Classical Chinese Verse Grammar
Coexisting sub-grammars and formal grounding

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Preface

This study develops a formal grammar that captures the modern speaker’s scansion of classical Chinese verse and accounts for his intuitive judgment of the metrical harmony. The central proposal is that the grammar is represented by the coexistence of the five minimally different sub-grammars in which the cognitively oriented reading experience can be grounded. The grammar is couched in the Optimality Theory framework and the empirical basis is constituted by a corpus of 3933 lines randomly selected from five major genres of classical Chinese verse spanning more than 2000 years. The corpus obviously offers a fertile ground for exploration from various angles, and the present study focuses on only one aspect, namely, the development of the above-stated grammar. Other related topics such as the historical dimension of the verse grammar are also briefly addressed.

As such, the study might hold appeal to a wide range of audience, including phonologists, metricists and sinologists. Specifically, phonologists may concentrate on the development of the individual sub-grammars and the representation of their coexistence via the floating constraints model. Metricists may wish to focus on the discussion of the formal grounding of the metrical harmony, find metrical issues of interest briefly dealt with in Sections 5.3 and 7.3, and hopefully gain insights into further issues from the present study. Sinologists might want to quickly go over Section 1.2 (and probably the references cited therein) to get familiarized with the theoretical frameworks before discovering how the present study bears directly on some intriguing questions in classical Chinese poetry, such as the position of a verb in a verse line, the best word order and the frequency pattern, which have been long discussed by literary commentators.

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Chapter 1 Introduction

This introductory chapter sets the research goals of the present study (Section 1.1), provides its theoretical underpinnings (Section 1.2), presents its analytical scheme (Section 1.3), describes the corpus (Section 1.4) and outlines the organization of the following chapters (Section 1.5).

1.1 Research goals

This study aims to achieve two goals: first, to develop a grammar for the modern speaker’s scansion of classical Chinese verse lines; second, to formally account for the metrical harmony of verse lines cognized by the verse reader. These two goals are intimately interrelated: specifically, as we will argue in the following chapters, the cognitively oriented notion of metrical harmony can be formally grounded in the grammar developed in reaching the first goal.

In elaborating on the goal of developing the modern speaker’s scansion grammar (to be simply referred to as the modern grammar below), two points deserve mentioning to begin with. First, the present study is confined to the modern speaker’s scansion of verse lines, which accordingly constitute its analytical domain. Phonological issues at higher levels of verse organization such as couplet and stanza are not covered. Second, this study adopts the unique perspective of examining the modern speaker’s scansion of the ancient corpus, which is entailed by the fact that classical Chinese verse enjoys great popularity with the modern speaker.

The vast reservoir of classical Chinese verse, spanning a period of over 2,000 years (ca. 1,000 BC – 1,200 AD), is typically divided into five genres, namely, Shijing, Chuci, Guti, Jinti and Ci (see e.g. Frankel 1972). The modern speaker’s scansion of verse lines is characterized by uniformity and diversity simultaneously. On the one hand, strong consistency is observed in his\(^1\) scansion of lines from different genres, for example, the unambiguous preference for binary feet, among other things. On the other hand, lines from different sub-genres might be scanned in subtly different manners: this is most evident in the scansion of lines of comparable structures from different genres. For example, the following Shijing line\(^2\)

(1) \([\text{san1}[\text{zhi1} \text{ ri4}]] \ [\text{na4} \ [\text{yu2} \ [\text{ling2} \text{ yin1}]]]
\)
third prt day carry to ice shelter
‘In days of the third (month), (we) carry (the ice) to the ice-houses’

is scanned as (S)(SS)(SS)(SS), where S stands for the syllable. By comparison, the following Jinti line of an identical structure

(2) \([\text{wei4}[\text{ta1} \text{ ren2}]] \ [\text{zuo4} [\text{jia4} \ [\text{yi1} \text{ shang3}]]]
\)
for other people make wedding garment dress
‘(She) makes wedding garments for other girls’

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\(^{1}\) For simplicity sake, ‘his’ instead of ‘his/her’ is used as a generic reference pronoun in this study.

\(^{2}\) The translation of verse lines in this study is respectively based on Legge (1871) (for Shijing), Yu (1949) (for Jiuge), Bynner (1929) (for Jinti) and Watson (1984) (for Guti and Ci).
is scanned differently as (SS)(SS)(S)(SS).

This dual characteristic suggests that the development of the modern grammar represents a scenario where the façade of superficial variation needs to be penetrated to uncover the underlying uniformity, and at the same time, the variation must be systematically captured. Accordingly, the grammar must crucially entertain a certain degree of core stability and inherent flexibility in order to accommodate both aspects. The scansion of verse lines from each genre is captured by a sub-grammar (following Anttila’s (1995) use of the term), whose delicate difference accounts for the different scansion; crucially the coexisting sub-grammars are minimally different so as to be unifiable into one single grammar.

Therefore, the first goal is tantamount to the development of a unified modern grammar, and the exploration of its instantiation into different sub-grammars. Optimality Theory (OT) provides an elegant framework to achieve this purpose and constitutes the analytical framework for this study. In OT terms, the grammar is necessarily a partial ranking on the set of constraints postulated to be operative in the modern speaker’s scansion of classical Chinese verse lines. The partial ranking enables the grammar to be instantiated into multiple full rankings on the same set of constraints, which correspond to individual sub-grammars. Analytically, the reverse route is taken: a sub-grammar is first developed for each genre, and subsequently these individual sub-grammars are unified into the overarching grammar. The sub-grammars are developed in an incremental fashion by taking the grammatical structure of the verse line as the input and the modern speaker’s prosodic parsing of the line as the optimal output. More is to be said on the theoretical underpinnings and the analytical scheme respectively in Sections 1.2 and 1.3 below.

It is further observed that in scanning and performing verse lines, the native speaker may entertain certain judgments, especially regarding whether a line ‘feels’ smooth and melodic or rugged and jarring. Such judgments, which are especially unequivocal in the case of the most harmonious lines, actually reflect their cognization of the metrical harmony of verse lines. This observation, together with the belief that the native speaker’s judgment of metrical harmony constitutes the ‘readily observable abilities of experienced poetry readers’ that must be accounted for by an adequate verse grammar (Halle and Keyser 1971:139) provides the motivation for the second research goal. We will argue that for every genre, the cognitively oriented notion of metrical harmony can be formally grounded in the corresponding sub-grammar and accordingly in the unified grammar. In addition to offering a formal account of the less tangible notion of metrical harmony, this also indicates the explanatory adequacy of the verse grammar.

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3 Here, we opt for the postulation of a single grammar (encompassing multiple sub-grammars) as it appears intuitively more appealing to conceive of one single grammar for the modern speaker, especially in light of the afore-mentioned strong uniformity exhibited in their scansion of lines across genres. Theoretically, it is also possible to adopt a multiple grammars model where the scansion of each genre is captured via a grammar. As is to be discussed in Section 1.2.2 below, which model is to be adopted carries little theoretical import.

4 We use the expression ‘grammatical structure’ of the verse line as a general way to refer to its grammatically parsed structure. This structure is, in most cases, reducible to the syntactic structure of the line, although semantic and even pragmatic considerations may also play a role in certain cases. See Section 1.4 below.
As mentioned earlier, in developing a unified modern verse grammar, we are assuming the unique perspective of exploring how the modern speaker scans the ancient verse lines. Nonetheless, the fact that the poems were all composed in ancient times naturally suggests the relevance of a historical dimension. A separate chapter is devoted to the exploration of the ancient verse grammar where we argue, on the basis of the evidence from the corpus per se, that all the constraints that are deployed in the modern grammar also played a role in the ancient one. However, for the sake of clarity and focus, this discussion on the historical side is necessarily brief.

As a final word, it behooves us to explicitly mention what this study is not about. First, it is not a study of the meter of classical Chinese verse, although our findings offer valuable insight into this issue, which will be briefly addressed in the final chapter. Second, in developing a theory of the native speaker’s phonological parsing of verse lines, it is not concerned with the phonetic side of the story, namely, the real-time performance of the verse lines. Third, it is not intended to be a comprehensive study on the phonological system of Chinese in general, either ancient or modern; rather only those issues pertaining to the discussion at hand are addressed, such as the phonological representation of interjection syllables and the prosodic hierarchy in Chinese, especially the delimitation of Phonological Phrase (PhP). Fourth, it is not a literary or functional study on the artistic value or aesthetic effect of the classical Chinese verse.

1.2 Theoretical background

As an OT analysis of verse scansion, this study draws upon the theoretical background from two main sources, i.e., metrics and OT, which are respectively presented below.

1.2.1 Theoretical framework for metrics

Two components comprise the metrics part of the theoretical framework: prosodic metrics and cognitive poetics. As mentioned above, the present study, with its central concern being the development of a formal scansion grammar rather than the investigation of meter or the metrical system of classical Chinese verse, is a phonological rather than a metrical study. Accordingly, these two metrical theories are not adopted in their entirety, and only those aspects pertaining to the present research goals are outlined below.

1.2.1.1 Prosodic metrics

The theory of Prosodic Metrics is developed in Golston and Riad (1994, 1995, 1997a, b) (also cf. Golston 1998; Helsloot 1995). The central thesis of the theory is to ground the study of metrics, including issues such as meter, versification, and metrical tension etc., solely in the formal systems of the ambient language, most notably, the prosodic system. Crucially, in doing so, the need to postulate a separate metrical hierarchy alongside the linguistic system is circumvented, and the analysis only employs universal prosodic constraints without recourse to language-specific or meter-specific constraints or any abstract metrical template. This is different from ‘generative metrics’ which invokes an independent metrical structure in addition to the prosodic system. Initially proposed in Halle and Keyser (1969, 1971) as an
abstract, one-level scheme, this metrical structure is subsequently developed into a hierarchy comprising metrical constituents at different levels such as the metrical position, (metrical) foot, dipod, metron, colon, hemistich, line, couplet, and quatrain (Kiparsky 1975, 1977; Piera 1980; Prince 1989; Hayes 1989; Hayes and MacEachern 1998). According to Kiparsky (1977), the ‘basic metrical patterns’ are produced via ‘some combinatorial processes’ by an independent ‘pattern generator’ (albeit in an unspecified manner).

In this light, we suggest that prosodic metrics embodies more economy: it eliminates the need for a separate metrical hierarchy, treats poetry as essentially a special form of the ambient language, and espouses the reconciliation of metrics and phonology. As such it is appealing both analytically and conceptually, and is adopted in this study.

1.2.1.2 Cognitive poetics

Developed in Tsur (1977, 1992, 1998) and originally referred to as a ‘perception-oriented theory of meter’, the theory of cognitive poetics introduces a cognitive angle into the verse study by granting central importance to the reader's verse performance and his cognitive experience involved therein, in particular the judgment of metrical harmony. Of its main proposals, two bear most closely on the present study.

First, verse performance is granted special emphasis in the present study, whose main goal is to develop a formal grammar for the modern speaker’s scansion. As is to be shown below, the speaker’s performance offers a critical point of departure for the analysis by enabling us to infer, on the assumption about the straightforward relation between the scansion and performance, the speaker’s scansion of the verse line, which constitutes the optimal output of the formal grammar to be developed.

Second, we import from cognitive poetics into the present study its proposal on metrical tension. This proposal holds that metrical tension is, rather than an abstract, isolated property inherent in a verse line, inextricably related to the reader’s dynamic experience of verse scansion and performance of the verse line. The introduction of the cognitive perspective into the current study is obvious in the formal grounding of the metrical harmony cognized by the reader in the grammar.

As in the case of prosodic metrics, both these two points from cognitive poetics reflect its fundamental difference from generative metrics. Specifically, while generative metrics shows more interest in verse texts than in verse performance in the same way generative linguistics is more interested in language form than language use, cognitive poetics shifts more focus to the reader’s cognitive experience in scansion and performance. Indeed, the importance of cognization in verse studies is convincingly argued in Attridge (1982, 1989) where meter is highlighted as a phenomenon in the perceptual domain with its basis in the human neuro-cognitive (as

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5 Here one might argue that in specifying the analytical domain to be the verse line, we are actually using the unit of line, which has been treated as a metrical unit, in our analysis. But at least two reasons might be cited against this: one is that in verse the line is always orthographically delimited, and the other is that the unit of line plays no role in the actual formulation of the grammar. Rather it is the prosodic counterpart of the line, namely, the Intonational Phrase (IP), which is built into the grammar.

6 As Hayes (1988) points out, poetics is the study of literary works from the structural point of view adopted in linguistics, and as such encompasses metrics. However, apparently, poetics used in Tsur’s work is tantamount to the narrower field of metrics as his work is only concerned with poetry.
well as muscular) system. On the other hand, the emphasis of cognitive poetics on verse performance (and accordingly scansion) in addition to verse texts actually embodies Jakobson’s (1960) insightful distinction between verse design and verse delivery, which are concerned with verse texts and the verse performance respectively.

1.2.2 Basics of Optimality Theory and OT approaches to variation

The formal analytical framework of this study is constituted by Optimality Theory (OT) as was first proposed in Prince and Smolensky (1993), McCarthy and Prince (1993a, b) and further developed in a plethora of subsequent literature. Furthermore, as one of the goals of this study is to account for, in a unified way, the various scansion of lines from different genres by the modern speaker, the issue of how to build variation into an OT grammar also becomes foregrounded. Below we first briefly present the basics of OT. (For full discussions, see e.g. Archangeli and Langendoen 1997 and Kager 1999.) Thereafter the theoretical models that have been proposed to deal with variation in OT are outlined and the model adopted in this study specified.

1.2.2.1 OT basics

In the most general terms, OT is a constraint-based and output-oriented grammatical framework which defines Universal Grammar as ‘a set of universal constraints and a basic alphabet of linguistic representational categories’ (Kager 1999: 4). At its heart is the postulation that the grammar of a language is a set of violable, universal constraints ranked in a specific way, and that any surface form in the language, i.e., output, is the optimal form emerging from the resolution of conflicts between constraints -- optimal in the sense that it incurs minimal violation of the constraint ranking hierarchy that defines the grammar of the particular language in question. As such, the optimal output is also the ‘most harmonic’ with respect to the set of ranked constraints. As constraints are intrinsically in conflict, a surface form will necessarily fail to satisfy all the constraints of a language, yet still be optimal compared to the others that incur more serious violations.

More specifically, an OT grammar comprises of three components: GEN, CON and EVAL. GEN stands for Generator, which produces a (potentially infinite) set of output candidates for every possible input from the lexicon. These candidates are fed into the constraint hierarchy (CON), and the optimal candidate is selected by Evaluator (EVAL) which evaluates how each output candidate satisfies the ranked constraints in CON. EVAL operates on the principle of parallelism, i.e., optimal satisfaction is computed over the whole hierarchy and the whole candidate set in one single step. Two constraint families are distinguished: faithfulness and markedness, which are inherently competing and which every grammar must reconcile. The former is concerned with the correspondence between the input and the output, while the latter solely focuses on the structural well-formedness of the output candidate.

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7 This includes, for example, McCarthy and Prince (1994, 1995a, b, 1999) and the work by others as collected in the Rutgers Optimality Archive (ROA) at http://roa.rutgers.edu.
The operation of an OT grammar is expressed in the tableau form, as shown below. The postulated underlying form is given in the upper left cell of the tableau and output candidates are listed in the left column. Across the top of the tableau are the constraints whose relative importance is indicated by the ranking: the higher a constraint is ranked, the further left it appears in the tableau. Constraints separated by a solid line are strictly ordered: the constraint to the left dominates the one to the right. Constraints separated by a dotted line are unranked with respect to one another due to either lack of evidence or lack of conflict. An asterisk in a cell indicates a violation of the constraint heading that column, and an exclamation mark following an asterisk indicates that this violation is ‘fatal’ by eliminating any chance for the candidate under consideration to be optimal. The shading of a cell indicates the irrelevance of the satisfaction/violation of the corresponding constraint to the selection of the optimal form. The selected optimal form, i.e., the surface form in the language, is indicated by the pointing finger ☞.

Having thus sketched the most basic concepts and constructs of OT, we wish to add two brief points regarding the presentation used in this study. First, as was mentioned above, a dotted line between two constraints indicates the non-ranking between them. Such constraints are in what Prince and Smolensky (1993: 51) refer to as a ‘non-crucial non-ranking’ relation with each other. For such a pair of constraints a non-crucial dominance relation can always be arbitrarily and trivially assigned (cf. McCarthy and Prince 1993b: 67) for ease of discussion. Violations of the constraints in such a relation are equally offensive in selecting the optimal form. This is illustrated in the tableau form below:

Second, besides tableaux presented above, the Hasse graph (cf. McCarthy and Prince 1993b: 56) will also be used to represent the constraint interaction. In such a graph, the constraints are positioned according to their ranking in the hierarchy: the higher a constraint is in the hierarchy, the higher its position in the graph. The presence of a line linking two constraints (which are necessarily not presented at the same level in the graph) indicates the dominance of the constraint at the lower level by that at the higher level, while the absence of a line between two constraints (whose relative position in the graph is non-committal) indicates either the lack of evidence for any

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6 Obviously, given the theoretically infinite number of output candidates, only a subset of them can be presented in a tableau.
crucial ranking between them, or the lack of conflict between them. As such, while
tableaux are good for illustrating the local ranking, the Hasse graph is particularly
effective in illustrating the global picture of constraint interaction, especially when
such interaction defies a linear representation.

1.2.2.2 OT models for variation

As mentioned in Section 1.1, the present study postulates one single unified modern
verse grammar, which must crucially be able to accommodate both the uniformity and
diversity exhibited in the scansion of classical Chinese verse lines from different
genres. This bears on the issue of how to represent variation within the OT
framework. On the basis of Anttila (2001), we suggest that in general, four OT
models have been proposed to address variation: (i) multiple grammars (the generic
model); (ii) partially ordered grammars; (iii) floating constraints; (iv) continuously
ranking grammars⁹. Below they are respectively outlined and the one adopted in the
present study presented.

To begin with, the multiple grammars model contends that variation arises from the
competition of multiple grammars (Kiparsky 1993; Kroch 1994). In the OT
framework, this model is known as constraint re-ranking, which holds that variation in
surface forms is a function of variation in constraint ranking and that this is true both
across and within languages. Re-ranking certain constraints will give rise to a
different constraint hierarchy that is able to account for a different set of data and
thereby capture attested variation (for application of this model, see McCarthy and
Prince 1993: 66 on the grammars for different registers of pre-Classical Latin; also cf.

It deserves mentioning that the multiple grammars model is a most generic model
imposing little restriction on the permissible extent of the difference between the
multiple grammars. In this light, both partially ordered grammars and floating
constraints constitute special cases of the generic multiple grammars model (Anttila
2001). More specifically, the model of partial ranking¹⁰ (Anttila 1995; Anttila and
Cho 1998; Anttila 2000) crucially assumes that an OT grammar is a partial rather than
a full ranking on some constraint set. Some constraints in the grammar are
underspecified in their ranking with others, and consequently, such a grammar is
translatable into more than one fully ranked constraint hierarchy, each selecting one
optimal candidate. Thus, the grammar can yield more than one optimal form, all being
surface outputs in the language.

On the other hand, the floating constraints model (Reynolds 1994; Nagy and
Reynolds 1997) captures variation in terms of the ranking mobility of certain
constraints. Similar to the partial ranking model, this model contends that an OT
grammar is not necessarily a fully ranked hierarchy and postulates that some

⁹ Anttila (2001) also mentioned two more models, i.e. tied violations and pseudo-optimality. Both are
theoretically the most conservative in the sense that they entail no modification of the standard OT
assumptions. However, both are exposed to have a number of conceptual and empirical weaknesses
which render them inadequate to accommodate the variation data. As such they are not discussed here.

¹⁰ In Anttila (2001), the partial ranking grammars model proposed for the Finnish genitive plural is
renamed as ‘stratified grammars model’ following the terminology of Tesar and Smolensky (1995).
The stratified grammars model, which consists of internally unranked strata of constraints strictly
ranked with each other, is a special case of the partial ranking grammar.
constraints may have variable rankings within a certain range, i.e. float. The idea is conceptually simple and intuitively appealing, as depicted in Reynolds (1994: 116):

... within a given language or dialect, it may be the case that a particular constraint X may be classified only as being ranked somewhere within a certain range lying between two constraints W and Z, without specifying its exact ranking relative to a certain other constraint Y (or constraints Y₁, Y₂, etc.) which also falls between W and Z. A graphic representation of such a variable constraint ordering is as follows:

…………….ConX…………….…
ConW >> ConY₁ >> ConY₂ >> ... >> Con Yₙ >> ConZ

Here, the constraint (or constraints) which appears on the higher level in the representation is the FC [floating constraint], while those on the lower level are ‘hard-ordered’ or ‘anchored’ constraints. The range over which the FCs may extend is defined, not in terms of the constraints (W and Z) which the FC lies between, but rather in terms of the particular subset of fixed or anchored constraints (Y₁, Y₂, ... Yₙ) with regard to which the FC is considered to be unranked. In other words, the FC may be allowed to fall in any position with respect to its anchored subset – above Y₁, below Yₙ, or at any point in between; this is the essence of the FC’s relationship with its anchored subset of range.

Finally, the continuous ranking model (Boersma 1998; Boersma and Hayes 1999, 2001; Hayes 2000) views variation in surface forms as gradient well-formedness and attempts to analyze it in terms of probability under the conception that ranking is a gradient and quantitatively explicit phenomenon. In this model, constraints are assigned numerical ranking values on a continuous numerical scale. The grammar entails a ‘stochastic candidate evaluation’ (Boersma and Hayes 2001): at evaluation time, a random positive or negative value is temporarily added to the ranking value of each constraint, which results in varying actual ranking values, referred to as ‘selection points’. The variable selection points are responsible for the generation of a range of optimal outcomes, therefore capturing the variation (for application, see Hahn 1998; Zuraw 2000; Hayes 2000).

While as acknowledged in Anttila (2001), comparison between these theoretical models has so far proven inconclusive and it remains unclear which of the models is superior, two points should be acknowledged. First, in introducing real-number ranking value, the continuous ranking model reflects some deeper difference from the other three. However, while this added power offers certain descriptive advantage, its necessity and possible consequences in other domains remain to be explored. Second, it might be suggested that the principal difference among models (i), (ii), and (iii) hinges upon the conception of whether an OT grammar is a full or partial constraint ranking. Specifically, the multiple grammars model straightforwardly builds upon the classic OT tenet that an OT grammar is a fully articulated ranking hierarchy of constraints, and in effect handles variation via different grammars, while the partial ranking and floating constraints models hold that an OT grammar may well be a partial ranking where some constraints whose ranking is unspecified. In addition, the multiple grammars model, being generic in nature, is suggested to be over-powerful and some restricted versions of it such as the partial ranking and floating constraints model discussed here appear sufficient.
Due to lack of evidence as to which model is superior, the choice between the models seems somewhat arbitrary. In this study we opt for the floating constraints model, largely for its formal simplicity and analytical facility, to account for the variation in the modern speaker’s scansion of different genres of classical Chinese verse. Evidently, in making this choice, we are pronouncing our assumption that an OT grammar is a partial ranking on some constraint set. This implies that the grammar, containing a certain constraint whose ranking is underspecified, can be articulated into several full constraint rankings. This constraint will be argued to float, which provides the grammar with a certain degree of inherent flexibility. The floating constraint may land in different places, which we refer to as ‘landing sites’, along the ranking hierarchy comprised by the constraints with ‘hard-ordered’ ranking (Reynolds Ibid.) which we refer to as the ‘ranking skeleton’. Its different landings give rise to different full rankings, referred to as sub-grammars, which nonetheless all correspond to one partially ranked grammar.

At the same time, it merits mentioning that while the floating constraints model as originally conceived of in Reynolds (1994) is potentially very powerful, we propose some restrictions on it on the basis of our findings, to be shown in Chapter 9. Briefly, while Reynolds (Ibid.) proposes no limit on the number or nature of floating constraints in the grammar and posits that a floating constraint may ‘fall in any position with respect to its anchored subset [of constraints]’, we will show that in the grammar developed in this study, the floating constraint is limited in its kind, number, and ‘landing sites’, thus rendering the floating constraints model more desirable.

1.3 Analytical scheme in the present study

In the floating constraints model, the grammar to be developed consists of a ranking skeleton comprised of constraints with fixed ranking and one floating constraint, whose limited possible landing sites are specified. As such, the grammar is constraining due to the maximally shared core ranking and the limitation on the number and landing sites of the floating constraint. At the same time, the floating constraint offers inherent flexibility to the grammar which is translatable into multiple full ranking hierarchies, i.e. sub-grammars, depending on where the floating constraint lands. Because only one constraint floats and its landing sites are restricted, the sub-grammars are minimally different.

The analytical scheme follows naturally from the floating constraints model. In delimiting the specific components of the sub-grammar, it needs to be borne in mind that the analytic domain in this study is confined to the verse line. Phenomena above the line level, albeit fascinating, lie beyond its focus. The input is constituted by the grammatical structure of the verse line, which is attributable to the conspiracy of a range of grammatical factors, the most important being the syntactic constituency.

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11 This is in fact a somewhat expedient way of looking at things: we may alternatively suggest that the grammatically unparsed verse line constitutes the input and that the cluster of constraints responsible for the grammatical parsing of the line are very highly ranked in the overall constraint hierarchy so that other potentially possible grammatical structures are thrown out and never get a chance to surface, leaving the one presented here as the only grammatical structure to be simultaneously evaluated by phonological constraints.
The output candidates are possible ways in which the given verse line may potentially be scanned, and thus are in theory infinite in number.

At this point, we wish to clarify our position regarding the dichotomy of scansion versus performance: briefly, scansion represents the prosodic parsing of the line while performance is the actual realization of this parsing into acoustic signals. As such, scansion is abstract and phonological in nature while performance is concrete and phonetic. Or in terms of the grammar versus production dichotomy (cf. Hale and Reiss 2000), scansion is the output of the grammar and performance that of the production system. Crucially, we assume a straightforward sequential relation between scansion and performance, which in effect entails such a relation between phonology and phonetics. Thus, scansion, as the output of the phonological module, is directly fed into the phonetic module, and undergoes a series of presumably trivial, no-frills phonetic operations such as strengthening at the beginning of the phonological unit and lengthening at the end of it (‘initial strengthening and final lengthening’, cf. Beckman and Edwards 1990; Fougeron and Keating 1997), extra lengthening of monosyllabic feet, pitch accent alignment, and intonation interpolation, before being realized as the phonetic form which is the performance of the verse line actually heard.

This linear and straightforward relation between scansion and performance enables us to directly infer the abstract prosodic parsing of a given line from its empirically observable phonetic performance, and in view of the fact that the phonetic performance is the actual realization, this corresponding prosodic parsing is thus the optimal parsing. Specifically, the above-mentioned phonetic features serve as important cues for the abstract phonological structure, in particular the foot structure: the unit that is clearly set off by the initial strengthening and final lengthening.

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12 In stating this assumption, we are fully aware of the ongoing debate about the interplay between phonetics and phonology (e.g. Flemming 1995; Hayes 1996; Steriade 1997; Myers 1997). However, it is not our intention to take position in this debate, and we believe the current assumption, which follows the classical generative assumption of a strict separation between phonology and phonetics (e.g. Chomsky 1981) and is based on the well-founded generalization on the phonetic realization of phonological structures, is sound, especially in the particular context of verse scansion and performance.

13 See Hayes (1984) for argument that such lengthening is phonetic in nature. Also for this reason, the phonological construct of ‘zero syllable’ is dispensed with in our study.

14 Three points are worth mentioning here. First, there are potentially an infinite number of performance styles (cf. Tsur 1998) for different readers and even for the same reader. However, this need not concern us, as crucially it is not the case that a verse line can be performed in any possible way; rather the many possible performance styles are subject to certain restrictions. Indeed, they may be regarded as the many ways of realizing one and the same phonological structure. Second, we exclude the scansion corresponding to the performance style in which the verse line is mechanically chopped into binary units from left to right, in a manner that is blind to the syntax or semantics of the line. Such a performance style is referred to as the ‘minstrel’ performance by C. S. Lewis in ‘Performance’ entry of The New Princeton Encyclopedia of Poetry and Poetics (1993) and as one type of ‘divergent’ performance in Tsur (1998). It is excluded because it is linguistically uninteresting. Third, there are indeed some cases, albeit rare, where the line can be performed in more than one way, each reflecting a different phonological structure, i.e., different scansion. However, in such cases, the different scansions are not equally preferred by the native speaker; one scansion is usually unambiguously more favored than the others, which, though possibly still acceptable, may be somewhat marginal. Our strategy in this study is to assume that for any given line, there is one and only one optimal scansion, which in such cases is constituted by the most preferred one. In this sense, our study is different from Anttila (1995) which deals with multiple surface forms of varying degrees of preferability.
constitutes the smallest prosodic unit above the syllable level, i.e., the phonological foot\textsuperscript{15}.

Therefore, the optimal foot structure, which is inferable in this fashion, is the winner out of the theoretically infinite number of output forms. So now what is known is the input, i.e., the grammatical structure of a line, and the optimal output, i.e., the optimal scansion by the modern speaker; what is to be developed is the constraint hierarchy, i.e., the sub-grammar, under which this optimal scansion inferred from the empirical performance is indeed selected as the optimal output for the given input. The analytical scheme is represented diagrammatically as follows:

\begin{itemize}
  \item Input (Grammatical structure) \quad (Known)
  \item GENerator
  \item Output candidates (Prosodic parsing)
  \item CONstraint hierarchy \quad (Unknown)
  \item EVALuator
  \item Optimal output (Optimal scansion) \quad (Known)
  \item Surface phonetic form (Actual performance)
\end{itemize}

In developing the sub-grammar for each genre, crucial data are cited to motivate the introduction of constraints and the ranking between them. Thereafter, under the assumption that the modern speaker entertains one overall grammar, the five sub-grammars are unified into one grammar via the constructs of floating constraint and ranking skeleton, as discussed above. The five sub-grammars might then be understood as the five instantiations of the overall grammar resulting from the specific landing sites of the floating constraint.

\textsuperscript{15} One might further argue that this ‘back-inference’ of the foot structure from the surface phonetic structure is rendered particularly feasible on at least two accounts. One is that classical Chinese verse is normally performed at a rather slow rate, which serves to ‘magnify’ the phonetic cues, in particular the boundary lengthening, rendering it reliably present. The other is that due to the largely monosyllabic nature of classical Chinese, a foot can never cut into a word. This is because the foot, which consists of minimally one syllable and typically two, is co-terminous with one or two words. In the exceptional case of the few disyllabic morphemes, these two syllables invariably form one foot. This is quite unlike the case in English, where a word can be parsed into more than one foot. In this connection, it also needs to be mentioned that only foot structure can be legitimately inferred back from the phonetic performance; phonological structures at other levels such as phonological phrase (PhP) are less tractable to this procedure. As is to be seen in Chapter 4, the PhP boundary is delimited primarily through means other than from the phonetic cues and the phonetic cues only serve as supplementary evidence.
The formal account of the metrical harmony directly builds upon the grammar developed in this way. Specifically, it can be elegantly accounted for via the construct of ‘tableau des tableaux’ (Itô, Mester and Padgett 1995) which compares, under the modern verse grammar developed so far, the multiple parses, each constituted by the parse from a certain grammatical structure of the lines to the optimal scansion of such lines and selects the optimal parse\textsuperscript{16}. We discover that for every line type in each genre, the grammatical structure in the optimal parse all corresponds to that of the lines cognized as metrically most harmonious. To cite the notion of ‘OT harmony’ gauged in terms of the constraint satisfaction/violation (Smolensky and Prince 1993), this optimal parse, which incurs the least violation of the sub-grammar, enjoys the greatest degree of ‘OT harmony’. This shows that the metrical harmony judgment can be formally grounded as OT harmony in the verse grammar; in other words, the grammar can account for such judgments and is therefore explanatorily adequate.

It behooves us to quickly mention the analytical scheme for the ancient grammar. Evidently, once we venture into the historical side of the picture, the performance data is no longer available, and only the ancient corpus lies at our disposal. We will be arguing, by excavating a wide array of evidence from the corpus per se such as rhyming patterns, distribution of disyllabic morphemes, and frequency pattern, that the constraints deployed in the modern grammar also played a role in the ancient one.

As a final note, now that we have presented the analytical scheme in the OT framework, it is of interest to consider how the theoretical underpinnings of metrics discussed in Section 1.2 might chip in. First, as is to be seen in the following chapters, the sub-grammars as well as the grammar solely deploy universal prosodic constraints, which embodies the principle of prosodic metrics. Second, the tenets of cognitive poetics are reflected in the crucial role of the native speaker’s cognization of the verse line in establishing the correlation between the metrical harmony cognized by the modern speaker and the OT harmony in terms of the constraint satisfaction/violation. At the same time, verse performance, which is of a central importance in cognitive poetics, also plays a vital role in enabling us to infer the optimal scansion.

### 1.4 Data of analysis

The data for this study comes from the corpus of verse lines, the native speaker’s performance of them and their metrical harmony judgments.

The corpus comprises of 3,933 lines from the five genres of classical Chinese verse. The following table gives an overview of the distribution of the lines across the five genres.

<table>
<thead>
<tr>
<th>Genre</th>
<th>Number of lines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shijing</td>
<td>1320</td>
</tr>
</tbody>
</table>

\textsuperscript{16} Such a tableau is called a ‘tableau des tableaux’ because each candidate form is constituted by a parse from the grammatical structure (which serves as the input in the tableau for developing the sub-grammar) to the corresponding optimal output (which is the optimal output in the tableau for developing the sub-grammar). As such it is actually constructed out of the many tableaux needed in the development of the sub-grammar.
All the poems are randomly selected from ancient anthologies that are still enjoying great popularity with the modern speaker. With the exception of Jiuge, which is already a small corpus, for each of the other four genres, the odd-numbered poems are selected from the corresponding anthology. As such, the present corpus constitutes approximately half of the whole corpus of well-recited verse lines contained in the above-mentioned anthologies, and may thus be legitimately considered as significantly large. It also needs to be mentioned that while seeking to strike a balance across the genres, we have included slightly more Shijing lines and fewer Jiuge ones. This is because Shijing poems tend to be irregular in length, and can be quite long, while Jiuge is strictly speaking only a sub-genre of the Chuci genre which appears between Shijing and Guti, and the reason that only it is selected is that it best embodies the use of ‘xi’, the defining feature of the Chuci genre\(^{17}\).

Evidently, this corpus consists of poems by various poets from different periods. It deserves mentioning that as the anthologies are collections of well-recited poems by many popular poets of each literary period, no single poet’s work is disproportionately represented. Consequently, the poems in the present corpus are evenly distributed across the poets, and there are no poems whose inclusion, or exclusion, for that matter, would dramatically alter the constitution of the corpus.

The other part of the data is constituted by the native speaker’s performance of verse lines and cognization of their metrical harmony. The former is empirically observable and straightforwardly gives rise to the scansion which serves as the optimal output of the verse grammar, and the latter can be directly elicited. Two things need to be mentioned. First, we are solely concerned with the performance (and accordingly scansion) of verse lines in Mandarin; performance (and scansion) in other Chinese dialects is a potentially intriguing topic (cf. Boyce’s (1980) study of Jinti verse performance in the Min dialect), but not discussed in this study. We will be using Chinese to stand for Mandarin interchangeably throughout the study. Second, the pool of informants for this study comprises five native speakers of Chinese\(^{18}\), who are all at or above university education level\(^{19}\). In virtually all cases, they entertain a strong

\(^{17}\) Another reason that only Jiuge is selected is because of all Chuci sub-genres, it is best recited, largely because it contains relatively few arcane dictions.

\(^{18}\) The following table provides further information on these five informants. For privacy consideration, only initials are used for identification.

<table>
<thead>
<tr>
<th>Name</th>
<th>Age</th>
<th>Gender</th>
<th>Dialect background</th>
<th>Occupation</th>
</tr>
</thead>
<tbody>
<tr>
<td>BM</td>
<td>30</td>
<td>M</td>
<td>Shenyang</td>
<td>Engineer</td>
</tr>
<tr>
<td>HH</td>
<td>32</td>
<td>F</td>
<td>Taiyuan</td>
<td>Chemist</td>
</tr>
<tr>
<td>XH</td>
<td>29</td>
<td>M</td>
<td>Suzhou</td>
<td>Architect</td>
</tr>
<tr>
<td>ZY</td>
<td>28</td>
<td>M</td>
<td>Bengbu</td>
<td>Physicist</td>
</tr>
<tr>
<td>QD</td>
<td>25</td>
<td>F</td>
<td>Zhangshu</td>
<td>Mathematician</td>
</tr>
</tbody>
</table>

\(^{19}\) Under the educational system of China, the recitation of classical Chinese poetry is an integral part of the education program from the last year of elementary school all the way through the university. The informants have acquired competence for both scanning (as well as performing) the verse line and
consensus regarding both the optimal way to perform (and accordingly scan) a line and the judgment on its metrical harmony, such as whether a line is good or awkward, metrically smooth or rugged.

For the exploration of the ancient verse grammar, this corpus needs to be processed into the ‘ripe’ corpus. The processing mainly seeks to represent the grammatical structure of the verse lines by encoding, via a coding scheme, the boundary strength between two (surface) adjacent syllables. The boundary strength can be grounded in the formal grammatical parsing, in particular syntax, occasionally supplemented by semantics and lexicon. The encoding renders it easy to further process the corpus: in particular, lines are subsumed into different groups according to their coding profiles, and the frequency of each coding type is calculated. This way, the frequency patterns obscure in the raw corpus become highlighted and are ready to serve as evidence for the exploration of the ancient grammar. As the historical dimension is not the main focus of this study, the coding scheme for processing the corpus is relegated to Appendix II, where the resulting ripe corpus is also presented.

