phonology of Stem 1 can be accurately predicted, though on the basis of Stem 1, the phonology of Stem 2 can accurately be predicted in all cases. But while one stem is predictable on the basis of the other, both stems must be listed as part of a given verb's stem set (a type of paradigm), which indexes the stems which can participate in particular morphological rules. It turns out, in fact, that Stem 1 and Stem 2 are selected for participation in different morphological rules.

One of the rules which selects Stem 2 is employs an MO that I refer to as Long Reduplication (LR)\(^5^6\), the type of reduplication involved in Wilbur's instances of overapplication in Tagalog. In LR, for any given stem, the first sequence of segments constituting a light syllable reduplicates, with the vowel of the reduplicant stipulated as long. In the case at hand, the prefix $ma-$ (also other affixes) appears in combination with both reduplicated and unreduplicated versions of a given verb. For example, the verb -$kuha$ 'take' appears as $majuha$ in its Basic Form (cf. Schachter and Otanes (1972:68, ff.)), and as $maju'juha$ in its imperfective form; on purely phonological grounds, we would expect the latter to appear as $*maju'kuha$, but it does not.

Now from the standpoint of the analysis I have offered thus far, there is no difficulty in explaining the occurrence of items like $maju'juha$. -$kuha$ has (at least) two distinct stems, one of which, Stem 1, is -$kuha$, the other of which, Stem 2, is -$juha$. LR is applied to Stem 2 by a stem rule, yielding yet another distinct stem, -$ju'juha$, which I will call Stem 3. This Stem 3 is generally used to express incompleteness, in that it occurs in words expressing both

\(^{5^6}\)Schachter and Otanes (1972) refer to this type of reduplication as $Dup_a$, while Carrier (1979) and Carrier-Duncan (1984) call it RA Reduplication.
imperfective and contemplated aspects (Schachter and Otanes (1973:67)), but it is also used in words expressing the so-called recent perfective aspect, in which actions are specified as having been completed just before the time of speaking or just before some other specified time (Schachter and Otanes (1973:371, ff.)).

Such a situation, in which a particular formal device, in this case a particular reduplicative MO, cannot be reliably connected with any consistent semantic or grammatical function, is a classic indicator of the use of formally distinct yet otherwise identical stems as input to different morphological rules (Aronoff (1992, 1994:31 ff.)). In this case I am arguing that Stem 3 is selected by at least three distinct MRs, one of which forms the imperfective, one of which forms the contemplated, and one of which forms the recent perfective aspect of a given verb. There is nothing fixed about the semantics of words that have undergone LR reduplication; it is merely a device that makes more formal distinctions available to the morphology of Tagalog. It is the cooccurrence of such formally distinct stems with other morphophonological operations (in this case the prefixation of *maq-*) that accounts for the semantic and morphosyntactic categories which are realized by Tagalog verbs; neither *maq-* affixation nor reduplication is by itself sufficient to do so; neither can be analyzed as a morpheme, with both fixed meaning and fixed phonology. (16) below presents a summary of some of the important stems and full forms for several words in Tagalog.
## Tagalog stems and full forms

<table>
<thead>
<tr>
<th>Stems</th>
<th>Full Forms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stem 1</td>
<td>Stem 2</td>
</tr>
<tr>
<td>-kuha</td>
<td>-ŋuha</td>
</tr>
<tr>
<td>-isda</td>
<td>-ŋisda</td>
</tr>
<tr>
<td>libak</td>
<td>libak</td>
</tr>
<tr>
<td>-talo</td>
<td>-nalo</td>
</tr>
<tr>
<td>sakit</td>
<td>nakit</td>
</tr>
<tr>
<td>bahagi</td>
<td>mahagi</td>
</tr>
</tbody>
</table>

(16) Tagalog stems and full forms

While I have already discussed much of what appears in (16), a couple further facts are worth mentioning. First of all, the Contemplated Form of the vowel-initial stem -isda 'fish' demonstrates that the -ŋ, which is conventionally analyzed as being the final consonant of the prefix, is better analyzed as the initial consonant of Stem 2, in that it is reduplicated (cf. note 43 above). This means that, in addition to the phonologically determined stem class which forms its Stem 2 by replacing the initial consonant with a homorganic nasal, the vowel-initial stem class forms its Stem 2 by simply prefixing ŋ-. Interestingly, this leads us to recognize a group of several formally distinct but functionally related MOs, each of which describes the relationship between Stem 1 and Stem 2 for a given phonologically determined stem class. In essence, each of these operations is a sub-operation of a single MO, in that they are complementarily distributed. For vowel-initial stems,
one operation prefixes *g*; for stems beginning with [p, b, t, s, k], another operation replaces the initial consonant with a homorganic nasal\(^{58}\); for stems beginning with [w, y, l, r, h, m, n, η, g, d], Stem 2 remains unchanged from Stem 1, the consequence of a default rule which costs nothing. What is important is that these operations group together according to complementary phonologically determined stem classes, which, when taken together, constitute an entire lexically determined class.

This leaves the question of the nature of the operation or operations which prefixes *man-* (or whatever we determine is actually prefixed) to the verb stem. The present analysis, unlike more traditional generative analyses, does not require there to be any underlying form of the prefix from which all outcomes are predictable. In fact, it turns out, the nature of verbal prefixation in Tagalog is not unlike the nature of stem formation, in that it consists of a cluster of formally, and in this case semantically, related MOs which, as we have observed in other cases, operate on distinct, phonologically determined classes of objects. This is, as with the situation involving stems above, best described as a set of complementarily distributed sub-operations of a single MO, which is brought to bear by an MR which I will call Focus Prefixation. Focus Prefixation acts upon Stem 2 of a verb to form the Basic Form, while it operates upon Stem 3 to form the Contemplated Aspect, presumably referring to morphological properties resident in both stems in selecting them for participation. In either event, the MO it employs acts as follows: if Stem 2 begins with a nasal consonant, then *ma-* is prefixed; if it begins with [w, y, l, r, h, g], then *man-* is prefixed; if, as is sometimes the case, Stem 2 appears with the initial [p, b, t, d, s] of the Citation Stem, then either *man-* or *mam-* is prefixed,

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\(^{58}\) As I point out above, the situation for this class is a bit more complicated than this, in that some stems retain the phonology of the Citation Stem for the Nasal Stem.
depending on which ends with a consonant homorganic to the initial consonant of the stem to which it attaches. One of the effects of such a system is to guarantee that between the ma- of the prefix and the first vowel of the verb stem, there is always one, and only one, nasal consonant. 59

4.4 Some concluding diachronic observations

Bloomfield comments that "prefixes ending in -ŋ (maŋ-, naŋ, paŋ-) alter a following initial, always in much-used words, frequently in others" (Bloomfield (1917:2113)). This comment hints at a scenario which may have given rise to a stem and affix system of the sort we find in Tagalog. Historically speaking, speakers may have begun to reanalyze frequently encountered complex words, particularly those involving stems which had undergone initial consonant nasalization as a consequence of the prefixation of nasal-final prefixes such as maŋ-. In their reanalysis, the nasal consonant falling at the boundary between the prefix and the stem began to be assigned as belonging to the stem. This reanalysis eventually spread by means of

59 Among the OT inclined, this may appear to hint at the existence of a form template in Tagalog that restricts the occurrence of nasal clusters. Elsewhere in the verb system, however, there is evidence against the existence of such a constraint. Thus, for most verbs, attaching the major suffix -an does not alter the segmental structure of the base; e.g. wakas-an 'put a stop to', formed from the base wakas; gupit-an, formed from the base gupit, etc. But for many of the most common verbs, which Schachter and Otanes refer to as irregular (1972:375 ff.), suffixation of -an triggers vowel elisions in the base; e.g. buksan 'open', from the base bukas; masdan 'stare at', from the base masid, etc. This vowel elision, which is optional for some bases and obligatory for others, gives rise to nasal clusters in some situations; e.g. lamnan 'put filling in', from the base laman; tijnan 'look at', from the base tijin, etc. The fact that vowel elision, which does not even occur with most verbs, nonetheless applies, even in the face of a resulting nasal cluster, raises suspicions about the existence of a constraint against such clusters. What is more suspicious is the fact that the ranking of such a constraint would have to be affix-specific and not language-specific, in that some affixes appear to trigger it and some appear not to.
analogy, leading to a situation in which previously affixal phonology became assigned to stems.

The resulting system is, in fact, not uncommon among the world's languages, though Tagalog is particularly dependent on reduplication as a formal device. By making use of several distinct morphological stems, upon each of which multiple morphophonological operations may act, Tagalog possesses a wide range of related words, each of which realizes a unique set of semantic and morphosyntactic features. The tendency in other treatments of Tagalog, regardless of theoretical orientation, has been to propose basic allomorphs which are concatenated to yield all other related items. The above facts indicate, however, that for Tagalog it is better not to analyze matters in terms of underlying stems or affixes. It is an artifact of generative assumptions to assume that it is, and when we do away with these assumptions, we also find ourselves in the position to do away with a range of problems associated with them. In regard to the case at hand, one major problem that we have eliminated is the anomalous phonological behavior of reduplicated items. If a Stem 2 exists in its own right, as the facts support, then the issue of overapplication as initially articulated by Wilbur ceases to be a problem. Reduplication simply acts upon Stem 2, giving rise in its own right to yet another distinct stem, which, in conjunction with other morphological rules, is used to realize a range of semantic and morphosyntactic distinctions.
CHAPTER 5

STEMS, OPERATIONS, RULES, AND FEATURES
IN SANSKRIT REDUPLICATION

5.1 Introductory remarks

In Chapter 4, we observed the way in which reduplication fits into the overall structure of Tagalog morphology, noting in particular the interaction of reduplication with other MOs in the formation of distinct stems and lexemes. In this chapter, I examine the way in which reduplication fits into the overall system of Sanskrit morphology, with several aims in view. First, I hope to illustrate the functional similarity of reduplication with other MOs in Sanskrit, largely to point out, along with previous researchers (e.g. Whitney (1889)), that reduplication is used to realize precisely the same SMIPs, even within a single language, as are non-reduplicative MOs. Second, I point out the frequency of there being multiple reduplicative MOs in particular languages, Sanskrit among them, and that this fact exactly parallels the ubiquitous occurrence of multiple instances of other morphophonological operation types, e.g. conventional affixation, in particular languages. Third, I examine the apparent "fragmentation" of reduplication (and of the morphological system in general) in Sanskrit (see Janda and Joseph (1986, 104).  

60 Janda and Joseph (1986) use the term "fragmentation" to refer to situations in which a single semantic property is realized by several different formal devices within a particular lexical category.
1992), discussing the extent to which this fragmentation can be traced to the interaction of MOs and MRs, the existence of distinct lexical stems, and the existence in Sanskrit of distinct lexically defined classes and phonologically defined classes within the verb system. Finally, I discuss the utility of referring to morphological features in describing Sanskrit reduplication and related phenomena.

Unlike my treatment of Tagalog in Chapter 4, in which I address a long-recognized analytical problem, no parallel problem exists for Sanskrit. Given, however, the wide linguistic significance of Sanskrit, the frequency with which Sanskrit reduplication has been discussed in the literature, and the substantial complexity surrounding the domain of reduplication in Sanskrit, it is appropriate to attempt a description of its reduplicative phenomena from the standpoint of the approach I am taking in this study. My hope is that the present approach will augment the insights of previous researchers and offer alternative analyses as appropriate.

Three relatively recent studies, Janda and Joseph (1986, 1992) and Steriade (1988), treat Sanskrit reduplication in some detail. Janda and Joseph point out that the data in their 1986 study extend across a number of historical stages of the language's development (Janda and Joseph (1986:101)), and their treatment is not uncharacteristic of the way in which other researchers have surveyed the language, Steriade (1988) being no exception. I, too, employ data in my discussion which extend across several historical stages.

To begin with, I outline the treatment of Janda and Joseph (1986), augmenting that discussion with brief reference to Janda and Joseph (1992), which can be seen as a follow-up to the basic proposals of their earlier treatment. I go on to briefly outline Steriade (1988), which I also touch upon
in 3.3.4. I then discuss what I see as some of the strengths and weaknesses of these treatments, during which discussion I also make several proposals concerning the approach I will take to Sanskrit. Finally, I go on to present the facts of Sanskrit reduplication and to discuss the ways in which they support my proposals. I conclude by summarizing what I see as the contribution that Sanskrit makes to our understanding of reduplication in particular, and of morphological systems in general.

5.2 Recent approaches to Sanskrit reduplication

The concerns of Janda and Joseph (1986, 1992) and Steriade (1988) differ significantly from one another. On the one hand, Janda and Joseph make it their primary aim to account for the noteworthy "fragmentation" of reduplication in Sanskrit. They define this morphological fragmentation as the lexical particularization of morphological rules, in this case the rules of reduplication in Sanskrit. To handle such cases of rule particularization, they propose a new theoretical construct, the rule-constellation. They define the rule-constellation as "a group of formally similar morphological processes sharing at least one characteristic property of form but distinguished by individual formal idiosyncrasies which prevent their being collapsed with one another" (Janda and Joseph (1986:85-86)). The bulk of their paper is spent illustrating this theoretical notion by means of the data and rules of Sanskrit reduplication, which, they argue, reflect not only the behavior of non-reduplicative morphology in Sanskrit, but also the fragmented behavior of morphological systems in general. As is clear, Janda and Joseph's concerns center on the formal dimension of Sanskrit reduplication, as opposed to the meanings and morphosyntactic properties with which it is connected.
Steriade (1988), also discussing reduplicative constructions, makes it the primary concern of her paper to discuss the relative syllabic position of the segments of the reduplicant as opposed to the segments of the attachment stem. Her basic concern, along with Janda and Joseph, and with nearly all researchers concerned with reduplication, is also formal in nature. Her primary interest lies in how the formal phenomena of reduplication in Sanskrit and other languages can best be accounted for. The formally complex reduplicative phenomena of Sanskrit provide an ideal context for her to explore this question.

Her basic claim concerns partial reduplication in general, as well as complete, non-exact reduplication, both of which fall within the category she labels "modified reduplication" (Steriade (1988:74)). All such modified reduplication, she claims, can be described in terms of operations that appear in non-reduplicative morphologies. These operations include stem truncation and segmental insertion and substitution, which operate in the case of reduplication to yield reduplicants which satisfy particular syllabic templates. Steriade defines such templates as "abstract conditions on the prosodic weight and syllabic organisation of strings" (Steriade (1988:146)), and thus stands as a direct challenge to accounts such as that of Marantz (1982), which defines reduplicative templates in terms of concrete C and V slots, which are filled by means of autosegmental association. Steriade secondarily claims that partial reduplication and non-exact reduplication need not co-occur, but may appear independently of one another.

Steriade uses the term base where I use the term attachment stem.

Steriade uses the term prespecified to refer to what I call non-exact reduplication.
5.3 Some basic claims regarding Sanskrit reduplication

Building on these two studies, I make some basic claims regarding Sanskrit reduplication, three of which appear below.

(17) Synchronically speaking, the fragmentation of reduplication in Sanskrit is the result of interactions between MOs on the one hand, and MRs on the other.

(18) The existence of morphological stems permits a more accurate description of Sanskrit reduplication than does an analysis in which morphological stems are not available.

(19) Reference to morphological features, to which MRs may refer, can contribute to an elegant description of Sanskrit reduplication.

As outlined in Chapter 2, morphophonological operations (MOs), following Zwicky (1988, 1992), are a distinct, finite set of functions which operate on phonological representations. They are distinct from, but employed by the morphological rules (MRs) of a language, which in essence select particular MOs from the morphophonological operations inventory and bring them to bear on the phonological representations of lexical stems. MOs are purely functions which operate on phonological representations and are entirely lacking in semantic or morphosyntactic content. Simultaneous to applying a MO to a lexical stem, a MR pairs the formal change with various
semantic, morphosyntactic, or indexing property (SMIP) values.

While Janda and Joseph clearly articulate and exemplify the notion of morphological fragmentation, I modify the notion of the rule constellation, at least as Janda and Joseph have applied it in regard to Sanskrit reduplication, claiming instead that the morphological fragmentation so evident in Sanskrit reduplication is attributable to a number of different causes. First of all, there is more than one basic reduplicative MO in Sanskrit, not just one maximally fragmented operation. These distinct MOs are, in turn, employed by distinct MRs. Second, Sanskrit lexical categories (we will be primarily concerned with Sanskrit verbs) are divided into several phonologically determined classes, each of which selects for one of several complementarily distributed sub-operations. Thus, Sanskrit possesses more than one reduplicative MO, each of which is employed by distinct MRs. Each MO, in turn, may be associated with slightly different phonological effects, depending on the phonologically determined class membership of the lexeme to which it applies.

While there is irregularity within the reduplicative domain of Sanskrit morphology, I nonetheless argue that there is a core of highly regular, productive reduplication involving distinct operations and distinct rules. Much of the morphological fragmentation in Sanskrit can be described in terms of distinct lexically determined classes, some of which further divide into distinct phonologically determined classes. In the case of reduplication, such phonologically determined classes may not be as intuitively transparent as, for example, the phonologically determined classes salient to certain affixal operations (cf. the operations that form the regular past tense in English by affixing -ed/-d/-t, as the case may be). But, I argue, they are exactly parallel to such examples. I cite examples from language games and from
reduplication in Nimboran as further support for such phonologically
determined class divisions related to reduplicative MOs. Presumably, the
phonologically determined class divisions relevant to Sanskrit reduplication
have their origin in universal grammar, and will appear in other languages
with similar reduplicative--and non-reduplicative--MOs.

Also, as becomes clear in the discussion below, reference to distinct
morphological stems, some of which are formed by means of rules which
employ reduplicative MOs, makes an analysis of reduplication much more
straightforward than otherwise would be possible. Reduplication, I point out,
is used in Sanskrit as a means of forming distinct morphological stems, as well
as for other purposes. These stems in turn serve as input to other MRs. Such
an analysis affirms the notion expressed in Steriade (1988:74 ff.) that certain
apparent features of Sanskrit reduplication are better treated as distinct from
reduplication proper. Such effects, often involving various segmental
changes, such as ablaut and lengthening, are, according to Steriade, the result
of "operations independent of and unrelated to the copying process central to
reduplication" (1988:75). From my analysis, this insight is described in terms
of distinct stems formed by means of reduplicative MOs, and upon which
separate segment-modifying MOs are subsequently brought to bear by distinct
MRs.

The separation in Sanskrit of reduplicative MOs (i.e. variable affixation)
from various segment-modifying MOs accounts for much of the data, as we will
observe. It also supports the notion that partial reduplication and non-exact
reduplication may be independent of one another--they need not co-occur, as
Steriade recognizes. Non-exact reduplication may arise as a consequence of
distinct MOs, some of which are reduplicative and some of which are segment-
modifying, acting upon distinct morphological objects, as we have reason to believe is the case in Sanskrit.

But it is also important to point out that segment-modifying operations may in some cases be part of reduplicative MOs, as appears to be the case in languages that have only one type of reduplication, and in which that type is partial, non-exact reduplication. In Nimboran, a language of Irian Jaya (a part of Indonesia), for example, there is only one type of reduplication, used to form the so-called Final Infinitive (Anceaux (1965:114-117)). The reduplicant in this case normally consists of the first consonant of the reduplicating stem followed by a prespecified \(-e\) as its vowel.\(^4\) Thus, the verb \(mùo\) 'to make' forms its Final Infinitive as \(memûo\); the verb \(bie\) 'to open' forms its Final Infinitive as \(bebie\), etc. Because in Nimboran this type of reduplication is a dedicated morphophonological operation (i.e. it is only used by one MR), there is no good reason to propose the existence of a distinct stem exhibiting partial exact reduplication, which itself is eligible for a single rule that employs a segment-modifying MO to yield the observed phonology of the Final Infinitive. The existence of such a hypothetical stem (e.g. *\(mumùo\), *\(bibie\), etc.) is further challenged by the fact that it never occurs in any morphological construct. It is better in such a case simply to state that the rule which forms the Final Infinitive in Nimboran makes direct use of a MO that concurrently effects reduplication and vowel modification.

This does not, however, address the distinction between partial reduplication and complete reduplication. According to Steriade, reduplication proper, whether partial or complete, involves a process which

\(^4\) The situation is actually a little more complicated than this, in that there are several phonologically defined classes, each of which patterns slightly differently as regards reduplication. All consonant-initial stems follow the described pattern, however.
creates a full and exact copy of the attachment stem (Steriade (1988:78 ff.)). This resulting copy, according to Steriade, is subsequently acted upon by any number of other truncations, insertions, substitutions, etc. on its way to its final phonological shape. Thus, from this perspective, reduplication, whether partial or complete, always begins with a complete, exact copy of the attachment stem. Partial reduplication then involves further truncations, independent of the operation the proposed full copy.

From the standpoint of this present study, however, the issue does not rest on the existence of an exact copy of the attachment stem, but on the fact that a given MO is brought to bear on a particular stem by one or more MRs. Partial reduplication always affixes to the attachment stem a prosodically defined chunk of the reduplicating stem, and it is not crucial to think of it as resulting from a full copy operation. While Steriade's attention to syllabic templates is of potential significance in defining the nature of reduplicative MOs, her full copy proposal will not prove crucial to the analysis at hand.

Formal identity between the reduplicant and the attachment stem, it turns out, is not a primary objective of grammars, as McCarthy and Prince (1995) claim. There is reason to suspect that such identity, when it occurs, is better viewed simply as the phonological effect of certain MOs employed by the MRs of a given language. What is important is that MOs "leave their mark"—that they leave some formal distinction on the stem of the lexeme upon which they operate. In principle, it makes no difference whether a MO effects reduplication, or prefixation, or ablaut, or subtraction; what is important is that it effects some formal distinction which is produceable by speakers and distinguishable by hearers.

Now this is not at all to say that certain kinds of MOs are not more
amenable to certain functions. There is reason to suspect that reduplication tends to be used to encode certain kinds of functions more than others. For instance, there is a strong tendency for reduplication to be used for category-preserving derivation, such as diminution of nouns, augmentation of adjectives, iteration of verbs, etc. far more frequently than it is for category-changing derivation or inflection. This is clearly the case among pidgin and creole languages and demonstrably so in other languages, too. Among languages, such as Tagalog and Sanskrit, which widely employ reduplicative MOs, the prominent use of such operations by stem rules is evident. But such a tendency does not in any way compel us to say that reduplicative MOs are targeting identity between the reduplicant and the attachment stem. It simply may be the case that MRs encoding certain kinds of SMIPs prefer certain kinds of MOs for certain kinds of functions.

From this standpoint, the tendency to choose reduplication for pairing with certain kinds of SMIPs is driven entirely by the MRs. MRs are the morphological matchmakers, the mechanism by which form and function are united in words. It is reasonable to suspect that they frequently match identity-yielding MOs, in languages where they are available, with certain kinds of SMIPs, for the simple reason that the form/function connection is particularly transparent—even iconic—in such cases.

By my analysis, it is also important to remember that the reduplicating stem need not be phonologically identical to the attachment stem, although in many cases it is. A variable affixation operation can obtain phonological material from one stem and affix it to another, leading to a phonological mismatch between the reduplicant and the attachment stem. In Sanskrit, for instance, as well as in other languages, there is reason to believe that, in some
cases, the stem upon which the reduplicate is based is not the attachment stem at all, but some other stem. In Sanskrit, this fact becomes evident in regard to the Zero Grade and the Full Grade, each of which is a distinct version of a given verb root.

For many Sanskrit verbs, each of these two versions appears in certain morphological contexts. Because, I will argue, the distinction between these two versions is generally not reducible to a regular phonological difference, and because these two versions, on arbitrary grounds, appear to be available to distinct MRs, I will designate abstract labels for them—Stem 1 for the Zero Grade, and Stem 2 for the Full Grade, each label representing a distinct morphological stem.

While Steriade treats these stems as generally arising in distinct phonological environments, she does recognize that their behavior must be explained in morphological terms. She treats the relationship between the Full Grade and the Zero Grade as resulting from a syncope operation that removes a from the Full Grade. Thus, we find stems like jan/jn ‘give birth’ and bhar/bhr ‘bear’, etc. which exhibit vowel syncope as the distinguishing characteristic between Stem 1 and Stem 2, the former often occurring when the stem vowel is unaccented, the latter often occurring when it is not. Following Whitney (1889:82), however, I treat the relationship between Stem 1 and Stem 2 as involving the insertion of a, not its deletion.

Regardless, however, of whether the relationship between these two stems is treated as syncope or epenthesis, it is not predictable on phonological

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65 Brian Joseph (personal communication) points out that the Zero Grade of verbs like bhar/bhr ‘bear’, etc. actually have two phonologically determined realizations. Thus, we find bhr appearing prevocally, e.g. 3 PL PRES bi-bhr-ati, etc.; while bhr appears before consonants, e.g. 1 PL PRES bi-bhr-mas, etc.
grounds alone. Steriade says that "[s]ynchronically, the fact that root-
internal variation was mostly eliminated means that individual roots must be
marked as undergoing or not undergoing Syncope" (Steriade (1988:102)).
Given that our aim is to account for Sanskrit morphology synchronically, this
forces us into the position of admitting that while in some cases Stem 1 and
Stem 2 bear a predictable relationship to one another, in others they do not,
and we cannot unequivocally predict the occurrence of one or the other on
the basis of their phonological environments alone. Each verb has Stem 1 and
Stem 2 available for use in distinct constructions, though not every verb
employs the same MOs to produce these stems. I treat them as morphological
stems which, while possibly having their historical origin in automatic
phonology, no longer are explainable in such terms alone. From my
perspective, Stem 1 and Stem 2 in Sanskrit are simply distinct stems available
for participation in distinct MRs.