1.5 Structure of the dissertation

Chapters 2 to 6 are respectively devoted to analysis of the five genres and constitute the core of the study. Each chapter consists of two parts: the development of the sub-grammar for the genre under discussion and the formal grounding of the metrical harmony judgment for this genre in the corresponding sub-grammar just developed. Chapter 7 unifies the five sub-grammars into the overarching modern grammar. Chapter 8 briefly considers the historical dimension of the research, mainly discussing the relevance of the modern constraints in the ancient grammar. Additional issues such as the meter of classical Chinese verse are also addressed briefly. Appendix I presents the chronology of Chinese history and II provides the guidelines for corpus processing and the ripe corpus.
Chapter 2 *Shijing* Sub-grammar

2.1 General description of the raw corpus

*Shijing*, also known as ‘Book of Songs’, is the earliest written record of verse in Chinese history and generally regarded as the origin of Chinese literature. It is an anthology compiled around 600 BC and comprising of 305 poems, which were composed during the *Zhou* Dynasty (1066-771 BC) and the *Spring and Autumn* period (770-476 BC) (see Appendix I for a chronology). These poems fall into three main subgenres: (1) *Feng* (literally ‘Airs’), poems thematizing on life of ordinary people; (2) *Ya* (literally ‘Elegance’), odes exalting life of the nobility and the court; and (3) *Song* (literally ‘Ode’), hymns of the Temple and the Altar sung on religious occasions. Of the 305 *Shijing* poems, 160 belong to *Feng*, 105 to *Ya*, and 40 to *Song*.

Like many ancient, inchoate literary forms, *Shijing* poems were mainly sung to music and accompanied by dance at the time of their composition, although the tunes have since long been lost\(^1\). One possible exception is the *Feng* poems, which were, according to the historical records (Chen 1994), also recited back then. For modern speakers with no access to the original tunes, reciting is the only mode of performing the ancient verse. Of the three subgenres, *Feng* is also best recited by modern speakers, presumably due to the fact that its themes center around the daily life of ordinary people. On this account, only *Feng* poems are examined here; specifically, of the 160 *Feng* poems, we randomly select the 80 odd-numbered ones totaling 1320 lines as the *Shijing* data for the present research.

2.2 Methodological issues and preview of the sub-grammar

2.2.1 Methodological issues

As mentioned in Chapter 1, the rest of this chapter consists of two parts: the development of the sub-grammar and the formal account of the metrical harmony judgment. The analytical scheme for developing the sub-grammar was already presented there and will not be repeated. In this section we only draw attention to three methodological issues. First, in developing an OT grammar, we need to motivate the introduction and ranking of each constraint. The ranking can only be determined on two accounts: either by conflict or by transitivity. (For more on the analytical procedure in reaching an OT grammar, see e.g. Kager 1999).

---

\(^1\) Three performance styles have been suggested for classical Chinese verse: singing, chanting and reciting (Chen 1994). Verse is sung to a certain musical tune, and recited to a certain rhythm but without reference to musical tunes. Chanting lies in between: more musical than mere recitation, but less so than singing. As reciting is the only mode of modern speakers’ performance of classical Chinese verse and the sole concern of the present research, the word ‘performance’ is used here to refer to recitation throughout.
Second, evidently not all types of line structures contribute equally to the development of the sub-grammar: some constitute crucial evidence for new constraints and/or new ranking while others may be adequately accounted for by the sub-grammar reached till that point, which for simplicity sake, will be referred to as ‘emergent sub-grammar’, and thus provide no argument for new constraints or ranking. Although analytically such lines have little to offer, we nonetheless choose to devote brief attention to them by including some examples and illustrate their scansion. This practice is out of two considerations. One is to enrich the present study with a descriptive dimension and the other is to present a ‘panoramic’ view of the operation of the emergent sub-grammar.

The third issue bears closely on this: to enhance its readability, Section 2.3 is divided into sub-sections according to the line type in terms of syllable numbers; within each sub-section we examine the grammatical structures that are crucial in developing the sub-grammar. Where a certain line type is not advancing new arguments for the sub-grammar, selective examples are provided and their scansion illustrated. This organizing principle is also adhered to in the corresponding sections of the following chapters on the other four genres.

Finally, regarding notational convention, we basically follow the standard OT practice in using tableaux to illustrate the crucial ranking between conflicting constraints, but occasionally the tableau is also used in a global way to demonstrate the working of the emergent sub-grammar. The usage of solid and dotted lines in the tableau was presented in Section 1.2.2.1 of Chapter 1. The Hasse graph is also used frequently. An extended use of tableau, namely, tableau des tableaux, is used in the formal account of the metrical harmony judgment in Section 2.4 and its working will be articulated there.

### 2.2.2 Preview of the sub-grammar

We now briefly outline the modern sub-grammar for *Shijing*. First, not surprisingly, one of the ‘staples’ of the sub-grammar is the constraint monitoring the size of the prosodic unit above the syllable level, namely, prosodic foot. We argue that binary feet are preferred and that there arises the need to split this requirement into $\text{BINMAX}$ and $\text{BINMIN}$, respectively imposing binarity as the maximal and minimal foot size. Second, as stated earlier, we are not interested in those scansion blind to the syntax or semantics of the line; a good scansion necessarily refers to the structure and the meaning of the line. Hence constraints governing the matching between the input, i.e. the grammatical structure of the line, and the output, i.e. its prosodic structure, also play a role in the sub-grammar. Two constraints belong to this constraint family: $\text{ANCHOR}$ and $\text{ANCHOR-ISBOPH}$ (with $\text{SB}$ and $\text{PhP}$ respectively standing for Strongest Boundary and Phonological Phrase), which respectively check the boundary matching at the lowest and highest levels of the hierarchy. Third, the prosodic hierarchy of Chinese is discussed and we show that the distribution of monosyllabic feet in the prosodic constituent of Phonological Phrase (PhP) is subject to the constraint that such feet cannot occur PhP-finally. This constraint is couched into $\text{*PhP-FINAL-MONOFT}$. Fourth, *Shijing* is characterized by the wide use of interjections which we argue are represented and parsed differently from lexical syllables. This is reflected in the presence of a constraint specifically targeted at the prosodic parsing of
interjections in the *Shijing* sub-grammar, namely, GOODFTINTERJ. Section 2.3 provides a detailed account of how these constraints are motivated and ranked.

2.3 *Shijing* sub-grammar

2.3.1 Point of departure: 2-syll lines

All 2-syll *Shijing* lines share the grammatical structure of [SS] and are scanned as (SS). Examples are:

1. \( \text{shui2 yu3?} \)
   Who with
   ‘With whom (shall I go)?’

2. \( \text{du2 xi1} \)
   alone rest
   ‘(I) rest alone’

3. \( \text{shi4 wei1} \)
   interjection
   ‘ah --’

Analytically, though, such lines offer little (except perhaps the preference for binary feet), and we just pass and move to the 3-syll lines.

2.3.2 \( \text{BINMAX >> BINMIN} \) and \( \ast\text{IP-FINAL-MONOFT} \): evidence from 3-syll lines

For 3-syll lines, two grammatical structures can be identified, i.e., [SS]S versus S[SS]\(^3\). The grammatical structure only constitutes the input; the optimal output, i.e. the actual scansion, for all 3-syll lines is (S)(SS), irrespective of the input structure\(^4\).

Below are some examples to illustrate the scansion (with the foot boundary indicated by the round brackets) of verse lines respectively of the above-mentioned grammatical structures (indicated by square brackets):

---

\( ^2 \) Chinese (including classical Chinese) is basically a SVO language but with a few exceptions. (1) is one such exception where the object, being a pronoun, is inverted to precede the preposition.

\( ^3 \) Strictly speaking, the bracketing should respectively be [[SS]S] and [S[SS]]; for simplicity sake, we leave out the outer layer of brackets.

\( ^4 \) However, this indifference to the input structure is not inconsequential. In cases of those verse lines where the prosodic and the grammatical structures mismatch, the native speaker experiences a sense of tension when such lines are recited. The degree of tension may vary depending on how gross the mismatch is; for example, (4) below is felt to be tenser than, say, (7) and (8), which are cognized as metrically perfectly harmonious. The reason is because structurally, the two ‘shen1’’s in (4) parse together, being the two elements of a reduplication whereas for (7) and (8) the first two syllables are structurally loose too. Thus, it appears that the input structure, and arguably the juncture strength recorded in the coding may well have a delicate effect on the native speaker’s cognization of the line. For the present, our focus remains the development of the constraint ranking; the issue of metrical harmony will be addressed in Section 2.4.
(4) \[shen1\] [shen1] [xi1] \(\rightarrow\) (shen1) (shen1 xi)
many interjection
‘(They are) many’

(5) [zhi1 zi3] [gui1] \(\rightarrow\) (zhi1)(zi3 gui1)
this person return
‘This person returns’

(6) [yi3 yan1] [zai3] \(\rightarrow\) (yi3) (yan1 zai3)
already finished interjection
‘Ah, (it is) already over’

(7) [jiang1] [you3 zhu4] \(\rightarrow\) (jiang1)(you3 si4)
river have bank
‘The river has banks’

(8) [shen1] [ze2 li4] \(\rightarrow\) (shen1) (ze2 li4)
deep then wade
‘If the river is) deep, then (I will) wade across it’.

For a 3-syll input, among the theoretically infinite number of potential outputs produced by GEN, the relevant ones are (SSS) and (SS)(S)\(^5\). However, they are less harmonious than the optimal (S)(SS). Using the symbol ‘>’ to stand for ‘wins over’, we have

(9) \( (S)(SS) \succ (SSS) \)

(10) \( (S)(SS) \succ (SS)(S). \)

(9) shows that a trisyllabic foot is worse than a monosyllabic one, when there are no other alternatives (now that the possibility of leaving a syllable unparsed is already precluded by the high-ranking PARSE-SYL constraint). This calls for two markedness constraints governing the well-formedness of feet: BINMAX and BINMin\(^6\). The former

\(^5\) Other potential forms include, for example, (S), (SS), S, SS, S(SS), (SS)S, and (SSSS) etc. which result from a wild operation of phonological processes such as deletion and addition, parsing and non-parsing of syllables etc. But they bear little relevance to the present discussion and so are not considered here. Their failure to emerge as the optimal form can be easily accounted for by postulating that the responsible constraints (such as PARSE-SYL, MAX, DEP; see Prince and Smolensky 1993) are highly ranked. Furthermore, it is of interest to point out that S(SS) and (SS)S can also be eliminated on the account that the prosodic structure in Chinese observes the Strict Layer Hypothesis (Selkirk 1984; Nespor and Vogel 1986).

\(^6\) We suggest that this binarity requirement can be traced to a deeper and more fundamental origin, namely, the preference for the alternation between strong and weak beats at regular intervals to create a rhythmic effect in both linguistic and non-linguistic domains. This preference is most readily expressed by the binarity of the beat group, and typically a strong beat followed by a weak one. The crucial point here is that this preference is not restricted to the linguistic domain; it is in fact a constraint deeply rooted in the cognitive system of human beings (cf. Chatman 1965; also see Dauer 1983; Dell 1984; Selkirk 1984: 36-37; Hayes 1984: 59), and is also suggested to be attributable to neurophysiological mechanisms (Fussell 1979). Another indication of its non-linguistic nature is the fact that this preference is also pervasive in rhythmical forms other than language, or verse, for that matter, such as music and dancing. Furthermore, this binarity preference is innate and universal, evidenced by its wide
requires a foot to be maximally binary, or, more precisely, to contain maximally two syllables in the present context\(^7\), whereas the latter stipulates that a foot is minimally binary, i.e. contains minimally two syllables. In the phonological literature, sometimes these two constraints are not distinguished and represented as a cover constraint FT-BIN which merely requires that feet be binary under moraic or syllabic analysis (Prince 1980; Kager 1989; Prince and Smolensky 1993). However, here arises the motivation for each of them. The fact that a monosyllabic foot but not a trisyllabic one appears in the optimal output indicates that a monosyllabic foot is conditionally acceptable and that it is worse to parse the input string into a trisyllabic foot than into a monosyllabic plus a disyllabic one. In terms of OT ranking, this preference is tantamount to \(\text{BINMAX} >> \text{BINMIN}\), and this ranking is true for both input structures of 3-syll lines under discussion here.

\[
\begin{array}{|c|c|c|}
\hline
\text{[SS]} & \text{BINMAX} & \text{BINMIN} \\
\hline
\text{(S)(SS)} & \ast & \checkmark \\
\text{(SSS)} & \checkmark & \ast \\
\hline
\end{array}
\]

Now, looking at (10), we find that these two constraints and their ranking fall short of accounting why (SS)(S) loses to (S)(SS). Furthermore, the fact that (S)(SS) is the optimal output in both cases where the inputs differ suggests that a further constraint needs to be motivated which is necessarily an output-oriented markedness one making no reference to the input structure. Compare the optimal form (S)(SS) with its competitor (SS)(S), and it is evident that the latter has a monosyllabic foot at the end of the verse line, which, in this case, contains two feet. As pointed out in Chapter 1, a verse line corresponds to Intonational Phrase (IP) prosodically, largely on account of the fact that when recited, a line falls under a unifying intonational contour, which is argued to be the defining characteristic of an IP (Chafe 1974; Pierrehumbert 1980; also Hayes 1989). Hence the operative constraint here is one that forbids monosyllabic feet from occurring IP-finally. This is formulated as

\[
\begin{array}{|c|c|c|}
\hline
\text{S[SS]} & \text{BINMAX} & \text{BINMIN} \\
\hline
\text{(SS)(S)} & \ast & \checkmark \\
\text{(SSS)} & \checkmark & \ast \\
\hline
\end{array}
\]

\(\ast\text{IP-FINAL-MONOFT}\)

Do not place the monosyllabic foot at the final position of an IP.

---

\(^7\) Binarity of foot requires that feet be binary under either moraic or syllabic analysis; in the current context, a syllabic analysis is more relevant, as Chinese syllables are, with very few exceptions, heavy, and hence bimoraic. The moraic analysis, though, comes into relevance in the discussion below about the parsing of interjection syllables (Section 2.3.4.1).
This constraint, which is evidently also an output-oriented markedness one, governs the position of the monosyllabic foot in higher-level prosodic units. At first sight, it may appear somewhat language-specific; however, we argue that this constraint is in fact a variant of NONFINALITY, a well-established universal phonological constraint, which is reformulated as RHYTHM in Hung (1994). NONFINALITY requires that no prosodic head be final in the Prosodic Word (Prince and Smolensky 1993); in other words, the Prosodic Word must not end in a head syllable of a foot. Duanmu (1999, 2000) convincingly argues that Chinese has both syllabic and moraic feet and that Chinese feet are strictly trochaic at both the syllabic and moraic levels. According to him, the good and bad foot structures in Chinese are:

(13) (i) Good foot structures in Chinese

\[
\begin{align*}
\text{Syllabic foot} & \quad \text{Moraic foot} \\
(S \ S) \text{ or } (S \ S) & \quad (\mu\mu) \quad (\mu\mu) \\
(\mu\mu) & \quad (\mu\mu) \\
\end{align*}
\]

(ii) Bad foot structures in Chinese

\[
\begin{align*}
\text{Syllabic foot} & \quad \text{Moraic foot} \\
(S \ S) \text{ or } (S \ S) & \quad (\mu) \quad (\mu) \\
(\mu) & \quad (\mu) \\
\end{align*}
\]

Furthermore, Duanmu assumes that a foot must have (at least) two syllables and adopts the notion of zero syllable proposed in Burzio (1994). In line with this proposal, he considers that a monosyllabic bimoraic syllable constitutes a disyllabic (albeit still bimoraic) foot containing a zero syllable, which is also well-formed. This is represented as (with zero syllable indicated by 0):

(14) \[
\begin{align*}
\text{Syllabic foot} & \quad \text{Moraic foot} \\
(S \ 0) & \quad (\mu) \\
\end{align*}
\]

Our position here is to circumvent the need for zero syllable and directly accept monosyllabic bimoraic feet as well-formed, at least in the verse context, on the account that such feet can indeed surface in the optimal scansion of verse lines, even though they violate BINMIN. Thus, we modify Duanmu’s inventory of good foot structures presented in (13)(i) by including the monosyllabic, bimoraic foot whilst at the same time discarding the bimoraic, disyllabic foot in (14). Obviously, the single syllable in a monosyllabic foot always carries the stress. Furthermore, following Hammond (1997), only heavy, i.e. bimoraic syllables can carry stress, whilst a light, i.e. monomoraic syllable cannot. Therefore, using H and L to represent the quantitative structure of a syllable, namely, H for heavy, bimoraic and L for light, monomoraic, well-formed feet in Chinese are only of three types: (i) (HH), disyllabic trochee where both syllables are heavy and the first syllable is the head; (ii) (HL),
disyllabic trochee where only the head syllable is heavy; and (iii) (H), monosyllabic bimoraic trochee bearing its own stress. In contrast, ill-formed feet in Chinese include (i) (LL), disyllabic foot constituted by two monomoraic syllables; (ii) (LH), disyllabic foot where only the head syllable is monomoraic and the non-head is bimoraic; and (iii) (L), monosyllabic monomoraic foot. This is illustrated below (where both the syllabic and moraic stress are indicated by x and syllable weight marked as H or L):

(15) (i) Good foot structures in Chinese

\[
\begin{array}{ccc}
  \text{x} & \text{x} & \text{x} \\
  (S) & (S) & (S) \\
  (\mu) & (\mu) & (\mu) \\
  H & H & H \\
\end{array}
\]

Syllabic foot

\[
\begin{array}{ccc}
  \text{x} & \text{x} & \text{x} \\
  (S) & (S) & (S) \\
  (\mu) & (\mu) & (\mu) \\
  H & H & H \\
\end{array}
\]

Moraic foot

(ii) Bad foot structures in Chinese

\[
\begin{array}{ccc}
  \text{x} & \text{x} & \text{x} \\
  (S) & (S) & (S) \\
  (\mu) & (\mu) & (\mu) \\
  L & L & L \\
\end{array}
\]

Syllabic foot

\[
\begin{array}{ccc}
  \text{x} \\
  (S) \\
  (\mu) \\
  H \\
\end{array}
\]

Moraic foot

Therefore, by forbidding the head syllable of a foot at the end of a Prosodic Word (PrW), NONFINALITY in effect bans the occurrence of the monosyllabic foot which, to mention in passing, must be bimoraic if the foot is legitimate, at the final position of a Prosodic Word. This ban is precisely in the same spirit as *IP-FINAL-MONOFT proposed here.

The next question now is how this constraint should be ranked with the other two constraints proposed so far, i.e. BINMAX and BINMIN. To begin with, BINMAX and *IP-FINAL-MONOFT do not conflict: indeed, both must be undominated in the constraint hierarchy. The reason is that neither a potential output violating BINMAX, i.e. (SSS) nor one violating *IP-FINAL-MONOFT, i.e. (SS)(S) can emerge as optimal. Both these two constraints impose a strict, non-negotiable requirement to filter out the sub-optimal forms from the candidate set.

As to the ranking between BINMIN and *IP-FINAL-MONOFT, again we find that they are not in conflict: a violation of the latter is necessarily accompanied by that of the former although the reverse is not necessarily true. In more concrete terms, if a potential output violates *IP-FINAL-MONOFT, which means it has an IP-final monosyllabic foot, then due to this monosyllabic foot, it simultaneously violates BINMIN; however, conversely, a potential output can have a monosyllabic foot, hence violating BINMIN but not violating *IP-FINAL-MONOFT if this foot is not IP-final. It is impossible for a potential form to violate *IP-FINAL-MONOFT without violating BINMIN; therefore, for candidates violating *IP-FINAL-MONOFT, a violation mark under BINMIN is not discriminating, and is therefore ‘cancelable’ (Prince and Smolensky 1993). This is illustrated below (since both constraints are purely output-oriented, the input structure is inconsequential and thus not specified here):

---

9 The monosyllabic monomoraic foot is also referred to as a ‘degenerate foot’ which contains a single light syllable. Many languages have an absolute ban on such feet, which can also be accounted for by the FT-BIN constraint being undominated in the grammar (Kager 1999: 161).
On the other hand, imagine two candidates, one incurring more than one violation of BinMin but satisfying *IP-Final-MonoFT, say (S)(S)(S)(SS), while the other incurring only one violation of BinMin and one violation of *IP-Final-MonoFT, say (SS)(SS)(S). That both are sub-optimal forms indicates that the ranking between the two constraints is immaterial and they do not conflict. This is shown below:\(^{10}\):

### Table (17)

<table>
<thead>
<tr>
<th>Structure</th>
<th>*IP-Final-MonoFT</th>
<th>BinMin</th>
</tr>
</thead>
<tbody>
<tr>
<td>(S)(S)(S)(S)</td>
<td>**</td>
<td>***</td>
</tr>
<tr>
<td>(SS)(SS)(S)</td>
<td>*</td>
<td>*</td>
</tr>
</tbody>
</table>

We illustrate the working of the constraint hierarchy arrived at so far with the two grammatical structures for 3-syll lines below. As mentioned earlier, to present the constraint hierarchy in a linear way, the ranking BinMax >> *IP-Final-MonoFT is trivially assigned to the non-conflicting pair.

### Table (18) (i)

<table>
<thead>
<tr>
<th>Structure</th>
<th>BinMax</th>
<th>BinMin</th>
<th>*IP-Final-MonoFT</th>
</tr>
</thead>
<tbody>
<tr>
<td>[SS]S</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(S)(SS)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(SS)(S)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(SSS)</td>
<td>*</td>
<td></td>
<td>**</td>
</tr>
</tbody>
</table>

(ii)

<table>
<thead>
<tr>
<th>Structure</th>
<th>BinMax</th>
<th>BinMin</th>
<th>*IP-Final-MonoFT</th>
</tr>
</thead>
<tbody>
<tr>
<td>S[SS]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(S)(SS)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(SS)(S)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(SSS)</td>
<td>*</td>
<td></td>
<td>**</td>
</tr>
</tbody>
</table>

To temporarily summarize, these three constraints, all being markedness ones, suffice to select the optimal output for 3-syll lines. Illustrated in the Hasse graph, the emergent sub-grammar at this stage is:

### Diagram (19)

```
  BinMax *IP-Final-MonoFT
     \                  |
      BinMin
```

\(^{10}\) To illustrate this argument, we have to move ahead of ourselves to present examples from the 5-syll lines, which are optimally parsed into (SS)(S)(SS) or (S)(SS)(SS), depending on the input structure, but never the two given here in (21).
with the line indicating the dominance relation between two constraints. *IP-FINAL-MONOFT stands alone alongside the ranking pair B\text{INMAX} and B\text{INMIN}, because it conflicts with neither of them.

### 2.3.3 More on the sub-grammar: evidence from 4-syll lines

Moving on to 4-syll lines, we note that a crucial fact is that the lines are invariably scanned into two disyllabic feet, i.e. (SS)(SS), irrespective of their grammatical structures\(^{11}\). For example, the following verse lines differ in their grammatical structures, but are scanned the same way\(^{12}\):

\begin{align*}
(20) & \quad \text{[wu3 mei4][qiu2 zhi1]} \rightarrow (wu3 mei4)(qiu2 zhi1) \\
& \quad \text{awake asleep desire her} \\
& \quad \text{‘(I) desire her both when I am awake and when I am asleep’}
\end{align*}

\begin{align*}
(21) & \quad \text{[yi4 [er3 [zi3 sun1]]]} \rightarrow (yi4er3)(zi3 sun1) \\
& \quad \text{suit you(r) children grandchildren} \\
& \quad \text{‘(It) suits your children and grandchildren’}
\end{align*}

\begin{align*}
(22) & \quad \text{[[she4 [bi3ju1]] yi3]} \rightarrow (she4 bi3)(ju1yi3) \\
& \quad \text{climb that hill interj} \\
& \quad \text{‘Ah, (I) climb that hill’}
\end{align*}

---

\(^{11}\) It deserves mentioning that this is only true for the verse scansion; if read in a prose style, or put in a prose context, 4-syll lines of certain structures may be scanned in ways other than (SS)(SS). For example,  

\begin{align*}
\text{[zai4 [he2 [zhi1 zhou1]]]} \\
& \quad \text{at river’s bank} \\
& \quad \text{‘at the river’s bank’}
\end{align*}

is scanned as \text{(zai4 he2) (zhi1 zhou1)} when read as a verse line, but when read in the prose context, it is most likely to be scanned as \text{(zai4) (he2 zhi1 zhou1)} with the first monosyllabic foot considerably lengthened and the middle syllable in the trisyllabic foot reduced both segmentally (into schwa) and tonally (into neutral tone). However, the present study is solely concerned with the scansion of verse lines when they are recited as such (as opposed to recitation in a ‘prose-way’), and it stands to reason that the ‘prose scansion’ can be accounted for by re-ranking some of the constraints proposed here for the ‘verse scansion’ (cf. Golston 1998; Schlepp p.c.). Alternatively, assuming that both the segmental and tonal reduction can be attributed to the deletion of one mora from the originally bimoraic syllable, we could argue that one of the most distinct features between the grammar for verse scansion and that for prose scansion is that the former attaches greater importance to the preservation of syllable weight than the latter, hence reduction of syllable weight is forbidden in the verse scansion. Along this line, we could propose that the constraint Max-µ, which requires the conservation of the input mora in the output, is ranked very high in verse scansion grammar. In contrast, in prose scansion, this constraint is lowly ranked, at least dominated by some constraints requiring the conservation of the grammatical structure of the input.

\(^{12}\) As in the case of 3-syll lines, the apparent ignoring of the input structure by the optimal parse is not totally without cost: for example, the 4-syll lines given here are experienced differently by the native speaker. For example, (20) is felt to be metrically very harmonious, in contrast to, say, (22), which is felt to be metrically much tenser. This is going to be discussed in the next section.
Classical Chinese Verse Grammar

(23) \[[\text{wo3 ma3}] \text{ tu2} \text{ yi3}] \rightarrow (\text{wo3 ma3}) (\text{tu2yi3})

I/my horse tired interj

‘Ah, my horse is tired’

(24) \[[\text{fei3} \text{ wo3si1}] \text{ cun2}] \rightarrow (\text{fei3 wo3}) (\text{si1 cun2})

not my thought lie

‘(they are) not where my thoughts lie’

This data is fully accounted for by the emergent sub-grammar. As shown below, (SS)(SS) always incurs the minimal violation and comes out as the winner. The grammatical structure of the line is unspecified, due to its irrelevance:

\[
\begin{array}{|c|c|c|c|}
\hline
\text{SSS} & \text{BINMAX} & \text{BINMIN} & \text{*IP-FINAL-MONOFT} \\
\hline
\text{SSS} & (\text{SS})(\text{SS}) & \ast \ast \ast & \\
\text{(SS)(SS)(S)} & \ast \ast \ast & \ast \\
\text{(S)(SS)(S)} & \ast \ast \ast & \ast \\
\text{(S)(S)(SS)} & \ast \ast \ast & \\
\text{(SSS)(S)} & \ast \ast \ast & \\
\text{(S)(SSS)} & \ast \ast \ast & \\
\text{(S)(SSS)} & \ast \ast \ast & \\
\hline
\end{array}
\]

The optimal scansion (SS)(SS) incurs no violation under the current constraint hierarchy. This, however, does not contradict the claim that in OT there are no ‘perfect’ winners and that even the optimal output is bound to incur some violation, which is referred to as the ‘minimal violation’ (Prince and Smolensky 1993), as the constraint hierarchy so far is only a subset of the sub-grammar in its final shape when all line types are examined. There, the optimal output (SS)(SS) will predictably violate some constraint(s).\(^{13}\)

\(^{13}\) Interestingly, this minimal violation of the constraints achieved when the input is of the structure [SS][SS] may also account for, at least to a certain extent, why in modern Chinese, the overwhelming majority of 4-syll idioms have the grammatical structure of [SS][SS]. More interestingly, even in those cases which do not have this symmetrical structural representation, the established scansion is (SS)(SS); a compelling example is

\[[\text{yi4 yi1 dai4}] \text{ shui3}] \rightarrow (\text{yi4 yi1}) (\text{dai4 shui3})

one clothing belt water

‘(separated by only) the water of the width of a clothing belt’.

It might be of further interest to note how this optimal scansion may sometimes serve in turn to corrupt the interpretation of the input string. In this case, for example, some informants do harbor, next to the correct interpretation, such a ‘corrupted’ interpretation as ‘a piece of clothing brings the water’ which, though not making much sense, corresponds to a ‘back-propagated’ grammatical structure [yi4 yi1][dai4 shui3] from the optimal scansion (yi4 yi1)(dai4 shui3).

\(^{14}\) Here might be a good point to briefly discuss the Gestalt effect in verse scansion. Although as stated earlier, the present study is confined to the verse line level, in actual verse recitation, the native speaker delivers the whole verse in its entirety rather than just individual lines. Consequently, the scansion of verse line should ideally be perceived in its verse context, in particular in the context of its preceding lines where the prevailing rhythmical pattern has been established in the performer’s mind and is most likely to carry on with momentum to influence how the incoming new lines are to be scanned. This holistcnicness in the perception of patterns and its subsequent influence on the individual constituting elements are known as the Gestalt effect in cognitively oriented studies on a range of topics. For example, Meyer (1956) is concerned with the Gestalt effect in the perception of music whereas Arnhem (1967) with that in the perception of the visual arts. Tsur (1998) applies it to the perception of poetic rhythm and versification. In verse scansion, the Gestalt effect may be rather strong: the mind
2.3.4 ALIGNR (Ft, IP), ANCHORING and GOODFTINTERJ: evidence from 5-syll lines

So far the emergent sub-grammar solely consists of markedness constraints that are only concerned with the well-formedness of the output. The scansion of 5-syll lines exposes the insufficiency of this sub-grammar and provides crucial evidence for inclusion of faithfulness constraints in the sub-grammar.

First, consider lines of the grammatical structure of [[SS][SS]]S, which are scanned as (SS)(S)(SS). For example:

(26)  [[ru2 ci2][liang2 ren2]] he2→(ru2 ci2)(liang2)(ren2he2)  
      like this fine person interj * (ru2 ci2) (liang2 ren2) (he2)  
      ‘Ah, a fine person like this!’

The analysis under the emergent sub-grammar so far is:

(27)  

<table>
<thead>
<tr>
<th>[[SS][SS]]S</th>
<th>BinMax</th>
<th>BinMin</th>
<th>*IP-FINAL-MONOFT</th>
</tr>
</thead>
<tbody>
<tr>
<td>(SS)(S)(SS)</td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(SS)(SS)(S)</td>
<td></td>
<td>*!</td>
<td></td>
</tr>
<tr>
<td>(S)(SS)(SS)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(SS)(SSS)</td>
<td></td>
<td>*!</td>
<td></td>
</tr>
<tr>
<td>(SS)(SS)</td>
<td></td>
<td>*!</td>
<td></td>
</tr>
</tbody>
</table>

As the current constraint hierarchy stands now, the potential (and in fact suboptimal) scansion (S)(SS)(SS) incurs the same violation as the desired output (SS)(S)(SS). (We use E and ☞ to respectively mark out the undesired and the true winner.) Obviously, to ensure the latter as the sole winner, some constraint is needed that cashes in on maintains as much of the current pattern as possible, and even tends to perpetuate ametrical or rhythmical pattern initially established. One of the most important ways in which the Gestalt effect works is through the formulation of expectation, on the assumption that ‘the mind is constantly striving toward completeness and stability of shapes (Meyer Ibid.: 87)’. Accordingly, the mind tends to complete what was incomplete, to regularize what was irregular. In the context of verse, this property is reflected in the notion of ‘metrical set’ (Chatman 1965), which produces the assimilative power of rhythm from one line to the next in a poem. The metrical set established by previous lines might be so strong as to assimilate an apparently deviating line into this already established pattern, provided of course, this line occurs significantly infrequently.

With regard to the present analysis, it needs to be emphasized that the Gestalt effect remains viable even though the analytical domain is the line. Here, for instance, lines of the structure S[[SS][S]] (see (24) above for an example) can arguably also be scanned as (S)(SS)(S), at least according to some informants. But once considered in the verse context in which it occurs, (SS)(SS) apparently comes as the only natural scansion whilst (S)(SS)(S) sounds awkward and out of place. The reason is because the lines preceding this one have already firmly established (SS)(SS) as the predominant scansion for 4-syll lines, a scansion so deeply entrenched in the reader’s mind that it takes more than one single line to shake off its effect. As stated back in Chapter 1, only the best accepted scansion is considered as the optimal scansion for an input line, and accordingly, our strategy in handling such cases is to opt for the scansion that is good both in isolation and in its verse context. Thus, with this guideline, the optimal scansion for 4235 is (SS)(SS), as indicated above. Formally, we might suggest that the Gestalt effect can be expressed in OT terms as an inter-linear faithfulness constraint, which must be highly-ranked (cf. Holtman’s (1996) work on an OT account of rhyme). We leave this issue open here.
what distinguishes (SS)(S)(SS) from (S)(SS)(SS). Compare the two scansion and we notice that in (SS)(S)(SS) the right edges of the feet are better aligned than in (S)(SS)(SS) to the right edge of the IP, which is, as pointed out before, the prosodic correspondent of the verse line. This readily suggests a constraint from the well-attested alignment constraint family. More specifically, to give (SS)(S)(SS) an edge over its competitor (S)(SS)(SS) to finally win, the following constraint needs to be introduced:

(28) \text{ALIGNR (FT, IP)}

The right edge of every prosodic foot coincides with the right edge of an IP.

As is typical of alignment constraints, ALIGNR (FT, IP) is evaluated gradiently, and specifically in terms of the number of syllables separating the two right edges that are required to coincide but are actually not. For example, (SS)(S)(SS) incurs 5 (= 2+3) violations of this constraint whilst (S)(SS)(SS) incurs 6 (= 2+4)\(^\text{15}\).

The next question is how to rank this newly introduced constraint with the other constraints. For convenience sake, we repeat the tableau in (27) above and indicate the satisfaction/violation of the new constraint ALIGNR (FT, IP) by the same set of candidates:

(29)  

<table>
<thead>
<tr>
<th>[[SS][SS]]S</th>
<th>BINMAX</th>
<th>BINMIN</th>
<th>*IP-FINAL-MONOFT</th>
<th><strong>ALIGNR (FT, IP)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>* (SS)(S)(SS)</td>
<td>*</td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>(SS)(SS)(S)</td>
<td>*</td>
<td></td>
<td></td>
<td>*!</td>
</tr>
<tr>
<td>E (S)(SS)(SS)</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(SS)(SSS)</td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(SSS)(SS)</td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This way, the ranking for ALIGNR (FT, IP) with other constraints becomes explicit. To begin with, BINMAX >> ALIGNR (FT, IP), because if the reverse were true, i.e. ALIGNR (FT, IP) >> BINMAX, then the potential form (SSS)(SS), or more precisely, (SSSSS), for that matter, with zero violations of ALIGNR (FT, IP) would win. This is shown below:

\(^{15}\) The violation of ALIGNR (FT, IP) by a candidate is calculated via the degree of misalignment between the right boundary of each foot contained in the IP and that of the IP in terms of the number of intervening syllables, and then adding up the numbers. For example, (SS)(S)(SS) contains three feet, the rightmost foot (SS) has its right boundary perfectly aligned with the right boundary of the IP, the middle foot has two syllables between its right boundary and that of the IP, while the first foot has three syllables between the two right boundaries. Thus, the overall violation of ALIGNR (FT, IP) by (SS)(S)(SS) is the sum of these two numbers: 2+3 = 5.
Second, there is no evidence for crucial ranking between BinMin and AlignR (FT, IP). The reason is that they have the same interests and do not conflict. Indeed, given the inviolability of BinMax, BinMin is inevitably violated in 5-syll lines.

Third, *IP-final-MonoFt >> AlignR (FT, IP), otherwise (SS)(S)(SS) would win. The ranking argument is

Hence the emergent sub-grammar is, presented in the Hasse graph, as follows:

Now, note that this emergent sub-grammar still consists only of markedness constraints, which implies that (SS)(S)(SS) would always emerge as the optimal scansion independent of the input. However, unlike the 4-syll lines, where the optimal scansion remains the same irrespective of the input structure, the optimal scansion may vary for the 5-syll lines with different grammatical structures. For example, lines of the grammatical structures [S][SS][SS], S[[SS][SS]] and S[[SS][S]][S] are all optimally scanned as (S)(SS)(SS) rather than (SS)(S)(SS):

(33) [san1[zhi1 ri4]] [yu2 lu3] → (san1) (zhi1 ri4)(yu24 lu3)
    three particle day very heavy
    ‘On the days of the third (month), (the wind) is very heavy’

(34) yuan3 [[fu4 mu3] [xiong1 di4]] → (yuan3) (fu4 mu3) (xiong1 di4)
    distant father mother brother brother
    ‘(She) becomes distant from her parents and brothers’

(35) [xing2 [[yu3 zi3] huan2]] xi1 → (xing1) (yu3 zi3) (huan2 xi1)
    go with you return interj
    ‘Ah, (I) go and return with you’
As just suggested, given the current constraint hierarchy, (SS)(S)(SS) will always win over other potential forms; (S)(SS)(SS) will always lose due to more violations of ALIGNR (FT, IP). This is illustrated below with S[[SS][SS]]:

\[(36)\]

<table>
<thead>
<tr>
<th>S[[SS][SS]]</th>
<th>BINMAX</th>
<th>BINMIN</th>
<th>*IP-FINAL-MONOFT</th>
<th>ALIGNR (FT, IP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(SS)(S)(SS)</td>
<td></td>
<td>*</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>(SS)(SS)(S)</td>
<td></td>
<td>*</td>
<td>*</td>
<td>4</td>
</tr>
<tr>
<td>(S)(SS)(SS)</td>
<td></td>
<td>*</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>(SS)(SS)</td>
<td></td>
<td>*</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>(SSS)(SS)</td>
<td></td>
<td>*</td>
<td></td>
<td>2</td>
</tr>
</tbody>
</table>

It is evident that a mere re-ranking of the current four constraints will not lead (S)(SS)(SS) to become the winner. A new constraint is in order, and crucially this constraint cannot merely be concerned with the output. Now carefully compare both the true winner, (S)(SS)(SS) and the unwanted winner (SS)(S)(SS) against the input structure. The most distinct difference is that the edges of the prosodic feet in (S)(SS)(SS) fully match those of the grammatical constituents in the input but it is not so with (SS)(S)(SS).

This correspondence of edges between the input and the output structures can be further traced to the correspondence of the segments respectively at the edges of the input and the output structures. This brings to bear the ANCHORING constraint proposed in McCarthy (2000:184). There two subcategories of ANCHORING are distinguished, i.e. ANCHOR-POS and ANCHOR-SEG, which respectively require the conservation of a segment’s position and a segment per se occurring at the designated edge. We argue that of the two, ANCHOR-SEG is relevant, which requires that segments at the designated peripheries of two representations S1 and S2 correspond to each other, thus in effect requiring the correspondence of edges between S1 and S2 (Kager 1999)\(^{16}\) \(^{17}\). For simplicity sake, below we will refer to ANCHOR-SEG as ANCHOR.

Furthermore, McCarthy (Ibid: 183) argues for the ‘existence of distinct but symmetric ANCHORING constraints from S1 to S2 and from S2 to S1’, a move that ‘parallels to an established symmetry in Correspondence Theory’. In other words, ANCHOR is a directional constraint can be broken down into two sub-constraints; McCarthy (Ibid.: 185) expresses them respectively as I-ANCHOR and O-ANCHOR, which are respectively comparable to MAX and DEP. For ease of constraint evaluation, we choose to formulate the two ANCHORING sub-constraints as follows:

\(^{16}\) Needless to say, this is only true when no syllables are deleted or inserted. This is already taken care of by the highly ranked MAX and DEP mentioned back in Footnote 5.

\(^{17}\) Indeed, as Kager (1999) points out, the ANCHORING constraint was first proposed in McCarthy and Prince (1995a) to replace ALIGNMENT (McCarthy and Prince 1993a) in those applications concerned with the correspondence between the elements at the designated peripheries (left or right) of S1 and S2, such as Input and Output, Base and Reduplicant etc.. In McCarthy and Prince (1999), it is further argued that ANCHORING should subsume ALIGNMENT in general on the account that edges of constituents can in effect be matched by the correspondence of segments standing at edges, using the ANCHORING format. It is in this extended sense that ANCHORING is being deployed here.
The edges in the input refer to the boundary of the grammatical constituent while that in the output refers to the prosodic foot boundary\(^{18}\). The two constraints respectively guard against the deletion and insertion of edges and together they are responsible for the boundary matching between the grammatical and the prosodic structures. Below we use ANCHOR when the two ANCHORING sub-constraints are referred to collectively.

As to the evaluation of ANCHOR, it is important to bear in mind that the edge matching is in effect achieved via the correspondence of the segments standing at the designated edges. Therefore, what matters is the presence or absence of the edges, i.e. brackets; neither the number of layers nor the direction of the brackets is relevant to the evaluation. Hence, ANCHOR-IO is satisfied as long as one or more (leftward and/or rightward) edges at a position in the input has a correspondent at the same position in the output, and violated when no such correspondence exists; \emph{mutatis mutandis} for ANCHOR-OI. For example, given the input-output pair of S[[SS][SS]] and (SS)(S)(SS), ANCHOR-IO is violated once due to (and despite) the lack of an output correspondent for the two grammatical boundaries between the first and the second syllables in the input and ANCHOR-OI is also violated only once due to (and despite) the lack of input correspondent for the two prosodic boundaries between the second and the third syllables in the output.

Having discussed the formulation and evaluation of ANCHOR, we now consider its ranking with the other constraints. Reconsider Tableau (36), which we juxtapose below with a separate column indicating the violation of ANCHOR-IO and ANCHOR-OI by the same (sub-)set of candidates.

\begin{table}[h]
\centering
\begin{tabular}{|c|c|c|c|}
\hline
\text{S[[SS][SS]]} & \text{BINMAX} & \text{BINMIN} & \text{*IP-FINAL-MONOFT} & \text{ALIGNR (Ft, IP)} \\
\hline
\text{\(\uparrow\)} (SS)(S)(SS) & * & * & 5 \\
(SS)(SS)(S) & * & *! & 4 \\
\text{\(\downarrow\)} (S)(SS)(SS) & * & *! & 6! \\
(SS)(SSS) & *! & * & 3 \\
(SSS)(SS) & *! & * & 2 \\
\hline
\end{tabular}
\end{table}

\begin{table}[h]
\centering
\begin{tabular}{|c|c|c|}
\hline
\text{S[[SS][SS]]} & \text{ANCHOR-IO} & \text{ANCHOR-OI} \\
\hline
(SS)(S)(SS) & * & * \\
(SS)(SS)(S) & ** & ** \\
(S)(SS)(SS) & * & * \\
(SS)(SSS) & ** & * \\
(SSS)(SS) & * & * \\
\hline
\end{tabular}
\end{table}

\(^{18}\) This formulation also allows us to bypass the need to specify the status of the grammatical constituents involved, which, as argued in Appendix II, are of a rather disparate nature and defy a unified characterization.
It is clear from (ii) that the true winner (S)(SS)(SS) incurs no violation of the two ANCHOR constraints while the undesired winner (SS)(S)(SS) incurs one violation of each of them. This provides the crucial ranking argument for ANCHOR >> ALIGNR (FT, IP), as indicated below. Note that we assume at this point that the two ANCHORING sub-constraints stay together in the hierarchy and are unranked with each other unless evidence arises calling for their ranking apart.

\[
\begin{array}{ccc}
S[[SS][SS]] & \text{ANCHOR-IO} & \text{ANCHOR-OI} & \text{ALIGNR(FT, IP)} \\
(SS)(S)(SS) & *! & * & 5 \\
\emptyset (S)(SS)(SS) & & & 6 \\
\end{array}
\]

As to the ranking between ANCHOR and the other constraints, the scansion of lines of S[[SS][SS]] falls short of providing crucial evidence: the optimal scansion satisfies ANCHOR, and the suboptimal forms incur various numbers of violations of ANCHOR. Crucial evidence for the ranking comes from the scansion of other coding types. Specifically, the scansion of lines of the structure [[SS][SS]]S (cf. (30) and (31)) provides evidence for the ranking of ANCHOR with BINMAX and *IP-FINAL-MONOFT: the scansion fully mapping the input structure, i.e. satisfying ANCHOR, loses to that satisfying the output-oriented constraints *IP-FINAL-MONOFT and BINMAX. Thus, both *IP-FINAL-MONOFT and BINMAX must dominate ANCHOR. The ranking argument is:

\[
\begin{array}{ccc}
[[SS][SS]]S & \text{*IP-FINAL-MONOFT} & \text{ANCHOR-IO} & \text{ANCHOR-OI} \\
\emptyset (SS)(S)(SS) & *! & * & \\
(SS)(SS)(S) & *! & & \\
\end{array}
\]

As for the ranking between BINMIN and ANCHOR, the evidence comes from verse lines with an even number of syllables, since the potential scansion for those with an odd number of syllables will always contain one monosyllabic foot, thus incurring one violation of BINMIN (unless they contain a trisyllabic foot which violates the highly ranked BINMAX). Specifically, consider lines of the grammatical structure S[S[SS]] which are scanned as (SS)(SS). For example:

\[
\begin{array}{cccc}
\text{wo3 [cu2 [dong1 shan1]]} \rightarrow \text{(wo3 cu2) (dong1 shan1)} \\
\text{I go east mountain} \\
\text{‘I go to the mountain on the east’}.
\end{array}
\]

This provides evidence for BINMIN to be ranked higher than ANCHOR:
The reasoning can also be conducted along this line: if ANCHOR >> BINMIN, then (SS)(SS) would lose and (S)(S)(SS) would win. However, this is empirically not true, hence BINMIN must dominate ANCHOR. In addition, since we have argued for the ranking ANCHOR >> ALIGNR (Ft, IP) (cf. (39)), by transitivity, we get BINMIN >> ALIGNR (Ft, IP).

To summarize, based on the scansion of the 5-syll Shijing lines supplemented by that of the 4-syll ones, we have introduced ANCHOR and ranked it accordingly. The emergent sub-grammar at this stage is presented in the Hasse graph below:

This constraint hierarchy, as it stands now, can adequately account for the scansion of all 5-syll Shijing lines, with only one exception, namely, the lines of the structure [SS][SS] with a line-medial interjection. This is illustrated below:

Given the constraint hierarchy reached so far, the optimal scansion is (SS)(S)(SS) rather than the empirically attested (S)(SS)(SS):

<table>
<thead>
<tr>
<th>[SS][SS]</th>
<th>BinMax</th>
<th>BinMIN</th>
<th>*IP- FINAL-MONOFT</th>
<th>ANCHOR-IO</th>
<th>ANCHOR-OI</th>
<th>ALIGNR (Ft, IP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(SS)(SS)</td>
<td>*</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>(S)(SS)(SS)</td>
<td>*</td>
<td>*</td>
<td>*!</td>
<td></td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>(SS)(SS)</td>
<td>*</td>
<td>*</td>
<td>*!</td>
<td></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>(SSS)(SS)</td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>(SS)(SSS)</td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>
At first it might appear puzzling why (SS)(S)(SS) fails to be the empirically attested scansion: it outperforms (S)(SS)(SS) by better satisfying both ANCHOR and ALIGNR (FT, IP). What constraint could be motivated to salvage (S)(SS)(SS) over (SS)(S)(SS)? The answer comes from the peculiarity exhibited in the parsing of the interjection. In the optimal scansion de facto, the interjection, which is the third syllable from the left, is parsed as the second syllable of a disyllabic foot. In contrast, in the unwanted winner, the interjection constitutes a monosyllabic foot on its own.

This difference in parsing the interjection syllable between the actual and the unwanted winners suggests that it is preferable to parse an interjection syllable as the second syllable of a disyllabic foot rather than as a monosyllabic foot. Furthermore, it is noteworthy that an interjection syllable cannot occupy the first position of the disyllabic foot: a parsing of the present line into (SS)(SS)(S) in which the second foot starts with an interjection is unquestionably ill-formed (though it happens that in this case, the parsing is suboptimal also on account of its violation of the highly ranked *IP-FINAL-MONOFT due to the presence of the line-final monosyllabic foot). Therefore, to sum up, suppose we use $S_I$ to stand for the interjection syllable and $S$ for other syllables (in particular lexical categories), the well-formedness pattern of prosodic feet containing $S_I$ is as follows:

$$
\begin{array}{|c|c|}
\hline
\text{Foot type} & \text{Well-formedness} \\
\hline
(SS_I) & \text{Good} \\
(S_I) & \text{Bad} \\
(S,S) & \text{Bad} \\
\hline
\end{array}
$$

With this peculiarity of the interjection syllable parsing in mind, we re-consider the two candidates (SS)(S)(SS) and (S)(SS)(SS) at issue in (46) where the third syllable is an interjection. It is obvious that the former has a monosyllabic foot constituted by the interjection, which, as shown above, is ill-formed. By comparison, in the latter the interjection is parsed as the second syllable of a disyllabic foot, which is well-formed, although the cost of this parsing is that the edges in the input and the output no longer match each other, namely, ANCHOR is violated.

This suggests two things. First, a new constraint is needed to evaluate the well-formedness of feet containing an interjection syllable. In this light, we propose the constraint GOODFTINTERJ which serves exactly the same purpose as (47) in constraining the shape of the foot containing an interjection syllable. It follows the same well-formedness pattern of such feet delimited in (47) and is formulated as:

$$\text{(48) GOODFTINTERJ}$$

The interjection syllable can only be legitimately parsed as the second syllable of a disyllabic foot.

Second, a trade-off relation exists between this new constraint and ANCHOR, or, in other words, this new constraint conflicts with ANCHOR. The ranking argument is provided by the pair of candidates (SS)(S)(SS) and (S)(SS)(SS): (SS)(S)(SS) satisfies ANCHOR, but violates GOODFTINTERJ, and is suboptimal whereas (S)(SS)(SS) satisfies GOODFTINTERJ, but violates ANCHOR, and is optimal. Hence:
Now, we consider the ranking of **GOODFTINTERJ** with the other constraints. First, since as argued above, **ANCHOR >> ALIGNR (FT, IP)**, by transitivity, we also have **GOODFTINTERJ >> ALIGNR (FT, IP)**. Second, **GOODFTINTERJ** does not conflict with **BINMAX**; indeed like **BINMAX**, **GOODFTINTERJ** is necessarily undominated in the hierarchy. The relevant pair of candidates, (SSS)(SS) and (SS)(S)(SS), which violate **BINMAX** and **GOODFTINTERJ** respectively, are both suboptimal, whereas the optimal candidate (S)(SS)(SS) violates neither of the two constraints. This is indicated below:

![Table](image)

Thirdly, by the same token, **GOODFTINTERJ** does not conflict with ***IP-FINAL-MONOFT**; the relevant candidate pair, (SS)(S)(SS) and (SS)(SS)(S), which respectively violate these two constraints, are both suboptimal whereas the optimal candidate (S)(SS)(SS) violates neither of the two constraints. This non-ranking between these two constraints is illustrated below:

![Table](image)

Fourthly, as to the ranking between **GOODFTINTERJ** and **BINMIN**, the 5-syll lines provide no evidence. The reason is that **BINMIN** is not discriminating enough for the two relevant competitors (SS)(S)(SS) and (S)(SS)(SS): both violate **BINMIN**. In fact, for verse lines containing an odd number of syllables, their scansion inevitably contain either a monosyllabic foot or a trisyllabic one under the premise that all the syllables are parsed. Therefore, all the candidates violate either **BINMAX** or **BINMIN** (or both, as in (S)(SS)(S)). Given the ranking **BINMAX >> BINMIN** reached above, those forms violating **BINMAX** are suboptimal whilst of the forms violating **BINMIN**, the one best satisfying the other constraints in the hierarchy is optimal. Therefore, **BINMIN** belongs to the kind of constraints that is violated by the winner and some of the losers alike, and at least for 5-syll lines, its ranking with **GOODFTINTERJ** is immaterial.

As an interim summary, the emergent sub-grammar now is:

\[(49) \text{GOODFTINTERJ >> ANCHOR}\]

<table>
<thead>
<tr>
<th>[SS][S][SS]</th>
<th>GOODFTINTERJ</th>
<th>ANCHOR-IO</th>
<th>ANCHOR-OI</th>
</tr>
</thead>
<tbody>
<tr>
<td>(SS)(S)(SS)</td>
<td>!</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(S)(SS)(SS)</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
</tbody>
</table>

As an interim summary, the emergent sub-grammar now is:
So far, however, we have only mentioned that the newly introduced \textsc{GoodFtInterj} constraints the well-formedness of prosodic feet containing an interjection syllable; what remains to be discussed is why the parsing of interjection syllables is subject to this constraint. Below we argue that this parsing pattern of interjection syllables, i.e., the constraint \textsc{GoodFtInterj} per se, is attributable to the phonological property of such syllables.

### 2.3.4.1 Phonological property of interjection syllables

Reconsider the pattern in (47), and it is immediately notable that the only legitimate position an interjection syllable can occur in is the second position of a disyllabic prosodic foot. In contrast, a monosyllabic foot constituted by an interjection syllable and a disyllabic foot with an interjection syllable occupying the first position are both ill-formed. We argue that this parsing pattern is attributable to the phonological representation of interjection syllables, namely, they are underlingly light, i.e. monomoraic. Given the argument that the only good foot type in Chinese is trochee (at both the syllabic and the moraic levels) (cf. Duanmu 1999, 2000; also see (15) above), the only good foot containing an interjection syllable is a disyllabic one where the interjection syllable, being monomoraic, occurs in the second position, i.e. the weak position of a disyllabic trochee. By comparison, a monosyllabic foot solely formed by an interjection syllable, hence also a monomoraic foot, and a disyllabic foot with an interjection syllable occupying the first position, namely, the head of the trochee, are both ill-formed. This is illustrated below together with comments on the well-formedness of each foot type (for clarity sake, we give the moraic and syllabic representations as well as syllable quantification structure next to the pattern of well-formedness presented in (47)).

(53)

<table>
<thead>
<tr>
<th>Foot type</th>
<th>Prosodic representation</th>
<th>Well-formedness</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\text{SS})</td>
<td>x \ (S S) \ (\mu\mu)(\mu) \ x \ H \ L</td>
<td>Good</td>
<td>Syllabic trochee and moraic trochee; heavy syllable carrying stress</td>
</tr>
</tbody>
</table>
This way, the constraint GOODFTINTERJ may be reformulated in terms of the conjunction of well-established universal constraints such as RH\textsc{type}=T (Feet have initial prominence, namely, are trochaic; cf. Kager 1999:172) and STRESS-TO-WEIGHT (If stressed, then heavy; cf. Riad 1992; Myers 1997). However, for simplicity sake, we continue to use GOODFTINTERJ portmanteau in our constraint hierarchy.

Two more points about the prosodic feet containing an interjection syllable call for discussion. First, so far we have only focused on the well-formedness of monosyllabic and disyllabic feet containing interjection syllables, and said nothing about trisyllabic feet. Although trisyllabic feet are expelled as illicit in verse scansion by the highly ranked B\textsc{inmax}, it is still necessary for the candidates containing such feet (albeit suboptimal) to undergo evaluation by GOODFTINTERJ. As argued above, on the one hand, interjection syllables are underlyingly monomoraic and thus unable to bear stress, and on the other hand, it has been argued that trisyllabic feet in Chinese result from the merging between a disyllabic foot and its neighboring monosyllabic foot, and as such, have the stress pattern of S(trong)-W(eak)-W(eak) (Duanmu 2000: 188). Therefore, an interjection syllable can legitimately occupy the medial or the final position of a trisyllabic foot, and as far as the parsing of the interjection syllable is concerned, (SSIS) or (SSSI) are both well-formed.

Second, it needs to be pointed out that the phonological property of interjection syllables argued for here is true with all interjections occurring in the Shijing genre, including the interjection ‘xi’. The reason that ‘xi’ is singled out is because it also occurs in the Chuci genre, but behaves differently there. Indeed, as we are going to argue in the next chapter, the versatility ‘xi’ exhibited in different contexts, which refer to both the specific phonological context and the broad context of the genre in which it occurs, is attributable to the presence of an empty mora in its underlying representation.

\begin{table}[h]
\centering
\begin{tabular}{|c|c|c|c|}
\hline
(S) & x & Bad & Light (monomoraic) syllable unable to carry stress\textsuperscript{19} \\
 & (S) & & \\
 & (\(\mu\)) & & \\
 & L & & \\
\hline
(S,S) & x & Bad & Light syllable unable to carry stress \\
 & (S S) & & \\
 & (\(\mu\)) & & \\
 & (\(\mu\)\(\mu\)) & & \\
 & x & & \\
 & L & & \\
 & H & & \\
\hline
\end{tabular}
\end{table}

\textsuperscript{19} An alternative way of accounting for the ill-formedness of the monosyllabic, monomoraic foot constituted by the interjection syllable alone is that it fails to meet the B\textsc{inarity} requirement, which is proposed in the literature as a general foot well-formedness constraint (e.g. Kager 1999), at either the syllabic or the moraic level.

\textsuperscript{20} Indeed, this is true in prose scansion where trisyllabic feet are allowed, for example:

(i) \(fa1 hu1 qing2 \rightarrow (fa1 hu1 qing2)\)

\quad \text{arise interj passion ‘Arise (out of) passion’}

(ii) [he2 shang4] \(hu1 [ao2xiang2] \rightarrow (he2 shang4 hu1) (ao2 xiang2)\)

\quad \text{river above interj fly fly ‘(The arrows) fly over the river’}. 

---
2.3.5 More on the sub-grammar: the scansion of 6-syll lines

Moving on to 6-syll lines, we note that they are all optimally scanned as (SS)(SS)(SS) irrespective of the grammatical structures. Some examples are:

(54) (i) \([\text{can1 zhi2]} [\text{zi3 } [\text{zhi1 qv4}]] \text{ xi1} \rightarrow (\text{can1 zhi2}) (\text{zi3 zhi1}) (\text{qie4 xi1})\)
    grasp hold you 's sleeve interj
    ‘Ah, (I) hold you by your sleeve’

(ii) \([\text{wu3 yue4} [\text{si1 zhong3} ] [\text{dong4 gu3}]] \rightarrow (\text{wu3 yue4}) (\text{si1 zhong3}) (\text{dong4 gu3})\)
    fifth month this cricket move leg
    ‘In the fifth month, the crickets move their legs’

(iii) \([\text{zheng4 shi4}] [\text{yi1 } [\text{pi2 yi4} \text{ wo3}]] \rightarrow (\text{zheng4 shi4}) (\text{yi1 pi2}) (\text{yi4 wo3})\)
    political affairs all give offer me
    ‘The political affairs are all handed to me’

(iv) \([\text{liu4 yue4} [\text{shi2 } [\text{yu4 jii2 yu4}]]] \rightarrow (\text{liu4 yue4}) (\text{shi2 yu4}) (\text{ji2 yu4})\)
    sixth month eat date plum
    ‘In the sixth month, (we) eat dates and plums’

(v) \([\text{yu4 } [\text{ren2 } [\text{zhi1 jian1 } \text{ nan2}]]] \rightarrow (\text{yu4 ren2}) (\text{zhi1 jian1}) (\text{nan2 yi3})\)
    suffer human's hardship difficulty interj
    ‘Ah, suffering from human’s hardships and difficulties’

(vi) \([\text{dai4 jii2 [gong1 zi3]} [\text{tong2 gui1}]] \rightarrow (\text{dai4 jii2}) (\text{gong1 zi3}) (\text{tong2 gui1})\)
    wait till lord gentleman together return
    ‘(I) wait till the gentleman can come back together (with me)’

(vii) \([\text{wo1 gui1 [zhuo2 [bi3 jin1 zun1]]]} \rightarrow (\text{wo1 gui1}) (\text{zhuo2 bi3}) (\text{jin1 zun1})\)
    temporarily fill that golden wineglass
    ‘I temporarily fill that golden wineglass (with wine)”.

Recall it has been shown that for 4-syll lines the optimal scansion is invariably (SS)(SS) irrespective of the input structure. Similar things can be suggested for 6-syll lines: (SS)(SS)(SS) would, given the current sub-grammar, always emerge as optimal. This is true with both lines containing no interjection syllables (e.g. (ii), (iii), (iv), (vi), and (vii) above) and those containing such syllables (e.g. (i) and (v)), as illustrated below:

(55) (i)
In all cases, the scansion (SS)(SS)(SS) satisfies the highly ranked constraints in the constraint hierarchy which are all markedness ones, namely, BINMAX, BINMIN, *IP-FINAL-MONOFT and GOODFTINTERJ. When the line contains no interjections, GOODFTINTERJ is vacuously satisfied; in those lines containing interjections, such syllables always occur line-finally, and as *IP-FINAL-MONOFT forbids line-final monosyllabic feet, the interjection syllables in the optimal scansion will always adjoin to the preceding syllable to parse into a disyllabic foot, thus satisfying GOODFTINTERJ. As we are going to see in Chapter 8, this distribution of interjection syllables proves significant.

As the sub-grammar stands now, these constraints all dominate ANCHOR, the only constraint that has to refer back to the input. Therefore, (SS)(SS)(SS), by best satisfying all the markedness constraints, outperforms all the other competing candidates which would each incur at least one violation of the highly ranked markedness constraints even though they might better satisfy ANCHOR, whose role in evaluating the candidates is suppressed due to its relatively low ranking.

Thus, even though no new constraints or rankings are motivated, the scansion of 6-syll Shijing lines demonstrates the sufficiency of the current sub-grammar.

2.3.6 ANCHOR-\textit{I}_{\textit{Sb}}O_{\textit{Php}} and *\textit{Php}-FINAL-MONOFT: evidence for hierarchicality from 7-syll lines

We now move to 7-syll lines. Some grammatical structures present no challenge to the constraint hierarchy reached so far, for example, [S[SS]][S[S[SS]]] and [S[S[S[SS]]]][S]:

\begin{itemize}
  \item \textit{san}1 \textit{[zhil ri4]} \textit{[na4 [yu2 [ling2yin1]]]}
  \end{itemize}

  ‘In days of the third (month), (we) carry (the ice) to the ice-houses’

21 As we are going to see in Chapter 8, this distribution of interjection syllables proves significant.
(ii) \[[\text{huan2} \ [\text{yu2} \ [\text{shou4} \ [\text{zi3} \ [\text{zhi1} \ [\text{can4}\]]\]]\] \text{xi1}\]
return I present you particle magnificence interj
‘Ah, (when you) return, I will present (you with) your magnificence’.

\rightarrow (\text{huan2 yu2} \ (\text{shou4 zi3}) \ (\text{zhi1})(\text{can4 xi1})

In both cases, the optimal scannings (SS)(S)(SS)(SS) and (SS)(SS)(S)(SS) are fully predicted by the constraint ranking so far. This is illustrated below:

\begin{align*}
\text{(57)} & \quad \text{(i)} \\
\begin{array}{|c|c|c|c|c|c|c|}
\hline
\text{BINMAX} & \text{BINMIN} & \text{GOODFt} & \#\text{IP-FINAL-MonoFt} & \text{ANCHOR-IO} & \text{ANCHOR-OI} & \text{ALIGNR} \\
\hline
\text{S}[SS][SS][SS] & * & * & * & * & * & 12 \\
\text{SS}(SS)(SS)(SS) & * & * & ** & * & * & 10 \\
\text{SS}(SS)(SS)(SS) & * & * & *** & * & 7 \\
\text{SSS}(SS)(SS) & * & * & *** & * & 6 \\
\text{SS}(SS)(SS)(S) & * & * & * & * & 11 & 12! \\
\text{SS}(SS)(SS)(S) & * & * & * & * & 7 & 12 \\
\end{array}
\end{align*}

But consider lines of the structure [[SS][SS][SS][SS]] which are, unlike the two examples in (56), optimally scanned as (SS)(SS)(SS)(SS):

\begin{align*}
\text{(58)} & \quad [[\text{zhi1 wo3} \ [\text{zhe3}] \ [\text{wei4} \ [\text{wo3} \ [\text{xin1 you1}]\]]\] \\
know me person say I heart worry
‘Those who know me say I am (just) worrying’.

\rightarrow (\text{zhi1} \ (\text{wo3} \text{zhe3}) \ (\text{wei4} \text{wo3}) \ (\text{xin1 you1})

This proves to be problematic for the current sub-grammar:

\begin{align*}
\text{(59)} & \quad [[\text{SS}][\text{SS}][\text{SS}][\text{SS}]] \\
\begin{array}{|c|c|c|c|c|c|c|}
\hline
\text{BINMAX} & \text{BINMIN} & \text{GOODFt} & \#\text{IP-FINAL-MonoFt} & \text{ANCHOR-IO} & \text{ANCHOR-OI} & \text{ALIGNR} \\
\hline
\text{a. }\text{S}[SS][SS][SS][SS] & * & * & *** & * & 12 \\
\text{b. }\text{SS}(SS)(SS)(SS) & * & * & * & 10 \\
\text{c. }\text{SS}(SS)(SS)(SS) & * & * & * & 11 & 12! \\
\text{d. }\text{SS}(SS)(SS)(SS) & * & * & * & 7 \\
\text{e. }\text{SS}(SS)(SS)(SS) & * & * & * & 6 \\
\end{array}
\end{align*}

As it stands now, (SS)(SS)(S)(SS) comes out as the winner, whereas empirically the winning candidate is (S)(SS)(SS)(SS). Actually, in terms of constraint violation, the desired winner (a) fares worse than both the unwanted winner (b) and another
suboptimal form (c). Specifically, (a) violates ANCHOR-OI whereas neither (b) nor (c) does and (a) scores the worst with regard to ALIGNR (FT, IP) of the three, which indicates that a mere re-ranking of the current constraints, or ranking of those hitherto unranked constraints, will not solve the problem. Obviously, a new constraint is needed to give credit to some feature of the desired winner which so far goes ignored by the current constraints.

Compare these three competitors and we note that of them, the desired optimal form (S)(SS)(SS)(SS) incurs the most violations of ANCHOR and ALIGNR (FT, IP); but the fact that it still is the real winner instructs us that its more violations of ANCHOR and ALIGNR (FT, IP) must be for a good reason. Specifically along the line of OT-thinking, the only good reason to violate some constraints is to satisfy some more important, i.e. higher-ranking one(s). In other words, in a constraint hierarchy, there always exists a trade-off between the violation of some constraints and the satisfaction of some other ones; which candidate eventually comes out as the winner out of the potentially infinite number of candidates produced by GEN is contingent on the net outcome of the trade-off. Put in more transparent OT parlance, the winner is the most harmonious candidate resulting from the resolution of constraint conflict under the given ranking hierarchy.

Now that the rationale behind the reasoning is clarified, the question is what this forthcoming higher-ranking constraint is. Observe carefully what is unique about the desired optimal form (S)(SS)(SS)(SS) against the other two competitors, with reference to the input structure, and not in terms of the constraints already existent in the hierarchy (which we already concluded to be inadequate). Two features are noteworthy. First, one of the most striking differences between (S)(SS)(SS)(SS), the desired winner, and (SS)(SS)(S)(SS), the unwanted winner, is whether the strongest grammatical boundary within the verse line (which occurs between the third and fourth syllables and is represented as a pair of reverse brackets in its grammatical structure) has a correspondent in the output. For the former, it does correspond to the right boundary of the second prosodic foot (which is, more precisely, the PhP boundary, to be argued below), whereas for the latter, it has no correspondent in the output.

The second feature bears on the comparison between the suboptimal candidate (c), (SS)(S)(SS)(SS), and the desired winner (S)(SS)(SS)(SS). They score equal in that for both of them the strongest boundary in the input has an output correspondent, but differ in the position of the monosyllabic foot. The desired winner (S)(SS)(SS)(SS) avoids having a monosyllabic foot as the second foot from the left boundary of the IP, which is the case with (SS)(S)(SS)(SS). This avoidance is achieved by parsing the first syllable into a monosyllabic foot, thus at the cost of better satisfaction of ANCHOR.

2.3.6.1 Introduction of hierarchicity into the sub-grammar

We argue that these two features highlight the hierarchicity of both the input and the output structures and reveal the need for it to be built into the sub-grammar. Up to

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22 As is shown in Appendix II, the strongest grammatical boundary in a verse line, which is coded as 4, is of a disparate nature and no straightforward, one-to-one correspondence exists between such a boundary and any single syntactic constituency. More is to be said below.
now, we have been treating both structures, especially the output, as flat and linear. Specifically, in monitoring the boundary mapping between the input and the output, ANCHOR is concerned only with the lowest-level brackets in both structures. Of all the constraints motivated so far, only *IP-FINAL-MONOFT and ALIGNR(Ft, IP) deploy the higher-level prosodic unit of IP. Other than this, neither the depth of the grammatical boundaries in the input, nor the prosodic units at the various levels of the prosodic hierarchy between the foot and the IP are utilized by the constraints. Below we elaborate on the construct of hierarchicality and its integration in the sub-grammar by respectively analyzing the two features mentioned above.

The first feature, namely, the presence of an output correspondent for the strongest grammatical boundary in the optimal scansion, in fact reflects a requirement similar to ANCHOR-IO, only operative at a higher level of the structural hierarchy. It is important that the strongest boundary here must be a line-medial one in order to become relevant in such an endeavor; obviously, such a boundary is present only in a bi-directionally branching grammatical structure. In terms of bracketing, a line-medial strongest boundary is translatable into a pair of back-to-back brackets. By comparison, line-initial or penultimate strongest boundaries are not relevant here as they respectively correspond to the right-branching or left-branching structure. For example, both lines in (54) (vi) and (vii) have a right-branching structure, while those in (54) (i) and (v) are essentially left-branching with a line-final interjection.

It needs to be pointed out that this strongest grammatical boundary may vary considerably in terms of the corresponding syntactic constituency. For example, it could be the boundary of NP (as in (58)), or VP, as in

(60) \[ qian1 \text{ shang3 she4 qin2 } \]
    lift skirt cross river name
    ‘(I) lift my skirt and cross the river Qin.’

or a clause boundary when the line contains two coordinated clauses:

(61) \[ ren2 she4 ang2 pi3 \]
    others cross I not
    ‘Others cross the river, (but) I do not.’

However, even though the strongest boundary may be generalized as an XP boundary, it is not necessarily true the other way around. Not every maximal projection boundary is the strongest boundary. For example, in

23 That the prosodic structure is hierarchical is evident from the fact that in an IP containing more than one foot, the degree of lengthening is not all the same at every foot boundary. Rather, a certain foot boundary in the middle of the IP is typically characterized by a bigger prosodic break that is empirically perceptible as a greater lengthening (or, for that matter, longer pause) than that occurring at other foot boundaries (with the exception of the line-final one of course). Given the established correlation between the degree of boundary lengthening (or duration of pause) and the level of prosodic units in the prosodic hierarchy (Beckman and Edwards 1990), this clearly suggests an intermediate prosodic level between foot and IP.

24 Alternatively, one can analyze the line-final interjection as a sentence level functional category. Under this analysis, the line remains a left-branching structure.
four maximal projections are identified, as indicated here, but only the boundary following the second IP is the strongest. A verse line typically has more than one maximal projection but only the boundary of one of them qualifies as the strongest boundary. Indeed, neither is there any single syntactic constituency whose boundary is always the strongest within a line nor can the strongest grammatical boundary be exclusively reduced to any single syntactic boundary. In view of this, we suggest that, as an analytical expedient, the requirement that the strongest grammatical boundary in the input have a correspondent in the output be straightforwardly expressed as the following constraint which directly borrows the notion of ‘strongest boundary’ and refers to it as SB:

\[(63) \text{ANCHOR-SB-O}\]

The strongest grammatical boundary within the line has a correspondent in the output.

Note that this is only a temporary formulation where the output correspondent of the SB remains undefined. As is to be argued below, this correspondent is Phonological Phrase (PhP), which is a prosodic boundary bigger than the foot boundary.

As argued earlier, in gauging the boundary matching between the input and the output, ANCHOR is necessarily bi-directional. In this light, this new constraint, concerned with the preservation of a specific input boundary in the output, is, precisely speaking, the higher-level counterpart of ANCHOR-IO.

We now turn to the second feature mentioned above about the optimal scansion of (58), which is concerned with the position of the monosyllabic foot in the IP. One of the constraints proposed hitherto is already involved with the position of such a foot, i.e. *IP-FINAL-MONOFT; nonetheless, as is shown in (59), this constraint is not sufficient in winnowing out the suboptimal forms. In the optimal scansion in (59), the monosyllabic foot not only avoids the IP-final position but also moves away from the second position from the left even though this results in more violations of ANCHOR. The crux here is, we propose, that the output is, rather than a linear sequence of prosodic feet, a hierarchical prosodic structure. Accordingly, the ‘second position’ which the monosyllabic foot shuns is in fact the final position of some higher-level prosodic unit, which is, as to be argued below, PhP. To pinpoint this higher-level prosodic unit entails a discussion of the prosodic hierarchy of Chinese.

2.3.6.1.1 Prosodic hierarchy of Chinese

That the prosodic organization is hierarchical in nature is far from an original view: it has been firmly established on account of a rich body of phonological data (see for example, Selkirk 1980, 1986; Nespor and Vogel 1986; Hayes 1989; Inkelas and Zec 1990). What has also become indisputable is that the prosodic structure interacts with the syntactic structure in a non-trivial manner. Nonetheless, the various proposals on prosodic phonology do not totally agree on either the exact number of levels of the hierarchy or the characterization of prosodic constituents at different levels. The one
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put forward in Nespor and Vogel (1986) has become more or less conventional (and which is also adopted in Hayes’ (1989) study of English metrics):

(64) Phonological Utterance (U)
    |
    Intonational Phrase (IP)
    |
    Phonological Phrase (PhP)
    |
    Clitic Group (CG)
    |
    Prosodic Word (PrW)
    |
    Foot (Ft)
    |
    Syllable (S).

In the current context of Chinese, the prosodic hierarchy, and in particular, its interaction with syntax, has also been a topic of considerable controversy; a wide range of proposals have been put forward, largely on the basis of tone sandhi data (for example, Cheng 1987; Shih 1986; Hung 1987). For practical considerations, these individual proposals are not presented here; instead, we will only mention Chen (1996), which offers a critical overview of the above-cited various proposals and concludes that the prosodic organization in Chinese is ‘of considerable typological significance’ (p. 518) in that the prosodic constituency of Chinese does not fit straightforwardly into any of the prosodic hierarchies proposed so far. Instead, Chen (Ibid.) proposes a prosodic hierarchy for Chinese that merely consists of two levels: IP and what he refers to as MRU (Minimal Rhythmic Unit). What deserves attention is the highly fluid nature of MRU – basically it could be anything. Indeed, according to Chen, there is neither a uniform form of MRU nor a straightforward way of determining what form MRU may take; rather MRU is determined in an OT fashion as the optimal candidate resulting from the dynamic interaction of a range of constraints on a case-specific basis for every given input. As such, MRU ‘stands apart from the conventional prosodic hierarchy’, ‘is basically a device to group syllables of a wide variety of grammatical ranks and status into rhythmic units, and as such, ‘constitutes a prosodic unit sui generis, off-scale, and hors-series’ (Ibid.: 518).

We should mention that this proposal of Chen’s is reached on the basis of a wide range of Mandarin tone sandhi data that proves intractable for a prosodic hierarchy along the conventional line as in (64), together with the assumption that the tone sandhi domain is constituted by the prosodic constituents at certain levels. However, the current context of verse scansion is one with a slower speech rate and more rigid prosodic domains, to which the characterization of prosodic constituency is most
sensitive (cf. Jun 1996; Shih 1997). Our position here is that in this current context, the prosodic constituency of Chinese can indeed be fit into a conventional prosodic hierarchy as (64); however, the prosodic hierarchy of Chinese is an impoverished rather than a full-fledged one\(^{25}\). Specifically, we adopt the prosodic hierarchy argued for in Shih (1986, 1997), namely, a five-level hierarchical prosodic structure of Chinese comprising of Utterance (U) as the top node, and below that, Intonational Phrase (IP), Phonological Phrase (PhP), prosodic foot (F) and syllable (S). This prosodic hierarchy is illustrated below:

(65) Phonological Utterance (U)
   Intonational Phrase (IP)
   Phonological Phrase (PhP)
   Foot (Ft)
   Syllable (S).

Compare this with (64) and we note that the levels of Clitic Group and Prosodic Word are missing\(^{26}\). It is in this sense that we suggest the prosodic hierarchy of Chinese is an impoverished one. We leave open the issue of to what extent this prosodic hierarchy can be reconciled with Chen’s two-level hierarchy.