An analysis in which Stem 1 and Stem 2 are associated with specific
morphological environments is supported by Whitney's approach, as well, and
in fact, dates back to the great Sanskrit grammarian Panini. Each of these
stems occurs with distinct affixes, either inflectional or derivational. Whitney
(1889:82, 83) points out that these two stems came to represent certain
conjunctural classes or inflectional and derivational stems.

As I argue below, Sanskrit, in addition to Stem 1 and Stem 2, possesses
several further morphological stems, some of which are formed by
reduplicative MOs, and some of which are not. This interaction of various MOs,
driven by MRs to yield distinct stems, is further augmented by the application

66 Brian Joseph (personal communication) also indicates that the automatic phonological origin of these Sanskrit stems, if tenable, must have predated PIE, in that stem choice in PIE was not a matter of automatic phonology.

115
of various derivational and inflectional rules, each of which employs further MOs. This leads to a marked increase in the number of possible relationships between independently occurring formal features in Sanskrit, and also in the number of SMIPs with which they can distinctively be paired. Such a system illustrates, as the following data demonstrate, the fact that languages do not encode meaning and morphosyntactic properties in morphemes, which by definition are the pairing of fixed form with fixed meaning, but in words, which permit the cooccurrence of several independently variable formal features paired with multiple combinations of SMIPs by means of MRs.

But there is more. It turns out that referring to Sanskrit stems as unitary objects will miss important generalizations. For instance, among the additional stems that occur in Sanskrit are a pair of stems which exhibit reduplication, and a pair of stems which, in certain cases, exhibit both reduplication and certain vowel quality modifications which I will refer to as ablaut. With each of these pairs, however, the only distinction for any given verb is the same as the distinction we observe between Stem 1 and Stem 2 for that same verb, often involving the presence or absence of a. If all six of these stems are merely unitary objects, then we are forced into the position of applying the same MO to three different stems to yield corresponding stems, each of which varies from one other stem by precisely the same SMIPS and, in most cases, by precisely the same formal effects as the others.

The solution to this problem turns out to be the morphological equivalent of phonological features. On the one hand, we can refer to a given phonological object, such as a phoneme, as a unitary object—/p/, for instance, or we can refer to it as a cluster of features—e.g. [-continuant, -voice, +labial

67 As the ensuing discussion will make clear, ablaut is entirely distinct from the vowel grade distinctions traditionally recognized in Sanskrit grammar.

116
In similar fashion, we can refer to individual morphological stems in a unitary fashion, using arbitrary labels (e.g. Stem 1, Stem 2, Stem 3, etc.), or we can refer to stems as clusters of morphophonological features. In the case at hand, it appears that three basic features are adequate to capture the generalizations of Sanskrit reduplication, and related phenomena, such as ablaut and stem weight, all of which interact with reduplication in the Sanskrit verb system. I thus propose three morphophonological features, each of which is associated with binary +/− feature values. They are [+/- full], [+/- reduplicated], and [+/- ablauted]. These values interact to form six distinct stems in Sanskrit, though there could, of course, be eight distinct feature combinations, mathematically speaking. The fact that Sanskrit makes use of only a subset of the mathematical possibilities poses no theoretical problem.

In what follows, I will make use of abstract cover terms for each of the relevant Sanskrit morphological stems, though it is important to keep in mind that each label is an arbitrary symbol representing a distinct bundle of morphological feature values. (20) below summarizes the feature values for each of the stems to which I will refer.

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64 The precise phonological feature system we choose is not important to the argument at hand.

65 I am actually simplifying the situation in Sanskrit to focus on the phenomena of reduplication. In reality, there is yet another grade available in Sanskrit—the vṛddhi grade—over and above the Zero Grade and the Full (guna) Grade. A full account of the Sanskrit verb system, or of its morphological system in general, clearly needs to incorporate the vṛddhi grade, as well, in that much so-called secondary derivation involving Sanskrit verbs is built on vṛddhi-grade stems (Whitney (1889:454 ff.)). Interestingly, the vṛddhi grade is generally formed by reapplying to Stem 2 the same MO that is used to form Stem 2 from Stem 1.

Similarly, languages with even the richest sound systems typically make use of only a portion of the possible phonological feature combinations available to them.
(20) Morphological feature values for Sanskrit stems

For the sake of clarity, I have chosen to employ feature names that closely parallel their respective formal correlates, though I could have used more arbitrary terms. What is important is that MRs are permitted to refer to morphological feature values, both in selecting the objects upon which they act and in specifying their morphological effects on such objects. In the following section, I explore, among other things, the way such a proposal works within the Sanskrit verb system, especially surrounding reduplication and related phenomena.

5.4 Some facts regarding Sanskrit reduplication

5.4.1 Reduplication in the Sanskrit verb system

The aim of this section is to present the basic facts concerning Sanskrit reduplication and to discuss their relevance to the claims I have articulated above, giving initial attention to the multiple ways in which Sanskrit reduplication contributes to morphological fragmentation. As Janda and Joseph point out, and as I aim to demonstrate below, the morphological
fragmentation in Sanskrit to which they refer extends along more than one dimension.

Part of the complexity of Sanskrit reduplication stems from the fact that it appears in conjunction with a range of grammatical and semantic functions. Thus, as Whitney's classic grammar of 1889 points out, Sanskrit reduplication contributes to the expression of verbal categories including the present tense, the perfect, the aorist, the intensive, and the desiderative, and also occurs in conjunction with the derivation of certain nouns. Therefore, as Janda and Joseph point out, similar or identical reduplicative operations appear in the realization of least six different SMIPs in Sanskrit. This fact illustrates one key aspect of morphological fragmentation—that which involves the appearance of the same MO in the realization of several different SMIPs.

It is within the Sanskrit verb system, which has been the focus of most studies of Sanskrit reduplication, that we find the bulk of its reduplicative phenomena. Yet even in the realization of particular SMIPs within the verb system, there is substantial variety. For example, certain SMIPs are expressed among Sanskrit verbs solely by means of reduplication, while others are expressed by means including, but not limited to, reduplication. Thus, for nearly all verbs, the perfect, the intensive, and the desiderative are associated with some reduplicative MO. For the present and the aorist, however, only certain classes of verbs employ reduplication, while other classes make use of a range of other MOs in the realization of these categories. In (21) below I present some examples of the variety of operations associated with the realization of the Sanskrit present tense.

119
In (21) above, several distinct MOs appear to be associated with the formation of the present tense. In (a), the stem remains unchanged; in (b) and (c), we observe reduplication; in (d), we observe the infixation of -n- before the final consonant of the root; in (e), we find the affixation of -nu; and this is not an exhaustive sampling of the operations associated with the present tense. What is clear here is that Sanskrit, like many languages, uses several distinct MRs, each of which employs a wholly distinct MO, in the realization of the same SMIP. This illustrates yet another example of morphological fragmentation.

Similarly, in (22) below I present some examples of the variety of operations associated with the realization of the aorist. As with the realization of the present, Sanskrit also employs several MRs, which in turn employ several distinct MOs, to realize the same SMIP. In (a) and (b), we observe the use of reduplication; in (c), we see the use of the unchanged root; in (d), we find the suffixation of -s.

The lexemes in examples b.-e. actually possess two versions of the Present Stem, though I have only listed one in each case, for simplicity’s sake.
(22) Formation of the Sanskrit aorist

Beyond these aspects of Sanskrit morphological fragmentation, there are some further observations which warrant our attention. (23) below shows some of the relevant data.

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71 I have deliberately omitted the final stem vowel -a from the aorist stems listed which exhibit it, to highlight the other formal effects under examination.
(23) Reduplication in the Sanskrit verb system

5.4.2 Reduplication in the present, perfect, aorist and desiderative

As the data in (23) above indicate, even among those SMIPs which are sometimes or always realized using some type of reduplication, namely the

72 “S1” refers to Stem 1, “S2” to Stem 2, which are discussed above. These stems correspond to the traditional labels “Zero Grade” and “Full Grade”, respectively. See section 5.1 above for discussion.

73 Though the present, perfect, aorist, intensive, and desiderative generally exhibit both Zero and Full Grade stems paralleling those noted for the root, I have listed only the Zero Grade stem in most cases, for the sake of clarity. Also, the stems to which I assign functional labels essentially follow Whitney's use of the terms (Whitney (1889)), but should not be taken as saying anything definitive about the morphology of such stems. The numerically labeled stems, on the other hand (e.g. Stem 1, Stem 2, etc.), to which I subsequently refer with some frequency, are designed to express specific facts about the morphological nature of the stems to which they are applied.

A note on transcription is also in order. The vowels ē and o, the so-called ganda-diphthongs in Sanskrit, are inherently long. In the earlier stages of Sanskrit, they were true diphthongs, phonetically aि and aू, respectively. They were contrasted with a pair of heavier diphthongs (the so-called व्रद्धि-diphthongs), which were aँि and aँू, respectively. Later in the development of Sanskrit, they are described as becoming the long simple vowels ē: and o:, respectively. I have opted to follow the traditional transcription pattern of Sanskrit, but the reader should bear in mind the actual phonetic values of the vowels ē and o.

122
present, perfect, aorist, desiderative, and intensive, there are some
noteworthy complexities. First of all, there is a strong formal correspondence
between the reduplicant of the present, perfect, aorist, and desiderative, while
the reduplicant of the intensive often diverges more dramatically from what
we see in these categories. While the quality of the vowel of the reduplicant
may vary among these four morphologically related categories, their
respective reduplicants are, nonetheless, strikingly similar, in that they
generally consist of the first available light syllable of Stem 1, with the vowel
lengthened in the case of the Aorist Stem.

This correspondence among the present, the perfect, the aorist and the
desiderative is best explained in terms of their having been built from the
same pair of stems (differing, as discussed above, according to the Zero
Grade/Full Grade distinction of traditional Sanskrit grammar), to each of
which has applied the same reduplicative MO. The realization of all four
categories in question is at least indirectly based on the pair of stems to which
a reduplicative MO has applied, and to which the feature [+reduplicated] has
also been attached.

Given that only the the perfect and, to a slightly lesser degree, the
desiderative, are nearly always realized by means of reduplication, it is to
these categories that we reasonably turn our attention in determining the
identity of the [+reduplicated] stems. As is clear, the reduplicant of the perfect
more consistently reflects the phonology of the root than the reduplicant of
the desiderative does, the latter often containing a different vowel from the
vowel of the root. It is therefore simplest to assume that the pair of
[+reduplicated] stems (i.e. Stems 3 and 4) serve unchanged as the stems upon
which the perfect is based. To form the desiderative, the phonology of Stems 3
and 4 is maintained exactly, except in the event that the initial vowel of the
stem is a-, in which case it is changed to i-. The lengthening of the final vowel
in some desiderative roots is associated with the affixation of -sa or -iṣa.

At this point it is important to review several previously mentioned
facts and highlight some new ones. First of all, reduplication does not play a
role in the realization of the present and the aorist for all verbs, as noted
above. Secondly, reduplication is for most verbs a contributing factor in the
realization of the desiderative, though the reduplicant found in the
desiderative, also noted above, often differs in vowel quality from that of the
perfect. Third, reduplicant vowel modification and the operation employed to
yield Stems 3 and 4 form only part of the realization of the desiderative, in that
distinct suffixes are also present in the desiderative, also as noted above.
Finally, among those verbs that exhibit reduplication in the realization of the
aorist and/or the present, there is a nearly universal identity between the
reduplicant of the desiderative and that of these categories, and the
differences are highly regular. (24) below illustrates these correspondences
and differences.

^74 See (21) and (22) above. Some verbs, for example, form their present by
infixing -n-; some verbs form their aorist by suffixing -s-, etc.

^75 Whitney (1889:374) points out that several roots, some of which are of very
common use, do not exhibit reduplication in the desiderative. He attributes this to the
contraction of the reduplicant and the initial stem syllable. Examples include ripsa from
rabh 'take hold', pitsa from pat 'fly, fall', etc.
(24) Comparison of Sanskrit present, aorist, and desiderative stems

In nearly all cases, the reduplicant of the desiderative and that of the present are identical. In (24), the only exception to this is the verb *da*: 'give', in which the reduplicant, unlike most other verbs with a as the stem vowel, does not appear with *i* as the vowel of its reduplicant. In all other cases, however, there is strong identity between the reduplicants in question. In the case of the aorist, the reduplicant is also identical to that of the desiderative,

...
except for the fact that its vowel is generally lengthened.\(^{78}\)

This state of affairs lends support to the existence of the ablauting feature, whose positive value contributes to the identity of two further stems, Stem 5 and Stem 6. As with Stem 1 and Stem 3, Stem 5 bears the feature [-full]; as with Stem 2 and Stem 4, Stem 6 bears the feature [+full] (i.e. odd-numbered stems bear the feature [-full] and even-numbered stems bear the feature [+full]). Stem 5 and Stem 6 are formed from [+reduplicated] stems, i.e from Stems 3 and 4. In addition to the [+reduplicated] value, Stems 5 and 6 are marked [+ablauted], and are the stems upon which the desiderative is always realized, and upon which the reduplicating aorist and present is also based, in the cases in which verbs realize these categories reduplicatively. The [+ablauted] stems are based on [+reduplicated, -ablauted] stems, and are formed by means of a stem rule which, to stems in \(a\), applies an ablauting operation to change the vowel to \(i\). All other stems use the unchanged [+reduplicated, -ablauted] stems as the [+ablauted] stems, by default.