\(^{25}\) Indeed, the possibility that the full-fledged prosodic hierarchy including all the seven constituents presented in (64) might not be relevant to all languages has been well entertained. For example, Gvozdanovic (1986), in delimiting the higher-level prosodic domains, suggests that the distinction between the Phonological Word and the Phonological Phrase might not be relevant in all languages. Nespor and Vogel (1986, 1989) themselves pointed out that ‘there is no a priori reason that the phonology of a given language must include all seven units’ (1986: 11), for example, at least for some languages there might not be the need for the level of Clitic Group (1989: 113). Also see the next footnote.

\(^{26}\) Arguably an alternative way to account for the absence of these two levels might be to suggest that they are isomorphic with first, each other, and second, either its upstairs neighbor - Phonological Phrase or its downstairs neighbour - Foot. For the first possible isomorphism, indeed, it has been lively debated whether the Clitic Group needs to be distinguished from the Prosodic Word. For example, Zec (1993) suggests that the Clitic Group is simply the Prosodic Word, as it is accessed in postlexical phonology, whilst Hayes (1989) puts forward arguments for Clitic Groups from English syllabification and argues for the distinction between Prosodic Word and Clitic Group on the basis of English metrics. For Chinese, it has indeed been argued that Prosodic Word is synonymous with Clitic Group; both are defined as a lexical host plus surrounding function words, which behave like prosodically dependent proclitics or enclitics (cf. Nespor and Vogel 1986:145f) (Chen 1996:542 in comparing MRU with the conventional prosodic units such as Prosodic Word and Clitic Group). As to the second possible isomorphism, given the range of characterizations proposed for Phonological Phrase for Chinese (e.g. Beattie 1985; Cheng 1987; Hsiao 1991), it seems more plausible to suggest that Prosodic Word (and thus Clitic Group) is isomorphic with its downstairs neighbor, i.e., Foot and that Phonological Phrase consists of one or more feet. Clearly, in effect this is identical to the prosodic hierarchy proposed by Shih (1997) presented here.
We now proceed to examine the five constituents in this hierarchy. As suggested earlier, a verse line is prosodically an IP, on the account that the whole line falls under a unified intonation contour. Since the line is selected as the domain of analysis for the present study, it follows that IP is the upper bound of the prosodic domain that is relevant. At the lower end, the discussion hitherto has been centering around the parsing of syllables into feet. Indeed, so far we have built IP and Ft into the sub-grammar, so the only prosodic unit remaining to be explored is PhP.

2.3.6.1.1 The circumscription of Phonological Phrase (PhP)

In this section, we argue that PhP is defined, first, by the line-medial SB in a preemptive manner when such a boundary is present, and second, when such a boundary is absent, by three constraints whose interaction can be captured in an OT fashion. They are: Binarity, Evenness and Long-Last. Below we discuss these constraints and the ranking between the latter three.

2.3.6.1.1.1 PhP boundary as the output correspondent of strongest boundary

To begin with, the prosodic hierarchy of Chinese observes the Strict Layer Hypothesis (Selkirk 1984; Nespor and Vogel 1986; Hayes 1989). In Section 2.3.2, for example, we argued for the strong layering view that a PrW (or for that matter, PhP) only consists of one or more feet against the weak layering one which allows an unparsed syllable to be parsed as an immediate daughter of PrW (or given the impoverished prosodic hierarchy presented here, PhP). At higher levels, the Strict Layer Hypothesis holds as well: Shih (1990, 1997) suggests that PhP consists of one or more prosodic feet, whereas on the other hand, an IP consists of one or more PhP. Accordingly, a PhP boundary necessarily coincides with a Foot boundary.

Secondly, recall that it was pointed out earlier that the prosodic hierarchy is influenced by the syntactic structure in important ways. This is already evident in the delimitation of prosodic foot so far, and we suggest that it is also the case with the characterization of PhP. More specifically, the strongest syntactic boundary within the line, which itself corresponds to IP, corresponds to the biggest prosodic boundary within the IP, which is PhP given the prosodic hierarchy proposed above.

In this light, the constraint Anchor-IspO proposed in (63) should, more precisely, be rendered as Anchor-IspO_{PhP}. And the formulation is accordingly refined into:

\[(66) \text{ANCHOR-IspO}_{PhP} \]

The strongest grammatical boundary within the line corresponds to the PhP boundary.

Clearly, this constraint and Anchor-IO may be understood as members of a constraint family responsible for the boundary correspondence at various levels of the hierarchical structure between the input and the output.

Now in the light of the PhP boundary delimited as such, reconsider the two features presented earlier for the winner (a) in (59), which is more precisely represented as (S)(SS)(SS)(SS). It should become evident that they are respectively concerned with

---

27 The prosodic status of the verse units above the line level is in itself, though, a fascinating issue worth pursuing. For example, as Schlepp (1980) insightfully points out, the couplet, which is typically constituted by two neighboring lines, corresponds to a Phonological Utterance.
the presence of an output correspondent of a line-medial strongest grammatical boundary and the avoidance of monosyllabic foot PhP-finally. These two distinct features associated with the winner actually calls for the introduction of two constraints, ANCHOR-ISBOPHP and *PHP-FINAL-MONOFT. The former was already discussed above, and the latter is formulated in analogy to *IP-FINAL-MONOFT and formulated as:

\[(67) \quad \text{*PHP-FINAL-MONOFT} \]

Do not place the monosyllabic foot at the final position of a PhP.

It imposes a similar ban on monosyllabic feet at the higher level of PhP and as such is also attributable to the well-attested NON-FINALITY constraint (Kager 1999).

The introduction of *PHP-FINAL-MONOFT calls for a clear circumscription of the PhP boundary in all candidate forms. The discussion so far about the PhP boundary delimitation is only concerned with lines of a bi-directionally branching structure which contain line-medial SB’s. The issue that follows naturally is how to determine the PhP boundary in those lines of a unidirectionally branching grammatical structure where line-medial SB’s are absent. This scenario is discussed below before we move further to consider the ranking of the two constraints introduced above.

2.3.6.1.1.1.2 BINARITY, LONG-LAST and EVENNESS: more on the delimitation of Phonological Phrase

In this section we propose three independently motivated general constraints responsible for the PhP boundary delimitation in lines which do not contain line-medial strongest grammatical boundaries, i.e. which have uni-directionally branching grammatical structure (translated into bracketing as either S[S… or …S]S). They are BINARITY, LONG-LAST and EVENNESS, and their interaction can be captured in an OT fashion.

First, we suggest that in the current context of verse scansion, the hierarchical organization of prosodic structure within IP observes the BINARITY constraint. Although it has been argued that prosodic structures are n-ary branching in refutation of earlier claims that they are binary branching (Leben 1982; van der Hulst 1984; Nespor and Vogel 1986), it is also acknowledged that ‘the question of binary vs. n-ary branching structures … is likely to remain a controversial issue for years to come, with respect to phonology as well as to the other components of the grammar’ (Nespor and Vogel 1986: 8). One of the main arguments cited therein for a preference of n-ary over binary branching is that the former calls for fewer intermediate levels and hence renders the structure flatter and simpler. As such, this simplicity argument entailed by an n-ary structure is more pertinent in cases where the higher-level prosodic unit such as an IP or Utterance is relatively long.

By comparison, in the verse context, this advantage offered by an n-ary prosodic structure is at best only marginal, as the verse lines are highly restricted in their length. Indeed, of the 3933 lines of verse constituting the present corpus, there are altogether only six 9-syll lines and no lines longer than that. Hence, while leaving open the issue of binarity versus n-arity regarding the prosodic structure in general, we suggest that as far as the current context of verse line scansion is concerned, to postulate an n-ary branching structure offers little particular advantage over a binary one, and that binarity is the basic structuring principle for the prosodic hierarchy (with
IP as the top-level constituent) (cf. similar arguments in Golston 1998). Furthermore, we suggest that the binarity requirement is violable and thus preferably couched into an OT constraint, in the same way that binarity at the foot level has been independently established a violable OT constraint FrBIN. This way, we wish to accommodate the possible cases where the prosodic structure is n-ary rather than binary. We refer to this constraint as BINARITY, formulated as follows:

(68) \textbf{BINARITY}  
Prosodic structure is binary branching.

BINARITY requires that an IP consists of two PhP’s, a PhP two feet and a foot two syllables\(^{28}\). Now consider a fully binary prosodic structure (with IP being the top node in the current context):

(69)

\begin{center}
\begin{tikzpicture}
  \node {IP} child{node {PhP} child{node {Ft} child{node {S}}} child{node {Et} child{node {S}}}} child{node {PhP} child{node {Ft} child{node {S}}} child{node {Et} child{node {S}}}};
\end{tikzpicture}
\end{center}

which is evidently only possible when the IP, i.e. the line here, contains an even number of feet, typically four\(^{29}\). This renders it particularly interesting to consider the grouping of feet into PhP’s when the IP consists of an odd number of feet, which occurs when the line contains for example five, six, nine, or ten syllables\(^ {30}\). In such cases, the division of the IP into PhP’s necessarily results in the violation of BINARITY, which motivates the second constraint, namely, LONG-LAST, formulated in most general terms as:

(70) \textbf{LONG-LAST}  
When two constituents in a domain are of different length, place the longer constituents at the right end of the domain.

This constraint is attributable to Hayes (2000) where it was originally proposed for the quatrain structure in English sung verse. Formulated in most general terms as ‘in a sequence of groups of unequal length, the longest member should go last’ (Ibid.), it expresses a preference for the placement of longer units at the right edge when a balanced, symmetrical grouping is impossible. An unbalanced structure with initial weight is considered bad (see also Hayes 1984: 71 for the result of an experiment in this connection reported in Bolinger (1962)). Furthermore, Hayes suggests that this preference is evidenced at various levels, ranging from the order of two coordinated constituents in terms of ascending phonological weight (e.g. ‘soup and sandwich’,

---

\(^{28}\) Here the BINARITY requirement at the IP and PhP levels are presented together as one constraint in the absence of motivation to separate them. See below for further discussion. The BINARITY requirement at the Foot level, on the other hand, is already specified in BINMAX >> BinMIN.

\(^{29}\) Note that we deliberately choose to refer to the number of feet instead of that of syllables, on the account that we have argued that a single syllable can form a legitimate monosyllabic foot in verse scansion. Thus, a 7-syll line and an 8-syll one would both contain four feet.

\(^ {30}\) A mathematical abstraction of the syllable numbers in a line containing an odd number of feet (which can be either monosyllabic or disyllabic) is \((4n + 1)\) or \((4n + 2)\), i.e., 5, 6, 9 or 10.
‘ladies and gentlemen’) to the 2+3 pattern of feet grouping in a verse line of English pentameter to the arrangement of verse lines in order of increasing length in the Kalevala meter of Finnish (Kiparsky 1968).

We argue that this constraint is also operative for prosodic structure: when a perfect symmetry cannot be achieved between the constituting parts, as in the case of an IP consisting of an odd number of feet, it is more preferable to place the longer parts towards the end. The length here is defined in terms of foot numbers. For example, for a 5-syll line containing three feet, the grouping of feet into PhP in observance of LONG-LAST would exhibit a ‘1+2’ pattern, where the first foot and the remaining two feet respectively form one PhP31.

The relevance of LONG-LAST to PhP parsing may be supported by the argument that this ‘1+2’ pattern is far from being accidental; rather, it can be given a principled account on independent grounds. Specifically, we argue that this ‘1+2’ pattern is attributable to NON-FINALITY at higher levels of prosodic hierarchy. Recall that we already argued for the relevance of NON-FINALITY in the form of *IP-FINAL-MONOFT and *PHP-FINAL-MONOFT. Now bear in mind the prosodic hierarchy of Chinese proposed in (65), and extend this ban of monosyllabic foot at the final position of PhP to one level higher along the hierarchy. As a result, we get a ban of mono-footed PhP at the final position of IP. In other words, when a mono-footed PhP is inevitable, it is preferable to put this mono-footed PhP at the initial position of the IP, whilst leaving the bi-footed PhP at the final position of the IP (which is also the second, assuming that an IP contains two PhP’s). This is exactly the ‘1+2’ pattern dictated by LONG-LAST here. Viewed in this light, the LONG-LAST constraint of prosodic organization operative at the PhP level is then an extrapolation of the well-established NON-FINALITY constraint along the vertical dimension of the prosodic hierarchy, and thus well-grounded.

Now consider the PhP parsing of a 5-syll Shijing line. As argued in Section 2.3.4, the foot-level scansion is either (SS)(S)(SS) or (S)(SS)(SS), depending on the grammatical structure of the line. As for the PhP parsing, the LONG-LAST constraint gives rise to (SS)(S)(SS) or (S)(SS)(SS). What is particularly noteworthy about the latter parsing is that it is a very lop-sided pattern in terms of the distribution of phonological weight across the two PhP’s. Note that the phonological weight here is directly measured by moras, and indirectly by syllable counting, assuming that in classical Chinese verse, most syllables are constituted by lexical items and thus bimoraic. Here it is apt to mention that PhP is argued to be ‘the lowest prosodic constituent in the prosodic hierarchy that is sensitive to length’ (Nespor and Vogel 1986: 185). More specifically, Nespor and Vogel (Ibid.) propose that there is a general tendency against forming particularly short (i.e. non-branching) PhP’s. The length is stated there in term of branching versus non-branching upon the assumption that non-branching constituents are generally shorter than branching ones. We argue that for Chinese the branching versus non-branching account can be characterized

31 It also deserves mentioning that to group the three feet into two PhP’s which are then grouped into one IP is in line with the BINARITY constraint proposed above; in a framework allowing n-ary branching prosodic structures, the three feet can arguably be grouped directly into a ternary PhP, which is then grouped into a monary IP, or alternatively, the three feet can each constitute a monary PhP, and the three PhP’s are then grouped into a ternary IP. Hence while entailing a simpler internal structure, the postulation of n-ary branching nonetheless undermines the restrictedness of the analysis.
straightforwardly by the syllable count (see also Duanmu 1997); accordingly the length can directly be gauged by syllable numbers, which is an indicator of phonological weight.

This general tendency to avoid particularly short PhP’s actually invites the third constraint for the PhP parsing, which we refer to as Evenness. This constraint requires an even distribution of phonological weight across the PhP’s in the IP, and is formulated as:\(^{32}\):

(71) **EVENNESS**

In a prosodic domain, phonological weight should be evenly distributed across the prosodic units therein.

Therefore, (S)|(SS)(SS), with a 1:4 distribution of phonological weight, is a flagrant violation of the Evenness constraint, while another possible parsing (S)(SS)|(SS) better satisfies this constraint via minimizing the difference of phonological weight.

Indeed, this constraint can be independently motivated on the basis of the stress clash resolution. Following Duanmu’s (2000) argument that Chinese is trochaic at syllable, foot and phrase levels, and assuming that the grid, which is the representation of rhythm (cf. among others, Liberman 1975; Liberman and Prince 1977; Hayes 1984), is built on the basis of the prosodic structure of a given string (Nespor and Vogel 1989; but cf. Selkirk 1980; Hayes 1995), we suggest that the parsing (S)|(SS)(SS) is ill-formed because of stress clash, which is illustrated below (moraic trochees are omitted):

(72)

\[
\begin{array}{cccc}
\text{Phrase level} & x & x & \xleftarrow{\text{Clash}} \\
\text{Foot level} & x & x & x \\
\text{Syllable level} & x & xx & xx \\
\end{array}
\]

(S)|(SS)(SS).

A plausible way to resolve this clash is thus to shift the second grid mark to the next docking site, namely, above the next foot-level grid mark:

(73)

\[
\begin{array}{cccc}
\text{Phrase level} & x & x & \xleftarrow{\text{Clash resolution}} \\
\text{Foot level} & x & x & x \\
\text{Syllable level} & x & xx & xx \\
\end{array}
\]

(S)(SS)(SS).

Thus far, we have introduced the three constraints crucial to PhP-level parsing, namely, **BINARITY**, **LONG-LAST**, and **EVENNESS**. They interact and determine the PhP boundary delimitation for lines with a unidirectional branching structure.

\(^{32}\) It is of interest to point out that the preference for an even distribution of phonological weight across prosodic domains is also evident in other higher-level prosodic constituents such as IP and U (Nespor and Vogel 1986).
We now consider how their interaction may be formally captured in an OT fashion. To begin with, some notes are in order for the evaluation of the constraints. First, as noted in (68), Binarity is concerned with both the IP-level and PhP-level parsing. Hence \((S)(S)(S)l(\hat{S})\) incurs two violations of this constraint, due to its monarity at the IP level (one PhP in the IP) and ternarity at the PhP level (three feet in the one PhP) while \((S)(S)(S)l(\hat{S})\) incurs one violation due to the second PhP which contains only one foot. Second, violation of Evenness is gauged by counting the difference between the two PhPs’s in terms of syllable numbers. When an IP contains only one PhP, as in the parsing \((S)(S)(S)l(\hat{S})\), Evenness is vacuously satisfied. Third, similarly, as Long-Last entails comparison between two PhP’s, it is also vacuously satisfied when an IP contains only one PhP.

As for the ranking, first, \((S)(S)l(\hat{S})\) provides the crucial argument for the ranking \text{Evenness} >> \text{Long-Last}. This is illustrated below:

\[
\begin{array}{|c|c|c|}
\hline
(S)(S)(S) & \text{Evenness} & \text{Long-Last} \\
\hline
(S)l(S)(S) & **! & * \\
\hline
\end{array}
\]

Second, \((S)(S)l(\hat{S})\) also provides the ranking argument for Binarity >> Evenness:

\[
\begin{array}{|c|c|c|}
\hline
(S)(S)(S) & \text{Binarity} & \text{Evenness} \\
\hline
\hat{S} (S)(S)l(\hat{S}) & * & * \\
\hline
(S)(S)l(\hat{S}) & **! & * \\
\hline
\end{array}
\]

Third, by transitivity, we have Binarity >> Long-Last. Indeed, this ranking is also supported by \((S)(S)l(\hat{S})\). The suboptimal parsing \((S)(S)(S)l(\hat{S})\) violates Binarity, but vacuously satisfies Long-Last (as well as Evenness). This is illustrated below:

\[
\begin{array}{|c|c|c|}
\hline
(S)(S)(S) & \text{Binarity} & \text{Long-Last} \\
\hline
\hat{S} (S)(S)l(\hat{S}) & * & * \\
\hline
(S)(S)l(\hat{S}) & **! & * \\
\hline
\end{array}
\]

Finally, one legitimate concern remaining to be addressed here is whether Binarity, which is now operative for both IP- and PhP-level parsing, needs to be stripped apart into, say, Binarity-PhP and Binarity-IP. Evidence from PhP parsings of two-footed IP’s (i.e. 3- and 4-syll lines) demonstrates that this is not necessary and Binarity as a cover constraint suffices to select the optimal candidate, as shown below:

\[
\begin{array}{|c|c|c|}
\hline
(S)(S) & \text{Binarity} & \text{Evenness} & \text{Long-Last} \\
\hline
(S)l(S) & **! & * & * \\
\hline
\hat{S} (S)(S)l & * & * & * \\
\hline
\end{array}
\]
In fact, the parsing of such lines reveals an interesting trade-off between the two binarity requirements respectively at the PhP and IP level. Specifically, the fact that (S)(SS) wins over (S)(SS), and (SS)(SS) over (SS)(SS) suggests that when binarity cannot be achieved at both levels, it is more important to have binary structures at the PhP level than IP level. In other words, it is more important for a PhP to have two feet than for an IP to have two PhP’s.

Thus we come up with the ranking hierarchy for the delimitation of PhP boundary for the foot-level scansion of verse line containing no SB:

\[(78) \text{ BINARITY} \gg \text{ EVENNESS} \gg \text{ LONG-LAST}\]33

It is important to point out that in the tableaux here, the optimal foot-level scansion is directly presented as the input solely for simplicity sake and does not suggests a two-level parsing. Rather we suggest that the scansion at both the foot and the PhP levels is carried out in a simultaneous and parallel fashion. For analytical purpose, we refer to the hierarchies respectively in charge of foot-level and PhP-level scansion as the main hierarchy (which has been our main focus so far) and the sub-hierarchy. Accordingly, a theoretically more precise way is to continue taking the grammatical structure of the line as the input and combine the main constraint hierarchy and the sub-hierarchy into one hierarchy. The candidate set, then, would be constituted by all potential foot-level and PhP-level parsings of the input string. For analytical convenience, however, we adopt a flexible practice below, namely, all tableaux will continue to have the grammatical structure of the line as the input, and as for the output forms we will be directly presenting the optimal PhP-level scansion for every potential foot-level scansion (including the optimal and the suboptimal ones), and in so doing tucking away behind the scene the working of the sub-hierarchy in (78) for the delimitation of PhP boundaries once the foot boundaries are given. In particular, the optimal PhP parsings for all the optimal foot-level scansion of 王令 lines are presented below as follows, which can then be directly imported into future tableaux under the main hierarchy whenever the PhP boundary needs to be explicitly marked out.

---

33 It is notable that in the several tableaux here, the columns under Long-last are all grey, which might set one wondering whether Long-last is superfluous and can be disposed of. The fact is that although it tends to be dormant, Long-last is not superfluous: it turns out crucial in accounting for the metrical harmony in the genres of Jinti and Ci via tableau des tableaux. See discussion in Chapters 5 and 6 respectively.
Three comments about this table are in order. First, only lines that actually occur in the *Shijing* corpus are presented here. Thus, lines longer than 8 syllables are not included. Second, the optimal foot-level parsings presented here are those based on relatively unambiguous empirical evidence of boundary lengthening which has been presented in the tableaux for the main hierarchy. All of them have been discussed so far except the 8-syll lines. Third, this table only includes the PhP-level parsings for those lines which do not contain a line-medial strongest grammatical boundary, since the PhP boundaries of those which do are determined straightforwardly and preemptively by such a grammatical boundary, as dictated by ANCHOR-ISBOPhP discussed in 2.3.6.1.1.1.1.

We conclude this section by mentioning that the sub-hierarchy proposed in (78) equally applies to the PhP boundary delimitation in suboptimal forms. Below we will follow the above-mentioned practice of directly demarcating the optimal PhP boundaries in the candidate forms, bearing in mind that such boundaries are actually the winner among the many possible PhP boundary delimitations for a given foot-level scansion under the sub-hierarchy in (78).

Recall that the discussion in this subsection was triggered by the introduction of ANCHOR-ISBOPhP and *PHP-FINAL-MONOFT into the sub-grammar. Now we are ready to explore their ranking in the emergent sub-grammar.

### 2.3.6.2 The ranking of ANCHOR-ISBOPhP and *PhP-FINAL-MONOFT in the sub-grammar

The foregoing section (3.3.6.1) discussed the hierarchicality in the grammatical and prosodic structures, especially the PhP boundary delimitation in the verse context. From the viewpoint of developing the sub-grammar, this serves two purposes. First, it motivates the introduction of ANCHOR-ISBOPhP and *PhP-FINAL-MONOFT. The former focuses on the output anchoring of the biggest grammatical break in the input,
whereas the latter, by chopping up the IP into intermediate prosodic constituents, imposes a more restricted constraint than *IP-FINAL-MONOFT on the location of monosyllabic feet within IP. Second, it enables the establishment of a connection between these two newly introduced constraints. Specifically, the output correspondent of the strongest grammatical boundary as required by ANCHOR-ISBOPhP constitutes the boundary of the PhP, a prosodic unit which cannot end with a monosyllabic foot as required by *PhP-FINAL-MONOFT. Below we consider their ranking with regard to other constraints in the sub-grammar.

2.3.6.2.1 The ranking of ANCHOR-ISBOPhP

First, the scansion of lines of the grammatical structure [[SS]S][S[S][S]] (see (58)) offers crucial evidence for the ranking ANCHOR-ISBOPhP >> ANCHOR-IO. The scansion of such lines was presented in (59) under the sub-grammar arrived at till then, and exposed its insufficiency. For convenience sake, we repeat (59) below:

(80)

<table>
<thead>
<tr>
<th>[[SS]S][S[S][S]]</th>
<th>BinMAX</th>
<th>BinMIN</th>
<th>GOODFT</th>
<th>*IP-FINAL-MONOFT</th>
<th>ANCHOR-IO</th>
<th>ANCHOR-OI</th>
<th>ALIGNR (FT, IP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>☞ (S)(SS)(SS)(SS)</td>
<td>*</td>
<td></td>
<td></td>
<td>***!</td>
<td>*</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>☜ (SS)(SS)(SS)(SS)</td>
<td>*</td>
<td></td>
<td></td>
<td>*</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>☞ (SS)(S)(SS)(SS)</td>
<td>*</td>
<td></td>
<td></td>
<td>*</td>
<td>11!</td>
<td></td>
<td></td>
</tr>
<tr>
<td>☜ (SSS)(SS)(SS)</td>
<td>*</td>
<td></td>
<td></td>
<td>**</td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>☞ (SSS)(SS)(SS)</td>
<td>*</td>
<td></td>
<td></td>
<td>**</td>
<td>6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Under the sub-grammar presented in this tableau, (SS)(SS)(S)(SS) is the (unwanted) winner, more harmonious than the desired winner (S)(SS)(SS)(SS). However, now with the newly motivated ANCHOR-ISBOPhP, the picture changes dramatically. The strongest grammatical boundary (SB) in the line lies after the third syllable, and it corresponds to the PhP boundary in the desired winner (S)(SS)(S)(SS), but not in (SS)(SS)(S)(SS). In the old sub-grammar, this failure of the conservation of the SB in the latter goes unpunished and the desired winner loses on account of more violations of ANCHOR-IO. Therefore, ANCHOR-ISBOPhP must dominate ANCHOR-IO in order for (S)(SS)(S)(SS) to beat (SS)(SS)(S)(SS). The ranking argument is illustrated below:

(81)

<table>
<thead>
<tr>
<th>[[SS]S][S[S][S]]</th>
<th>ANCHOR-ISBOPhP</th>
<th>ANCHOR-IO</th>
</tr>
</thead>
<tbody>
<tr>
<td>☞ (S)(SS)(SS)(SS)</td>
<td>**</td>
<td></td>
</tr>
<tr>
<td>☜ (SS)(SS)(SS)</td>
<td>*</td>
<td></td>
</tr>
</tbody>
</table>

This pair of candidates further provides the ranking argument for ANCHOR-ISBOPhP and the other ANCHOR constraint, i.e. ANCHOR-OI. This is illustrated below:

(82)

<table>
<thead>
<tr>
<th>[[SS]S][S[S][S]]</th>
<th>ANCHOR-ISBOPhP</th>
<th>ANCHOR-OI</th>
</tr>
</thead>
<tbody>
<tr>
<td>☞ (S)(SS)(SS)(SS)</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>☜ (SS)(SS)(S)(SS)</td>
<td>*</td>
<td></td>
</tr>
</tbody>
</table>
Still using ANCHOR as the cover constraint, we have ANCHOR-ISBOPHP >> ANCHOR. This ranking alone already suffices to elevate (S)(SS)|(SS)(SS) from a losing candidate to the optimal one.

Next, consider briefly the ranking between ANCHOR-ISBOPHP and the other constraints. To begin with, as ANCHOR >> ALIGNR (FT, IP), by transitivity, we have ANCHOR-ISBOPHP >> ALIGNR (FT, IP). As for BINMAX, BINMIN, *IP-FINAL-MONOFT (to be superseded by the newly proposed *PHP-FINAL-MONOFT, see immediately below), and GOODFTINTERJ, ANCHOR-ISBOPHP is in conflict with none of them. First, no candidate can survive a violation of BINMAX, or ANCHOR-ISBOPHP, or *IP-FINAL-MONOFT, which indicates that all three constraints are undominated. Second, as to BINMIN, given that the input line contains an odd number of syllables and that BINMAX is inviolable, BINMIN is inevitably violated in the optimal candidate together with some of its competitors, and accordingly BINMIN is not crucial in selecting the winner and the scansion of 7-syll lines provides no crucial evidence for the ranking between BINMIN and ANCHOR-ISBOPHP. Third, there is no evidence for the ranking between ANCHOR-ISBOPHP and GOODFTINTERJ. Of the Shijing lines containing an interjection, only two 5-syll ones have a line-medial interjection (structured as [SS]S[S][SS] and scanned as (S)(SS)[SS] (SS), illustrated in (45)), and all the others have interjections line-finally. Therefore, SB is present only in the two with a line-medial interjection. As shown in (46), such lines are scanned as (S)(SS)[SS] (SS), which satisfies both GOODFTINTERJ and ANCHOR-ISBOPHP.

Therefore, with the introduction of ANCHOR-ISBOPHP and its ranking, the sub-grammar presented in (52) is updated into:

(83) BINMAX GOODFTINTERJ *IP-FINAL-MONOFT ANCHOR-ISBOPHP

2.3.6.2.2 The ranking of *PHP-FINAL-MONOFT

However, merely adding ANCHOR-ISBOPHP is still insufficient: even though its high ranking succeeds in forcing (SS)(SS)|(S)(SS) out of the competition, the desired winner (S)(SS)|(SS)(SS) still loses to (SS)(S)|(SS)(SS). This is shown below (compare (80)):

(84)

<table>
<thead>
<tr>
<th>[[SS][S][S][SS]]</th>
<th>BINMAX</th>
<th>BINMIN</th>
<th>GOODFTINTERJ</th>
<th>*IP-FINAL-MONOFT</th>
<th>ANCHOR-ISBOPHP</th>
<th>ANCHOR-IO</th>
<th>ANCHOR-OI</th>
<th>ALIGNR (FT, IP)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>*</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>(S)(SS)</td>
<td>(SS)(SS)</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(SS)(S)</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>11</td>
</tr>
</tbody>
</table>


(S)(SS)(SS)(SS) loses on account of more violations of ANCHOR-IO; ANCHOR-ISBOPHP is of no help here, as (SS)(S)(SS)(SS) does satisfy it, unlike the earlier competitor (SS)(SS)(S)(SS). Here *PHP-FINAL-MONOFT becomes critical: (S)(S)(SS)(SS)(SS), the unwanted winner, fatally violates *PHP-FINAL-MONOFT due to the monosyllabic foot at the end of the first PhP. By comparison, (S)(SS)(S)(S)(SS) wins by refraining from formulating a monosyllabic foot PhP-finally, even though this move results in more violations of ANCHOR-IO. This trade-off implies that it is more important to avoid a PhP-final monosyllabic foot than to preserve all the input boundaries in the output. In other words, *PHP-FINAL-MONOFT >> ANCHOR-IO, illustrated below:

This pair of competitors also furnishes the crucial ranking argument for *PHP-FINAL-MONOFT >> ANCHOR-OI, as illustrated below:

Therefore, we have *PHP-FINAL-MONOFT >> ANCHOR.

We now consider how *PHP-FINAL-MONOFT should be ranked with the other constraints. For analytical purpose, we temporarily leave out *IP-FINAL-MONOFT for special discussion below, and consider the remaining constraints, namely, BINMAX, BINMIN, GOODFTINTERJ, ANCHOR-ISBOPHP, and ALIGNR (FT, IP). To begin with, as ANCHOR >> ALIGNR (FT, IP), by transitivity, we have *PHP-FINAL-MONOFT >> ALIGNR (FT, IP). Second, as argued above, BINMAX, GOODFTINTERJ and ANCHOR-ISBOPHP are all undominated; *PHP-FINAL-MONOFT joins their company on the account that no potential output form can emerge as a winner if it violates *PHP-FINAL-MONOFT by allowing a PhP-final monosyllabic foot, no matter how well it satisfies the other constraints. Third, there is no evidence for the ranking between *PHP-FINAL-MONOFT and GOODFTINTERJ. As mentioned above in discussing the ranking of ANCHOR-ISBOPHP, all Shijing lines containing interjections have interjections line-finally except for two 5-syll lines where the interjection occurs line-medially. For those lines with line-final interjections, GOODFTINTERJ actually forbids the interjection to parse into a monosyllabic foot, therefore working in the same direction as *PHP-FINAL-MONOFT. For the two 5-syll lines with the line-medial interjection (structured as [SS]S[I][SS]), again GOODFTINTERJ shares the same interest as *PHP-FINAL-MONOFT: both encourage the optimal scansion (S)(S)(SS)(S). Finally, *PHP-FINAL-MONOFT does not conflict with BINMIN, for the same reason suggested above for the non-ranking between ANCHOR-ISBOPHP and BINMIN, i.e., BINMIN is inevitably violated, hence not discriminating.
Now consider the ranking between *IP-FINAL-MONOFT and *PHP-FINAL-MONOFT, which are, as argued earlier, instantiations of NON-FINALITY at different levels. Recall that the former had been argued to be undominated in (52), before the latter was introduced; and when the latter was indeed introduced, we argued above that it is also undominated in the sub-grammar shorn of *IP-FINAL-MONOFT. Thus, we have two constraints that are from the same family and both inviolable in the sub-grammar. The question now is whether they are both necessary in the sub-grammar, i.e. whether they are both active in selecting the optimal scansion (cf. Prince and Smolensky’s (1993: 107) definition of ‘active constraints’).

In addressing this question, we first need to realize that a subtle relation holds between the satisfaction/violation patterns of these two constraints: a violation of *IP-FINAL-MONOFT is necessarily accompanied by one of *PHP-FINAL-MONOFT, as the end of an IP is necessarily the end of a PhP, but the reverse is not necessarily true. This is illustrated below (√ and * respectively standing for constraint satisfaction and violation):36

<table>
<thead>
<tr>
<th>Input</th>
<th>*IP-FINAL-MONOFT</th>
<th>*PHP-FINAL-MONOFT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Candidate a (e.g. (SS)(SS)(S))</td>
<td>√</td>
<td>*</td>
</tr>
<tr>
<td>Candidate b (e.g. (SS)(S)(SS))</td>
<td>*</td>
<td>√</td>
</tr>
<tr>
<td>Candidate c (e.g. (SS)(S)(SS))</td>
<td>√</td>
<td>*</td>
</tr>
</tbody>
</table>

Notably, the satisfaction/violation pattern for *IP-FINAL-MONOFT is a true subset of that for *PHP-FINAL-MONOFT. In other words, *IP-FINAL-MONOFT is not as discriminating as *PHP-FINAL-MONOFT. *PHP-FINAL-MONOFT can filter out those suboptimal forms that *IP-FINAL-MONOFT cannot. In contrast, any sub-optimal form that is filtered out by *IP-FINAL-MONOFT is also bound to fail the evaluation of *PHP-FINAL-MONOFT. Hence these two constraints feature different degrees of granularity: *IP-FINAL-MONOFT is coarser-grained whilst *PHP-FINAL-MONOFT is finer-grained. The presence of the finer-grained one in the sub-grammar renders that of the coarser-grained one redundant, because the former can fulfil all the tasks that the latter can perform and in fact even more. Therefore, the introduction of *PHP-FINAL-MONOFT announces the retirement of *IP-FINAL-MONOFT from the sub-grammar37.

Thus, the sub-grammar is now streamlined into (cf. (83)):

36 Note (91) is just for illustrative purposes and not intended to be read as a tableau.
37 It deserves pointing out that under this new sub-grammar, the optimal scansion accounted for by the emergent sub-grammar at earlier stages remain optimal. This backtracking is arguably necessary as the replaced *IP-FINAL-MONOFT is more liberal than the newly added *PHP-FINAL-MONOFT, and concern arises as to whether some optimal candidates that won earlier by satisfying, among other constraints, *IP-FINAL-MONOFT may inadvertently be harboring a PhP-final monosyllabic foot, which was innocuous back then, but fatal now. As it turns out, none of them have such feet.
We conclude this section by illustrating below how the optimal scansion of the grammatical structure $[[SS][S][SS]]$, which triggered all this discussion, can now be satisfactorily accounted for. A comparison between the following tableau and its predecessor in (81) reveals the powerfulness of the two newly introduced constraints and the vital significance of introducing hierarchicality into the sub-grammar.

<table>
<thead>
<tr>
<th>(89)</th>
<th>[\text{S}](\text{S})(\text{S})(\text{S})(\text{S})</th>
<th>\text{BINMAX}</th>
<th>\text{BINMIN}</th>
<th>\text{GOODFTINTERJ}</th>
<th>*\text{PHP-FINAL-MONOFT}</th>
<th>\text{ANCHOR-I}<em>{\text{S}S}\text{O}</em>{\text{PHP}}</th>
<th>\text{ANCHOR-IO}</th>
<th>\text{ANCHOR-OI}</th>
<th>\text{ALIGNR} (\text{FT}, \text{IP})</th>
</tr>
</thead>
<tbody>
<tr>
<td>**</td>
<td>*</td>
<td>*</td>
<td>**</td>
<td>*</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*(S)(SS)(SS)(SS)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*(SS)(SS)(S)(SS)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*(SS)(S)(SS)(SS)</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*(SS)(SS)(SS)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*(SSS)(SS)(SS)</td>
<td></td>
<td></td>
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</tbody>
</table>

2.3.7 More on the sub-grammar: scansion of 8-syll lines

After the elaborate discussion on 7-syll lines in the preceding section, the discussion on 8-syll lines appears rather anti-climactic: it offers no evidence for new constraints or new ranking. Hence, this section is a quick illustration of how the sub-grammar can sufficiently deal with the scansion of 8-syll Shijing lines.

There are only three 8-syll lines in the Shijing corpus and they all share the same grammatical structure $[[S][SS]][S][S][SS]]$ and are scanned as (SS)(SS)(SS)(SS). For example:

(90) $[[\text{bu4}[\text{zhi1} \text{ wo3}]]\text{zhe3}]$ $[\text{wei4} [\text{wo3} [\text{he2 qiu2}]]$

not know me person say I what desire

‘Those who do not know me wonder what I desire’

$\rightarrow (\text{bu4zhi1}) (\text{wo3 zhe3}) (\text{wei4 wo3}) (\text{he2 qiu2}).$

This optimal scansion can be fully accounted for by the sub-grammar as follows:
The optimal scansion, (SS)(SS)(SS)(SS), wins by satisfying all higher-ranking constraints, even though it violates the lower-ranking ANCHOR and ALIGNR (FT, IP).