To form the Desiderative Stem from Stems 5 and 6, the affixes -\(sa\) or -\(i\(\)\(a\) are attached to them; to form the Present Stem, Stems 5 and 6 are used unchanged; to form the Aorist Stem, the initial vowel of Stem 5 or 6 is lengthened, for most verbs that form a reduplicated aorist. For those in which it is not lengthened, the Aorist Stem is based on the [+reduplicated, -ablauted] stem or the unlengthened [+ablauted] stem, depending on the verb. Clearly, the default case in the formation of the Aorist Stem involves the lengthening

\(^{78}\) In Whitney (1885), among the 148 reduplicative aorist stems he lists, 101 exhibit initial vowel lengthening, while 47 do not. This indicates that the lengthening pattern is a dominant pattern among several distinct patterns. There may be unifying features among the groups of verbs which show a long vowel in the aorist reduplicant and those which show a short vowel in the same, but I have not discovered them.

It is also worthy of note that in only 2 of the 49 verbs which show reduplication in the present is the reduplicant long, while a long reduplicant occurs in only 4 of the 164 desideratives listed in Whitney (1885).
of the initial vowel of the relevant [+]ablauted] stem.

So the story thus far goes something like this. For each verb, there are several distinct morphological stems. Two of these stems, Stem 1 and Stem 2, typically bear a predictable formal relationship to one another, the latter displaying a vowel, normally a, which is not present in the former. For long a, there is no difference between the vowel of Stem 1 and Stem 2. (25) below is indicative of the formal relationship between Stem 1 and Stem 2.

<table>
<thead>
<tr>
<th>Stem 1</th>
<th>Stem 2</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>da:</td>
<td>'give'</td>
</tr>
<tr>
<td>b.</td>
<td>hu</td>
<td>'sacrifice'</td>
</tr>
<tr>
<td>c.</td>
<td>bhr</td>
<td>'bear'</td>
</tr>
<tr>
<td>d.</td>
<td>pr</td>
<td>'fill'</td>
</tr>
<tr>
<td>e.</td>
<td>bhi:</td>
<td>'fear'</td>
</tr>
<tr>
<td>f.</td>
<td>jn</td>
<td>'give birth'</td>
</tr>
<tr>
<td>g.</td>
<td>dru</td>
<td>'run'</td>
</tr>
<tr>
<td>h.</td>
<td>trp</td>
<td>'be pleased'</td>
</tr>
</tbody>
</table>

(25) Sanskrit Stems 1 and 2

As is clear in (25) above, the normal relationship between Stem 1 and Stem 2 corresponds to the distinction between Zero Grade and Full Grade verb stems in Sanskrit grammar. But, as Steriade points out, not all verbs exhibit

\[ ^{79}\text{See note 73, \S2.} \]
this formal relationship. The verb *tras ‘be terrified’, for example, has no Stem 1 with * in it, and is indicative of a verb class with numerous members. In the end, individual verbs are placed in arbitrary lexically defined classes based on the relationship between their respective Stems 1 and 2 (Steriade (1988:102)). While the occurrence of Stem 1 in inflected forms was generally correlated in Vedic Sanskrit with the absence of high pitch\(^8^0\) on the stem vowel, and the occurrence of Stem 2 with its presence, by Classical Sanskrit there was no such suprasegmental correlation, so that the two distinct versions of a given root were associated with distinct morphological functions, rather than being phonologically determined. Stem 2, for instance, typically occurs in the three persons of the singular active perfect, while Stem 1 occurs in all persons of the dual and plural active perfect and all middle voice forms (Whitney (1889:283)).

For every verb, both Stem 1 and Stem 2 form a corresponding stem bearing the feature \([+\text{reduplicated}]\) by means of a stem rule that employs a reduplicative MO. This MO prefixes a copy of the first eligible sequence\(^8^1\), shortening the vowel, if necessary, to all \([-\text{reduplicated}, -\text{ablauted}]\) stems, namely to Stem 1 and Stem 2 of a given root, thereby yielding Stem 3 and Stem 4.

To those Stems 3 and 4 that have a in them, another stem rule applies. This stem rule employs a MO that effects ablauting to yield the pair of corresponding \([+\text{ablauted}]\) stems, parallelling the other Zero Grade/Full Grade stems already discussed. Both the \([+\text{full}]\) and \([-\text{full}]\) versions of the \([+\text{reduplicated}]\) and \([+\text{ablauted}]\) stems serve unchanged for the respective

\(^8^0\) Joseph (personal communication) reports that in Vedic Sanskrit primary accent was realized as high pitch.

\(^8^1\) I discuss the details regarding what sequences are eligible in 5.4.4 below.
Perfect and Present Stems. The Aorist Stem and the Desiderative Stem, however, generally form either a [+full] or a [-full] stem, though sometimes both. For stems containing the vowel a, they are sometimes built on Stem 5, sometimes on Stem 6, and sometimes on both. For all other stems, the Aorist Stem and Desiderative Stem are built on Stem 5. In any event, to form the Aorist Stem, the first vowel of the stem is lengthened by means of another distinct MO. To form the Desiderative Stem, as mentioned above, a derivational rule applies a MO that affixes -sa or -iśa to [+ablauted] stems. Thus, for the stem ṭprar 'pass', we find tatras as Stem 3 and tatar as Stem 4. The Desiderative Stem is titarisa and the Aorist Stem appears as titar. For the stem ṭrdard 'split, bore', we find tatrd as Stem 3, tatard as Stem 4, titrta as the Desiderative Stem, and titrd as the Aorist Stem. 

Properly speaking, we probably want to recognize another distinct pair of stems, Stems 7 and 8, which correspond to what I have thus far referred to as the Aorist Stem. Given that for at least one class of verbs, the Aorist Stem undergoes initial vowel lengthening, I will assign the feature [+/- lengthened] to distinguish between Stem 7 and Stem 8. Given that all reduplicated aorists not only prefix an a- to yield the actual item that serves in inflected forms, but also appear with a set of affixes, we are well-motivated in positing such a pair of stems. Also, the semantics of the aorist is not demonstrably associated with the lengthening of the stem vowel, but with a combination of formal markers, only one of which is vowel lengthening. Also, given that some verbs form reduplicated aorists from a [+full], and some

82 The change in the final consonant of the root occurs in the context of the desiderative suffix -sa, but is, as it turns out, a matter of automatic phonology, i.e. ds ---> ts. This d ---> t, change, therefore, does not occur before the desiderative suffix -iśa, in that it does not yield the proper environment to trigger the change.
from a [-full] stem, it is more economical to form both a [+full] and a [-full] for all verbs, and designate which stem is used to form the aorist according to verb class, however it may be defined. For verbs that do not form a reduplicated aorist, Stem 7 and Stem 8 may be formed from Stem 1 and Stem 2 by means of a number of distinct MOs, as mentioned in 5.4.1 above.

An important fact to note here is that the reduplicant of the Present Stem (which is an unchanged Stem 5 or Stem 6) and the reduplicant of the Perfect Stem (which is an unchanged Stem 3 or Stem 4) remain the same, regardless of whether they are attached to Stem 1 or Stem 2. Similarly, as might be expected, the reduplicant in a desiderative, present, or aorist construct does not vary in relation to whether the attachment stem is Stem 1 or Stem 2. What is more, the reduplicant is always based on Stem 1, except when there is no vocalic segment in that stem. This indicates, then, that the reduplicant is not based on the attachment stem, but on Stem 1, except when Stem 1 contains a non-vocalic syllable nucleus, in which case the reduplicant is based on Stem 2. This fact challenges the frequent assumption in the literature on reduplication that the reduplicant is a copy of part or all of the stem to which it attaches. (26) below highlights these facts.

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83 See Appendix for examples of Stem 7 and Stem 8 and for summary of the MOs and MRs relevant to Sanskrit reduplication.

84 I.e. when Stem 1 contains a syllabic r as its syllable nucleus, the reduplicant is based on Stem 2, which will contain a corresponding a as its syllable nucleus.
For the reasons previously cited, it is best to view Stem 1 and Stem 2 as distinct stems, both of which form a [+reduplicated] stem, upon which dual versions of [+ablauted] stems are also based. The consistent phonology of the reduplicant in Stems 3 and 4 and Stems 5 and 6 also supports the claim that it is based on the phonology of Stem 1 and Stem 2, respectively, for all verbs except those lacking a vocalic syllable nucleus.

5.4.3 Intensive reduplication

This then sets the stage for a similar analysis of the Sanskrit intensive formation. Sanskrit intensives are highlighted in (27) below, along with the corresponding Stems 1 and 2 for each verb in question.
In (27) above, it is significant to note that the reduplicant of the Intensive Stem in all cases reflects the phonology of Stem 2 of the verb in question. Thus, in every instance, the initial vowel of the reduplicant is identical to the initial vowel of Stem 2, and in those instances where the reduplicant contains two consonants (e.g. in (27c), (27e), and (27g) above), the second consonant of the reduplicant is identical to the second consonant of Stem 2 for that same verb. While it is not shown in (27), the attachment stem of the Intensive Stem may be based on either Stem 1 or Stem 2 of the verb in question, as similarly noted for Stems 3 and 4 in 5.4.2 above. The reduplicant stays the same, though, whether the attachment stem is based on Stem 1 or on Stem 2. I argue that this is precisely because the reduplicant of the Intensive
Stem is based on Stem 2, while the reduplicant of Stems 3 and 4 is based on Stem 1.

Like the formation of the desiderative, the realization of the intensive is the result of a derivational rule, not a stem rule, in that intensives possess neither distinct indexing properties, as in the case of distinct stems; nor distinct inflectional properties, as in the case of inflectionally required forms; but rather distinct semantic properties characteristic of classic category-preserving derivation. The MR that realizes the intensive links the creation of a distinct intensive lexeme with a distinct reduplicative MO, not with another MO acting upon a previously existing [+reduplicated] stem, as we have observed above in the case of non-intensive reduplication.

Support for this analysis is in part found in a relatively large class of verbs represented by (27c) and (27e) above. In these examples, the reduplicant consists of the first heavy syllable (in this case, the entire stem) plus -i-, and the first heavy syllable by itself, respectively. On the other hand, the reduplicant in Stems 3 and 4 for this class of verbs consists simply of (for most verbs), the first available light syllable. To base the Intensive Stem on Stems 3 and 4 for this class of verbs would involve positing a MO that copied the third segment of Stem 2 and then infixed it, either with or without a following -i-, after the reduplicant of Stem 3 or Stem 4, as the case may be. To attribute a sequence of segments in the reduplicant that exactly reflects a sequence of segments in Stem 2 to two separate MOs is clearly an unnecessarily cumbersome means of accounting for the reduplicant in such cases.
5.4.4 Phonologically determined classes and reduplicative MOs

It turns out that all the roots that behave like (27c) and (e) above end in a sonorant consonant, though not all such roots form the Intensive Stem in these ways. A good example appears in (d) above, where Stem 2 ends in a liquid and where its reduplicant consists of a heavy syllable formed from the first light syllable of Stem 2, with the V lengthened to make the syllable heavy. Accordingly, there appear to be several lexically and phonologically determined classes among Sanskrit verbs in regard to the MO employed for intensive reduplication. First of all, there are the roots ending in a sonorant consonant that reduplicate like (c) above; second, there are those ending in a sonorant consonant that reduplicate like (d) above; third, there are those that reduplicate like (e) and (g) above; fourth, there are those that simply show the first eligible heavy syllable of their respective Stem 2 as the reduplicant, like (a), (b), (f), and (h) above.  

There are a few exceptions to be found, but nothing that rivals the prevalence of the patterns discussed above. For example, one of the alternative Intensive Stems for the root baḍh ‘oppress’ is baḍbadh, though Stem 2 does not end in a sonorant consonant. The root sras ‘fall’ has an Intensive Stem sanisras, though there is no n in the attachment stem. In the end, it is best to propose the existence of a distinct MO which forms the Intensive Stem for every verb.

85 It is important to remember here that the vowels e and o are both diphthongs, and as a syllable nucleus, they make the syllable in which they occur heavy.