So far on the basis of the scansion of all _Shijing_ lines in the corpus, we have developed, in an incremental manner, the sub-grammar presented in (88) for the scansion of _Shijing_ lines. Below we briefly reflect upon several points in the sub-grammar.

### 2.3.8 Some reflections on the sub-grammar of _Shijing_ verse line scansion

Consider the constraints in the sub-grammar and the first thing to notice is that they are all universal, or at least expressible in universal terms. For example, as suggested before, GOODFTINTERJ can be reformulated in terms of RH_TYPE=TROCHEE and STRESS-TO-WEIGHT and *PHP-FINAL-MONOFT in terms of NON-FINALITY.

Second, the sub-grammar only deploys prosodic constraints that can be grounded in the phonological system of Chinese, and the construct of a separate metrical hierarchy or module is dispensed with. This is in conformity with the tenet of prosodic metrics outlined in Chapter 1. These constraints fall into the two categories of faithfulness (ANCHOR-ISBOPHP and ANCHOR) and markedness constraints (BINMAX, BINMIN, GOODFTINTERJ, *PHP-FINAL-MONOFT and ALIGNR (FT, IP)).

Third, the ranking ANCHOR-ISBOPHP >> ANCHOR-IO testifies the Pāṇinian Ranking Theorem (Prince and Smolensky 1993: 107) and reveals that the rigor of the boundary matching between the input and output varies at different levels of the hierarchical structure. Specifically, it exhibits a pattern of ‘the higher the stricter and the lower the more liberal’, namely, the higher the boundaries are in the hierarchy, the stricter is the boundary matching and the lower the boundaries the looser the matching. A similar pattern of the scalarity of rigor is also observed in Hayes’ (1989) study of the correspondence between the metrical and prosodic hierarchies in English art verse. This renders it interesting to explore to what extent this connection between the strictness of faithfulness constraints involving different levels and the position of the levels in the hierarchical structure can be extrapolated.

Finally, so far we have interpreted *PHP-FINAL-MONOFT and *IP-FINAL-MONOFT in terms of NON-FINALITY; in fact, by imposing certain restrictions on the end of a prosodic domain but not the beginning, these two constraints, and accordingly, NON-FINALITY per se, reflect yet another pattern proposed in Hayes (1989), which he refers
to as ‘beginning liberal and ending strict’. Again, it is worth investigating why the end of a phonological domain is susceptible to more restrictions than the beginning.

2.4 Formal grounding of metrical harmony

This section takes as its point of departure the observation that when presented with a verse line, the native speaker can usually offer judgment on metrical harmony of the line and that such judgments are especially strong and solid in those lines which are felt to be metrically most harmonious. This section provides a formal account of this metrical harmony experienced by the native speaker by arguing that it can be grounded in the sub-grammar for the corresponding genre.

To begin with, one proviso needs to be mentioned, namely, only the metrically most harmonious lines will be considered. This is in conformity with the above-mentioned observation. As is to be seen below, this also conforms to the postulated working tenet of the ‘tableau des tableaux’, i.e. one and only one optimal candidate will be selected. We will return to this issue below.

The formal mechanism to be employed is the ‘tableau des tableaux’, the nomenclature borrowed from Itô, Mester and Padgett (1995). It is named as such because the tableau is constructed out of the many ‘conventional’ tableaux that are used in developing the sub-grammar: the candidates in the ‘tableau des tableaux’ for a certain line type (say 4-syll lines) are constituted by parses from various grammatical structures for this line type to their respective optimal scansion. As such, the candidates actually represent the ‘parse route’ corresponding to various grammatical structures. The constraint ranking hierarchy for the evaluation of various candidates is constituted by the verse sub-grammar for the genre under discussion. The tableau des tableaux operates on the same principle as the conventional OT tableaux: the candidate that best satisfies the constraints ranked in the given order is the winner and there is only one such candidate. It might be suggested that the (finite) number of candidates in a tableau des tableaux are all optimal and the optimal parse is thus ‘optimal among the optimal’. More specifically, the optimal candidate is the best parse whose ‘parse route’ is the least offensive under the grammar – least offensive in terms of best satisfying the constraints in their given ranking order. Or, if we cite the notion of ‘OT harmony’ which refers to ‘the degree to which a possible analysis of an input satisfies a set of conflicting well-formedness constraints’ (Prince and Smolensky 1993: 3), the optimal candidate enjoys the greatest OT harmony.

Below we will argue that for each line type, the line cognized as metrically most harmonious coincides with the line whose corresponding parse is optimal in the tableau des tableaux for this line type. Put simply, the most harmonious grammatical structure coincides with the grammatical structure of the optimal parse. This consistent, non-trivial correspondence shows that the native speaker’s cognitively oriented metrical harmony judgment can be formally grounded in the grammar via the construct of OT harmony.

First, consider the 3-syll lines. As mentioned in Section 2.3.2, two grammatical structures occur in the corpus: S[SS] and [SS]S. The optimal scansion for lines of
both structures is (S)(SS). With the *Shijing* sub-grammar developed in Section 2.3, the following tableau des tableaux can be constructed\(^{38}\):

(Candidate parses) | BIN MAX | BIN MIN | GOODFT | *P1P-FINAL-MONOFT | ANCHOR-ISO2 | ANCHOR-IO | ANCHOR-OI | ALIGNR
--- | --- | --- | --- | --- | --- | --- | --- | ---
 a. \((SS)(SS)\) | * | | | | | | | 2

Corresponding to the two grammatical structures, there are two candidate parses. As shown here, of the two, parse (a) wins. On the side of the native speaker’s metrical harmony judgment, 3-syll *Shijing* lines of the structure S[SS] are experienced as metrically most harmonious, as reported by my informants. Evidently, for 3-syll *Shijing* lines, the native speaker’s metrical harmony judgment can be formally accounted for by the sub-grammar by virtue of OT harmony.

The other lines types are analyzed similarly. Below I will directly present the tableau des tableaux for 4- and 5-syll lines. For any given line type, the number of candidate parses equals that of the grammatical structure types occurring in the corpus for this line type. However, for simplicity sake, not all the grammatical structures are shown in the tableaux below.

(93) 4-syll lines

\(^{38}\) The tableau des tableaux uses the same notation as the conventional tableau. (Cf. Itô, Mester and Padgett’s (1995) use of the ‘superhand’ to refer to the winner in the tableau des tableaux.)
(94) 5-syll lines

Candidate parses

<table>
<thead>
<tr>
<th></th>
<th>BINMAX</th>
<th>BINMIN</th>
<th>GOODFT</th>
<th>FINAL-MONOFT</th>
<th>ANCHOR-IsBOPHP</th>
<th>ANCHOR-Io</th>
<th>ANCHOR-Oi</th>
<th>ALIGNR (Fr, IP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>![SS][SS][SS]</td>
<td>![SS][SS]</td>
<td>![SS][SS]</td>
<td>![SS][SS]</td>
<td>*</td>
<td>*</td>
<td>!</td>
<td>*</td>
</tr>
<tr>
<td>b.</td>
<td>![SS][SS][SS]</td>
<td>![SS][SS]</td>
<td>![SS][SS]</td>
<td>![SS][SS]</td>
<td>*</td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>c.</td>
<td>![SS][SS][SS]</td>
<td>![SS][SS]</td>
<td>![SS][SS]</td>
<td>![SS][SS]</td>
<td>*</td>
<td></td>
<td>*</td>
<td>6</td>
</tr>
<tr>
<td>d.</td>
<td>![SS][SS][SS]</td>
<td>![SS][SS]</td>
<td>![SS][SS]</td>
<td>![SS][SS]</td>
<td>*</td>
<td></td>
<td>*</td>
<td>6</td>
</tr>
<tr>
<td>e.</td>
<td>![SS][SS][SS]</td>
<td>![SS][SS]</td>
<td>![SS][SS]</td>
<td>![SS][SS]</td>
<td>*</td>
<td></td>
<td>*</td>
<td>5</td>
</tr>
</tbody>
</table>

In both cases, the metrically most harmonious lines correspond to the optimal parse, respectively being ![SS][SS] and ![SS][SS][SS] for these two line types. So far, only the main hierarchy suffices to establish this convergence and thus account for the metrical harmony. However, it turns out insufficient in the case of the 6-syll lines:

(95) 6-syll lines

Candidate parses

<table>
<thead>
<tr>
<th></th>
<th>BINMAX</th>
<th>BINMIN</th>
<th>GOODFT</th>
<th>FINAL-MONOFT</th>
<th>ANCHOR-IsBOPHP</th>
<th>ANCHOR-Io</th>
<th>ANCHOR-Oi</th>
<th>ALIGNR (Fr, IP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. ![SS][SS][SS][SS]</td>
<td>![SS][SS][SS][SS]</td>
<td>![SS][SS][SS][SS]</td>
<td>![SS][SS][SS][SS]</td>
<td>![SS][SS][SS][SS]</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. ![SS][SS][SS][SS]</td>
<td>![SS][SS][SS][SS]</td>
<td>![SS][SS][SS][SS]</td>
<td>![SS][SS][SS][SS]</td>
<td>![SS][SS][SS][SS]</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. ![SS][S][SS][SS]</td>
<td>![SS][S][SS][SS]</td>
<td>![SS][S][SS][SS]</td>
<td>![SS][S][SS][SS]</td>
<td>![SS][S][SS][SS]</td>
<td>*!</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. ![S][SS][SS][SS]</td>
<td>![S][SS][SS][SS]</td>
<td>![S][SS][SS][SS]</td>
<td>![S][SS][SS][SS]</td>
<td>![S][SS][SS][SS]</td>
<td>*!</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. ![SS][S][SS][SS]</td>
<td>![SS][S][SS][SS]</td>
<td>![SS][S][SS][SS]</td>
<td>![SS][S][SS][SS]</td>
<td>![SS][S][SS][SS]</td>
<td>*!</td>
<td>6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

 Parses (a) and (b) emerge as equi-optimal and the main hierarchy alone fails to discriminate between them. It is noteworthy that they differ only in the position of the PhP boundary which reflects their different SB’s. This prompts us to supplement the main hierarchy with the sub-hierarchy for PhP boundary delimitation and the tableau des tableaux under this extended hierarchy is as follows. The double line is used between the main hierarchy and the sub-hierarchy due to lack of evidence for their ranking.
We see that the PhP parsing hierarchy plays a crucial role in distinguishing between parse (a) and (b). Indeed, once again, the 6-syll lines of the right-branching structure [SS][SS][SS], which corresponds to the optimal parse, are cognized as metrically the most harmonious. In the sense that both the main hierarchy and the sub-hierarchy are in the Shiijing sub-grammar, respectively in charge of the foot parsing and PhP parsing, the metrical harmony data from 6-syll lines further supports our claim that metrical harmony can be formally grounded in the verse grammar in the form of OT harmony. Further evidence for this claim is provided by 7- and 8-syll lines the discussion of which is skipped here to avoid repetition.

We wish to conclude this section by further justifying our practice to examine only the most harmonious lines in formally accounting for the metrical harmony, and pay no attention to the degree of metrical harmony and its possible formal correlate. This is, we suggest, not a point of concern; rather it follows from both the empirical and theoretical considerations. Empirically, the native judgment on metrical harmony is converging and solid only regarding the metrically most harmonious lines; passing judgments on the often subtle difference in the degree of metrical harmony among the less harmonious lines is more challenging and typically characterized by less consensus. As Youmans (1989:10) observes, judgment about the degree of metrical tension even by ‘trained ears’ can be inconclusive and unreliable.

The theoretical consideration comes from the relative nature of OT harmony (Prince and Smolensky 1993). An OT grammar is solely concerned with the selection of the one and only one optimal candidate. All other candidates are indiscriminately treated as suboptimal; no second best (the ‘runner-up’), or the third best etc. are distinguished. In other words, the difference in constraint satisfaction/violation among the other suboptimal candidates is irrelevant, and it makes no sense to rank one over another among them. The issue of relativity in reckoning optimality in an OT grammar is explicitly addressed in Prince and Smolensky (Ibid.: 27) as follows:

---

It is of interest to note that the 6-syll lines respectively of the structures [SS][SS][SS] and [SS][SS][SS] are experienced in subtle but distinct ways in terms of their metrical harmony: my informants unanimously reported that the former feels much smoother while the latter somehow feels ‘imbalanced’ and ‘tilted’. This complaint of imbalance, which might be superficially attributable to the position of the SB, is actually captured by LONG-LAST in the PhP parsing sub-hierarchy.
HOF [Harmonic Ordering of Forms] can never determine the absolute number of violations; that is, count them. HOF deals not in quantities but in comparisons, and establishes only relative rankings, not positions on any fixed absolute scale.

This implies that formal OT harmony is categorical in nature (McCarthy and Prince 1993a: 88); a form is either optimal or suboptimal and there is no such thing as 'more/less optimal'. In the tableau des tableaux, only the optimal parse is selected and the satisfaction/violation pattern by the suboptimal parses carries no formal significance. Accordingly, the establishment of correlation is feasible only between the metrically most harmonious lines and the optimal parse. This meshes well with the fact that as far as the metrically most harmonious lines are concerned, the native judgments are strong and converging, but when it comes to less harmonious lines, their native judgments become somewhat equivocal.
Chapter 3 Jiuge sub-grammar

3.1 General description of the raw corpus

The corpus for this chapter comprises of eleven poems of the Jiuge sub-genre, which belongs to the genre collectively referred to as Chuci. A description of the Jiuge poems first entails some background knowledge about the Chuci genre in general.

Chuci, literally meaning ‘Elegies of Chu’, was composed around the Spring and Autumn Period and the Warring States Period around 300 BC when China was divided into seven feudal states, all vying with one another for fief and power (Yang and Yang 1983). Chu was one of the seven states, and Chuci was believed to be mostly composed single-handedly by Qu Yuan (ca.340-278 BC), the greatest poet of this period as well as an under-appreciated court official of Chu, around the time when Chu was on the verge of being annexed by the more powerful state of Qin. Chuci is hailed as the origin of romanticism in Chinese literature in the sense that the poets sought to decry the decline of the country, criticize the impotence of the court, and express their frustration and forlornness by way of romantic allusions and religious allegories, rather than realistic depiction. Consequently, there is a religious theme in many Chuci poems, particularly the Jiuge ones, where shamanism is a prevailing theme. Furthermore, as Chu was located in what is nowadays the south-central part of China, Chuci is also known as ‘Poems of the South’.

The anthology of Chuci that has survived today consists of seventeen chapters, each constituting a unique sub-genre1. At the same time, the common features they share serve to collectively define the distinct genre known as Chuci. It is characterized by a unique integration of on the one hand, the distinct features of the Chu folk song, in particular, the wide use of the singing element ‘xi’, and on the other hand, the literary style of the northern states, which was mainly inherited from Shijing of the previous literary era. Nonetheless, the seventeen chapters differ in the degree in which they balance these two sources against each other and display variations on the basis of this overall refrain (Chen 1994). For example, Tianwen (‘Heavenly Questions’) and Dazhao (‘Great Summons’) are more heavily influenced by the Shijing tradition and feature more 4-syll lines and relatively few ‘xi’ s whereas all the other fifteen chapters are unified by the pervasive use of ‘xi’. Furthermore, some chapters of the latter group, for example Jiuge (‘Nine Songs’) to be studied here, are characterized by the presence of ‘xi’ in every single line, whereas others, e.g. Lisao (‘On Encountering Trouble’) and Yuanyou (‘Far-off Journey’), have lines containing ‘xi’ interspersed with those bearing more resemblance with Shijing lines.

The omnipresence of ‘xi’, regarded as the hallmark of the Chuci genre, and the virtual absence of transitional lines of the Shijing type in Jiuge renders it a full-blown sub-genre as far as the representation of ‘xi’ is concerned, the distinct characteristic of Chuci. Indeed, Jiuge is also among the most popular Chuci verse for modern

1 For a full list of the titles and poems of the seventeen chapters, check out the website faculty.virginia.edu/cll/chinese_literature/Chuci/Chucitoc.htm.
Speakers. On this account, we opt to select it as the empirical basis for an exploration of the sub-grammar\(^2\).

With this background about the *Chuci* genre in general, we now move on to say a few words specifically about *Jiuge*. First, as is true with all *Chuci* chapters, *Jiuge* was intended to be mainly sung at its time of composition, though it was also argued to be recited back then; however, the tunes have long been lost and for modern speakers, the only viable manner for its delivery is recitation. Second, as mentioned earlier, every *Jiuge* line contains the interjection ‘*xi*’, and no other function words are used. Furthermore, ‘*xi*’ only occurs line-medially in *Jiuge*. In other words, every *Jiuge* line solely comprises of one (obligatorily present) line-medial ‘*xi*’ and a number of lexical syllables. Third, the *Jiuge* chapter contains altogether eleven poems, which are thematically concerned with different deities worshipped in the various parts of Chu. Fourth, the eleven poems display a considerable degree of variation: the number of lines contained in a poem ranges from 5 to 26, either belonging to one long stanza or grouped into several stanzas. The number of lines totals 253, and the overwhelming majority of them (250 out of 253) contain 5, 6 or 7 syllables. Admittedly, this corpus is much smaller than the *Shijing* corpus; nonetheless, it comprises of all *Jiuge* lines and as such offers a sufficient basis for the development of a robust scansion *Jiuge* sub-grammar.

3.2 Methodological issues and preview of the sub-grammar

3.2.1 Methodological issues

The organization of the chapter, and the notational convention are the same as those in the *Shijing* chapter (Section 2.2.1 of Chapter 2) and will not be repeated here. What differs between the *Shijing* chapter and this chapter in terms of methodology is that while the *Shijing* sub-grammar was developed from scratch, the *Jiuge* sub-grammar builds upon this sub-grammar. More specifically, in developing the *Shijing* sub-grammar, individual constraints and constraint rankings are motivated solely on the basis of the data; in developing the *Jiuge* sub-grammar, these constraints and rankings are, in principle, readily available and may be directly imported whenever applicable to the *Jiuge* data.

Obviously, this practice is enabled by the assumption outlined in Chapter 1 that there is one and only one overarching grammar for the modern speaker’s scansion of classical Chinese verse lines of all the five genres. At the same time, it was also mentioned there that this grammar is necessarily a partial ranking and the sub-grammars for different genres may well differ in their ranking. In view of this, we

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\(^2\) Quite a few of the seventeen chapters are rather ill-known to modern speakers, largely due to the arcane, and in some cases, even obsolete diction used therein. Furthermore, some chapters, for example, *Qijian* (‘Seven Remonstrances’), are often featured by long lines with involved structures, which also thwarts its recitability and thus dampens its popularity with the modern speaker. On the other hand, to study the scansion sub-grammar for each of the seventeen sub-genres would be unfeasible for the current research which aims to cover the other four major genres of classical Chinese verse as well.
choose to adopt the relatively weak assumption in our analysis below, namely, that the sub-grammars only share constraints but not necessarily the ranking.

Translated into the specific analytical strategy, this assumption implies the following two points. First, the constraints motivated so far for the *Shijing* sub-grammar are part of the ‘constraint pool’ which contains all the constraints actively involved in the modern speaker’s scansion of classical Chinese verse lines, and we will be freely drawing constraints from this pool in the analysis below. At the same time, it is well conceivable that the *Shijing* constraints do not constitute the whole constraint pool; new constraints motivated by data from other sub-genres will be added to it. Second, in accordance with the above-mentioned assumption, constraint ranking will primarily be motivated on the basis of the *Jiuge* data, although as we will see, the ranking already arrived at in the *Shijing* sub-grammar considerably expedites the analytical process.

### 3.3 Jiuge sub-grammar

Of the 253 lines constituting the *Jiuge* corpus, except for one 8-syll line and two 9-syll lines, the remaining 250 lines range from 5- to 7-syllable long. As mentioned earlier, one of the most distinct features of the *Jiuge* genre is the omnipresence of ‘xi’; in terms of grammatical representation, we treat ‘xi’ as a stand-alone element. The organization of this section follows the same principle as that of Section 2.3 of the last chapter, namely, in the order of line length measured by syllable numbers.

#### 3.3.1 BINMAX, BINMIN and ANCHOR: evidence from 5-syll lines

All 5-syll *Jiuge* lines share the grammatical structure [SS]S[SS] (with the unbracketed middle syllable being ‘xi’) and the optimal scansion of (SS)(xi)(SS)

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3 On a larger scale, this pool of constraints is in turn drawn from the repertoire of universal constraints shared by all human languages.

4 In theory, we could also adopt the strong assumption that the sub-grammars share both the constraints and the ranking. However, in practice, this does not really simplify the analysis and exposition, as in many cases we need first to show the assumed ranking does not work for the current data, and then establish the new ranking. An additional reason for the adoption of the weak assumption and the concomitant analytical strategy laid out here is that we wish to be able to organize the following section in a way identical to that of Section 2.3 of Chapter 2, namely, by covering all line types (in terms of syllable numbers). This is in turn motivated by the desire to present the reader with not only an analytical process to reach the sub-grammar, but also a descriptive picture of the various lines for the current genre (including the ‘non-crucial’ lines that apparently contribute little to the development of the sub-grammar). We wish to emphasize notwithstanding that the choice between these two assumptions is essentially a stylistic matter and as such carries no theoretical significance. This weak assumption and the concomitant analytical strategy will also be adopted in the following chapters.

5 It should be clarified that (SS)(S)(SS) is the optimal parsing for verse scansion, which, as argued in Footnote 11 of Chapter 2, disallows trisyllabic or polysyllabic feet. Indeed, (SSS)(SS) is an acceptable parsing for prose scansion, but crucially, in this parsing, the middle syllable of the trisyllabic foot has to be considerably reduced. The current study is only concerned with the grammar for verse scansion.
To begin with, consider the potential candidate form (SSS)(SS), which, although acceptable in prose scansion, is nonetheless suboptimal in verse scansion. This exhibits exactly the same pattern as in the scansion of *Shijing* lines, where monosyllabic feet are conditionally acceptable but trisyllabic ones always banned. This invites the direct importing of the two binarity constraints BinMAX and BinMIN and their ranking BinMAX >> BinMIN from the constraint pool, which is illustrated as below:

\[
\begin{array}{cccc}
\text{[SS]xi[SS]} & \text{BinMAX} & \text{BinMIN} \\
\text{(SS)(xi)(SS)} & * & * \\
\text{(SSxi)(SS)} & *! & \\
\end{array}
\]

Second, consider the potential but suboptimal candidate (S)(Sxi)(SS). Compare it against the input structure [SS]xi[SS], and it becomes apparent that Anchor from the constraint pool is able to winnow out this candidate by penalizing its poorer boundary matching between the grammatical and the prosodic structures than (SS)(xi)(SS).

As to the ranking of Anchor with BinMAX and BinMIN, the current case provides no crucial argument; the reason is that the optimal winner, (SS)(xi)(SS), perfectly satisfies Anchor, while other suboptimal parsings, including (S)(Sxi)(SS), violate it in one way or another. Therefore, however Anchor is ranked, (SS)(xi)(SS) will always win, as illustrated below:

\[
\begin{array}{cccc}
\text{[SS]xi[SS]} & \text{BinMAX} & \text{BinMIN} & \text{Anchor-IO} & \text{Anchor-OI} \\
\text{(SS)(xi)(SS)} & * & * & * & * \\
\text{(S)(Sxi)(SS)} & * & * & * & * \\
\text{(SSxi)(SS)} & *! & * & * & * \\
\text{(SS)(xiSS)} & *! & * & * & * \\
\end{array}
\]

Thus the emerging sub-grammar developed solely on the basis of 5-syll lines is, in Hasse graph:

\[\text{Note that for some informants, (S)(SS)(SS) is also passable, but the consensus is that this scansion is}
\text{‘much less natural than (SS)(S)(SS)’. As befits our decision to address only one optimal candidate}
\text{spelled out in Chapter 1, we treat (S)(SS)(SS) as sub-optimal.}\]
Before we move on to 6-syll lines, the optimal scansion (SS)(xi)(SS) deserves further attention. Recall that Shijing has lines of the same structure [SS][SS], where the third syllable is an interjection. However, as shown in Section 2.3.4 of Chapter 2, such lines are best scanned as (S)(SS)(SS). For such Shijing lines, (SS)(S)(SS), which is the optimal scansion for Jiuge lines of the same structure, is suboptimal. The question now is what contributes to this difference. Apparently, these two lines belong to two different genres, but the real crux, we argue, lies in the fact that while the third syllable in the Shijing line is a normal interjection, the third syllable in the Jiuge line is ‘xi’, which is unique in many ways. With specific regard to the present case, the contrast between the parsing of 5-syll Jiuge lines and that of 5-syll Shijing lines of the same structure is attributable to the phonological property of ‘xi’, which is different from that of normal interjection syllables. Specifically, ‘xi’ can constitute a monosyllabic foot on its own whereas a normal interjection syllable can only serve as the weak syllable of a disyllabic foot. Indeed, as mentioned earlier, the omnipresence of ‘xi’ is one of the most distinct characteristics of the Jiuge sub-genre and in fact Chuci in general (Chen 1994), and it displays some unique phonological behaviors that call for a special treatment. However, since so far we have not demonstrated the full range of the phonological behavior of ‘xi’, we defer the discussion of ‘xi’ till a later point. For now, it is important to bear in mind that unlike normal interjection syllables, ‘xi’ can constitute a monosyllabic foot on its own.

### 3.3.2 ANCHOR-OI >> BINMIN >> ANCHOR-IO: evidence from 6-syll lines

6-syll lines constitute more than half of all Jiuge lines (128 out of 253); two grammatical structures are identified, namely, [[SS][S][xi][SS] and [S][SS][xi][SS]]. Lines of these two structures are respectively scanned as (SS)(Sxi)(SS) and (S)(SS)(xi)(SS). For example,

(6)  
\[ ([yu3 \ nu3] \ mu4) \ xi1 \ [xian2 \ chi2] \rightarrow (yu3 \ nu3) \ (mu4 \ xi1) \ (xian2 \ chi2) \]
with you bathe xi place name
‘Ah, (I) bathe with you in Xianchi’.

(7)  
\[ ([ling2[huang2 \ huang2]] \ xi1[ji4 \ jiang4] \rightarrow (ling2) \ (huang2huang2) \ xi1(ji4 \ jiang4) \]
spirit magnificent/redup. xi already descend
‘Ah, the magnificent spirits have already descended (upon us)’.

(8)  
\[ ([fu3 \ [chang2 \ jian4]] \ xi1 \ [yu4 \ er3] \rightarrow (fu3) \ (chang2 \ jian4) \ (xi1)(yu4 \ er3) \]
stroke long sword xi jade ornament
‘Ah, (I) stroke my long sword and (put on) my jade ornament’.
While the 5-syll lines provide no evidence for the ranking between **BINMIN** and **ANCHOR**, the scansion of lines of the structure \([SS][xi][SS]\) as \((SS)(Sxi)(SS)\) offers crucial evidence for **BINMIN >> ANCHOR**. The scansion \((SS)(S)(xi)(SS)\) which fully conserves the input boundaries is suboptimal, due to its violations of **BINMIN**. The ranking argument is shown below:

\[(9)\]

<table>
<thead>
<tr>
<th>([SS][xi][SS])</th>
<th><strong>BINMIN</strong></th>
<th><strong>ANCHOR-IO</strong></th>
<th><strong>ANCHOR-OI</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>⋆ (SS)(Sxi)(SS)</td>
<td>*</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>(SS)(S)(xi)(SS)</td>
<td><em>!</em></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Furthermore, since **BINMAX >> BINMIN**, by transitivity, we have **BINMAX >> ANCHOR**. Thus the sub-grammar now is **BINMAX >> BINMIN >> ANCHOR**.

However, this sub-grammar turns out insufficient to account for the scansion of lines of the structure \([S][SS][xi][SS]\): \((SS)(Sxi)(SS)\) would still win, while the real winner is \((S)(SS)(xi)(SS)\). This is illustrated below:

\[(10)\]

<table>
<thead>
<tr>
<th>([S][SS][xi][SS])</th>
<th><strong>BINMAX</strong></th>
<th><strong>BINMIN</strong></th>
<th><strong>ANCHOR-IO</strong></th>
<th><strong>ANCHOR-OI</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>a. ⋆ (SS)(Sxi)(SS)</td>
<td></td>
<td>⋆</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>b. ⋆ (S)(SS)(xi)(SS)</td>
<td><em>!</em></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. (SSS)(xi)(SS)</td>
<td><em>!</em></td>
<td></td>
<td>*</td>
<td>*</td>
</tr>
</tbody>
</table>

Under the current sub-grammar, the undesired winner (a) wins because of its maximal satisfaction of the highly ranked **BINMAX** and **BINMIN**, even though it violates **ANCHOR**. Indeed, as the sub-grammar stands now, \((SS)(Sxi)(SS)\) is bound to emerge as the winner irrespective of the grammatical structure. The reason is that \((SS)(Sxi)(SS)\), by evenly chopping up the six syllables in the line into three disyllabic feet, always maximally satisfies the two high-ranking well-formedness constraints, **BINMAX** and **BINMIN**, even though this chopping violates **ANCHOR** by ignoring the input boundaries and freely inserting output ones. By comparison, the desired winner \((S)(SS)(xi)(SS)\), whose boundaries fully match the input ones, loses because of the double violations of **BINMIN**.

The boundary matching between the input and output in the desired winner calls for a proper ranking of **ANCHOR**. Recall that in (9) only **BINMIN >> ANCHOR-IO** was arrived at on the basis of crucial evidence, and we got **BINMIN >> ANCHOR-OI** thereafter merely by assuming that the two **ANCHOR** constraints stay together in the hierarchy unless there is evidence to the contrary. Now, the scansion of lines of the structure \([S][SS][xi][SS]\) provides exactly such evidence to rank them apart;

7 Evidently, in the so-called ‘minstrel’ performance style where the syntax and meaning of the verse line are ignored, \((SS)(Sxi)(SS)\) would always win. But as mentioned in Chapter 1, such performance is linguistically uninteresting and not discussed in this study.
specifically, it constitutes the crucial ranking argument for \textsc{Anchor-Oi} \gg \textsc{BinMin}, and by transitivity, \textsc{Anchor-Oi} \gg \textsc{Anchor-IO}. This is shown below:

\begin{equation}
\begin{array}{|c|c|c|}
\hline
\text{[S[SS]]xi[SS]} & \text{\textsc{Anchor-Oi}} & \text{\textsc{BinMin}} & \text{\textsc{Anchor-IO}} \\
\hline
\text{(SS)(Sxi)(SS)} & \ast ! & \ast \\
\text{\ast !(S)(SS)(xi)(SS)} & \ast ! & \ast ! & \ast ! \\
\hline
\end{array}
\end{equation}

As to the ranking between \textsc{Anchor-Oi} and \textsc{BinMax}, there is yet no crucial evidence, as neither (SSS)(xi)(SS), which violates \textsc{BinMax}, nor (SS)(Sxi)(SS), which violates \textsc{Anchor-Oi}, wins. This shows that both \textsc{BinMax} and \textsc{Anchor-Oi} are highly ranked. Hence, the emergent sub-grammar is:

\begin{equation}
\text{\textsc{BinMax \textsc{Anchor-Oi}}}
\end{equation}

\begin{equation}
\text{\textsc{BinMin \textsc{Anchor-IO}}}
\end{equation}

We close this section by drawing attention to a second type of well-formed feet containing ‘xi’ in addition to the monosyllabic foot (xi) mentioned at the end of Section 3.3.1, namely, (Sxi), which is the second foot in the optimal scansion for \text{[[SS]S]xi[SS]} illustrated in (9).

\subsection{3.3.3 \textit{*IP-FINAL-MONOFT and GOODFT’XI’}: evidence from 7-syll lines}

Compared with 5- and 6-syll ones, 7-syll lines exhibit more diverse patterns in both the grammatical structure and optimal scansion. Altogether six grammatical structures are identified: \text{[[SS]S]xi[[SS]S]}, \text{[[SS]S]xi[SS][S]], \text{[SS]xi[S[SS]]}, \text{[SS]xi[[SS]S]}, \text{[SS]xi[SS][S]}, and \text{[S[SS]]xi[SS][S]}. Lines of these diverse structures have four optimal scansion, i.e. (SS)(Sxi)(S)(SS), (SS)(xi)(S)(SS), (S)(SS)(xi)(SS) and (SS)(SS)(xi)(SS). Below we give examples for each of the six grammatical structures and their scansion.

(13) (i) \text{[[dong1 feng1] piao1] xi1 [[shen2 ling2] yu3]}
\text{east wind blow xi holy spirit rain}
\text{‘Ah, the east wind blows and the holy spirit rains’}
\rightarrow \text{(dong1 feng1) (piao1 xi1) (shen2) (ling2 yu3)}
(ii) \[\text{[yu3} \text{ nv3} \text{ you2}] \text{ xi1 [he2} \text{ [chi1 zhu4]]}\]
with you swim xi river ’s shallows
‘Ah, (I) swim with you in the shallows of the river’
\[\rightarrow (yu3 \text{ nv3}) (you2 \text{ xi1}) (he2) (chi1 zhu4)\]

(iii) \[\text{[fu1 ren2]} \text{ xi1 [zi4 [you3 [mei3 zi3]]]}\]
that person xi certainly have beautiful children
‘Ah, that person certainly has beautiful children’
\[\rightarrow (fu1 \text{ ren2}) (xi1) (zi4 you3) (mei3 zi3)\]

(iv) \[\text{[yao3 [ming2 ming2]} \text{ xi1 [yi3 dong1 xing2]}\]
far far/redup. xi towards east go
‘Ah, (it is) so far away, and (I) will go eastwards’
\[\rightarrow (yao3) (ming2 ming2) (xi1) (yi3) (dong1 xing2)\]

(v) \[\text{[shi2 [lei3 lei3]} \text{ xi1 [ge3 [man4 man4]]}\]
rock big/redup. xi vine long/redup.
‘Ah, how big the rocks are, and how long the vines are’
\[\rightarrow (shi2) (lei3 lei3) (xi1) (ge3) (man4 man4)\]

(vi) \[\text{[zhao1 [chi2 [yu2 ma3]]]} \text{ xi1 [jiang1 gao3]}\]
morning ride my horse xi river side
‘Ah, in the morning I ride my horse along the river’
\[\rightarrow (zhao1 chi2) (yu2 ma3) (xi1) (jiang1 gao3)\].

As not all of the cases presented here are crucial in motivating new constraints or rankings, below we will first discuss those crucial ones to further develop the new sub-grammar and then illustrate the operation of this sub-grammar with some ‘non-crucial’ cases.

To begin with, so far there is yet no evidence for the ranking between BinMax and Anchor-OI; the scansion of lines of the structure [[SS]xi[[SS]S] provides crucial evidence for BinMax >> Anchor-OI. This is illustrated below:

(14)

\[
\begin{array}{|c|c|c|}
\hline
[[SS]xi[[SS]S] & BinMax & Anchor-OI \\
\hline
(SS)(Sxi)(S)(SS) & * & \\
(SS)(Sxi)(SSS) & *! & \\
\hline
\end{array}
\]

Thus, the sub-grammar is now: BinMax >> Anchor-OI >> BinMin >> Anchor-IO. Now, consider lines of the structure [S[SS]xi[[SS]S] and optimally parsed into (S)(SS)(xi)(S)(SS), as shown in (13)(iv). The current sub-grammar fails to predict the correct winner:
As the sub-grammar stands now, (S)(SS)(xi)(SS)(S) which better satisfies the highly ranked ANCHOR-OI, emerges as the winner. In contrast, the desired winner (S)(SS)(xi)(S)(SS) loses on account of violation of ANCHOR-OI. Now carefully compare this pair of competitors and it becomes apparent that the desired winner avoids an IP-final monosyllabic foot in order to satisfy some constraint that is presumably more important than ANCHOR-OI. For this purpose, *IP-FINAL-MONOFT from the constraint pool readily presents itself and it has to dominate ANCHOR-OI, as the unwanted winner satisfies ANCHOR-OI but violates *IP-FINAL-MONOFT. This is illustrated below:

Second, as ANCHOR-OI >> BINMIN >> ANCHOR-IO, by transitivity, we have *IP-FINAL-MONOFT >> BINMIN >> ANCHOR-IO. Third, *IP-FINAL-MONOFT does not conflict with BINMAX: both are in fact inviolable as no potential parsings that violate either of them will survive, for example, (SS)(Sxi)(SS)(S) in violation of *IP-FINAL-MONOFT and (SS)(Sxi)(SSS) in violation of BINMAX. Thus the emergent sub-grammar now is

However, under this sub-grammar, (S)(SS)(xi)(S)(SS), the desired winner, still fails to win; this time it loses to (S)(SS)(xiS)(SS), which equally satisfies *IP-FINAL-MONOFT, but incurs less violation of BINMIN. This is shown below:

Evidently, in order for (S)(SS)(xi)(S)(SS) to win over (S)(SS)(xiS)(SS), some new constraint is needed that crucially cashes in on some difference between the two. A careful observation of the pair reveals that the suboptimal candidate contains a foot (xiS) with ‘xi’ at the first position while in the optimal candidate ‘xi’ occurs at the
second position in the foot (Sxi). Given that Chinese feet are trochaic (Section 2.3.2 of Chapter 2), this difference can be rephrased as ‘xi’ occurring in the head versus non-head position of a foot.

Clearly, the foot (xiS) is offensive in (S)(SS)(xiS)(SS) and this restricted parsing of ‘xi’ is reminiscent of that of normal interjection syllables discussed in Chapter 2; however, the constraint proposed there, i.e. GOODFTINTERJ cannot be directly imported. The reason is because the well-formedness pattern of feet containing (normal) interjections slightly yet crucially differs from that of feet containing ‘xi’. Specifically, a normal interjection syllable can only occur at the non-head, i.e. second position in a disyllabic foot but cannot constitute a monosyllabic foot on its own. In contrast, ‘xi’ can occur either as the non-head syllable in a disyllabic foot headed by a full syllable, or constitute a monosyllabic foot on its own (as was shown towards the end of Section 3.3.1). The only position where ‘xi’ cannot occur is the head position of a disyllabic foot. Therefore, we propose the constraint GOODFT’XI’ which is formulated as:

(19) GOODFT’XI’

‘XI’ can only be legitimately parsed as the non-head of a disyllabic foot or as a monosyllabic foot on its own, but not as the head of a disyllabic foot.