86 The alternative Intensive Stem is baḍbadh.

87 Interestingly, sras ‘fall’ has an alternative stem srās, exhibiting a nasal vowel, which occurs in several of this root’s inflectional paradigms. In this case, the reduplicant appears to be based upon the stem with the nasal vowel, while the attachment stem appears to be based on the stem without it. I have found a similar, though not identical, state of affairs to hold in the root jabh/jambh, which shows janjabh for its intensive stem.
But these are only some of the details regarding phonologically determined classes relevant to Sanskrit intensives, and several further details remain, for both types of reduplication we have thus far observed. As Janda and Joseph point out, Sanskrit reduplication reflects a number of distinct, yet related patterns. Whitney, too, makes explicit the fact that in Sanskrit reduplication "the varieties of detail . . . are very considerable" (Whitney (1889:222)). A closer examination of these "varieties of detail" will, it turns out, shed light not only on reduplication in Sanskrit, but on the nature of reduplication in general.

Apart from the lexically and phonologically determined class distinctions affecting intensive reduplication, several other class distinctions bear on both types of Sanskrit reduplication. For both intensive and non-intensive reduplication, there are several factors which have a bearing on the phonological shape of the reduplicant--most frequently on the shape of the onset of the reduplicant syllable. (28) below illustrates the relevant patterns, some of which have occurred in the data already presented.
The data in (28) above indicate that while the two distinct reduplicative MOs in Sanskrit each appear to stipulate a distinct syllabic template as their respective reduplicants, the material from which they build the stipulated template differs according to the phonology of the stem upon which they operate. Thus, in the case of non-intensive reduplication, let's assume the MO is defined along the lines of "prefix the first eligible light syllable from Stem 1 to [-reduplicated] stems, unless Stem 1 has no syllabic nucleus, in which case use Stem 2." Any attempt to apply such a MO uniformly across stems of widely ranging phonology requires a number of additional choices, not unlike those encountered in the classic English-based play language, Pig Latin.

In Pig Latin, the pattern is simple--remove the initial consonant of a word; place it at the end of the word; and add the vowel [e] after it. Thus, "Pig Latin" emerges phonetically as [igpe æt̄mle], etc. When a word, however,
begins with a consonant cluster, for instance, or with a vowel, different speakers take a different strategy in forming the Pig Latin version. “Bread”, for example, can appear as [edbre] or as [redbe], depending on the speaker. “All” can appear as [ale] or as [lae], etc. The point of this is simply to illustrate the fact that the phonology of the material upon which a given MO is brought to bear forces decisions as to how a speaker will apply that MO.

It is probably best not to take such phonologically complementary applications of a given MO as instances of entirely distinct operations, but rather to take them as the specific instructions, manifested in the clustering together of related sub-operations, as to how a given singular MO is to apply to a range of different phonological representations. In Sanskrit, for example, several distinct phonologically determined classes exist— one class has a single [-back] initial consonant; one class has a single [+back] initial consonant; one class is vowel-initial; one class begins with an obstruent followed by -r; one class begins with an s- followed by a stop consonant, etc. Both reduplicative MOs take note of these phonologically determined class distinctions in the realization of their phonological effects. We can expect that other languages will divide stems up according to a similar pattern.

The formation of Stem 3 in (28) is as follows: for vowel-initial stems, a copy of the initial vowel, with accompanying coalescence, describes the observed pattern, as in (28)a. In (28)b. we observe a stem beginning with a single initial [-back] consonant, in which the reduplicant consists of the first CV of Stem 1, which stands as the first eligible light syllable. In (28)c. and (28)d., we observe stems containing initial back consonants, which reduplicate as [-back] consonants in the case of both intensive and non-

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88 This data is drawn from my six-year-old daughter, Emma, and my nine-year-old daughter, Claire.
intensive reduplication. In (28)e., Stem 1 has no nuclear vowel, so the reduplicant is based on Stem 2, and consists of the first eligible light syllable, again a CV sequence. In (28)f., an aspirated initial consonant appears unaspirated in the reduplicant. In (28)f., an initial st- cluster behaves like a t-initial stem, in that the reduplicant eliminates the initial s-. Finally, (28)h. illustrates a class containing initial stop-liquid clusters, which simplify clusters by eliminating the -r, thus leaving a CV light syllable, as we have commonly observed. We observe similar patterns regarding the phonology of the reduplicant onset in regard to intensive reduplication, as well. Stems with an initial long vowel do not reduplicate.

I take these effects not as resulting from separate operations, _per se_, but as resulting from a single operation applied to several distinct phonologically determined classes which, by and large, stand in complementary distribution to one another. This leads to groups of complementarily distributed sub-operations in Sanskrit, a fact which is common not only to reduplication in Sanskrit, but to many MOs crosslinguistically.

This kind of lexical subdivision as regards reduplication should come as no surprise, given the strong tendency for languages to treat stems of differing phonology in different ways, not only regarding reduplication, but in regard to other MOs, too. In Nimboran (Anceaux (1965:114 ff.)), for instance, some vowel-initial stems behave identically to those in Sanskrit, e.g. _irō_ 'to fill', _iirō_ 'in order to fill', etc. Similarly, Nimboran takes only the initial consonant of many CC clusters as the onset of the reduplicant, e.g. _brub_ 'to fold', _bebrub_ 'in order to fold', etc. Also in Nimboran, however, if the initial consonant of the cluster is _η_, then both consonants appear in the onset of the reduplicant. _Steriade_ (1988:121 ff.) uses this fact to justify a claim regarding the extrametricality of the [s] in [st] clusters in Sanskrit.

138
reduplicant, e.g. *ngedáu ‘to shave’, *ngengedáu ‘in order to shave’, etc.\(^9\) And even more divergent from the Sanskrit pattern is the class in Nimboran that consists of a stem following a consonant-vowel-nasal pattern, in which case the reduplicant consists of the initial stem consonant, followed by the stipulated vowel -e-, followed by a nasal consonant homorganic to the initial consonant of the stem, e.g. *bug ‘to wait’, *bmbug ‘in order to write’, etc. The point of all of this is that it is normal for a language to divide its lexicon into phonologically determined classes in regard to the application of reduplicative MOs. Determining the recurrent crosslinguistic patterns for such divisions is a task that, to my knowledge, has not yet been undertaken.

As regards the formal reduplicative pattern for the intensive stem in Sanskrit, a couple of observations are in order. First of all, for most verbs, the reduplicant appears to be built from Stem 2, not Stem 1, even when the attachment stem is Stem 1. Thus, in (28) above, we find *jo-hu, *be-bhi:, *do-dru, etc., in which the reduplicant in every case is based on Stem 2. This further supports the kind of situation which the proposals of this study predict, namely a situation in which the reduplicant is systematically built from a stem other than that to which it attaches. To approach a description of this aspect of Sanskrit reduplication without recognizing the fact that the reduplicant is based on Stem 2 is to miss a significant generalization, yet approaches like that of McCarthy and Prince do just that.

\(^9\) If *ng turns out to be a single, prenasalized stop segment (a possibility suggested to me by Brian Joseph (personal communication)), this example would appear to be less idiosyncratic.
5.5 Concluding remarks on Sanskrit

Thus, to deal with the regular patterns of Sanskrit reduplication, we need to propose two basic MOs, the first of which is used by the rules forming the stem used in present, perfect, aorist, and desiderative constructs, the latter of which by the rule forming the intensive constructs. To account for the many idiosyncrasies not accounted for by these operations, I make several further proposals. First, several distinct non-reduplicative MOs are brought to bear by other MRs on stems formed by means of reduplication, illustrating the importance of carefully distinguishing between MOs, on the one hand, and MRs, on the other. Second, of similar importance to the distinction between MOs and MRs is the explicit recognition of morphological stems as discrete morphological objects. Third, the admission of morphological features as part of what MRs refer to eliminates redundancies which would otherwise exist in a treatment along the lines of what I propose. Fourth, recognizing the existence of several lexically and phonologically defined classes, each of which behaves in specific fashion as regards reduplication, allows us to see the essential unity in the application of a given MO.

Thus, the fragmentation of Sanskrit reduplication is both pervasive and explainable. This should not be all that surprising, however, given that in all but the most orthodox agglutinative systems do we find anything approaching the ideal one-to-one pairing of form and meaning implicit in the traditional notion of the morpheme. The widespread tendency on the part of many linguists to treat reduplication as a formally unitary operation in the languages in which it occurs obscures the fact that, as in traditional affixal morphology, reduplication frequently appears in a range of formal types. Virtually nobody suggests that all affixation in English is the result of a
unitary process, and there is no good reason to suppose that reduplication should be treated any differently. Researchers may be predisposed to seeing reduplication as formally unitary because, unlike garden-variety affixation, it is constrained by its formal dependence on the stem to which it attaches. An operation type that affixes material closely resembling the stems upon which its MOs operate is perhaps more limited in its effects than an operation type that is not so constrained, but that does not mean that reduplication is necessarily unitary, either.

In the end, I argue, the various sub-patterns of Sanskrit reduplication are less idiosyncratic than they at first appear. On the one hand, we do not any more want to say that the two basic reduplicative operations of Sanskrit are part of the same rule constellation than we want to say that all affixal operations in English are part of the same rule constellation. On the other hand, the formal distinctions between the way any given reduplicative MO in Sanskrit applies to distinct lexically and phonologically determined classes should not be interpreted as illustrating the insurmountable uncollapsibility of related operations. While languages may recognize distinct phonologically determined classes as regards reduplicative MOs and non-reduplicative MOs, the class divisions are nonetheless just as principled in either case, and should be recognized as such.
6.1 Complete reduplication as a type of compounding

Thus far, the analytical discussion has centered on partial reduplication. In Chapter 4, we examined issues surrounding partial reduplication in Tagalog, and in Chapter 5, we did the same for Sanskrit. In this chapter, I investigate some of the issues surrounding complete reduplication, which, I claim, differs in certain crucial ways from partial reduplication. Most specifically, I claim that all true complete reduplication is a type of compounding, not the result of a reduplicative MO, as in the case of partial reduplication. I know of no modern treatments, however, that attribute actual instances of partial reduplication and actual instances of complete reduplication to fundamentally different types of operations.

The suggestion that complete reduplication is best treated as compounding stems from structuralist authors such as Bloomfield (1933) and Nida (1949). I know of no recent treatments of reduplication (i.e. post-Wilbur (1973)), however, that attribute the distinction between partial and complete reduplication to two separate causes, the former being more purely affixal, and the latter being the result of compounding operations.

There is good reason, however, for reconsidering the structuralist suggestions in this regard. For example, it is interesting to note that complete reduplication is never infixal, unlike partial reduplication, and complete
reduplication tends to be limited to expressing far more concrete semantics than does partial reduplication. Partial reduplication is more frequently used as an exponent of more abstract SMIPs, such as stem-formation, and possibly inflection, than is complete reduplication. Both of these facts are in keeping with what we might expect if complete reduplication is indeed the result of compounding.

Additionally, there are some interesting facts about creole morphology which have a bearing on our treatment of complete reduplication as compounding. Reduplication is present in nearly all creole languages (Bakker (1995:39)), even though creoles have notably limited morphological structure. I have, for instance, found no creoles with productive partial reduplication, yet without complete reduplication.\(^{91}\) I have found creoles such as Sranan (Adamson and Smith (1995:223-224)) and Ndyuka (Huttar and Huttar (1994)) which exhibit only productive complete reduplication, with partial reduplication occurring only non-productively.

What is more, in addition to reduplication, compounding is among the most common MOs found in creoles, but the significance of the fact that complete reduplication so frequently co-occurs with compounding appears to have been missed in theoretical accounts of the phenomena. Also, given the relative complexity of the grammatical apparatus required to account for reduplication by most accounts, the fact that reduplication is among the most frequently encountered MOs in creoles, which are known for the simplicity of their morphological systems, appears to be anomalous. And the reason that, in such systems, the other most frequently encountered MO is that of

\(^{91}\) Clearly, a comprehensive search of creoles needs to be undertaken in this regard before anything definitive is proposed, but preliminary indications strongly suggest this implicational pattern.
morphological conversion remains unexplained. Our theory of morphology should have something to say about why these particular operations are selected for use in the simplest of morphological systems, and why, time and again, they co-occur.

The prevalence of morphological conversion (or alternatively, multifunctionality)\(^{92}\) in simple morphologies is perhaps not surprising, in that it simply allows a MR to associate a new set of SMIPs to a particular lexical stem with no accompanying MO. We can thus expect the default MO to always be “DO NOTHING”, i.e. make no change in the existing phonological representation of a given stem. But why should compounding and reduplication group together with it? The fact that they do should lead us to wonder whether, in fact, there is something about the three operations that predisposes them to co-occur.

If indeed complete reduplication is a type of compounding, as I claim, then the cooccurrence of complete reduplication and compounding in creole grammars is not at all surprising. It is precisely what we would expect from a morphological system making the most of a paucity of MOs in its morphological operations inventory. The morphology of a creole simply compounds the available lexical stems with one another and with themselves, thereby maximizing the mileage it can get from the lexicon itself.