The legitimate parsing pattern of ‘xi’ expressed by this constraint can be presented in table form as follows (where S stands for the full lexical syllable):

<table>
<thead>
<tr>
<th>Foot type</th>
<th>Well-formedness</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Sxi)</td>
<td>Good</td>
</tr>
<tr>
<td>(xi)</td>
<td>Good</td>
</tr>
<tr>
<td>(xiS)</td>
<td>Bad</td>
</tr>
</tbody>
</table>

As for the ranking between GOODFT’XI’ and the other constraints, first, the two candidates in (18) provide the crucial ranking argument for GOODFT’XI’ >> BINMIN, illustrated as follows:

(21) [S[SS]]xi[[SS]S] GOODFT’XI’ BINMIN

Second, as we have argued for BINMIN >> ANCHOR-IO, by transitivity, we get GOODFT’XI’ >> ANCHOR-IO. Third, 6-syll Jiuge lines provide no crucial evidence for the ranking between GOODFT’XI’ and ANCHOR-OI. In fact, a careful consideration of all the line types in the Jiuge corpus reveals that none of them offers such crucial data. Thus the emergent sub-grammar now becomes:

---

8 For the moment, we only present this parsing pattern for the purpose of developing the constraint without further explanation as to why the pattern is such; in the section below, we will argue that these patterns can be accounted for by the peculiar phonological property of ‘xi’.
To revisit lines of the structure \[S[SS]]xi[[SS]S] in (15), we see that its optimal scansion can now be accounted for:

\[\text{(22)}\]
\[
\begin{array}{c}
\text{BINMAX} \\
\text{**IP-FINAL-MONOFt} \\
\text{GOODFT’XI’} \\
\text{ANCHOR-OI} \\
\text{BINMIN} \\
\text{ANCHOR-IO}
\end{array}
\]

This sub-grammar is also adequate to account for the scansion of 7-syll Jiuge lines of the other grammatical structures in the corpus. For space consideration, below we only illustrate the working of the sub-grammar with the grammatical structures \[SS]xi[S[SS]] (13) (iii)), and \[S[SS]]xi[SS] (13)(vi)):

\[\text{(23)}\]

<table>
<thead>
<tr>
<th>Structure</th>
<th>BINMAX</th>
<th>*IP-FINAL-MONOFt</th>
<th>GOODFT’XI’</th>
<th>ANCHOR-OI</th>
<th>BINMIN</th>
<th>ANCHOR-IO</th>
</tr>
</thead>
<tbody>
<tr>
<td>(S)(SS)(xi)(S)(SS)</td>
<td></td>
<td>*</td>
<td>***</td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(S)(SS)(xi)(SS)</td>
<td></td>
<td>*!</td>
<td>*</td>
<td>*</td>
<td>**</td>
<td></td>
</tr>
<tr>
<td>(S)(SS)(xi)(SS)(S)</td>
<td></td>
<td>*!</td>
<td></td>
<td>***</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\[\text{(24)}\]

<table>
<thead>
<tr>
<th>Structure</th>
<th>BINMAX</th>
<th>*IP-FINAL-MONOFt</th>
<th>GOODFT’XI’</th>
<th>ANCHOR-OI</th>
<th>BINMIN</th>
<th>ANCHOR-IO</th>
</tr>
</thead>
<tbody>
<tr>
<td>(SS)(xi)(SS)(SS)</td>
<td></td>
<td>*</td>
<td></td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>(S)(xi)(SS)(SS)</td>
<td></td>
<td>*!</td>
<td>*</td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>(S)(xi)(SS)(SS)</td>
<td></td>
<td>*!</td>
<td>*</td>
<td>**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(SS)(xi)(SS)(SS)</td>
<td></td>
<td>*!</td>
<td></td>
<td>**</td>
<td>*</td>
<td></td>
</tr>
</tbody>
</table>

\[\text{(25)}\]

<table>
<thead>
<tr>
<th>Structure</th>
<th>BINMAX</th>
<th>*IP-FINAL-MONOFt</th>
<th>GOODFT’XI’</th>
<th>ANCHOR-OI</th>
<th>BINMIN</th>
<th>ANCHOR-IO</th>
</tr>
</thead>
<tbody>
<tr>
<td>(S)(SS)(xi)(SS)</td>
<td></td>
<td>*</td>
<td></td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>(S)(SS)(xi)(SS)</td>
<td></td>
<td>*!</td>
<td></td>
<td></td>
<td>**</td>
<td></td>
</tr>
<tr>
<td>(S)(SS)(xi)(SS)</td>
<td></td>
<td>*!</td>
<td></td>
<td></td>
<td>**</td>
<td></td>
</tr>
<tr>
<td>(SS)(SS)(xi)(SS)</td>
<td></td>
<td>*!</td>
<td>*</td>
<td></td>
<td>*</td>
<td></td>
</tr>
</tbody>
</table>

\[\text{Note that following our earlier practice, the arbitrary ranking GOODFT’XI’ >> ANCHOR-OI is assigned to this non-ranking pair. One may of course assign the ranking ANCHOR-OI >> GOODFT’XI’, which would yield the same optimal candidate.}\]
3.3.3.1 The phonological representation of ‘xi’

In this section, we are going to argue that the well-formedness pattern for feet containing ‘xi’ presented in (20) and expressed in the form of the constraint GOODFT’Xi’ is attributable to the unique phonological representation of ‘xi’.

For this purpose, it is enlightening to compare the parsing of ‘xi’ with that of normal interjections. The most dramatic difference is that the former can legitimately constitute a monosyllabic foot whereas the latter cannot. This is shown clearly in the following table which presents, side by side, the parsing of ‘xi’ and normal interjection syllables (indicated as SI) as presented in Section 2.3.4 of Chapter 2.

<table>
<thead>
<tr>
<th>Foot type</th>
<th>Well-formedness</th>
<th>Foot type</th>
<th>Well-formedness</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Sxi)</td>
<td>good</td>
<td>(SSI)</td>
<td>good</td>
</tr>
<tr>
<td>(xi)</td>
<td>good</td>
<td>(SI)</td>
<td>bad</td>
</tr>
<tr>
<td>(xiS)</td>
<td>bad</td>
<td>(SIS)</td>
<td>bad</td>
</tr>
</tbody>
</table>

As shown above, this difference underlies the different scansions of lines between Shijing and Jiuge lines of the same structure. Superficially, the parsing pattern exhibited by ‘xi’ appears rather paradoxical: on the one hand, if ‘xi’ can constitute a monosyllabic foot, then it should be heavy; on the other hand, crucially it cannot occur as the head of a disyllabic trochee, which shows that it cannot really be heavy. We argue that the formal construct of empty mora offers a ready solution to this apparent dilemma: ‘xi’ has as its phonological representation an empty mora in addition to a filled mora whereas the normal interjection syllable is represented as a monomoraic structure where the mora is filled. Diagrammatically, the phonological representation of ‘xi’ is[^10]:

![Diagram](image)

[^10]: We assume that all moras, including the empty mora, are parsed into syllables; in other words, PARSE-µ is inviolable. This constraint stems from the general theory of prosodic licensing developed in Itô (1986) within the derivational framework and it requires that all phonological segments be prosodically licensed. Indeed, as a general constraint, PARSE could be understood as a constraint family requiring the prosodic licensing of phonological constructs at all levels of the prosodic structure; for example, PARSE-SYL which requires all syllables to be parsed into feet is another member of this family.
Compare this with the phonological representation of normal interjection syllables, for example, ‘yi’:

(28)

We argue that it is this empty mora in (27) that leads to the greater flexibility of ‘xi’ in its phonological parsing. Specifically, this underlying representation gives rise to two surface representations of ‘xi’ contingent on its position in the foot: (i) as bimoraic when occurring alone or at the second position of a disyllabic (and trochaic) foot, thus rendering these feet licit; (ii) as monomoraic when occurring at the first position of a disyllabic foot, thus rendering the foot illicit. Put differently, this underlying representation enables ‘xi’ to legitimately occur as either a monosyllabic foot or the non-head syllable of a disyllabic foot, but never as the head syllable of a disyllabic foot. Furthermore, we argue that these various surface realizations of ‘xi’ in different environments result from the interaction of several OT constraints. For clarity sake, below we refer to the constraint hierarchy responsible for the selection of the optimal surface realization of ‘xi’ as the ‘‘xi’-grammar’.

Given the postulated presence of an empty mora in the underlying representation of ‘xi’, to start the ball rolling, we need a constraint that demands the conservation of segment-to-mora linkage. McCarthy (2000: 159) proposes two universal faithfulness constraints NO-SPREAD and NO-DELINK which respectively militate against spreading and delinking of autosegmental associations. Specifically, NO-SPREAD requires that any association line that is present in the output have a correspondent in the input, and NO-DELINK requires that any association line present in the input have a correspondent in the output. As such they are respectively analogous to DEP (‘do not insert association lines’) and MAX (‘do not delete association lines’). These two constraints exert opposite influences and apply to each pair of associated autosegmental tiers, such as tone, place, mora and segment. Apparently, what is relevant here is the segment-to-mora association. Following McCarthy’s (Ibid.:159) formal notation, they are respectively as follows:

(29) NO-SPREAD ($\mu$, SEG)\(^{11}\)

Let $S_1$ and $S_2$ stand for two related phonological representations, where

$\mu_1$ and seg$_1 \in S_1$,

$\mu_2$ and seg$_2 \in S_2$,

$\mu_1$ R $\mu_2$, and

seg$_1$ R seg$_2$,

if $\mu_2$ is associated with seg$_2$,

---

\(^{11}\)Two points are worth mentioning here. First, as the mora and segment are the only autosegmental tiers involved here, below we will simply note this constraint as NO-SPREAD. Second, a similar pair of constraints FILLLINK (‘All association relations are part of the input’) and PARSELINK (‘All input association lines are kept’) are proposed in Ito, Mester and Padgett (1995:586) within the older Parse/Fill/Containment framework (Prince and Smolensky 1991, 1993).
then $\mu_i$ is associated with $\text{seg}_1$.

\[(30) \text{NO-DELINK ($\mu$, SEG)}\]

Let $S_1$ and $S_2$ stand for two related phonological representations, where

- $\mu_1$ and $\text{seg}_1 \in S_1$,
- $\mu_2$ and $\text{seg}_2 \in S_2$,
- $\mu_1 \text{R} \mu_2$, and
- $\text{seg}_1 \text{R} \text{seg}_2$.

if $\mu_1$ is associated with $\text{seg}_1$,
then $\mu_2$ is associated with $\text{seg}_2$.

In the current context, NO-SPREAD is tantamount to forbidding the association of the empty mora, unassociated with any segment in the input, with any phonological segment in the output, thus maintaining its ‘emptiness’. NO-DELINK, on the other hand, prevents any association lines present in the input from being deleted in the output. We assume that NO-DELINK is highly ranked in the `$\text{\textquoteleft}x\text{\textquoteright}$'-grammar and hence all input segment-to-mora linkages are preserved in the output; only NO-SPREAD is subject to interaction with other constraints, to be discussed below.

In addition, the presence of an empty mora in the syllable structure is highly marked, and a markedness constraint is in order that requires all moras to be linked with phonological segments in the output, thus explicitly banning the occurrence of any empty mora in the surface structure. We refer to it simply as NOEMPTYMORA, stated below:

\[(31) \text{NOEMPTYMORA:}\]

A mora must be filled.

Before we proceed, one notational remark is in order. As we assume PARSE-$\mu$ is highly ranked and all moras are parsed into syllables, below for simplicity sake, (27) is simplified into

\[(32) \mu\mu\]

where both the syllable node and the onset $x$ are dropped.

As is evident from (26), ‘$\text{\textquoteleft}x\text{\textquoteright}$’ displays a unique flexibility in its parsing in that it assumes different surface forms depending on its phonological environment: (i) bimoraic when occurring alone, given the legitimacy of ($\text{\textquoteleft}xi\text{\textquoteright}$); (ii) monomoraic when occurring at the first position of a disyllabic foot, given the illegitimacy of ($\text{\textquoteleft}xiS\text{\textquoteright}$). When occurring at the second position in a disyllabic foot, it can in theory be either bimoraic or monomoraic $^{12}$.

$^{12}$ This follows from the inventory of good and bad foot structures in Chinese presented in Chapter 2, and repeated here for convenience sake:
In terms of the preservation or deletion of the empty mora in the underlying representation, this pattern is tantamount to (i) when occurring alone, the underlying empty mora is preserved and filled in the surface representation; (ii) when preceding a full syllable in a disyllabic foot, this empty mora is deleted in the surface form and thus cannot head the disyllabic trochee. As for the scenario where ‘xi’ follows a full syllable in a disyllabic foot, a priori, no inference can be made regarding its surface structure, though as to be seen below in (42), ‘xi’ actually surfaces as bimoraic in this context.

This unique flexibility in the parsing of ‘xi’ is partially captured by the postulation of an empty mora in its underlying structure. Furthermore, certain constraints are needed to account for the surface appearance of this mora in some contexts and disappearance in others. On the one hand, the preservation of the underlying empty mora at least in some contexts calls for MAX-µ, a faithfulness constraint requiring all moras that are present in the input to be also present in the output, and this requirement is in force irrespective of whether the mora is empty or not. On the other hand, the underlying empty mora is not always preserved, but only when it is foot-final, as is evidenced from the licitness of (Sxi) and (xi) but illicitness of (xiS). That (xiS) is illicit suggests that the empty mora is deleted and ‘xi’ surfaces as a monomoraic syllable when foot-initial, thus resulting in a bad foot of the quantitative structure (LH).

This instructs us that by imposing a blanket requirement that all underlying moras should be preserved in the surface structure regardless of the environment in which the mora occurs, MAX-µ is too indiscriminating and needs to be supplemented by a ‘fine-tuning’ constraint that is responsible for the preservation of the underlying empty mora only in foot-final positions\(^\text{13}\). This latter constraint can be expressed as a position-specific version of MAX-µ, which is referred to as a ‘positional faithfulness constraint’ (Beckman 1997a, b). Specifically, it requires the preservation of the empty mora only when the syllable occurs foot-finally, and we represent it as MAX-µ\(_F\). The right bracket and the subscript \(F\) following the position-neutral MAX-µ indicates the foot-final environment in which MAX-µ operates\(^\text{14}\). Thus, we have two new constraints from the same family but of different granularity:

\(^\text{(i) Good foot structures in Chinese}\)

\[
\begin{array}{cccc}
  \text{(S)} & \text{(S)} & \text{(S)} & \text{(S)} \\
  (\mu\mu) & (\mu\mu) & (\mu\mu) & (\mu) \\
  H & H & L & H \\
\end{array}
\]

\(^\text{(ii) Bad foot structures in Chinese}\)

\[
\begin{array}{cccc}
  \text{(S)} & \text{(S)} & \text{(S)} & \text{(S)} \\
  (\mu) & (\mu) & (\mu\mu) & (\mu) \\
  L & L & H & L \\
\end{array}
\]

\(^\text{13}\) Note that in spite of its coarse granularity, MAX-µ is still indispensable and cannot be superseded by the position-specific version of MAX-µ altogether. Both need to be present in the constraint hierarchy and actually as is to be shown immediately below, the power of the analysis lies exactly in the ranking between the general constraint and the position-specific one as well as their ranking with the other two constraints introduced earlier.

\(^\text{14}\) It needs to be pointed out that the proposal of the positional faithfulness constraint MAX-µ\(_F\) bears on weighing between the two alternative views of ‘context markedness’ versus ‘positional faithfulness’ as discussed in Kager (1999:407ff), and the ‘positional faithfulness’ view is adopted here largely in view
(33) \( \text{MAX-}\mu \)
A mora that is present in the input is present in the output.

(34) \( \text{MAX-}\mu]_F \)
A mora that occurs in a foot-final position in the input is present in the output.

Now that we have four constraints at our disposal, the next task is to rank them properly in order to account for the various phonological behaviors of ‘xi’, as presented in (26), which was rephrased in terms of the surface preservation or deletion of the underlying empty mora above.

To begin with, when forming a foot on its own, ‘xi’ is bimoraic where the empty mora is filled. This ban of the empty mora from the surface representation of ‘xi’ shows \( \text{NOEMPTYMORA >> NO-SPREAD} \):

\[
\begin{array}{c|cc|c}
\mu & \mu & \text{NOEMPTY MORA} & \text{NO-SPREAD} \\
\mid \ & \ & \ & \\
i & & & \\
\end{array}
\]

b. \( \mu \mu \) \( \text{!*} \)

c. \( \mu \mu \) \( \text{!} \)

Second, that ‘xi’ surfaces as monomoraic in some cases but bimoraic in other cases calls for the deployment of two faithfulness constraints \( \text{MAX-}\mu \) and \( \text{MAX-}\mu]_F \). For one thing, \( \text{MAX-}\mu \) penalizes the deletion of any underlying mora, and the illegitimacy of *(xiS) which testifies to the deletion of the underlying empty mora in this case, offers crucial evidence for \( \text{NO-SPREAD >> MAX-}\mu \), and by transitivity, \( \text{NOEMPTYMORA >> MAX-}\mu \). This is shown below:

---

of Kager’s (Ibid.) general arguments for it, although he also states there that ‘in most cases it is simply impossible to find evidence for one view or the other’ and that ‘in current literature both views have been adopted’ (see Kager (Ibid.) for details).
A slight twist of mind is needed to interpret this tableau: candidate (a) is the optimal parsing in the sense that ‘\(\text{x}\)’ in this position is optimally parsed as monomoraic, even though the foot is illegitimate; indeed, we know that ‘\(\text{x}\)’ surfaces as monomoraic in this environment exactly because the foot with ‘\(\text{x}\)’ at the head position followed by a full syllable is illegitimate, as it can only be of the (LH) structure.

However, although these three constraints ranked as such succeed in predicting the optimal parsing of ‘\(\text{x}\)’ in the environment of (xiS), and in an indirect way, account for why (xiS) is illegitimate, they turn out to be inadequate for the two legitimate parsings of ‘\(\text{x}\)’, namely, (xi) and (Sxi). Take the monosyllabic foot constituted by ‘\(\text{x}\)’ as an example:

Compare the desired winner (candidate (c)) and the unwanted winner (candidate (a)): in the former the empty mora is deleted with only an inconsequential penalization due to the lowest ranking of MAX-\(\mu\). Clearly, some constraint is needed to preserve the empty mora on the part of the desired winner. At the same time, however, this preservation of the empty mora obviously has to be sensitive to the specific position of the mora because the empty mora cannot be preserved when it occurs at the first position of a foot as shown in (36). }
The issue now is how to rank MAX-µ|F. First, the pair of candidates (a), the unwanted winner, and (c), the desired winner, provides crucial evidence for the ranking MAX-µ|F >> NO-SPREAD: (a) violates MAX-µ|F but satisfies NO-SPREAD while (c) violates NO-SPREAD but satisfies MAX-µ|F. This is shown below:

(38)

|      |      | MAX-µ|F | NO-SPREAD |
|------|------|-----|-----------|
| a. µ |      | *!  |           |
| b. µ |      | *!  |           |
| c. µ |      | *!  |           |

Second, because NO-SPREAD >> MAX-µ, by transitivity, we have MAX-µ|F >> MAX-µ. Third, there is no crucial evidence for the ranking between MAX-µ|F and NOEMPTYMORA, as candidate (b) satisfies MAX-µ|F, but does not outperform the desired winner (c) as it loses on account of its violation of NOEMPTYMORA.

Thus, the ‘xi’-grammar is now:

(39) MAX-µ|F, NOEMPTYMORA >> NO-SPREAD >> MAX-µ.15

Under this constraint hierarchy, the parsing of ‘xi’ when it occurs alone is as follows (compare it with (37)):

(40) (xi)

|      |      | MAX-µ|F | NOEMPTYMORA | NO-SPREAD | MAX-µ  |
|------|------|-----|-------------|-----------|--------|
| a. µ |      | *!  |             |           |        |
| b. µ |      | *!  |             |           |        |
| c. µ |      | *!  |             |           |        |

Clearly the introduction of MAX-µ|F dramatically changes the picture and ‘xi’ surfaces as bimoraic, which accounts for why it can form a legitimate foot on its own.

15 Presumably other constraints such as DEP-µ are also involved to prevent the free insertion of moras and serve other basic ‘housekeeping’ purposes; however since they are not critical to the present discussion, we leave them out.
Furthermore, it does not affect the case of *(xiS) analyzed earlier in (36), as the final syllable is a full bimoraic one and MAX-τF is vacuously satisfied by all candidates presented there. This is shown below:

(41) *(xiS)

We now proceed to consider the parse of ‘xi’ in (Sxi) where the first syllable is a heavy, bimoraic one. As is shown by the tableau below, in this environment, ‘xi’ surfaces as bimoraic, and accordingly the foot has a quantitative structure of (HH), which is well-formed.

(42) (Sxi)

Thus we have shown that the seemingly perplexing and irregular phonological behavior of ‘xi’ can be satisfactorily accounted for by the postulation of an underlying
empty mora and the above ‘xi’-grammar which crucially makes use of the positional faithfulness constraint MAX-µF.

However, it needs to be realized that the well-formedness pattern of ‘xi’ presented in (26) is only concerned with the foot-level parsing. In fact, ‘xi’ is subject to further restrictions at higher levels of the prosodic structure, i.e. PhP and IP. Specifically, while (xi) is a legitimate foot, it cannot head a PhP or IP. For example, the PhP-level parsing for the optimal scansion for [S[S[SS]]]xi[SS] in (25), i.e. (SS)(SS)(xi)(SS), is (SS)(SS)(xi)(SS) rather than (SS)(SS)(xi)(SS). This restriction is evidently insufficiently handled by the ‘xi’-grammar reached in (39). We propose that the inability of (xi) to head a PhP can be accounted for by the addition of yet another positional faithfulness constraint NO-SPREAD[PhP] to the ‘xi’-grammar developed so far as the high-ranking one. Similar to MAX-µF, this constraint is a position-specific version of a more general faithfulness constraint, i.e. NO-SPREAD, and can be formulated as:

\[
\text{(43) \ NO-SPREAD}_{\text{PhP}}[\text{Any association line of the PhP-initial segment that is present in the output have a correspondent in the input.}}
\]

Or more formally as (cf. (29)):

\[
\text{(44) Let } S_1 \text{ and } S_2 \text{ stand for two related phonological representations, where } \\
\mu_1 \text{ and } \text{seg}_1 \in S_1, \\
\mu_2 \text{ and } \text{seg}_2 \in S_2, \\
\mu_1 \text{ R } \mu_2, \text{ and} \\
\text{seg}_1 \text{ R } \text{seg}_2, \\
\text{if } \mu_2 \text{ is associated with } \text{seg}_2, \text{ and} \\
\text{seg}_2 \text{ is PhP-initial,} \\
\text{then } \mu_1 \text{ is associated with } \text{seg}_1.
\]

The ‘xi’-grammar is thus:

\[
\text{(45) NO-SPREAD}_{\text{PhP}}[\text{, MAX-µF}, \text{NOEMPTYMORA} \gg \text{NO-SPREAD} \gg \text{MAX-µ}].
\]

Under this revised ‘xi’-grammar, the optimal form for a PhP initial ‘xi’ is the zero parse (ϕ), which refers to the non-surfacing of the underlying form (Kager 2000; referred to as ‘null parse’ in Prince and Smolensky 1993). In other words, (xi), albeit legitimate, can never occur PhP-initially. This is illustrated below (cf. (40)):

---

16 Informally, one might suggest that the reason for this has something to do with the fact that although ‘xi’, when occurring alone, surfaces as bimoraic, this weight nonetheless results from the linking of the underlying empty mora to the segment i, and as such is ‘acquired’. This acquired weight is somewhat not as strong as the ‘innate’ weight of full lexical syllables which have two filled moras underlyingly. Furthermore, given the argument that prosodic units at all levels of the prosodic hierarchy of Chinese are trochaic, the PhP- and IP-initial positions are evidently very strong. Hence the monosyllabic foot (xi), with its ‘acquired’ weight from the empty mora, is somehow not as strong as the monosyllabic foot formed by a full lexical syllable, and as such cannot head a PhP or an IP.
Evidently, the addition of this new positional-specific \texttt{NO-SPREAD}_{\texttt{PhP}} \[ only affects the parsing of \texttt{PhP-initial} ‘xi’ (including IP-initial one, of course) and has no bearing on the parsing of ‘xi’ elsewhere.

### 3.3.3.2 More discussion on the ‘xi’-grammar

The ‘xi’-grammar developed in (45) calls for more discussion. First, in retrospect, this grammar is configured in such a way that the two position-specific faithfulness constraints \texttt{NO-SPREAD}_{\texttt{PhP}} \[ and \texttt{MAX-\texttt{\mu}} \] \texttt{F} respectively dominate their position-neutral counterparts \texttt{NO-SPREAD} and \texttt{MAX-\texttt{\mu}} with the markedness constraint \texttt{NOEMPTYMORA} ‘sandwiched’ in between. This ranking scheme is compatible with the general pattern formulated in Kager (1999: 408):

\[
\text{(47)} \quad \text{IO-Faithfulness (prominent positions) >> Markedness >> IO-Faithfulness (general)}
\]

which recurs in many OT grammars cross-linguistically, e.g. the grammar for Shona vowel harmony (Beckman 1997a) and that for the distribution of complex codas in Tamil (Beckman 1997b).\(^{17}\)

Second, compare the phonological representations of normal interjection syllables, ‘xi’ and normal lexical syllables, and we notice an intriguing pattern of moraicity gradience: in the above order, the representations are respectively one (filled) mora (as argued in section 2.3.4.1 of Chapter 2), one (filled) mora and an empty one, and two (filled) moras. In terms of syllable weight, this means that in Chinese, whereas normal lexical syllables are heavy and normal interjection syllables are light, ‘xi’ lies in between and may be suggested to be ‘semi-light’ (or ‘semi-heavy’ for that matter).

Third, a natural question is why ‘xi’ is so special with this extra bit of phonological weight. The reason is not completely clear at this moment, but we believe that it may well be, at least partly, traced back to its unique origin: on top of the features associated with interjections in general (such as semantically empty and emotionally laden), ‘xi’ is distinctly characterized by a significant singing element inherited from

\(^{17}\) One might also suggest that the dominance of \texttt{MAX-\texttt{\mu}} \texttt{F} over \texttt{MAX-\texttt{\mu}} exemplifies the ranking between two constraints in a Paninian relationship.
the folk song of the State of Chu. Indeed, some scholars have gone so far as to suggest that ‘xi’ is a linguistic unit specially reserved to simulate the drawl in singing (Legge 1871; Chen 1994) while others treat it as a mere ‘breather’ or ‘breathing sound’, which is an ‘otherwise meaningless sound that originally adapted the lyrics to the melody of the song’ (Field 1986). We suggest this musical element might furnish ‘xi’ with some additional weight, and renders it heavier than normal interjection syllables; however, this acquired weight is not so much as to elevate it on a par with full lexical syllables. As a consequence, it falls in between and cannot head a disyllabic foot. Furthermore, the monosyllabic foot (xi) is not strong enough to head higher-level prosodic units such as a PhP and an IP, as is a monosyllabic foot formulated by a full lexical syllable.

Fourth, as pointed out in Section 2.3.4.1 in Chapter 2, ‘xi’ also occurs in Shijing, but interestingly, there it exhibits no such uniqueness and behaves just like other interjection syllables. The noteworthy point is that modern speakers again are well aware of this subtle yet important difference and treat ‘xi’ in Shijing differently from in Jiuge, as is evidenced in their different scansion of lines containing ‘xi’.18. We assume that ‘xi’ in Shijing and Jiuge are one and the same lexical entry in the modern speaker’s lexicon and share one underlying representation; the difference only lies in the ‘xi’-grammars respectively responsible for the surface representation of the Shijing ‘xi’ and the Jiuge ‘xi’. More specifically, we argue that the parsing pattern of the Shijing ‘xi’ results from the following ‘xi’-grammar operative for its surface realization19:

\[(48) \text{NOEMPTYMORA, NO-SPREAD >> MAX-} \mu\]

Compare this to the ‘xi’-grammar for the Jiuge ‘xi’ in (45), and it is notable that the positional faithfulness constraints NO-SPREADPwp[ and MAX-\(\mu\)]F are not operative for the Shijing ‘xi’. As a result, the Shijing ‘xi’ always surfaces as monomoraic, lacking the position sensitivity characterizing the parsing of Jiuge ‘xi’. Consequently it can only serve as the non-head of a disyllabic trochee, as shown below:

---

18 Indeed, ‘xi’ is also present in a handful of earlier poems of Guti, the genre following Chuci. And interestingly there, the modern speaker also treats it merely as a normal interjection syllable and parses it accordingly (see Chapter 4). In other words, Chuci is the only genre where ‘xi’ acquires this extra bit of phonological weight; once out of this genre, it is deprived of this phonological privilege and ‘back to normal’. Needless to say, that the modern speaker is able to treat the same lexical item ‘xi’ differently when it occurs in different genres crucially rests upon the fact that she is able to tell which genre a given line is of, largely thanks to the distinct characteristics associated with each genre.

19 As the development of this side-grammar is similar to (though considerably less complicated than) that of the side-grammar for the Jiuge ‘xi’, it is not belabored here.
(49) Surface realization of the *Shijing* ‘xi’

<table>
<thead>
<tr>
<th></th>
<th>NoEMPTY MORA</th>
<th>No-SPREAD</th>
<th>MAX-µ</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. µ</td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>b. µ µ *!</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. µ µ *!</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Fifth, so far we have dealt with three types of feet containing ‘xi’: (Sxi), (xi) and (xiS), the former two being legitimate whereas the latter illegitimate. In view of the weight scalarity mentioned above, we might wonder about the well-formedness of feet comprised of ‘xi’ and a normal interjection syllable. Still using S_I to stand for the interjection syllable, what is at issue here is the legitimacy of (xiS_I) and (S_Ixi). Neither of these combinations are present in our corpus, and we suggest that this absence is principled: both turn out to be ill-formed under the ‘xi’-grammar developed above, as shown below (the normal interjection syllable is exemplified with the interjection ‘yi’):

(50) *(xiS_I)

<table>
<thead>
<tr>
<th></th>
<th>No-SPREAD[PhP]</th>
<th>MAX-µ [F]</th>
<th>NOEMPTY MORA</th>
<th>NO-SPREAD</th>
<th>MAX-µ</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. σ</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*!</td>
</tr>
<tr>
<td>b. σ *!</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. σ *!</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
(51) *(S_i_x_i)

<table>
<thead>
<tr>
<th></th>
<th>NO-SPREAD_{PhP}</th>
<th>MAX-[\mu]_F</th>
<th>NOEMPTYMORA</th>
<th>NO-SPREAD</th>
<th>MAX-[\mu]</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td></td>
<td></td>
<td></td>
<td>!</td>
<td></td>
</tr>
<tr>
<td>c.</td>
<td></td>
<td></td>
<td></td>
<td>!</td>
<td></td>
</tr>
</tbody>
</table>

In these two cases, the feet resulting from the surface realization of ‘xi’ respectively have the quantitative structure of (LL) and (LH), and hence are illicit.

Sixth, it is important to point out that similar to the constraint GOODFT\_INTERJ proposed in the Shijing sub-grammar, GOODFT’XI’ is, in theory, also reformulable in terms of more universal constraints; GOODFT’XI’ is used as a portmanteau constraint merely for convenience sake to tuck away the constraints into which it can be decomposed. Specifically, now that we have argued for the phonological representation of ‘xi’ as a filled mora plus an empty one, what is encapsulated in GOODFT’XI’ is, on the one hand, the ‘xi’-grammar argued for here (which yields the optimal surface forms of ‘xi’), and on the other hand, the two bedrock constraints for good and bad foot structures in Chinese, namely, RhTYPE=TROCHEE and STRESS-TO-WEIGHT (which checks the well-formedness of the foot containing ‘xi’; see Section 2.3.4.1 of Chapter 2). All the four constraints in the sub-grammar, i.e., MAX-[\mu]_F, NOEMPTYMORA, NO-SPREAD and MAX-[\mu], as well as the latter two constraints, are all universal ones well-attested cross-linguistically; in addition, as shown in (47), the ranking among the four constraints constituting the ‘xi’-grammar also follows a general pattern of interaction that holds across languages between positional faithfulness constraints, markedness ones, and general faithfulness ones.

Seventh, it needs to be realized that this ‘xi’-grammar is actually ‘the grammar behind GOODFT’XI’’, and GOODFT’XI’ effectively encapsulates it. Expositorily, similar to the treatment of the sub-hierarchy for the delimitation of the PhP boundary in Chapter 2, the ‘xi’-grammar is also ‘folded away’ in the constraint GOODFT’XI’ in the sub-
grammar. Indeed, in the sense that the phonological parsing of the verse line containing ‘xi’ must conform to the well-formedness of feet containing ‘xi’ rather than the other way around, we might argue that this ‘xi’-grammar, if integrated into the sub-grammar, must be high-ranking, which is reflected in the high-ranking of GOODFT’XI’.

Finally, let us reconsider the optimal parsing in (25). That the PhP-level parsing is (SS)(SS)(xi)(SS) rather than (SS)(SS)(xi)(SS) offers crucial evidence for the dominance of the sub-hierarchy for PhP boundary delimitation, i.e. BINARITY >> EVENNESS >> LONG-LAST, by the sub-grammar responsible for foot-level parsing, where the ‘xi’-grammar is encapsulated in the inviolable GOODFT’XI’\(^\text{20}\). This is shown below. For simplicity sake, we only show the different PhP parsing of the same foot parsing (SS)(SS)(xi)(SS).

<table>
<thead>
<tr>
<th>Foot-level parsing hierarchy</th>
<th>PhP-level parsing hierarchy</th>
</tr>
</thead>
<tbody>
<tr>
<td>[S[SS]]xi[SS]</td>
<td>BINMAX, *IP-FINAL-MONOFT, GOODFT’XI’ &gt;&gt; ANCHOR-OI &gt;&gt; BINMIN &gt;&gt; ANCHOR-IO</td>
</tr>
<tr>
<td>(SS)(SS)(xi)(SS)</td>
<td>*</td>
</tr>
<tr>
<td>(SS)(SS)(xi)(SS)</td>
<td>*</td>
</tr>
</tbody>
</table>

Evidently, if the PhP-level parsing hierarchy dominated the foot-level parsing hierarchy, (SS)(SS)(xi)(SS) would have won.

### 3.3.4 8-syll lines and 9-syll lines

The above discussion on the phonological representation of ‘xi’ is triggered by the parsing of ‘xi’ exhibited in the scansion of 5-, 6- and 7-syll Jiuge lines. The sub-grammar developed so far, as presented in (22), is represented in a linear form as:

(53)

\[
\text{BINMAX, *IP-FINAL-MONOFT, GOODFT’XI’ >> ANCHOR-OI >> BINMIN >> ANCHOR-IO.}
\]

As stated earlier, 5-, 6- and 7-syll lines comprise the bulk of the present corpus; still, there remain one 8-syll line and two 9-syll lines in the corpus to be analysed. As is shown below, their scansion can all be adequately handled by the sub-grammar just presented.

### 3.3.4.1 8-syll lines

The single 8-syll line is of the grammatical structure [S[SS]]xi[[SS][SS]] and optimally scanned as (S)(SS)(xi)(SS)(SS). This is presented below:

---

\(^{20}\) This argument is based on the assumption that constraints in each of these two hierarchies cluster together and do not intermingle.
The sub-grammar correctly predicts (S)(SS)(xi)(SS)(SS) as the optimal scansion:

<table>
<thead>
<tr>
<th>[S][S][S]xi[[S][S][S]]</th>
<th>BINMAX</th>
<th>*IP-FINAL-MONOFT</th>
<th>GOODFT ‘XI’</th>
<th>ANCHOR-OI</th>
<th>BINMIN</th>
<th>ANCHOR-IO</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. (S)(SS)(xi)(SS)(SS)</td>
<td></td>
<td>**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. (SS)(Sxi)(SS)(SS)</td>
<td></td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. (SS)(xi)(SS)(SS)</td>
<td>*!</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. (S)(Sxi)(SS)(SS)</td>
<td>*!</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. (SS)(Sxi)(SS)(SS)</td>
<td>*!</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>f. (S)(Sxi)(S)(SS)(SS)</td>
<td></td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3.3.4.2 9-syll lines

Two 9-syll lines appear in our corpus, which are respectively structured as [S][S][S]xi[[S][S][S][S][S]] and [S][S][S][S]xi[[S][S][S][S]], and optimally scanned as (S)(SS)(xi)(SS)(S)(SS) and (SS)(SS)(xi)(SS)(SS)(SS). The two lines are given below:

(56)  
[qi1 [bu2 xin4]] xi1 [gao4 yu2] [yi3 [bu4 xian2]]
promise not keep xi accuse me because not leisure
‘Ah, the promise is not kept and I was accused of not being leisurely’

→  (qi1) (bu2 xin4) (xi) (gao4 yu2) (yi3) (bu4 xian2)

(57)  
[yu2 [chu3 [you1 huang2]]] xil [zhong1 [bu2 [jian4tian1]]]
I stay gloomy bamboo xi ever no see sky
‘Ah, I stay in the gloomy bamboo forest, and never see the sky’

→  (yu2 chu3) (you1 huang2) (xi) (zhong bu) (jian tian).

Again both optimal scansions are well predicted by the sub-grammar, as shown below:

21 Note that candidate (d) has a trisyllabic foot containing ‘xi’ that needs to undergo evaluation by GOODFT ‘XI’. So far we have been solely concerned with the well-formedness pattern of monosyllabic or disyllabic feet containing ‘xi’. The sub-grammar leads ‘xi’ to surface as a bimoraic syllable in this context of (SSxi) (the tableau is omitted here, similar to (40). Thus, the trisyllabic foot has a quantitative structure of (HHH), which is well-formed when trisyllabic feet are allowed, i.e. in prose scansion.
Thus, the sub-grammar developed so far is adequate to account for the modern speaker’s scansion of all Jiuge lines. It needs to be pointed out here that although ALIGNR (FT, IP) apparently has no bearing on the scansion, it must be dominated by ANCHOR-IO which so far ranks the lowest:

![Table](Image)

Indeed, that ALIGNR (FT, IP) plays no active role in selecting the winner is exactly because of its ranking as such\footnote{For a fully articulated definition of the notion of ‘(in)active’, see Prince and Smolensky (1993: 107).} . Thus, with this new addition, the grammar is:

![Diagram](Image)
For simplicity sake, ALIGNR (FT, IP) has been omitted in the tableaux so far due to its inactiveness, but as we will see below, it does become crucial in accounting for the metrical harmony judgment.

### 3.4 Formal grounding of metrical harmony

Similar to the organization of Chapter 2, this section is devoted to a formal account of the metrical harmony. We are going to argue that as in the case of the *Shijing* lines, the modern speaker’s metrical harmony judgment of *Jiuge* lines can be formally grounded in the *Jiuge* sub-grammar. The analytical procedure is identical with that in Section 2.4 of Chapter 2 and will not be repeated here. Furthermore, 8- and 9-syll lines will be omitted due to their negligible percentage (respectively 1 and 2 out of 253 lines) and only 5-, 6- and 7-syll lines will be examined below.

To begin with, as mentioned in Section 3.3.1, all the 5-syll *Jiuge* lines have the same grammatical structure *[SS]xi[SS]* and scansion (SS)(xi)(SS). Apparently, the tableau des tableaux would consist of only one candidate parse, which is trivially the optimal one. At the same time, there is converging native judgment on the metrical harmony of such 5-syll lines: they are all experienced to be metrically very harmonious. Thus, in this case, the metrical harmony can be trivially grounded in the sub-grammar.

Alternatively, we can show the formal grounding of the metrical harmony judgment in the grammar as the OT harmony by constructing some hypothetical grammatical structures and then elicit the native metrical harmony judgment on the one hand, and examine the formal harmony on the other. For example, consider the constructed line of the grammatical structure *[S]xi[S[SS]]* in imitation of line (13) (iii) above:

(62) \[\text{ren2} \ xi1 \ \text{you3[mei3 zi3]}\]

person xi have beautiful children

‘The person has beautiful children’

for which I elicited from my informants the optimal scansion *(ren2 xi1) (you3) (mei3 zi3)* and the judgment that it is ‘not as harmonious as *[SS]xi[SS]*’. The following tableau des tableaux is therefore constructed:

(63)

<table>
<thead>
<tr>
<th>Candidate parses</th>
<th>BIN MAX</th>
<th>#IP-FINAL-MONOFT</th>
<th>GOODFT’ Xi’</th>
<th>ANCHOR-OI</th>
<th>BIN MIN</th>
<th>ANCHOR-IO</th>
<th>ALIGNR (FT, IP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. *[SS]xi[SS]</td>
<td></td>
<td></td>
<td>*</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(SS)(xi)(SS)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. *[S]xi[S[SS]]</td>
<td></td>
<td></td>
<td>*</td>
<td>*!</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Sxi)(S)(SS)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

23 The interesting question to pursue here is why 5-syll *Jiuge* lines in the corpus only exhibit this grammatical structure, and all the other grammatical structures fail to appear. Evidently, this question necessarily brings us to look into the ancient side of the picture. As is to be argued in Zuo (in preparation), this is because the ancient verse grammar entertained by the ancient poet encourages the maximal mapping of the boundaries between the grammatical and the prosodic structures. Indeed, compared with other line types where the grammatical structures serving as the input of the sub-optimal parses merely occur with a low frequency, the 5-syll *Jiuge* lines might be considered an extreme case where the grammatical structures in the sub-optimal parses occur with a zero frequency.

24 Note that ALIGNR (FT, IP) is included in the tableaux des tableaux in this section.
This indeed reveals that the parse corresponding to the grammatical structure that actually occurs in the corpus best satisfies the constraints and as such has the most OT harmony. Actually, it is as good as a 5-syll line can be in that it incurs the ‘minimal violation’ of BINMIN, which is inevitable given that the line contains an odd number of syllables. In contrast, the parse corresponding to the constructed grammatical structure is suboptimal.

Now consider 6-syll lines. As mentioned in Section 3.3.2, there are two grammatical structures, i.e. [[SS]S][xi][SS] and [S][SS][xi][SS], corresponding to two parses. Given their respective optimal scansion being (SS)(Sxi)(SS) and (S)(SS)(xi)(SS), the tableau des tableaux is constructed below:

(64)

<table>
<thead>
<tr>
<th>Candidate parses</th>
<th>BIN MAX</th>
<th>*IP-FINAL-MONOFT</th>
<th>GOODFT' XI'</th>
<th>ANCHOR-OI</th>
<th>BIN MIN</th>
<th>ANCHOR-IO</th>
<th>ALIGNR (FT, IP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. [[[SS]S]x][[S][SS]]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>b. [S][SS][xi][SS]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><em>!</em></td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

Of the two grammatical structures, lines of the [[SS]S][xi][SS] are felt to be metrically more harmonious by the native speaker. As shown here, the parse corresponding to this grammatical structure is optimal under the Jiuge sub-grammar. Thus, again the metrical harmony can be formally grounded in the sub-grammar via the construct of OT harmony.

For 7-syll Jiuge lines, six grammatical structures occur in the corpus, which give rise to six candidate parses, and given the optimal scansion by the ancient speaker for lines of each grammatical structure, the tableau des tableaux is constructed below:

(65)

<table>
<thead>
<tr>
<th>Candidate parses</th>
<th>BIN MAX</th>
<th>*IP-FINAL-MONOFT</th>
<th>GOODFT' XI'</th>
<th>ANCHOR-OI</th>
<th>BINMIN</th>
<th>ANCHOR-IO</th>
<th>ALIGNR (FT, IP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>b. [[SS]x][[S][SS]]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*</td>
<td>*</td>
<td>10</td>
</tr>
<tr>
<td>c. [SS][xi][S][SS]]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*</td>
<td>*</td>
<td>11!</td>
</tr>
<tr>
<td>d. [[S]S][x][SS]]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*!</td>
<td>*</td>
<td>15</td>
</tr>
<tr>
<td>e. [S][SS][xi][S][SS]]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*</td>
<td>*</td>
<td>15</td>
</tr>
<tr>
<td>f. [[[SS]S]x][SS]]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*</td>
<td>*</td>
<td>10</td>
</tr>
</tbody>
</table>

The sub-grammar yields two equi-optimal parses (b) and (f), when the fact of the matter is that only the input structure of the parse (b), i.e. [[SS]S][xi][S][SS]] is cognized by the modern speaker as the most harmonious. It is notable that ALIGNR (FT, IP), hitherto inactive, becomes crucial in sifting parse (c) out. To discriminate (f)
from (a) presents a similar scenario to the case of 6-syll Shijing lines (cf. (95) and (96) in Chapter 2) where parse (f), with its PhP boundary after the first foot, can be winnowed out by the PhP boundary delimitation sub-hierarchy `BINARITY >> EVENNESS >> LONG-LAST`.

\[(66)\]

<table>
<thead>
<tr>
<th>Candidate parses</th>
<th>BINARITY</th>
<th>EVENNESS</th>
<th>LONG-LAST</th>
</tr>
</thead>
<tbody>
<tr>
<td>b. (\text{(SS)(Sxi)(SS)})</td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>f. (\text{(S)(SS)(Sxi)(SS)})</td>
<td>*</td>
<td>***</td>
<td></td>
</tr>
</tbody>
</table>

This way, parse (b) emerges as the only winner, which coincides with the modern speaker’s metrical harmony judgment. This is illustrated below. As argued in (52), the PhP boundary delimitation hierarchy ranks lower than the foot-level parsing hierarchy.

\[(67)\]

<table>
<thead>
<tr>
<th>Candidate parses</th>
<th>BINMAX</th>
<th>*IP-FINAL-</th>
<th>GOODFT</th>
<th>ALIGNR (FT.)</th>
<th>BINARITY</th>
<th>EVENNESS</th>
<th>LONG-LAST</th>
</tr>
</thead>
<tbody>
<tr>
<td>b. (\text{([SS][S][S][S]])(Sxi)(SS)(SS)})</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>c. (\text{([SS][S][S][S]])(Sxi)(SS)(SS)})</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>11</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>f. (\text{([S][S][S]][S][S][S]])(Sxi)(SS)(SS)})</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10</td>
<td>*</td>
<td>***</td>
</tr>
</tbody>
</table>

To conclude, the metrical harmony judgment for the Jiuge lines can be formally grounded in the corresponding sub-grammar, which necessarily includes both the foot-level and PhP-level parsing hierarchies.
Chapter 4 *Guti* sub-grammar

4.1 General description of the raw corpus

This chapter deals with the scansion of verse lines of the *Guti* genre; *Guti* genre is a cover term that loosely refers to the various literary subgenres appearing between ca. 200 BC and 700 AD. Both *Shijing* and *Chuci* appeared before 221 BC, i.e. during what is known as the pre-*Qin* era. The year 221 BC, when Emperor *Qin* united all the individual states that had been constantly at war into the first autocratic feudal empire in the Chinese history heralds a new Chinese literary era in that the next nine hundred years or so forms the third stage in the development of classical Chinese verse, namely, *Guti*. At the same time, it needs to be pointed out that the *Guti* era is characterized by a diversity and fluidity of literary styles that gradually evolved during each dynasty from *Qin* all the way into early *Tang*, which witnesses the birth and prepares for the boom of the *Jinti* genre. The *Guti* genre plays an important role in the evolution of classical Chinese verse from the early, primitive form to the more mature, developed one, culminating in the rise of the *Jinti* genre, acclaimed as the peak achievement of classical Chinese verse.

The *Guti* period, spanning over nine hundred years, covers a large number of dynasties, the major ones including *Han* (206 BC – 220 AD), *South-North* (420 – 589 AD), *Sui* (581 – 618 AD), and early *Tang* (618 – ca. 700 AD). Accordingly, the *Guti* genre is actually a mixture of different subgenres, which nonetheless display a clear and coherent pattern of evolution. For example, verse composed at the initial stage, in the *Han* dynasty, still bears features clearly inherited from its predecessors, *Shijing* and *Chuci*, such as the preference of 4-syll lines and the use of ‘xi’. By comparison, verse composed towards the end of this period exhibits a significant uniformity which is reinforced in the following *Jinti* genre, in particular, the exclusive use of 5- and 7-syll lines and the total absence of function words or interjections. Still, the *Guti* verse may be suggested to display some distinct features of its own, for example, the relatively restricted (compared with *Shijing*) but still diverse (compared with the following *Jinti* genre) line length and considerable liberty in verse length.

It is presumably due to this diversity that there is no one single anthology of *Guti* verse; instead, what is extant today is a number of collections compiled largely under the rubric of the major dynasties mentioned above with the annotation that they all belong to the general genre of *Guti*. Most of such collections are popular with modern speakers. Some of the verse pieces composed during the *Han* dynasty known as *Yuefu* (‘Music Bureau’) were originally accompanied by tunes, but as with other verse that was intended to be sung at the time of their composition, recitation remains the only feasible performance style for modern speakers.

The current corpus comprises of 68 poems, altogether 843 lines, randomly selected from the above-mentioned collections. The selection is random in the sense that no criteria such as authorship or theme is applied. A special point is made of achieving a

---

1 As a matter of fact, the *Guti* genre, literally meaning ‘Old Style’, is named as such not so much because it displays a distinct style as because it precedes, and hence is old compared to the *Jinti* genre, literally meaning ‘New Style’. Indeed, the name ‘*Guti*’ was devised only at the early *Tang* dynasty – the last stage of this transitional literary period when ‘*Jinti*’ was making its debut.
well-balanced sampling across the major subgenres corresponding to the major dynasties during this literary period.

4.2 Methodological issues and preview of the sub-grammar

The analytical methods adopted below in developing the sub-grammar and grounding the metrical harmony are the same as those for Jiuge (cf. Section 3.2.1 of Chapter 3) and here we will only reiterate two points. First, following the weak assumption suggested there, only the constraints, but not necessarily the rankings, are directly imported from the sub-grammars developed so far. Second, to enhance its readability, the section on the sub-grammar is organized according to the line type in terms of syllable numbers, and analytically non-crucial cases are presented alongside the crucial ones to lend the study a descriptive dimension.

The Guti sub-grammar turns out much simpler than that of either Jiuge or Shijing, largely because in many cases, the lines are scanned in a uniform way that is indifferent to the grammatical structure of the line. Markedness constraints from the constraint pool such as BinMax, BinMin, *ip-final-Monoft and Alignr (Ft, IP) are invoked and ranked accordingly. Furthermore, some verse lines at the early stage of the Guti period contain ‘xi’ passed over from Chuci, which however, unlike ‘xi’ in Jiuge, is treated as a normal interjection by the modern speaker. Consequently, GoodftINTERJ rather than Goodft’xi’ is imported from the constraint pool. Finally, the scansion of 8-syll Guti lines of a particular grammatical structure calls for the introduction of Anchor to accommodate the boundary matching between the grammatical and prosodic structures.

4.3 The Guti sub-grammar

As briefly mentioned in Section 4.1, Guti verse features a considerable degree of diversity in its line length. In our corpus, Guti lines range from 4 to 8 syllable long, although towards the end of the Guti period, 5- and 7-syll lines became overwhelmingly predominant.

4.3.1 BinMax and BinMin: evidence from 4-syll lines

4-syll Guti lines display three grammatical structures: [SS][SS], S[[SS]S] and S[S][SS]. Similar to 4-syll Shijing lines, 4-syll Guti lines are exclusively parsed into (SS)(SS) irrespective of their grammatical structures2. Some examples are below:

(1)   [tian2 chang2] [man3 su4] → (tian2 chang2) (man3 su4)
      cram intestine fill mouth
      ‘(The food) crams his intestines and fills his mouth’.

---

2 As in the case of 4-syll Shijing lines, here the input structure is not totally inconsequential: lines of different grammatical structures may induce different reading experience for the reader, measured in terms of their cognization of metrical harmony. This is discussed in Section 4.4.
(2)  
\[ \text{yong}^3 [\text{cong}^2 \text{ci}^2] \text{ jue}^2 \rightarrow (\text{yong}^3 \text{ cong}^2) (\text{ci}^2 \text{jue}^2) \]

forever from now separate
‘From now on, we separate forever’.

(3)  
\[ \text{shui}^3 [\text{he}^2 [\text{dan}^4 \text{dan}^4]] \rightarrow (\text{shui}^3 \text{ he}^2) (\text{dan}^4 \text{dan}^4) \]

water how clear/redup.
‘How clear the water is’.

This scansion clearly demonstrates the modern speaker’s strong preference for binary feet and thus calls for the importation of BinMAX and BinMIN from the constraint pool. However, only 4-syll lines do not yet provide evidence for their ranking, as illustrated below:

(4)  

<table>
<thead>
<tr>
<th>SSSS</th>
<th>BINMAX</th>
<th>BINMIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>*(SS)(SS)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(S)(SS)</td>
<td>*!</td>
<td>*</td>
</tr>
<tr>
<td>(SS)(S)</td>
<td>*!</td>
<td>*</td>
</tr>
<tr>
<td>(S)(SS)(SS)</td>
<td>*!</td>
<td>*!</td>
</tr>
</tbody>
</table>

4.3.2 BinMAX >> BinMIN and *PHP-FINAL-MONOFT >> ALIGNR (FT, IP): evidence from 5-syll lines

Evidence for the ranking between BinMAX and BinMIN comes from the scansion of 5-syll Guti lines, which also invokes new constraints from the constraint pool.

Altogether eight types of grammatical structures can be identified for 5-syll lines. With the exception of three lines structured as [SS]S[SS], with the interjection ‘xi’ being the third syllable, all 5-syll Guti lines consist exclusively of lexical words, which are full, bimoraic as discussed before. This bears consequences in their scansion: while lines of the structure [SS]xi[SS] are scanned as (S)(SS)(SS), all the other lines are scanned as (S)(SS)(SS), irrespective of the grammatical structure. Lines of the structure [SS]xi[SS] and some other grammatical structures are illustrated below:

(5)  
\[ [\text{suo}^3 \text{si}^1] \text{ xi}^1 [\text{he}^2 \text{ zai}^4] \rightarrow (\text{suo}^3) (\text{si}^1 \text{ xi}^1) (\text{he}^2 \text{ zai}^4) \]

prt\(^4\) think xi where is
‘Ah, the person I think of, where is she?’

(6)  
\[ [\text{shan}^1 \text{ yue}^4] [[\text{sui}^2 \text{ ren}^2 \text{ gui}^1] \rightarrow (\text{shan}^1 \text{ yue}^4) (\text{sui}^2) (\text{ren}^2 \text{ gui}^1) \]

mountain moon with people return
‘The mountain and the moon return with the person’.

\(^3\) The introduction of only the constraints but not the ranking follows from the analytical methodology presented in Section 5.2 above.

\(^4\) ‘Suo’ is a particle that may be suggested to serve to nominalize the verb following it, for example, ‘suo si’ (‘si’ meaning ‘think of’) means ‘what/whom/the person I (you…) think of’. Similarly, ‘suo you’ (‘you’ meaning ‘have’) means ‘what I (you…) have’, and ‘suo qiu’ (‘qiu’ meaning ‘desire, want’) means ‘what/whom I (you…) want’.
We temporarily leave aside cases like (5) and consider the other lines which solely contain lexical syllables. For one thing, that (SS)(S)(SS) is the optimal scansion provides straightforward evidence for the ranking BINMAX >> BINMIN, as illustrated below. The grammatical structure is unspecified due to its irrelevance.

For another thing, the fact that all the 5-syll lines other than those structured as [SS]xi[SS] are uniformly scanned as (SS)(S)(SS) irrespective of the grammatical structures indicates that only markedness constraints are active. As an analytical expedite, in the tableaux below the input structure is unspecified unless necessity arises. First, that the potential parsing (SS)(SS)(S) is suboptimal calls for *IP-FINAL-MONOFT. As for its ranking, evidently it does not conflict with BINMAX: both must be undominated since no candidate forms violating either of them can win. Second, consider the optimal scansion (SS)(S)(SS) versus the suboptimal one (SS)(SS)(S):

Both violate BINMIN and thus it is immaterial whether BINMIN is ranked higher or lower than *IP-FINAL-MONOFT.

Consider further the suboptimal candidate (S)(SS)(SS) against the optimal one (SS)(S)(SS): both satisfy *IP-FINAL-MONOFT and what is at issue here is the degree of alignment between the right foot boundaries and the right IP boundary. This readily invokes ALIGNR (FT, IP). As for its ranking, first, the loss of the candidate form
(SS)(SS)(S) to (SS)(S)(SS) provides the crucial ranking argument for \textit{*IP-FINAL-MONOFT} >> \textit{ALIGNR (FT, IP)}, as illustrated below:

\begin{table}[h]
\centering
\begin{tabular}{|c|c|c|c|}
\hline
\textit{SSSSS} & \textit{*IP-FINAL-MONOFT} & \textit{ALIGNR (FT, IP)} \\
\hline
\textit{☞ (SS)(S)(SS)} & 5 &  \\
\hline
\textit{(SS)(SS)(S)} & *! & 4 \\
\hline
\end{tabular}
\end{table}

Second, consider the suboptimal candidate (SS)(SSS), or for that matter, (SSSSS) which incurs less violation of \textit{ALIGNR (FT, IP)} than the optimal parsing (SS)(S)(SS), but violates BinMax. Indeed, in the case of (SSSSS), \textit{ALIGNR (FT, IP)} is fully satisfied. Their loss to (SS)(S)(SS) provides the crucial ranking argument for BinMax >> \textit{ALIGNR (FT, IP)}. This is illustrated below:

\begin{table}[h]
\centering
\begin{tabular}{|c|c|c|c|}
\hline
\textit{SSSSS} & \textit{BinMax} & \textit{ALIGNR (FT, IP)} \\
\hline
\textit{☞ (SS)(S)(SS)} & 5 &  \\
\hline
\textit{(SS)(SSS)} & *! & 3 \\
\hline
\textit{(SSSSS)} & *! & 0 \\
\hline
\end{tabular}
\end{table}

Third, BinMin and AlignR (FT, IP) do not conflict; in fact they work in the same direction: the fewer monosyllabic feet there are, the better \textit{ALIGNR (FT, IP)} is satisfied. Indeed, both the optimal candidate and the suboptimal ones which do not violate the highly ranked BinMax are bound to have at least one monosyllabic foot, thus violating BinMin. The non-ranking between the two is illustrated below:

\begin{table}[h]
\centering
\begin{tabular}{|c|c|c|c|}
\hline
\textit{SSSSS} & \textit{BinMin} & \textit{ALIGNR (FT, IP)} \\
\hline
\textit{☞ (SS)(S)(SS)} & * & 5 \\
\hline
\textit{(S)(SS)(SS)} & * & 6! \\
\hline
\textit{(S)(S)(S)(SS)} & *** & 9 \\
\hline
\end{tabular}
\end{table}

Clearly, (SS)(S)(SS) will win no matter how BinMin is ranked with AlignR (FT, IP).

The emergent sub-grammar at this point is:

\begin{equation}
\text{BinMax} \quad \text{*IP-FINAL-MONOFT} \\
\text{BinMin} \quad \text{ALIGNR (FT, IP)}
\end{equation}

It needs to be reminded that this sub-grammar is reached while lines of the structure [SS][S][SS] (see (5) above) are temporarily shelved. As mentioned earlier, such lines are distinct from other 5-syll Gut\textit{i} lines because they contain the interjection ‘\textit{xi}’ and accordingly are scanned differently. We suggested back in Section 3.3.3.1 of Chapter 3 that ‘\textit{xi}’ displays the unique flexibility in its parsing only when occurring in the Chuci genre, and that once out of this particular genre, ‘\textit{xi}’ behaves like a normal interjection for the modern speaker. This holds for ‘\textit{xi}’ in both Shijing and Guti: in these contexts, ‘\textit{xi}’ can only be parsed as the non-head of a disyllabic foot, but neither as a monosyllabic foot on its own nor as the head of a disyllabic foot. With this
mind, we examine whether the sub-grammar in (16) is sufficient to account for the scansion of such lines as (S)(SS)(SS). For clarity sake, the third syllable, which is ‘xi’, is marked out as $S_i$ indicating the fact that phonologically it is just like a normal interjection syllable.

(17)

<table>
<thead>
<tr>
<th>[SS]$S_i$[SS]</th>
<th>BINMAX</th>
<th>*IP-FINAL-MONOFT</th>
<th>BINMIN</th>
<th>ALIGNR (FT, IP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$*$ (S)(SS)$S_i$(SS)</td>
<td>*</td>
<td>6!</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$*$ (SS)$S_i$(S)</td>
<td>*</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(SS)[S][SS]</td>
<td>*!</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(SS)[S][SS]</td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As shown here, the sub-grammar fails to predict the optimal scansion for such lines. Under the current sub-grammar, (SS)(S)(SS) emerges as the winner, as in the case of 5-syll $Guti$ lines containing no interjection syllables. This is actually not surprising: given the sub-grammar, (SS)(S)(SS) will always win. Carefully observe the desired winner (S)(SS)$S_i$(SS) against the unwanted winner (SS)$S_i$(SS), and we notice that in the latter the interjection ‘xi’ forms a monosyllabic foot on its own, which is illegitimate because ‘xi’, as a normal interjection syllable here, is underlingly weak. This calls into mind the constraint GOODFTINTERJ.

As for the ranking of GOODFTINTERJ with the other four constraints in the sub-grammar, first, the above pair of candidates provides the crucial ranking argument for GOODFTINTERJ $\gg$ ALIGNR (FT, IP), illustrated below:

(18)

<table>
<thead>
<tr>
<th>[SS]$S_i$[SS]</th>
<th>GOODFTINTERJ</th>
<th>ALIGNR (FT, IP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$*$ (S)(SS)$S_i$(SS)</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>(SS)$S_i$(S)</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

Second, this pair also shows that it is immaterial to rank GOODFTINTERJ with BINMIN, as BINMIN is violated by even the optimal candidate. Third, GOODFTINTERJ does not conflict with BINMAX: both have to be highly ranked, as no candidates violating either of them would win. Fourth, for the same reason, GOODFTINTERJ does not conflict with *IP-FINAL-MONOFT either. Thus, the sub-grammar is updated into:

(19)   BINMAX *IP-FINAL-MONOFT GOODFTINTERJ

Note that GOODFTINTERJ rather than GOODFT ‘XI’ is invoked here because of (i) although what is superficially at issue here is the parsing of ‘xi’, ‘xi’ in $Guti$ behaves just like a normal interjection syllable; (ii) GOODFT ‘XI’ is specifically targeted at the parsing of ‘xi’ in the $Chuci$ context. In theory, we could also say that ‘xi’ in $Guti$ still has the same underlying representation as in $Shijing$ or $Chuci$, but that the ‘‘xi’-grammar’ responsible for its optimal surface form in $Guti$ differs from that in $Chuci$, but is the same as that in $Shijing$, where ‘xi’ also behaves just like a normal interjection syllable (cf. Section 2.3.3.2 in Chapter 2).
Obviously, the addition of \textsc{GoodFtInterj} to the sub-grammar has no effect on the lines containing no interjection syllables: in such cases, \textsc{GoodFtInterj} is vacuously satisfied.

\subsection*{4.3.3 Two IP’s within one line: the case of 6-syll lines}

There are five 6-syll lines in our corpus, containing two grammatical structures, i.e. [SS][SS][SS] and [S[S][SS]][SS]. They are illustrated below:

\begin{itemize}
  \item[(20)]\begin{itemize}
    \item[(i)] \textbf{[gong1 que4][cui1 wei3] xi1, yi4!}
      \begin{itemize}
        \item palace palace magnificent imposing xi exclamation
      \end{itemize}
      \begin{itemize}
        \item ‘Ah, how magnificent and imposing the palaces are. Ah!’
      \end{itemize}
    \end{itemize}
    \rightarrow \begin{itemize}
      \item (gong1 que4) (cui1)(wei3 xi1), (yi4)!
    \end{itemize}
  \item[(ii)] \textbf{[she4 [bi3 [bei3 mang2]]] xi, yi4!}
      \begin{itemize}
        \item climb that north mound xi exclamation
      \end{itemize}
      \begin{itemize}
        \item ‘Ah, (I) climbed up that mound in the north. Ah!’
      \end{itemize}
    \end{itemize}
  \rightarrow \begin{itemize}
      \item (she4 bi3)(bei3)(mang2 xi), (yi4)!
    \end{itemize}
\end{itemize}

Two background notes are in order. First, these five 6-syll lines are all from one poem; indeed, they constitute the poem entitled ‘wu yi ge’, literally meaning ‘Five “yi” Lyric’, because these five lines all end in the exclamation ‘yi’. Second, like the other \textit{Guti} lines containing interjection syllables, these five lines also appeared at the early stage of the \textit{Guti} period.

Linguistically, we argue that instead of a bona fide 6-syll line, each of these five lines are actually a 5-syll line plus a monosyllabic line constituted by the word ‘yi4’ which we label here as an exclamation syllable. More is to be said on ‘yi4’ below. For the moment, three pieces of evidence may be cited to show why they are not real 6-syll lines. First, orthographically, there is an indispensable comma between the penultimate syllable, which is ‘xi’, and the final syllable ‘yi4’. Second, the two parts separated by this comma are independent of each other in terms of both syntax and interpretation. Third, when these lines are performed, a pause is obligatory where the comma occurs, and the two parts separated by this comma clearly fall under two distinct intonational contours. This suggest that prosodically, this 6-syll sequence actually comprises of two IP’s, rather than one IP, as would be expected if it was indeed one single line. The reason that the 5-syll and the monosyllabic lines are collapsed together into a six-syllable sequence is, we suggest, largely for the typographical consideration of avoiding a super-short monosyllabic line constituted solely by the exclamation syllable ‘yi4’. Thus, taking (20) (i) to illustrate, the 6-syll sequence is in fact as follows:

\begin{itemize}
  \item[(21)] \textbf{liao2 liao2 wei4 yang1 xi1, yi4!}
\end{itemize}

Having thus unveiled the true nature of these 6-syll sequences, we now need to answer two questions: first, how the parsing of the 5-syll lines can be accounted for;
second, why ‘yi4’ can constitute a line on its own. For the first question, as indicated in the examples above, the 5-syll lines are all optimally scanned as (SS)(S)(SS). This optimal scansion can be adequately accounted for by the sub-grammar developed so far. It is noteworthy that with the last syllable being ‘xi’ (again behaving like a normal interjection syllable here), GOODFTINTERJ becomes relevant, although its discriminating power overlaps with that of *IP-FINAL-MONOFT in winnowing out (SS)(SS)(S).

(22)

<table>
<thead>
<tr>
<th></th>
<th>BINMAX</th>
<th>*IP-FINAL-MONOFT</th>
<th>GOODFTINTERJ</th>
<th>BINMIN</th>
<th>ALIGNR(FT, IP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>[SS][SS]S_i</td>
<td></td>
<td>*</td>
<td></td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>(SS)(S)(SS_i)</td>
<td></td>
<td></td>
<td></td>
<td>*!</td>
<td>4</td>
</tr>
<tr>
<td>(SS)(SS)(S_i)</td>
<td></td>
<td></td>
<td></td>
<td>*!</td>
<td>6</td>
</tr>
<tr>
<td>(S)(SS)(SS_i)</td>
<td></td>
<td></td>
<td></td>
<td>*!</td>
<td>**5</td>
</tr>
<tr>
<td>(S)(SSS)(S_i)</td>
<td></td>
<td></td>
<td></td>
<td>*!</td>
<td>3</td>
</tr>
</tbody>
</table>

Turning to the second question posed above, namely, why ‘yi4’ can form a line on its own, we first need to mention that ‘yi4’ is semantically empty but emotionally very rich and as such not unlike the ‘Ah-’ or ‘Oh-’ in English. Apparently, in terms of grammatical category, it is an interjection. However, the reason we opt to refer to it as ‘exclamation’ here is basically phonological: we wish to show that phonologically it is different from the interjection syllables discussed so far. More specifically, we argue that like any full lexical syllables, ‘yi4’ is underlyingly represented as bimoraic. As such, it can form a monosyllabic foot on its own. Indeed, that ‘yi4’ is underlyingly strong is also evident from the very fact that it can constitute an IP on its own. Under the assumption that the prosodic hierarchy observes the Strict Layering Hypothesis, it is only natural that a foot cannot straddle an IP boundary, which is delimited by the punctuation mark. In other words, it is impossible for a stand-alone exclamation syllable to form a foot with a neighboring syllable that is separated from it by an IP boundary. Still with (20) (i) as an example, this is illustrated below:

(23)

\[[(\text{liao2\ liao2})\ (\text{wei4})(\text{yang1\ xi1})]\_\text{IP}]

\[[(\text{yi4})]\_\text{IP}].

Thus, in terms of the development of the sub-grammar, 6-syll lines provide no further impetus. We wish to conclude this section by drawing attention to the distinction between the phonological representations of major and minor categories, the latter exemplified by interjection syllables in particular. We have argued that all lexical categories, namely, major categories, are bimoraic, while as far as the phonological representation of the minor category of interjection syllables is concerned, so far we have a tripartite picture: normal interjection syllables are represented as monomoraic, ‘xi’ (as occurred in Chuci) as one filled mora plus one empty mora, and exclamation

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6 In this connection, one would predict that a full lexical syllable is also able to form a monosyllabic foot, and an IP on its own. This is indeed true: we have seen so far abundant examples where lexical syllables form a legitimate foot on their own, and as to a lexical syllable constituting an IP, say, a verse line, alone, in theory this is perfectly possible, but in practice, this is also conditioned by semantic considerations. Obviously, only those lexical syllables expressing a self-contained meaning can constitute an IP, e.g. ‘hao3’ (good), or ‘zou3’ (go).

7 That IP imposes a non-trespassible upper bound for the prosodic domain is widely agreed upon; indeed, it is formulated into a constraint IP-BOUND in Chen (2000) (also see Shih 1997).
sylables as bimoraic. We suggest that this contrast embodies the distinctive prosodic properties of major versus minor categories, as argued in McCarthy and Prince (1986) (cf. also Selkirk 1986; McCarthy and Prince 1993b). More specifically, McCarthy and Prince (Ibid.: 44) contend that ‘Stem or Lexical Word must correspond to a Prosodic Word’. Given that the prosodic hierarchy of Chinese is an impoverished one where a PrWd is argued to be co-terminous with a foot (cf. Section 2.3.6.1.1 of Chapter 2), and thus minimally bimoraic, this is tantamount to saying that lexical words are minimally bimoraic. In contrast, non-lexical words are not subject to such minimal word requirement, and thus may not necessarily be bimoraic. This contrast is directly reflected in their different phonological representations, as shown below:

(24)           Major category

<table>
<thead>
<tr>
<th>σ</th>
<th>σ</th>
<th>σ</th>
</tr>
</thead>
<tbody>
<tr>
<td>µ</td>
<td>µ</td>
<td>µ</td>
</tr>
</tbody>
</table>

   (1 mora)   (1 ½ moras)   (2 moras)

Minor category

4.3.4 7-syll lines

7-syll lines occupy a very high percentage of the Guti corpus (367 out of 843), and display a large diversity in grammatical structures: altogether 21 types of structures are identified. 25 of the 367 lines contain ‘xi’. We refrain from presenting the full inventory of the grammatical structures here due to their irrelevance to the discussion. All of them, with or without ‘xi’, share the optimal scansion (SS)(SS)(S)(SS). For illustrative purpose, below we present examples of some grammatical structures, first those not including ‘xi’ and then those including ‘xi’.

(25) (i)  [bei3 feng1] [juan3 di4] [[bai2 cao3] zhe2]  

north wind  sweep  ground  white grass  bent  

‘The northern wind sweeps the ground and the white grasses become bent’

→ (bei3 feng1) (juan3 di4) (bai3) (cao3 zhe2)

(ii)  ren2 [[sui2] [sha1 lu4]]  [xiang4 [jiang1 cun1]]  

man  follow  sand  road  towards  river  village  

‘People follow the sand road to go towards the village at the riverside’

→ (ren2 sui2) (sha1 lu4) (xiang4 jiang1 cun1)
(iii) \([qu4 \text{ shi2}} [xue3 \text{ man3} [%tian1 \text{ shan1} \text{ lu4}]\])
goes time snow cover heavenly mountain road
‘When we went there, the road to the heavenly mountain was covered with snow’
\[\rightarrow (qu4\text{ shi2}) \ (xue3 \text{ man3}) \ (tian1) \ (shan1 \text{ lu4})\]

(iv) \([yi4 \text{ zuo2} [lu4 \text{ rao4} [[jin3 \text{ ting2} \text{ dong1}]\]]\])
recall before road wind glamorous pagoda east
‘(I) recall the road used to wind to the east of the glamorous road’
\[\rightarrow (yi4 \text{ zuo2}) \ (lu4 \text{ rao4}) (jin3) \ (ting2 \text{ dong1})\]

(v) \([jia1 [[[zai4 [[xia1 \text{ mo2} \text{ ling2} \text{ xia4}]] \text{ zhu4}]]\])
home at place name hill below live
‘(Her) home is at the foot of Xiamo Hill’
\[\rightarrow (jia1 \text{ zai4}) \ (xia1 \text{ mo2}) \ (ling2) \ (xia4 \text{ zhu4})\]

(26) (i) \([li4 \text{ ba2} \text{ shan1}] \ [xi1 \text{ qi4} [gai4 \text{ shi4}]\])
strength pull mountain xi spirit overwhelm world
‘Ah, (his) strength (is so big that he can) pull up the mountain, and his spirit (is so high that it) overwhelms the whole world’
\[\rightarrow (li4 \text{ ba2}) \ (shan1 \text{ xi1}) \ (qi4) \ (gai4 \text{ shi4})\]

(ii) \([qiu1 \text{ feng1} \text{ qi3}] \ [xi1 [[bai2 \text{ yun2} \text{ fei1}]\]]\)
avertern wind rise xi white cloud flow
‘Ah, the autumn wind is blowing and the white cloud is floating’
\[\rightarrow (qiu1 \text{ feng1}) \ (qi3 \text{ xi1}) (\ bai2) \ (yun2 \text{ fei1})\]

(iii) \([da4feng1 \text{ qi3}] \ [xi1[yun2 \text{ fei1 \ yang2}]]\]
big wind rise xi cloud fly rise
‘Ah, the big wind rises, and the cloud flies upward’
\[\rightarrow (da4\text{ feng1}) \ (qi3 \text{ xi1}) \ (yun2) \ (fei1 \text{ yang2}).\]

(iv) \([yu2 \text{ xi1}] [yu2 \text{ xi1}] [nai4 \ [ruo4 \text{ he2}]\])
anxious xi anxious xi help like what
‘Ah, anxious I am, but so helpless!’
\[\rightarrow (yu2\text{ xi1}) \ (yu2 \text{ xi1}) \ (nai4) \ (ruo4 \text{ he2}).\]

Now consider the sub-grammar reached in (19). It is notable that all the five constraints are markedness ones: BinMAX, BinMIN, *IP-FINAL-MONOFT, GOODFTINTERJ and ALIGNR (Ft, IP). This suggests that the selection of the optimal scansion is independent of the grammatical structure of the line, which is evidently true given that all 7-syll lines have the same optimal scansion. However, as the
evaluation by GOODFTINTERJ is contingent upon whether the input line contains ‘xi’ or not, below we discuss the 7-syll lines with and without ‘xi’ separately.

First, for those 7-syll lines without ‘xi’, apparently GOODFTINTERJ is vacuously satisfied. This enables us to construct the following tableau without specifying the input structure.

<table>
<thead>
<tr>
<th></th>
<th>BINMAX</th>
<th>*IP-FINAL-MONOFT</th>
<th>GOODFTINTERJ</th>
<th>BINMIN</th>
<th>ALIGNR (FT, IP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(SS)(SS)(SS)(SS)</td>
<td>*</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(SS)(SS)(SS)(S)</td>
<td>*!</td>
<td>9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(SS)(SS)(SS)</td>
<td>*</td>
<td>11!</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(SS)(SS)(SSS)</td>
<td>*!</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(SS)(SSS)(SS)</td>
<td>*!</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For those with ‘xi’, it is noteworthy that except in (26) (iv) where ‘xi’ occurs both at the second and the fourth positions, in all other cases, ‘xi’ only occurs at the fourth position. As in 5-syll Guti lines, ‘xi’ again behaves just like a normal interjection syllable. Below we first construct the tableau for lines where ‘xi’ only occurs at the fourth position such as (26) (i), (ii) and (iii), and then consider the single line (26) (iv) individually. In both cases, ‘xi’ is explicitly marked out as $S_I$ for clarity sake.