If we further consider the fact that conversion (or multifunctionality, by some accounts) is the other most frequently encountered MO among creole languages\(^{93}\), an interesting picture emerges. Reduplication, compounding,

\(^{92}\) “Morphological conversion” and “multifunctionality” refer to a situation in which a phonologically unchanged lexeme may be used as a member of more than one lexical category, e.g. English hope or find, each of which may function as both a noun or a verb with no phonological changes.

\(^{93}\) In the case of multifunctionality, I am assuming a default “do nothing”
and conversion are precisely those operations which make use only of phonological material which they "mine" directly from the inventory of lexical stems in the language—they do not depend in any way upon stipulated affixal material. Given the apparent preponderance of complete reduplication over partial reduplication among creoles, as well as the rarity of productive non-reduplicative affixation among the same, there are often almost no MOs in most creoles which refer to anything other than lexical stems.

Semantically speaking, such a system maximizes semantic transparency, in that every aspect of morphological structure is associated with a particular lexeme. Along these lines, it may also be worth considering whether there is a default meaning associated with complete reduplication (i.e. intralexical compounding) for each part of speech. Reduplicated numerals, for example, very often express the notion of "two by two", "three by three", etc.; reduplicated nouns often express plurality; reduplicated verbs often express iteration or intensiveness, etc. Obviously, however, any generalizations in regard to the default semantics of complete or partial reduplication, among creoles or otherwise, must be based on a systematic crosslinguistic investigation which, to my knowledge, has not yet been undertaken.

All this being said, to treat complete reduplication as fundamentally different than partial reduplication breaks with all the recent mainstream treatments of reduplication, including Marantz (1982), Carrier (1979), Carrier-Duncan (1984), McCarthy and Prince (1995), etc. All such accounts treat partial and complete reduplication as essentially the same. As a consequence, there is nothing in these accounts which explains the patterning of operation associated with the category change of the lexeme in question.
reduplication in creoles, though creoles provide a unique opportunity among the world's languages to examine morphological systems without the relative clutter of a large inventory of MOs. The approach I am taking nicely accounts for these otherwise odd correspondences.

In what follows, I briefly examine three distinct patterns of complete reduplication. First of all, I examine complete exact reduplication in Ndyuka, a creole of Suriname, focussing on the issues raised above. Secondly, I examine one type of complete, non-exact reduplication, namely that found in Uzbek and several other languages of south and central Asia. In Uzbek echo-compounding, the reduplicant consists of a modified version of an entire stem, with the initial consonant distinct from that of the stem with which it is concatenated. I argue that the "echo-stem" is, in fact, a conjunct stem, which appears only in compounds.

Finally, I examine two kinds of reduplicative compounding in Madurese. In one type, a lexical stem is compounded with itself to yield the plural of a noun. In another type, a truncated stem serves as the reduplicant, giving the appearance of partial exact reduplication. I treat Madurese truncated compounding, like Uzbek echo-compounding, as yet another example of the use of conjunct stems.

6.2 Complete reduplication in Ndyuka

Ndyuka, an English-based creole of Suriname described by Huttar and Huttar (1992) and (1994), makes extensive use of complete reduplication. According to Huttar and Huttar (1994:537), certain verbs in Ndyuka can undergo complete reduplication, yielding a "participle" (quotes theirs) which distributes similarly to an adjective (Huttar and Huttar 1992:12 ff.). Thus, in
object complement position, a reduplicated item must appear, at least following certain verbs, as the examples below indicate (Huttar and Huttar (1994:160, 1992:13)).

a. *Gi mi a udu piipiiti/\*piiti.  
   'Give me the wood [after it's been] split.'

b. *Mi fende en libilibi/\*libi.  
   'I found him alive.'

c. *Mi nyan-mi en boliboli/\*boli.  
   'I ate it cooked.'

(29) "Participial" reduplication in Ndyuka

Huttar and Huttar (1994:543n) analyze this type of complete reduplication as straightforward derivation of adjectives from verbs, in that the reduplicated items do not occur in the same positions as verbs do. Also, they reject the notion that this type of reduplication is merely syntactic, used to mark the passive function of verbs, since it operates upon intransitive (e.g. (29b)), as well as transitive (e.g. (29c)), verbs. Thus, the syntax requires an adjective in such constructions, not a distinct inflected form of a verb, and it turns out that adjectives can be formed from some verbs by means of complete reduplication.
Beyond deverbal derivation of adjectives, complete reduplication occurs among some adjectives to indicate intensive degree. Huttar and Huttar (1994:530) offer the following example.

a. \textit{wan tuu toli}  
b. \textit{wan tuutuu toli}  
\hspace{1cm} ‘a true story’ \hspace{1cm} ‘an emphatically true story’

(30) Ndyuka intensive adjective reduplication

Interestingly, for other adjectives, complete reduplication indicates attenuation or approximation, as the following examples reflect.

a) \textit{wan lebi impi}  
\hspace{1cm} \textit{wan lebilebi impi}  
\hspace{1cm} ‘a red shirt’ \hspace{1cm} ‘a reddish shirt’

b) \textit{A bataa lontu.}  
\hspace{1cm} \textit{A bataa lontulontu.}  
\hspace{1cm} ‘The bottle is round’ \hspace{1cm} ‘The bottle is roundish’

(31) Ndyuka attenuative/approximative adjective reduplication

Beyond this, complete reduplication is used among nouns for functions including variety or multiplicity, a type of augmentation, as follows:
a)  *den wataa fu libi sama sikin*
   ‘The liquids of the human body’

   *den wataawataa fu libi sama sikin*
   ‘The various liquids of the human body’

b)  *na paitei den de*
   ‘There were different kinds’

   *na paiteipaitei den de*
   ‘There were lots of different kinds”

(32) Ndyuka noun reduplication

Finally, a slightly more complicated state of affairs occurs in regard to the derivation of nouns from certain verbs. The following examples include all the examples of this pattern found in Huttar and Huttar (1992:2).
a) *kan* 'to comb'  
   *kankan* 'comb'  

b) *fon* 'to beat'  
   *fonfon* 'a beating'  

c) *fee* 'to fly'  
   *feefee* 'fly (insect)'  

d) *seke* 'to shake'  
   *sekesekè* 'a rattle for shaking'  

e) *tei* 'to tie'  
   *teï* 'rope, cord'  

f) *tyai* 'to carry'  
   *tyatyâ/tyatyali* 'padded headcloth'  

g) *nyan* 'to eat'  
   *nyanyan* 'food'  

h) *sibi* 'sweep'  
   *sisibi* 'broom'  

i. *koti* 'cut'  
   *kokoti* 'ritual scars'  

(33) Reduplicative deverbal nouns in Ndyuka

In items (a)-(d), we observe a straightforward pattern of complete reduplication. In items (e) and (f), we observe apparent partial reduplication, though it is suspicious that both these items have diphthongs as the vowel of the underived verb. Given examples like *momoi* 'gift', from the adjective *moi* 'nice, pretty', this may stand as evidence of a broader avoidance of identical diphthongs in consecutive syllables. Alternatively, this may reflect the emergence of a distinct pattern for producing conjunct stems within this particular phonologically defined class of verbs.

Item (g) also appears to be an instance of partial reduplication, but this is likely due to the assimilation of the coalescence of the final -n and the initial n- of the compounded stems, both of which are *nyan*. This leaves *sisibi* 'broom' as the only unambiguous candidate for partial reduplication, and the pattern it exhibits is insufficiently represented to be clearly productive.
Furthermore, semantically speaking, there appear to be significant commonalities between many of the reduplicated items in (33), and these commonalities cut across the apparent line between the partially and completely reduplicated items. Several items, most notably (a), (d), (e), (f), and (h), are straightforwardly instrumental in their meanings; e.g. *sekeseke* roughly refers to ‘that which you shake with’, *sisibi* refers to ‘that which you sweep with’, etc. While (b) and (i) deviate from this pattern, they exhibit a small-scale pattern of their own, roughly meaning ‘the result of X’, e.g. *fonfon* refers to ‘the outcome of *fon*, and *kokoti* refers to ‘the outcome of *koti*’. (c) and (g) each bear their own unique semantics.

Yet though there is semantic variation within this class of items, there is a strong semantic core within it, and it is often the case in derivation and compounding for there to exist substantial semantic variation among items formed by means of the same rule. In the end, the evidence in Ndyuka indicates that complete reduplication is the only clearly productive pattern of reduplication to be found, and the present analysis, which treats such complete reduplication as intralexical compounding\(^4\), fits far better with the overall structure of Ndyuka morphology than does an analysis which treats it otherwise.

6.3 Echo compounding in Uzbek

Along with many other languages of south and central Asia, Uzbek possesses a highly productive pattern involving the compounding of a noun with an identical copy of that same noun, except that, in the default case, the

\(^4\) See 2.2.2 for discussion of intralexical compounding.
initial consonant of the reflection is stipulatively m-. (34) below is representative of the pattern of Uzbek compounding. I treat such cases as resulting from a compounding operation, in which a given item is compounded with a distinct conjunct stem of the same lexeme to yield a new lexeme.

95 This pattern actually extends as far west as Turkey and into the Balkans, according to Brian Joseph (personal communication).

96 The notion of the conjunct stem is not new to this study, and appears under various guises elsewhere. Stump (1995:264 ff.) discusses the notion, noting the existence of distinct phonological shapes for stems and affixes in Sanskrit and Old Irish, depending on whether or not they are in compounded constructions. Kirkness (1994) discusses the formation of scientific vocabulary which employs bound forms (akin to conjunct forms), e.g. historico- in *historico-political* and Italo- in *Italo-German*, etc. The classic examples of so-called “cranberry morphs” also stand as potential examples from English.

Relatedly, Steriade (1988:75), in her discussion of French hypocoristics, cites patterns such as that found in *Marie-Claude* -> [mako] and *Marie-Alice* -> [malis], in which truncated versions of a given name are formed, only to occur conjoined to other such items.

Spencer (1991:346-348) cites numerous examples of so-called “stub compounds” in Russian, e.g. *ispolkom* from *ispolnitel’nyj komitet* ‘executive committee’, etc., in which a truncated portion of two or more stems combine into a new lexeme. Russian truncated past stems similarly display a shortened conjunct stem, e.g. *krad-‘steal’, kra-‘he stole*, etc. (Zwicky (1992:336)).
As (a)-(c) above indicate, the default stem-modifying MO involves the replacement of the initial consonant with \(-m\). For vowel-initial stems, as in (d), \(m\)- is simply added to the beginning of the stem. For stems that begin with \(m\)- or end with \(-p\), as in (e)-(f), the conjunct stem is formed by replacing the initial consonant with \(p\)-; (g) is uniques, in that it both begins and ends with \(p\)-, and consequently exhibits a modified stem with initial \(m\)-. The aim appears to prioritize the forming of a conjunct stem which begins with a bilabial consonant that is different from the initial consonant of the attachment stem.

Semantically speaking, the effects of echo-compounding are strikingly iconic. The MO employed to create the conjunct stem yields a stem similar, but not identical to the attachment stem. The semantics of echo compounds, e.g. “the item represented by the uncompounded stem, plus objects similar, but not identical to the object represented by the uncompounded stem”, closely reflect

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97 This data was elicited by the author from Uzbek speakers in Quetta, Pakistan.
the formal representation with which it is associated, not only in Uzbek, but also in other unrelated languages of the region, including Baluchi and Farsi, both of which are Indo-Iranian.\(^8\)

Conjunct stems by definition never occur in isolation, but only appear in combination with other stems. Such an analysis is really very similar to garden variety intralexical compounding, as I propose for Ndyuka above, inasmuch as it combines two stems of the same lexeme to yield another. It is distinct only in that it combines two non-identical, as opposed to two identical, stems of the same lexeme, but as far as I can tell, this does not require any expansion of the overall power of the grammar. Operations similar to those employed in the formation of Uzbek conjunct stems appear as MOs in other languages, so it turns out that the interaction of conjunct stems coupled with the notion of intralexeme compounding may hold significant descriptive value for a wide range of reduplicative phenomena without increasing the descriptive power of the morphology in any significant ways.

As in the case of Ndyuka, it is far preferable to treat Uzbek reduplication as compounding, rather than in traditional morphemic or processual terms. Stems in Uzbek, regardless of the number of syllables, reduplicate in their entirety with accompanying initial consonant changes, indicating that it is not a syllabically defined MO that is operating, but rather an operation that references entire stems. On independent grounds, compounding is precisely such an operation; the only difference in cases such as Uzbek is that both concatenated stems happen to be stems of the same lexeme.

\(^8\) This fact was also noted by the author while conducting fieldwork in Quetta, Pakistan.
6.4 Truncated compounding in Madurese

In Madurese, an Austronesian language of Indonesia, we find a situation similar to that in Uzbek, except that the conjunct stem is formed by means of a different MO. Specifically, the conjunct stem in Madurese is formed by means of truncation, in which case part of the unreduplicated stem is removed. In addition to this so-called truncated compounding, Madurese employs complete exact reduplication to express plurality. Unlike either Ndyuka and Uzbek, Madurese also makes widespread use of at least three distinct MOs involving unequivocally partial reduplication, so it would appear in principle be a simple matter to treat either truncated compounding or complete exact reduplication as other than compounding in Madurese.

But other features of Madurese morphology indicate that a compounding treatment is more appropriate for reduplicative truncated compounding. In Madurese, for example, truncated compounding occurs both reduplicatively and non-reduplicatively. Thus, we find truncated compounding which involves the stems of two different lexemes, as evidenced by examples like *sap-lati* 'handkerchief', from *usap* 'wipe' and *lati* 'lip', and we also find truncated compounding which involves two distinct stems of the same lexeme, as evidenced by examples like *bit-abit* 'finally', from *abit* 'long (time)' and *garudus* 'fast, quickly' and *dus-garudus* 'too quickly, fast and sloppy' (Steriade (1988:74) and Stevens (1968:61, 82, 102 ff)). The former are examples of interlexical compounding; the latter are instances of intralexical compounding. I claim here that both components of the construct in such cases are complete stems in their own right, though the truncated stem has undergone a stem rule which employs a subtractive MO.

McCarthy and Prince (1986:60-62) note the parallel between
reduplicative and non-reduplicative truncation, as does Steriade (1988). But neither treats reduplicative truncation as an instance of straightforward compounding, but rather as the effects of a particular reduplicative morpheme. They thereby do not carry the parallels they note to their logical conclusion. It is precisely the existence of non-reduplicative compounding in Madurese which motivates the treatment of this type of apparent partial reduplication as compounding, too. Not to treat it as such misses a clear generalization about the language. If the pattern of non-reduplicative truncated compounding were absent from Madurese, there would be ample reason to consider reduplicative truncated compounding as simply another of the many reduplicative MOs already clearly motivated in Madurese morphology, but given that it is present, the present analysis is well-motivated.

By this analysis of truncated compounding, the truncated stem is a conjunct stem, which occurs only in combination with other specific morphological material. Thus, phonologically speaking, the conjunct stem is a shortened version of the reduplicating stem, though morphologically speaking, it is a complete stem nonetheless. Stevens (1968:102) speaks of full root and shortened root compounding, recognizing the notion presently under discussion. The former, which Stevens considers uncommon, involves the compounding of two untruncated stems; the latter is the truncated compounding presently under discussion.

Because the reduplicant in Madurese truncated compounding consists of a phonological fragment of the attachment stem, reduplicative truncated compounding in Madurese appears to be partial reduplication, but is not. It is actually complete reduplication, in that the reduplicant is a complete
morphological stem in its own right. This parallels those instances discussed in Chapter 1 which appear to be complete reduplication, but actually turn out to result from a partially reduplicative MO.

As far as complete exact reduplication in Madurese is concerned, Madurese follows a pattern common to many other Austronesian languages, in which nouns are “doubled” to indicate plurality. Such a pattern occurs in Indonesian, Malay, Javanese, and other related languages. The following examples are representative.

**Madurese** (Stevens (1968:35))

a. sakola?an  ‘school’ sakola?ansakola?an  ‘schools’

**Indonesian** (Dardjowidjojo (1978:77,78))

c. koper  ‘suitcase’ koperkoper  ‘suitcases’
d. pegawai  ‘official’ pegawaipegawai  ‘officials’

**Javanese** (Horne (1961:15))

e. buku  ‘book’ bukubuku  ‘books’
f. korsi  ‘chair’ korsikorsi  ‘chairs’

**Malay** (Oey and Hutton (1994:46))

g. anak  ‘child’ anakanaak  ‘children’
h. buku  ‘book’ bukubuku  ‘books’

(35) Malayo-Polynesian complete exact reduplication
It is significant that plurality is optionally expressed among the Austronesian languages represented in (34), and that verbs, demonstratives, and modifiers do not change form to agree with a plural noun in any of the languages ((Oey and Hutton (1994:38)), (Dardjowidjojo (1978:32 ff., 77 ff.)), (Horne (1961:76, 103 ff., et passim))). Thus, plurality in Madurese should not be viewed as an inflectional category as it is in English. If complete reduplication is properly analyzed as compounding, as I claim it to be, we would never expect to find a true instance of complete reduplication (i.e. intralexical compounding) used inflectionally; such an example, in fact, would pose a challenge to the present claim, in that we would not want to attribute an inflectional function to a compounding operation.

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99 See Sapir's discussion of the different functions of plurality in various languages in Sapir (1921:102 ff). The derivational nature of plurality in Austronesian languages is illustrated by the semantics of Madurese complete exact reduplication (Stevens (1968:166-167)), described as referring to 'a group of objects viewed as consisting of different individuals'. Coupled with the absence of number-related agreement phenomena in the languages in question, there is no reason to treat plurality in these cases as an inflectional feature.
7.1 Introductory remarks

In the previous six chapters, I have attempted to outline the way in which reduplication can be treated from the standpoint of WP morphology coupled with the notion of the morphological stem. The focus of the analysis, which appears in Chapter 4, Chapter 5, and Chapter 6, examines languages which, at least in some aspect of grammar, make significant use of reduplication. We have observed the way in which reduplication is used by distinct stem rules in Tagalog for the realization of distinct morphological stems. In Sanskrit, we have observed the appearance of reduplicative MOs in a range of distinct MRs, including, most notably, stem rules and derivational rules, and have also observed the benefit of permitting MRs to refer to morphological features. In Chapter 6, we examined the claim that partial reduplication appears to be best treated as a type of variable affixation, while complete reduplication appears to be a type of compounding.

In this chapter, my aim is threefold. First, I examine, in rather grab-bag fashion, several minor issues surrounding reduplication—camp followers, if you will, none of which warrant a chapter of their own at this point. Second, I discuss several areas of research regarding reduplication and morphological theory which, in my estimation, warrant further inquiry. My
intent in both cases is largely, as is often the case in final chapters, to bring into the circle of discussion those issues which are worthy of mention but beyond the scope of detailed treatment herein. Finally, I conclude by very briefly summarizing the basic aims of this study.

7.2 A sampling of further issues

7.2.1 The role of reduplication in inflection

One interesting result of the case studies of Chapters 4, 5, and 6 has been to raise a question regarding the frequency with which reduplicative MOs are employed by inflectional MRs. In the case of both Tagalog and Sanskrit, we find uses of reduplication which play a role in the realization of inflectional features, but which turn out on closer examination to do so only indirectly, in that reduplicative MOs in both cases are only involved directly in the realization of distinct stems, not inflected forms. Such stems are themselves the objects upon which further inflectional rules act, creating the impression that the reduplicative patterns resident within them are actually the direct consequence of inflectional rules and the MOs the employ, when they are not.

In Sanskrit, too, reduplicative MOs may appear to be directly linked with the realization of inflectional features, but in the end are connected with stem indices and purely derivational functions. Situations like these lead us to consider whether many other apparent instances of reduplication being used inflectionally are actually attributable to the frequent use of reduplicative MOs by stem operations and by derivational rules.

Making determinations regarding the functions of reduplication in the morphologies of particular languages is no easy business, particularly when it involves determining whether a given MO is employed by an inflectional MR,
or by some other morphological rule type. Clearly, there are many very transparent cases of reduplicative MOs serving as the formal correlates to derivational MRs, as the widespread use of reduplication to encode augmentative, intensive, diminutive, pejorative, and similar meanings testifies. But in order to determine whether a given MO is employed by an inflectional MR, a researcher must undertake a detailed investigation into the way in which the MO in question fits into the overall morphosyntactic system under investigation. Does it participate in agreement phenomena in the language in question? Is it required by the syntax in particular constructions? Is it directly employed by an inflectional MR, or is its contribution to inflection purely secondary, by way of marking a distinct morphological stem? To answer such questions requires more than a spot judgement based on the SMIPs associated with particular formal devices—it rather warrants sustained treatments of reduplication in individual languages, in which the apparent and the actual functions of the MO in question may be coaxed apart.

One area in which such judgements regarding inflection will likely come into play concerns the crosslinguistic frequency with which reduplication is used to encode the semantics of plurality and related concepts. As speakers of a language that employs plurality inflectionally, native readers of this English text may be prone to treat all uses of plurality as clearly inflectional, but we are not permitted such a liberty. Each instance of reduplication found to encode plurality must be investigated with reference to the role it plays in the syntax of the language in question, recognizing that many such instances will turn out to be derivational in nature.\footnote{See 6.4, note 84, for discussion of derivational uses of the plural.}

\footnote{See 6.4, note 84, for discussion of derivational uses of the plural.}
One relatively clear instance of reduplication employed inflectionally, however, mentioned in 1.1 above, occurs in Nimboran. In Nimboran, the Final Infinitive (Anceaux (1965:114 ff.)) is formed by means of reduplication on the basis of the plain infinitive, and is apparently required by certain syntactic constructions. Thus, we find the Final Infinitive \textit{bebîe} 'in order to open', formally based on the infinitive \textit{bie} 'to open, etc.', required in specific syntactic contexts. (36) below illustrates the pattern.

(a) \textit{nde} \textit{mái} \textit{bie} \textit{kebâri} \textit{temien}

'\text{this}' \text{ 'door'} \text{ 'open'} \text{ 'work'} \text{ 'big'}

'It is a big job to open this door.'

(b) \textit{no} \textit{iamô} \textit{ne} \textit{mái} \textit{bebîe} \textit{ho}

'\text{he}' \text{ 'house'} \text{ 'to'} \text{ 'door'} \text{ 'in order to open'} \text{ 'in regard to'}

'He goes to the house to open the door.'

(36) Nimboran reduplicative inflection

In (36), what appears to be happening is that for an infinitive to show up in a particular construction, it must be reduplicated, evidencing the likelihood that reduplication functions inflectionally in Nimboran.

Even if such instances hold up under further scrutiny, however, the prevalence of reduplication as a MO used by stem rules is striking, particularly in languages which widely employ reduplication, such as Tagalog and
Sanskrit. It is worthy to consider and further investigate whether this is a genuine tendency, or an accident of the languages we have chosen to examine closely. If the former, why? Is the use of reduplicative MOs by inflectional rules is as relatively rare as it appears to be, and the use of reduplicative MOs in stem formation as relatively common as it appears to be? Clearly, much broader surveys of the role of reduplication in particular languages are needed before we can make this determination.

7.2.2 Reduplication in shape-formation

Up to now, I have encountered no clear examples of reduplication used to create distinct shapes\textsuperscript{101}, selected by the syntax on phonological grounds. This apparent gap in the use of reduplication, however, may simply be a function of the relative rarity with which languages in general make reference to distinct shapes, or it may result from the fact that researchers have simply not looked for examples. Clearly, any existing examples will only be forthcoming as researchers survey languages with a specific eye for the phenomenon, and, as far as I know, the domain of reduplicative shape-formation is as yet entirely unexplored.

7.2.3 Fixed consonantism in reduplication

Typologically speaking, it appears to be far more common for languages to include consonants in the material which they copy from the reduplicating stem than not to do so. Furthermore, it also appears to be far more common for languages to copy consonants and stipulate vowels in instances of partial, non-exact reduplication, than it is for them to do the reverse. In principle,\textsuperscript{101} See discussion of shapes and shape rules in 2.1.3 above.

163
however, there is no reason that cases of fixed consonantism with copied vowels should not occur, and the data, it turns out, are there to support this fact.

Two such instances of such fixed consonant “vowel harmonic” reduplication, one an example of partial exact reduplication, and one an example of partial, non-exact reduplication, occur in Tübatualbal, an Uto-Aztecán language of California, and Klamath, a Penutian language of Oregon and California (Voegelin and Voegelin (1977:344, 287). In (Voegelin (1937:74)), for example, as mentioned in 1.1, certain SMIPs are associated with reduplicative MOs. Thus, we find the basic forms pôlôn- ‘hit’, ta:wig- ‘see’, tícib- ‘scrape’, mu:gin- ‘hurt’, associated with reduplicated versions, e.g. ô-pôlôg-, adawik-, ñicib-, umu:gin-, in which the nucleus of the first syllable is reduplicated and prefixed to the attachment stem.102

In Klamath (Clements and Keyser (1983:143-145) and Barker (1964:113)), causative verbs are formed from non-causative verbs by prefixing a reduplicant consisting of a vowel copied from the reduplicating stem sandwiched between a stipulated h and s. Thus, we observe the basic forms pe:w ‘to bathe’, sko:g ‘to be frightened by a ghost or spirit’, and sli:çixä ‘to comb’ corresponding to the causatives hes-pe:w-a, hos-ko:g-a, and his-lçixä, respectively.

The point here is that it is irrelevant in partial reduplication, either exact or non-exact, whether, as most commonly occurs, the reflection is consonantal and the stipulation, if it exists, is vocalic, or whether the reverse is true, as occurs in languages such as Tübatulabal and Klamath. In neither of

102 The various vowel length effects in these items must be marked according to lexically determined class membership, while the consonant changes are purely phonological (Voegelin (1937:68, 69, 82)).
these cases does the vowel copying effect have to do with broad vowel harmonic patterns in the language, and there is thus good reason to view such situations as clear cases of reduplication, albeit less common than other types. The reason behind this apparent formal preference, however, remains to be investigated.

7.2.4 Non-reduplicative variable affixation

As I mention in Chapter 1, we are still faced with the challenge of determining whether other phonologically stem-dependent operations, such as those encountered in vowel and consonant alternations in Turkish suffixes, are best treated as a species of reduplication, or as something else. We need to ask whether the line between variable affixation, on the one hand, and other stem-dependent operations, such as morphologically conditioned assimilatory and vowel harmonic operations, is a genuine dividing line, or whether we are observing points on a continuum. Is reduplication just an extreme point on a continuum of underspecification, or is it, as I have assumed, an entirely distinct operation?

In the case of Turkish, a highly agglutinative language, we see a range of phenomena which resemble in some aspects the variable affixation we encounter in classic examples of reduplication. For example, Turkish case suffixes closely reflect the phonology of the stems to which they attach, in terms of both their vowels and their consonants. The ablative is realized, for example, as -dan/-den/-tan/-ten, depending on the phonology of the stem to which it is suffixed; e.g. tarla-dan ‘field (ABL)’, gece-den ‘night (ABL)’, kitap-tan ‘book (ABL)’, renk-ten ‘color (ABL)’, etc. (Lewis (1967:29-31)). As these examples illustrate, if a stem’s final vowel is front and non-low, then the
suffix appears with the vowel e; if its final vowel is other than front and non-low, then the suffix appears with the vowel a. The consonant of the suffix, on the other hand, varies according to the voicing of the final segment of the stem. If the final segment is voiced, the ablative is realized with an initial d; if the final stem segment is voiceless, then the ablative is realized with an initial t.

In languages like Turkish, what we observe can be understood solely as the variation of phonological features in affixal MOs. Affixal material varies purely in terms of phonological features; it is dependent on the stem for features alone, not for syllabic structure. And in Turkish, the patterns of variation apply to multiple MOs throughout its morphological system, and in all cases appear to be limited to phonological features.

In regard to reduplication, however, we observe material ranging from a single segment to a group of syllables exhibiting stem dependency—in all cases, the reduplicant can be described in terms of components of syllable structure. Some syllabically defined portion of a lexical stem is taken and affixed to some stem of the same lexeme. Some portion of the stem is either copied or removed to yield the portion that is affixed, and to say that such operations are essentially the same as vowel harmony or consonantal assimilation would seem to be missing the distinct characteristics of the operations under investigation. Assimilatory and vowel harmonic MOs look at segmental features to obtain their phonology; reduplicative MOs look at syllabic structures to obtain theirs.
7.2.5 Single-segment reduplication

Nevertheless, there may be situations in which the judgements we make regarding these matters are not entirely straightforward. One such case is found in Levantine Arabic, where only a single segment is reduplicated. Thus, as previously mentioned, we observe examples like barad 'shaved versus barbad 'shaved unevenly' (Broselow and McCarthy (1983:36)), in which the initial stem consonant is copied and infixed following the second stem consonant. The ambiguity in such cases of single-segment reduplication has to do with what components of structure have been copied by the reduplicative MO.

One possibility, proposed by Broselow and McCarthy (1983:36), states that what is copied is the first root consonant. This is in essence saying that a skeletal morpheme, consisting of a lone consonant, is inserted after the second root consonant. This morpheme triggers phonemic melody copying; and autosegmental association links the \textit{b} of \textit{barad} to the unattached morpheme skeleton, thereby yielding \textit{barbad}.

Another approach would attempt to describe Levantine Arabic reduplication in syllabic terms. The onset of the first syllable is copied and inserted before the nucleus of the second. The fact, in this case, that the monosegmental reduplicant is non-adjacent to the portion of the reduplicating stem from which it is copied virtually eliminates the possibility of feature spreading or lengthening as the type of operation in play\(^{103}\), but the fact that it is monosegmental leaves us to wonder whether what has been copied is a minimally small piece of a syllable or a fully-defined bundle of

\(^{103}\) Although, from the perspective of Broselow and McCarthy (1983), this is, in essence what is proposed. To accomplish this, however, they (following Marantz (1982)) require a step in which the entire phonemic melody is copied, though it is always and only the first segment of that melody which appears as infixed material.
phonological features. In the end, what appears to be crucial in reduplication is this—that some syllabically (or perhaps, moraically) defined chunk of a given lexical stem has been copied and attached to that, or another stem of the same lexeme.

Also, as mentioned in 1.3.5, it appears crucial to be able to, in operational terms, separate the reduplicant from the attachment stem. An added syllable, or piece thereof, is always clearly separable from the attachment stem, while an assimilated feature is not. In Nimboran and Levantine Arabic, for example, it is merely a single segment that is reduplicated, thus, strictly speaking, falling outside of Huttar and Huttar's (1992:1) definition requiring the copying of more than one segment. But the single reduplicated segment either serves as a reflection and combines with a vocalic stipulation to form the reduplicant (cf. Nimboran beie 'to open, etc.' versus bebie 'in order to open' (Anceaux 1965:114 ff.), or it occurs in a position non-adjacent to the part of the attachment stem corresponding to the substem, and is therefore divisible as a distinct unit (cf. Levantine Arabic barad versus barbad 'shaved unevenly' (Broselow and McCarthy (1983:36))) . In both instances, not only is the reduplicant separable, but it is definable in purely syllabic terms.

7.2.6 Further matters concerning morphophonological operations

Two issues have emerged, particularly in regard to our analysis of Sanskrit, which require further attention. One issue has to do with the way in which MOs very often appear in groups, each member of which is applied to a distinct phonologically determined class in the language in question. I have
claimed that, with regard to both reduplicative and non-reduplicative MOs, these groupings are of exactly the same theoretical standing, though the formal parallels which hold between related sub-operations, as well as the phonologically determined classes with which they correspond, fall along different lines.

While I apply Janda and Joseph's notion of the rule constellation to Sanskrit in a way different from what they suggest (Janda and Joseph (1986)), there is clearly a need to discuss the way in which related operations are grouped together and applied by MRs to realize SMIPs on disparate phonologically defined classes of lexemes. Because, however, I attempt to draw a clear distinction between operations and rules (see esp. Chapter 2), it seems appropriate to discuss not the notion of the rule constellation so much as the notion of the operation constellation. It is MOs, not MRs that group together and apply to corresponding phonologically determined classes of lexemes. A thorough investigation of the formal relationships that hold between and among operations that group together into constellations, whether in reduplicative or non-reduplicative situations, is clearly in order, as is a corresponding investigation of the way in which their phonologically determined classes are divided up, depending on the morphophonological operation type in question. Another related issue involves the limits which exist as to the way in which distinct MOs may be grouped together and concurrently applied. As I mention in regard to Nimboran in 5.3 above, there are instances in which it appears that more than one MO has been concurrently applied to the same phonological representation. Presumably, detailed investigation will reveal limits in regard to the number and type of MOs that can be concurrently applied by MRs, whether or not reduplicative
MOs are involved. This is clearly an avenue of research that should yield interesting results.

7.3 More future prospects

7.3.1 The need for typological treatments

By and large, typological treatments of reduplication are entirely lacking, save for Moravcsik's initial pass nearly twenty years ago (Moravcsik (1978)), and occasional brief areal or genetic surveys (e.g. Gonda (1949), Haeberlin (1918), etc.). Most recent discussions, mine included, have focused on particular theoretical issues, and/or have dealt with data from a small number of languages. The fact is, however, that a survey of descriptive grammars in a decent research library\textsuperscript{104} will by itself yield a wealth of as yet uncatalogued data, with both formal and functional emphases, regarding reduplication. Any typological surveys of reduplication, whether they focus on formal or functional dimensions of the phenomena, or whether they focus on particular areal or genetic language groups, will stand to benefit the research program greatly. One as yet uninvestigated typological question of particular interest regards the similarities and differences between the functions of complete versus partial reduplication crosslinguistically.

Another particular area of interest lies in the role of reduplication in creole languages. Given the relatively small number of creole languages, and the relative simplicity of their morphological systems, it is likely that interesting generalizations concerning the form and function of reduplication, and the structure of basic morphological systems, are lying relatively close to the surface. A detailed typological survey of the formal and

\textsuperscript{104} I will take opportunity to mention here my gratitude for the excellent language and linguistics research collection available to me at The Ohio State University.
functional dimensions of reduplication in creoles would be a good place to start. Some questions of particular interest regard the distribution of complete versus partial reduplication in creoles, the relative prevalence of category-preserving versus category-changing reduplication in creoles, and the interaction of reduplication with morphological conversion in creoles. Other valuable areas of research clearly exist, as well.

Nevertheless, detailed investigations of individual languages as regards reduplication are still crucial, even in the face of the need for broad typological surveys. Even concerning much-discussed languages such as Tagalog and Sanskrit, the story is not over. Both the panorama and the close-up will yield valuable insights in our future studies of reduplication.

7.4 Concluding remarks

My aim in this study has been to examine the phenomena of reduplication from the standpoint of a Word-and-Paradigm approach to morphology. My hope has been to build on the insights of both transformational and affixational accounts of reduplication\textsuperscript{105}, while avoiding what I see as the pitfalls of both. In assuming a morphological world populated not by morphemes, but by lexemes and their stems, morphological rules, and morphophonological operations, I have attempted to describe, for at least a few instances of reduplication in a few languages, the complex relationship between form and meaning in words and their paradigms.

\textsuperscript{105} And the rare, voice-crying-in-the-wilderness, process morphology account of reduplication (e.g. Janda and Joseph (1986, 1992), (Zhang (1987), etc.), from which I have so benefited.
APPENDIX

Summary of Morphophonological Operations, Morphological Rules, and Stems with Regard to Sanskrit Reduplication

-Morphophonological Operations
- M01- a-Insertion- Insert -a- before syllable nucleus
- M02-Light Reduplication- Prefix first eligible light syllable from Stem 1; if Stem 1 has no vocalic nucleus, take the light syllable from Stem 2
- M03-Ablauting- If initial vowel is a, change it to i
- M04-sa-Suffixation- Suffix -sa or -iṣa
- M05-Lengthening-Lengthen the first vowel of the stem
- M06-Heavy Reduplication- Prefix the first eligible heavy syllable from Stem 2; lengthen initial vowel if there is no eligible heavy syllable

(37) Some morphophonological operations in the Sanskrit verb system

-Morphological Rules
- MR1-Full Stem Formation- Apply M01 to Stem 1 and mark the result [+full]
- MR2-Reduplicated Stem Formation- Apply M02 to [-reduplicated] stems and mark the result [+reduplicated]
- MR3-Ablauted Stem Formation- Mark [-ablauted, +reduplicated] stems [+ablauted], having applied M03 as appropriate
- MR4-Desiderative Derivation- Apply M04 to [+ablauted] stems to form derived lexeme meaning 'I wish to [action of underived lexeme]'
- MR5-Lengthened Stem Formation- Mark [+ablauted] stems as [+lengthened], having applied M05 to stems of the appropriate class
- MR6-Intensive Derivation- Apply M06 to [-reduplicated] stems and assign an intensive or frequentative meaning to the result

(38) Some morphological rules in the Sanskrit verb system

172
<table>
<thead>
<tr>
<th>Stem 1</th>
<th>Stem 2</th>
<th>Stem 3</th>
<th>Stem 4</th>
<th>Stem 5</th>
<th>Stem 6</th>
<th>Stem 7</th>
<th>Stem 8</th>
<th>Gloss</th>
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<tr>
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<td>ta-tar</td>
<td>ti-tṛ</td>
<td>ti-tar</td>
<td>ti-tṛ</td>
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<tr>
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<td>ja-jn</td>
<td>ja-jan</td>
<td>ji-jn</td>
<td>ji-jan</td>
<td>ji-jn</td>
<td>jijan</td>
<td>'give birth'</td>
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<td>ju-ho</td>
<td>ju-ho</td>
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<td>ju-ho</td>
<td>'sacrifice'</td>
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<td>pa-par</td>
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<td>bi-bhe</td>
<td>bi-bhe</td>
<td>bi-bhe</td>
<td>---</td>
<td>---</td>
<td>'fear'</td>
</tr>
</tbody>
</table>

(39) Stem sets for selected Sanskrit verbs\textsuperscript{106}

\textsuperscript{106} I have not included any listings under Stem 7 and Stem 8 for verbs that form the aorist non-reduplicatively. In such cases, however, these stems are formed by means of distinct, non-reduplicative MOs. See discussion in 5.4.1 for details and references.


174


176


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