<table>
<thead>
<tr>
<th></th>
<th>BINMAX</th>
<th>*IP-FINAL-MONOFT</th>
<th>GOODFTINTERJ</th>
<th>BINMIN</th>
<th>ALIGNR (FT, IP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(SS)(SS)(S)(SS)</td>
<td>*</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(SS)(SS)(SS)(S)</td>
<td>*!</td>
<td>9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(S)(SS)(S)(SS)</td>
<td>*!</td>
<td>11</td>
<td>***</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>(SS)(S)(SSS)</td>
<td>*!</td>
<td>11</td>
<td>*</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>(SSS)(SS)(SS)</td>
<td>*!</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

And the tableau for (26) (iv):

<table>
<thead>
<tr>
<th></th>
<th>BINMAX</th>
<th>*IP-FINAL-MONOFT</th>
<th>GOODFTINTERJ</th>
<th>BINMIN</th>
<th>ALIGNR (FT, IP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>[SS][SS][S][SS]</td>
<td>*</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(SS)(SS)(S)(SS)</td>
<td>*!</td>
<td>9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(S)(SSS)(S)(SS)</td>
<td>*!</td>
<td>11</td>
<td>**</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>(SS)(SSS)(SS)</td>
<td>*!</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

We see that in all cases, the sub-grammar invariably selects (SS)(SS)(S)(SS) as the optimal scansion, irrespective of the grammatical structure of the line. This meshes

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8 As is to be seen in Chapter 8, this highly restricted distribution of ‘xi’ within the line offers compelling evidence for the phonological treatment of ‘xi’ by the ancient Guti reader.
well with the fact. Indeed, in all cases, the parsing (SS)(SS)(S)(SS) wins on a good record: in addition to violating ALIGNR (Ft, IP), it incurs only one inevitable violation of BINMIN due to the odd number of syllables contained in the line and the inviolability of BINMAX. Thus, all the 7-syll Guti lines can be satisfactorily accounted for by the emergent sub-grammar, and that no new constraints or rankings are needed.

### 4.3.5 8-syll lines

The present Guti corpus contains ten 8-syll lines, which all contain a line-medial ‘xi’ and display four grammatical structures: [[SS][SS]S][SS], [SS][SS][SS], [SS]S[[SS]S][SS] and [SS]S[[SS][SS]][SS]. ‘Xi’ is represented as the stand-alone syllable. As a background note, like the other Guti lines containing ‘xi’, these ten 8-syll lines are also from the early stage of the Guti period, although not from one single verse, as in the case of 6-syll lines. Furthermore, unlike the 7-syll lines just discussed, the scansion of the 8-syll lines does exhibit sensitivity to the grammatical structure, at least in one case, which, as is to be seen below, turns out vital in developing the sub-grammar. Below we first illustrate each of the grammatical structures and their scansion:

(30) (i) [[cao3 mu4] [huang2 luo4]] xi [yan4 [nan2 gui1]]
    grass tree yellow fall xi swan south return
    ‘Ah, the grasses and trees turn yellow and fall, and the swans return south’
    → (cao3 mu4) (huang2) (luo4 xi1) (yan4) (nan2 gui1)

(ii) [ju1 [chang2 tu3]] [si1] xi1 [xin1 [nei4 shang1]]
    live long land miss xi heart inside sad
    ‘Ah, I am living in this land for long, I feel homesick, and I feel sad inside my heart’
    → (ju1) (chang2 tu3) (si1 xi1) (xin1) (nei4 shang1)

(iii) [yuan3 [tuo1 yi4 guo3]] xi1 [[wu1 sun1] wang2]
    far trust foreign country xi obscure subject king
    ‘Ah, I was trusted to the king of the obscure subjects in this foreign country’
    → (yuan3 tuo1) (yi4) (guo3 xi1) (wu1) (sun1 wang2)

(iv) [wei1 [jia1 hai3 nei4]] xi1 [gui1 [gu4 xiang1]]
    power impose sea inside xi return old home
    ‘Ah, with my power imposed all over the land, I return home’
    → (wei1 jia1) (hai3) (nei4 xi1) (gui1) (gu4 xiang1)

It is noteworthy that while lines of the grammatical structures (i), (iii) and (iv) share the scansion (SS)(SS)(SS)(SS), (ii) is scanned differently as (S)(SS)(SS)(SS). Under the emergent sub-grammar (see (19)), which exclusively contains output-oriented markedness constraints indifferent to the input structure, (SS)(SS)(SS)(SS) will always win, as shown below:
(31)

<table>
<thead>
<tr>
<th>Sub-grammar</th>
<th>BinMax</th>
<th>*IP-</th>
<th>GOODFt</th>
<th>BinMin</th>
<th>ALIGNR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Fnal-</td>
<td>INTERJ</td>
<td></td>
<td>(Ft, IP)</td>
</tr>
<tr>
<td>a. (SS)(S)(SS)(S)(SS)</td>
<td></td>
<td>**</td>
<td>16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. (S)(S)(S)(S)(S)(SS)</td>
<td>*!</td>
<td>**</td>
<td>17!</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. (SS)(S)(S)(S)(S)(SS)</td>
<td>*!</td>
<td>*</td>
<td>14</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Although this adequately accounts for the scansion of (30) (i), (iii) and (iv), the scansion of (30) (ii) is obviously problematic. The different scansion of (ii) indicates the relevance of the grammatical structure to the optimal scansion and motivates the introduction into the sub-grammar of the faithfulness constraint ANCHOR (including both ANCHOR-IO and ANCHOR-OI) from the constraint pool.

We now consider the ranking of ANCHOR. First, recall that (30) (ii) is best scanned as (S)(S)(S)(S)(S)(S), which is candidate (c) in (31). There it loses to candidate (a), which is actually a suboptimal scansion for (30) (ii) due to more violations of ALIGNR (Ft, IP). But in terms of satisfaction of the newly invoked ANCHOR, candidate (c) prevails over (a). This constitutes crucial evidence for ANCHOR >> ALIGNR (Ft, IP), as shown below:

(32)

<table>
<thead>
<tr>
<th>[S][S][S][S][S][S]</th>
<th>ANCHOR-IO</th>
<th>ANCHOR-OI</th>
<th>ALIGNR (Ft, IP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. (SS)(S)(S)(S)(S)</td>
<td>**! *</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>b. (S)(S)(S)(S)(S)</td>
<td>*</td>
<td>17</td>
<td></td>
</tr>
</tbody>
</table>

Note that here the grammatical structure of the line becomes relevant and is specified. Furthermore, following our practice, in the absence of evidence, ANCHOR-OI and ANCHOR-IO stay unranked with each other.

Second, consider the scansion of lines of the structure [[SS][SS]][S][S][S] ((30) (i) above): the scansion (SS)(S)(S)(S)(S)(S), which best satisfies ANCHOR but violates GOODFtINTERJ due to the monosyllabic foot constituted by ‘xi’ alone, nevertheless loses to (SS)(S)(S)(S)(S)(S), which violates ANCHOR but satisfies GOODFtINTERJ. This shows GOODFtINTERJ >> ANCHOR:

(33)

<table>
<thead>
<tr>
<th>[[SS][SS]][S][S][S]</th>
<th>GOODFt INTERJ</th>
<th>ANCHOR-IO</th>
<th>ANCHOR-OI</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. (SS)(S)(S)(S)(S)</td>
<td>* *</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. (SS)(S)(S)(S)(S)</td>
<td>*!</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Third, still for lines of the structure in (33), the loss of (SS)(S)(SS)(S)(S)(S) to (SS)(S)(SS)(S)(S)(S) shows BNMAX >> ANCHOR, as illustrated below:
Fourth, consider the scansion of lines of the structure [S[S][S]]S[S][S]S ([30] (iii)): (SS)(SS)(S)(SS) violates ANCHOR but avoids the occurrence of an IP-final monosyllabic foot, and is optimal, whereas (SS)(SS)(SS)(S) incurs fewer violations of ANCHOR but has an IP-final monosyllabic foot, and is suboptimal. This shows *IP-FINAL-MONOFT >> ANCHOR:

Thus, with these arguments about the ranking of ANCHOR, the emergent sub-grammar is:

The discussion of the 8-syll lines also brings the development of the Guti sub-grammar to an end.

### 4.4 Formal grounding of metrical harmony

As in the corresponding sections of the previous chapters, this section seeks to formally account for the native judgments regarding the metrical harmony of Guti lines. The analytical procedure is identical to that in the previous chapters. For each line type, the tableau des tableaux is presented and the optimal parse is selected under the Guti sub-grammar developed above out of the multiple candidate parses each of which is constituted by the parse from a grammatical structure for this line type to the corresponding optimal scansion of lines of this grammatical structure. We then examine whether for each line type, the grammatical structure in the optimal parse coincides with that experienced to be metrically most harmonious. 6-syll lines would be omitted given that they are in fact 5-syll lines plus the single exclamation syllables, as was discussed in Section 4.3.3.

We start with 4-syll Guti lines. As mentioned in Section 4.3.1, 4-syll lines are of one of three grammatical structures, but share the scansion (SS)(SS). This gives rise to three candidate parses. The following tableau des tableaux is constructed:
The optimal parse is from \([SS][SS]\) to \((SS)(SS)\). As to the metrical harmony judgment, 4-syll lines of the structure \([SS][SS]\) are indeed experienced as being metrically most harmonious. Thus for 4-syll lines, the metrical harmony can be grounded in the grammar via the OT harmony.

For 5- and 7-syll lines, of the great number of grammatical structures which correspond to an equally great number of candidate parses, only a few are presented for practical considerations.

Given the uniform optimal scansion, which is the output in each candidate parse, all parses necessarily satisfy and violate the same markedness constraints in the sub-grammar; what is crucially distinctive is the faithfulness constraint ANCHOR, which refers back to the grammatical structure in each candidate parse. The parse from \([SS][S[SS]]\) to \((SS)(S)(SS)\) emerges as optimal. Lines of this grammatical structure are indeed felt to be metrically most harmonious by the native speaker. Thus, the data from 5-syll lines again supports our claim that the metrical harmony can be formally grounded in the grammar via OT harmony.
Here a problem arises: under the sub-grammar, parses (a) and (b) turn out to be equi-optimal, while the fact of the matter is that only lines of the grammatical structure in parse (a) are felt to be metrically most harmonious. It is notable that the only difference between these two parses lies in the position of the strongest grammatical boundary (SB). As argued back in Chapter 2, SB in a line must correspond to PhP boundary in its prosodic scansion. Thus, the two optimal scansion in parses (a) and (b) actually differ in the PhP-level parsing, which nonetheless is concealed in (38) where only the foot-level parsing, which they share, is presented. Therefore, the 7-syll lines constitute a strong case for the crucial role of the sub-hierarchy for PhP boundary delimitation, i.e., $\text{BINARITY} \gg \text{EVENNESS} \gg \text{LONG-LAST}$, in accounting for the metrical harmony. The evaluation of these two parses by this sub-hierarchy is presented below. The PhP boundary in the optimal scansion in each parse is marked out, corresponding to the line-medial strongest boundary in the respective inputs.

Clearly, candidate (b) incurs two violations of $\text{BINARITY}$ because of the monarity of the first PhP and ternarity of the second. It also incurs three violations of $\text{EVENNESS}$ due to the grave imbalance of phonological weight between the two PhP’s. Consequently, it loses to (a) which incurs only one violation of $\text{EVENNESS}$. In plain words, (b)’s loss can be attributed to asymmetry, both in the branching of the prosodic structure and in the distribution of phonological weight. The grammatical structure in parse (a), which is the optimal one under the extended sub-grammar comprising constraint hierarchies responsible for both foot- and PhP-level parsing\(^9\), thus coincides with the grammatical structure of the metrically most harmonious lines. This clearly

\(^9\) As in the case of accounting for the metrical harmony of 6-syll $\text{Shijing}$ lines (see (100) in Chapter 2), there is no evidence for the interaction between these two hierarchies.
indicates that the position of SB in the line is not trivial: it affects the cognization of the line in terms of its metrical harmony.

Finally, we consider the 8-syll lines where the fifth syllable is ‘xi’ (albeit behaving like an interjection):

(41)

<table>
<thead>
<tr>
<th>Candidate parses</th>
<th>BINMAX</th>
<th>FINAL-MONOFT</th>
<th>IP</th>
<th>GOODFTI</th>
<th>BINMIN</th>
<th>IO</th>
<th>ANCHOR-FT</th>
<th>ALIGNR (FT, IP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. [[SS][SS]]S_i S_i [SS]</td>
<td>**</td>
<td>*</td>
<td>*</td>
<td>16</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. [S][SS]S_i [SS]</td>
<td>**</td>
<td>**!</td>
<td>*</td>
<td>17</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. [S][SS]i[SS][SS]</td>
<td>**</td>
<td>**!</td>
<td>**</td>
<td>16</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. [S][SS]i[SS][SS]</td>
<td>**</td>
<td>**!</td>
<td>*</td>
<td>16</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

8-syll lines of the grammatical structure [[SS][SS]]S_i S_i [SS], which is exactly the grammatical structure in the optimal parse, are cognized as being metrically most harmonious, thus again upholding our proposal that the metrical harmony can be grounded in the grammar via OT harmony.
Chapter 5 *Jinti* sub-grammar

5.1 General description of the raw corpus

The corpus for this chapter comprises of 121 poems of the *Jinti* genre, which encompasses verse composed during the middle and late Tang dynasty (ca. 700 - 907). As such, *Jinti* verse is also known as *Tang* poetry. The *Jinti* genre is widely acclaimed to be the peak of the classical Chinese literary tradition due to the great number of profoundly influential poets and vast collection of poems that are thematically extensive and artistically ingenious; the *Tang* dynasty (618-907), in particular the so-called ‘high Tang’ around the 8th century, is accordingly known as the golden age of classical Chinese poetry.

As mentioned in Section 4.1 of Chapter 4, *Guti* verse becomes, towards the end of its period, i.e. early *Tang*, more restricted, which is reflected in two aspects: first, the line length is drastically limited to either 5 or 7 syllables in contrast to the large variety of line lengths in its predecessors *Shijing*, *Chuci* and the early *Guti* verse; second, the line exclusively consists of lexical words in contrast to the use of function words in previous genres and early *Guti* verse. *Guti* verse developed as such is actually already *Jinti* verse in its embryonic form, although in addition to these two features, the full-fledged *Jinti* verse is characterized by a further restriction on the number of lines within a poem to either 4 or 8: *Jinti* poems consisting of 4 lines are referred to as *Jueju* (literally meaning ‘truncated line’) and those consisting of 8 lines as *Lüshi* (literally ‘regulated verse’). The two variables of line length and verse length result in four sub-genres of *Jinti*: 5-syll *Jueju*, 5-syll *Lüshi*, 7-syll *Jueju* and 7-syll *Lüshi*. Yet another distinctive feature of *Jinti* verse is the conscious use of lexical tones: the *Tang* poets were believed to follow an artificially defined canon of tonal patterns, although preliminary results from an empirical study have cast doubts upon to what extent the tonal patterns were being strictly observed (Ripley 1979, 1980).

The vast reservoir and preeminent literary achievement of *Jinti* poems have invited the compilation of hundreds of anthologies. As many as 49,000 *Tang* poems by 2200 poets have survived till today; of them 320 better-known poems by 77 of the better-known poets have been selected with great care and collected in ‘*Tang Shi San Bai Shou*’ (300 *Tang* Poems) compiled in 1763 by *Heng-tang-tui-shi* (Sun Zhu) of the *Qing* dynasty. Ever since its compilation, this anthology has remained a mainstay of classical Chinese literature and enjoyed tremendous and long-lasting popularity till today. As suggested by the compiler, the popularity of the poems served as the main criteria for the selection and the 320 poems included in the anthology represent the best works by the most prominent *Tang* poets that have enjoyed the popularity with generations of poem-readers. The anthology has been reprinted in countless editions for over two hundred years and today it is still a well-recited classic with its charm.

---

1 It is an open issue whether the use of tones in *Jinti* verse coincided with the appearance of tones in the ambient language, or tones were first developed in the ambient language before they were actively and consciously used in verse composition by *Tang* poets. Yip (1984) holds the former opinion, but Pulleyblank (1978, 1998) and Li (1986) argues for the latter based on diachronic works. Norman (1988), on the other hand, assumes a more conservative attitude in making no further speculations beyond the argument that Old Chinese was a toneless language.
and popularity undiminished for the modern speaker, which renders it especially suitable for the present study.

It needs to be pointed out that the 320 poems included in 300 Tang Poems cover the best ones written during the whole Tang period, including early Tang (618 – ca. 700) which witnessed the transformation from the Guti genre into the Jinti one. Although admittedly, the boundary between Guti and Jinti verse might be less than clear-cut, in this collection, the genre in which a poem belongs to was nonetheless explicitly specified next to its title, which shows that 89 of the 320 poems belong to Guti and the remaining 231 to Jinti. The 121 poems comprising the present corpus of Jinti verse are randomly selected from these 231 Jinti ones: we take the odd-numbered ones, attempting to strike a balance between on the one hand, 5- and 7-syll lines, and on the other hand, 4- and 8-line verse pieces, i.e. the two sub-genres of Jueju and Lüshi as mentioned above. As a result, it contains 21 5-syll Jueju, 43 5-syll Lüshi, 31 7-syll Jueju and 26 7-syll Lüshi, which makes a total number of 764 lines, 434 being 5-syll and 330 7-syll.

5.2 Methodological issues and preview of the sub-grammar

The analytical approach remains the same as those in previous chapters and will be omitted here. The chapter is also structured similarly to previous ones, except that this chapter features a section (Section 5.5) which briefly addresses certain issues presented specifically by the Jinti genre such as the role of lexical tones. Section 5.3 is devoted to the development of the scansion sub-grammar and Section 5.4 discusses the formal grounding of the metrical harmony. As Section 6.3 is organized according to the line type, it is particularly noteworthy that Jinti verse lines are either 5- or 7-syll long, and as is to be seen below, they are scanned by the modern speaker in a simple and uniform way. Consequently, this significantly simplifies both the analytical task and the sub-grammar per se.

To offer a glimpse of the sub-grammar, all 5-syll lines are scanned as (SS)(S)(SS), and 7-syll ones as (SS)(SS)(S)(SS). This indifference to the grammatical structure of the line implies that only markedness constraints are active in scansion: BinMAX and BinMIN take care of the binarity parsing, while *IP-FINAL-MONOFT guards against IP-final monosyllabic feet and AlignR (Ft, IP) encourages the rightward alignment between the foot boundaries and the IP boundary. However, interestingly, if faithfulness constraints, in particular Anchor, play no active role in the scansion sub-grammar, they prove crucial in accounting for the native judgment on metrical harmony, and as such should be included in the sub-grammar.

5.3 Jinti sub-grammar

The scarcity of the line types and the uniformity in their scansion drastically simplify the analytical task of developing the sub-grammar. Nonetheless, to enrich the analysis with a descriptive dimension, examples of certain grammatical structures are still to be presented below.
5.3.1 $\text{BinMax, } *\text{IP-Final-MonoFt} >> \text{BinMin, AlignR (Ft, IP)}$: evidence from 5-syll lines

The 434 5-syll *Jinti* lines display seven grammatical structures; they are uniformly scanned as (SS)(S)(SS)$^2$. Some grammatical structures are illustrated below:

(1) (i) \[[\text{han2 deng1}] [\text{si1} [\text{jiu4 shi4}]]\] \rightarrow \((\text{han2 deng1}) (\text{si1}) (\text{jiu4 shi4})\)  
   cold light think old happening  
   ‘(I) think of old happenings by the cold light’

   (ii) \[[\text{tian1 di4}] [\text{ying1 xiong2} qi4]\] \rightarrow \((\text{tian1 di4}) (\text{ying1}) (\text{xiong2 qi4})\)  
   heaven earth hero spirit  
   ‘The heroic spirit (fills up) between the heaven and the earth’

   (iii) \[[\text{yi2} [\text{shi4} [\text{di4 shang4} shuang1]]\] \rightarrow \((\text{yi2 shi4}) (\text{di4}) (\text{shang4 shuang1})\)  
   doubt be ground on frost  
   ‘(I) doubt (whether the moonlight) is the frost on the ground’

   (iv) \[[\text{zao3} [\text{zhi1} [\text{chao2} [\text{you3 xin4}]]]\] \rightarrow \((\text{zao3 zhi1}) (\text{chao2}) (\text{you3 xin4})\)  
   early know wave have tiding  
   ‘Had (I) knew earlier that the waves can carry tidings’

To begin with, the uniform scansion in spite of the grammatical structures shows that the sub-grammar comprises exclusively of markedness constraints. We now consider what such markedness constraints are. First, that a monosyllabic foot rather than a trisyllabic one occurs in the optimal scansion shows two things: first, $\text{BinMax} >> \text{BinMin}$, and second, $\text{BinMax}$ is inviolable. The ranking is shown below. The input structure is unspecified due to its irrelevance.

(2)

\[
\begin{array}{c|c|c}
\text{SSSSS} & \text{BinMax} & \text{BinMin} \\
\hline
\#\# (\text{SS})(\text{S})(\text{SS}) & * & * \\
(\text{SS})(\text{S})(\text{SS}) & *! & * \\
\end{array}
\]

Second, consider other potential but suboptimal scissions. For one thing, (S)(S)(S)(SS) can be combed out by its multiple violations of $\text{BinMin}$, as shown below:

(3)

\[
\begin{array}{c|c|c}
\text{SSSSS} & \text{BinMax} & \text{BinMin} \\
\hline
\#\# (\text{SS})(\text{S})(\text{SS}) & * & * \\
(\text{S})(\text{S})(\text{S})(\text{SS}) & **!* \\
\end{array}
\]

$^2$ As is the case with 5-syll *Guti* lines, although the grammatical structure of a line has no effect on its scansion, it does bear on how it is cognized in term of the metrical harmony.
For another thing, that (SS)(SS)(S) is suboptimal offers evidence for *IP-FINAL-MONOFT; furthermore, *IP-FINAL-MONOFT does not conflict with BinMAX. Indeed, both are inviolable as neither (SS)(SSS), which violates BinMAX, or (SS)(SS)(S), which violates *IP-FINAL-MONOFT, wins. *IP-FINAL-MONOFT does not conflict with BinMIN either: both the suboptimal form (SS)(SS)(S) and the optimal form (SS)(S)(SS) violate BinMIN.

Consider yet another suboptimal form (S)(SS)(SS), which satisfies *IP-FINAL-MONOFT and BinMAX: it loses to the optimal form (SS)(S)(SS) only in the rightward alignment between the foot boundaries and the IP boundary, respectively being 6 (=2+4) and 5(=2+3). This calls for AlignR (Ft, IP). As to its ranking, first the pair of (SSSSS) versus (SS)(S)(SS) shows BinMAX >> AlignR (Ft, IP). This is shown below:

<table>
<thead>
<tr>
<th></th>
<th>BinMAX</th>
<th>AlignR (Ft, IP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>☞</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>!</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Second, consider the suboptimal form (SS)(SS)(S): it loses to the optimal (SS)(S)(SS) due to its violation of *IP-FINAL-MONOFT, in spite of its better satisfaction of AlignR (Ft, IP) than (SS)(S)(SS). This constitutes the ranking argument for *IP-FINAL-MONOFT >> AlignR (Ft, IP), shown below:

<table>
<thead>
<tr>
<th></th>
<th>*IP-FINAL-MONOFT</th>
<th>AlignR (Ft, IP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>☞</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>!</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Third, AlignR (Ft, IP) does not conflict with BinMIN. In fact they are working in the same direction: the more monosyllabic feet an IP has, the greater the number of syllables between the right boundaries of the individual feet and the right boundary of the IP, thus the more violations of AlignR (Ft, IP). To illustrate this point, consider the pair (SS)(SS)(SS) and (SS)(SS)(SS) where the latter incurs more violations of BinMIN and, as a result of the multiple monosyllabic feet, 9 (= 2+3+4) violations of AlignR (Ft, IP) compared with 5 (=2+3) violations by (SS)(SS)(SS).

Fourth, even though Anchor plays no active role in the sub-grammar, it must be crucially dominated by AlignR (Ft, IP), which is the lowest-ranking, albeit still active, constraint in the sub-grammar. The ranking argument is provided by the scansion of the Jinti line of the structure S[[SS][SS]] as (SS)(S)(SS):
Thus, the sub-grammar now is

For simplicity sake, in the tableaux in this section, ANCHOR is omitted due to its inactiveness. However, it will be included in the tableaux des tableaux in Section 5.4 below, where it becomes crucial in accounting for the metrical judgment.

To conclude the discussion of 5-syll lines, we illustrate how this sub-grammar is adequate to select (SS)(S)(SS) as the invariable winner irrespective of the input structure. The input structure is again unspecified:

5.3.2 7-syll lines

The 7-syll Jinti lines display a richer pattern than the 5-syll ones in terms of grammatical structures: altogether 23 grammatical structures are identified for the 330 7-syll lines. But it resembles 5-syll lines in that lines of these diverse grammatical structures all share the optimal scansion (SS)(SS)(S)(SS). For practical concern, below only a handful of grammatical structures are illustrated:

(i) 

Although it is spring, it is still chilly outside the curtain, so (the emperor) orders to issue (the dancer) silk garment

→ (lian2 wai4) (chun1 han2) (ci4) (jin3 pao2)
(ii) [wu1 yì1] [xiàng4 kòu3] [xi1 yàng2 xìe1]
black clothes lane mouth evening sun slant
‘(There is a man) in black at the entrance of the lane, and the evening sun slants’
→ (wu1 yì1) (xiàng4 kòu3) (xi1) (yàng2 xìe1)

(iii) [zhòu1 rén2] [yè4 yú3] [jùè3 [cháo2 shèng1]]
boat person night talk feel tide rise
‘The people on the boat talk at night and feel that the tide is rising’
→ (zhòu1 rén2) (yè4 yú3) (jùè3) (cháo2 shèng1)

(iv) [jiù4 yè4] [yì3 [suì2 zhèng1 zhàn4] jìn4]
old feat already with travel battle end
‘The old feats are already gone with the travels and battles’
→ (jiù4 yè4) (yì3 suì2) (zhèng1) (zhàn4 jìn4)

(v) zòng3 [weì4 [fú2 yùn2] [nèng2 [bì4 rì4]]]
always think floating cloud can cover sun
‘(I) always think that floating clouds can cover the sun’
→ (zòng3 weì4) (fú2 yùn2) (nèng2) (bì4 rì4)

As it turns out, the sub-grammar (7) turns out sufficient to select (SS)(SS)(S)(SS) as
the optimal scansion, which may be seen as resulting from adding a disyllabic foot
in front of the optimal scansion for 5-syll lines. The scansion of 7-syll lines is illustrated
below where the input structure is again unspecified due to its irrelevance:

<table>
<thead>
<tr>
<th></th>
<th>SSSSSS</th>
<th>BINMAX</th>
<th>*IP-FINAL-MONOFT</th>
<th>BINMIN</th>
<th>ALIGNR (FT, IP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>!</td>
<td>(SS)(SS)(S)(SS)</td>
<td>*</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(SS)(SS)(S)</td>
<td>*</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(SS)(SS)(SS)</td>
<td>*</td>
<td>11!</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(S)(SS)(SS)</td>
<td>*</td>
<td>12!</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(SS)(SS)</td>
<td>*!</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(SS)(SS)(SS)</td>
<td>*!</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(S)(S)(S)(S)</td>
<td>**! *</td>
<td>17</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This brings the analysis to a quick end: the scansion sub-grammar for Jìntí lines is
that presented in (7).

5.4 Formal grounding of the metrical harmony

This section seeks to formally account for the native judgment on the metrical
harmony of Jìntí lines. As is our practice so far, we will only focus on lines whose
grammatical structures are cognized as being metrically most harmonious; they are
respectively [SS][S[SS]] for 5-syll lines and [[SS][SS]][S[SS]] for 7-syll ones. As will
be seen below, *Jinti* constitutes a unique case in that although the constraint ANCHOR is inactive for the scansion, it turns out crucial in accounting for the metrical harmony.

We start with 5-syll lines. As mentioned in Section 5.3.1, seven grammatical structures occur in the corpus and are all scanned as (SS)(S)(SS). This gives rise to seven candidate parses from different input structures to the same output structure (i.e. (SS)(S)(SS)). The faithfulness constraint ANCHOR, which ranks the lowest in the sub-grammar and is inactive in selecting the optimal scansion, becomes crucial in distinguishing between these parses due to its reference to the input structures. This is shown below:

![Candidate parses](image)

Nonetheless, although ANCHOR succeeds in winnowing out parses (b), (c), (d), (e), and (g), it fails to distinguish between (a) and (f). Observe these two parses, and we note that they are the same in the foot-level parsing, but differ in the PhP-level parsing, which is not marked out in the above tableau. This scenario is similar to that in the discussion of 7-syll *Guti* lines in Section 4.4.2.2 of Chapter 4, and following our practice there, the sub-grammar is extended with the sub-hierarchy for PhP boundary delimitation, which selects (a) as the ultimate winner. This is shown below:

![Parses](image)

This way, the optimal parse is that from [SS][S[SS]] to (SS)(S)(SS). 5-syll lines corresponding to this parse are exactly what are cognized as metrically most harmonious. As the PhP boundary delimitation constraint hierarchy is part of the *Jinti* sub-grammar, this shows that the metrical harmony can be grounded in the sub-grammar.
7-syll lines present a similar case: lines of the 23 different grammatical structures all share the same scansion (SS)(SS)(S)(SS) and out of the corresponding parses, the optimal one can be selected thanks to the operation of ANCHOR and PhP boundary delimitation ranking hierarchy. This is shown in the following tableau des tableaux. For simplicity sake, only five parses corresponding to five out of the 23 grammatical structures are presented. The data here provides no evidence for crucial ranking between the constraint hierarchies respectively for foot-level and PhP-level parsings, but as argued in (52) in Chapter 3, the former dominates the latter, indicated below with a solid line between them.

This way, parse (a) emerges as the winner; again it coincides with the line felt to be metrically most harmonious.

To conclude, we have shown that the native judgment of the metrical harmony for Jinti lines can be formally accounted for by the sub-grammar, which consists of constraint hierarchy for both foot-level and PhP-level parsing. Specifically, for both 5- and 7-syll lines, the line corresponding to the optimal parse under the sub-grammar is exactly the one cognized as metrically most harmonious by the native speaker. In other words, metrical harmony can be correlated to the formal OT harmony.

5.5 Some additional issues

This section briefly addresses three additional issues of particular relevance to the Jinti genre, upon which, as we shall see, the discussion so far has shed light. They are as follows. First, why are Jinti lines exclusively 5- or 7-syll long? Second, will the uniformity in the scansion of 5- and 7-syll Jinti lines lead to monotony? Third, what is the role of lexical tones in the meter of Jinti verse?
5.5.1 Exclusive use of 5- and 7-syll lines

One notable feature of the Jinti genre is its exclusive use of 5- or 7-syll lines; indeed, as mentioned earlier, this pattern was under development throughout the Guti period and became firmly established towards its end. A natural question is how to account for this strong preference of 5- and 7-syll lines. Is it accidental for Jinti lines to consist of either 5 or 7 syllables? Why for example are Jinti lines not 4-, 6- or 8-syll long?

We suggest that this preference of 5- and 7-syll lines is because when a line containing an odd number of syllables is scanned, the preference of binary feet renders the occurrence of a monosyllabic foot inevitable. The presence of this monosyllabic foot serves to introduce a sense of ‘malleability’ into the performance of the line. This is because each foot tends to be performed with roughly the same duration, and a monosyllabic foot apparently offers an extra degree of fluidity and room for artistic maneuvering by the performer which is not possible when the line consists of an even number of syllables and accordingly is scanned into a series of disyllabic feet. Consequently, while an overuse of lines containing an even number of syllables might risk leading to monotony, lines containing an odd number of syllables are less likely so. Indeed, as Sung (1998) points out, the extensive use of 4-syll lines in Shijing creates a somewhat simplistic impression and may risk drifting into a sing-song melody. As Chiang Yee also wrote in the introduction to Herdan (2000), largely impressionistically, on the development of 5-syll lines out of the 4-syll line that had dominated in the pre-Qin period, ‘the employment of five characters to the line was found to be a more rewarding measure, permitting a smoother and more melodious effect and the evocation of subtler human feelings’.

In addition, as far as the specific number of syllables in the line is concerned, of the available odd numbers, 5 and 7 are the most appropriate in terms of both its capacity for content and the human memory mechanism. 3-syll lines are too short to effectively convey messages or express emotions that are often rich and complex, while 9-syll lines extend beyond the average capacity that human short-term memory system can host, which is argued in Miller (1970) to be the magic seven chunks of information. Some also suggest that seven syllables make the longest line which can be comfortably performed within the stretch of one breath (Zhang 1996).

We may better understood this preference of 5- and 7-syll lines in the late Guti and Jinti periods by tracing the historical evolution of poetic genres that leads to their birth and boom. Recall that on the one hand, in both Guti and Jinti, 5-syll lines preceded 7-syll ones with the latter being developed by adding a disyllabic foot at the beginning of the former; on the other hand, it has been argued that the 5-syll line, which made its debut in Guti where the influence of Shijing was still palpable, was developed on the basis of 4-syll lines which were overwhelmingly predominant in Shijing (Chen 1994). Thus, one might suggest that 4-syll lines first appeared, were

---

3 One piece of compelling evidence for this argument comes from the slightly different poems collected in different anthologies which are identical except that one comprises of 4-syll lines and the other of 5-syll ones. For example, compare the following two poems and pay attention to how straightforwardly each 5-syll line is constructed out of a 4-syll one by inserting an extra syllable (which is in bold form) into the latter:

(1) 5-syll lines

\[
\text{bei}^3 \quad \text{fang}^1 \quad \text{you}^3 \quad \text{jia}^1 \quad \text{ren}^2,
\]
subsequently developed into 5-syll ones to reduce the risk of monotony (among other reasons), and then further developed into 7-syll ones in an effort to expand the capacity of the line.

5.5.2 Risk of monotony

That the 5- and 7-syll *Jinti* lines respectively share one scansion which is totally blind to their grammatical structures might lead one to wonder whether from the perspective of the poem reader, the uniformity of the scansion will quickly result in monotony, thus undermining the esthetic beauty of this art form.

The fact of the matter is, however, *Jinti* lines are never monotonous to the modern poem-reader; on the contrary, *Jinti* verse, representing the peak of literary accomplishment of classical Chinese poetry, never fails to offer the reader a pleasant and exciting reading experience. This is attributable to the rich diversity exhibited in the grammatical structure of the line, which, although not playing an active role in the scansion, nonetheless bears closely on how the line is experienced by the reader, which is captured via the notion of metrical harmony. As shown in Section 5.4, metrical harmony may be formally correlated to OT harmony, which, as evident from the tableau des tableaux, can be specifically captured via the constraint satisfaction/violation of ANCHOR, LONG-LAST and BINARITY.

That lines of different grammatical structures may differ in their cognitive consequences and in particular, 5- and 7-syll lines of the structures [SS][S[SS]] and [[SS][SS]][S[SS]] are respectively felt as the most harmonious is a well-acknowledged observation in various literary commentaries (cf. Chen 1979), but it has typically been accounted for in an impressionistic way. The discussion in Section 5.4 has offered a formal account by grounding the vague notion of metrical harmony in the sub-grammar via the robust analytical tool of OT harmony measured in the concrete terms of constraint satisfaction/violation. Specifically, the constraints responsible for the metrical harmony, i.e. ANCHOR, LONG-LAST and BINARITY, are all related to the grammatical structure of the line, although in the case of LONG-LAST

| north place have beautiful person |
| In the north there is a beautiful person |
| jue2 shi4 er3 du2 li4 |
| stun world and single stand |
| ‘She stuns the world (with her beauty) and stands single’ |

| yi2 gu4 qing1 ren2 cheng2 |
| one glance collapse people city |
| ‘If she casts a glance, the city could (be charmed to) collapse’ |

| zai4 gu4 qing1 ren2 guo3 |
| again glance collapse people country |
| ‘And if she casts another glance, the country would fall’ |

(2) 4-syll lines:

| bei3 fang1 jia1 ren2 |
| jue2 shi4 du2 li4 |
| yl2 gu4 qing1 cheng2 |
| zai4 gu4 qing1 guo3 |
and BINARITY, the effect of the grammatical structure is exerted indirectly via the PhP
boundary which is determined by the strongest boundary (SB) in the grammatical
structure.

Therefore, although all the 5- or 7-syll Jinti lines are scanned in a uniform way
indifferent to their grammatical structures, the different grammatical structures of the
lines nonetheless induce different judgment on the metrical harmony on the part of the
reader. As a consequence, the reader experiences a rich spectrum of metrical harmony
corresponding to the large variety of line structures, constantly moves between
metrically harmonious lines and metrically tense ones, and enjoys an exciting rather
than a monotonous reading experience.\footnote{The variation of metrical harmony between the lines within one poem is welcome and in fact crucial
for the success of a poem. Similar observations are made in Nespor and Vogel’s (1986:295) discussion of English art verse, or Hanson and Kiparsky (1996:295)’s INTEREST constraint which calls for a
maximalization of esthetic interest of the verse. This is evident from the fact that it is most rare for a
piece of art verse to contain lines of the same structure, even though the repeated structure is the
metrically most harmonious one. For example, none of the 121 verse pieces in the Jinti corpus is like
this. Such poems where every line has the same degree of metrical harmony would most likely result in
monotony for the reader and seem to be a bit more acceptable in the more tolerant ‘folksy’ poetic styles
such as limericks etc. For example, in the following limerick all the four lines have the (metrically most
harmonious) structure [SS][S[SS]], but it reads as rather boring and would hardly be taken as a serious
poem.

\begin{verbatim}
gao1 shan1 you3 hao3 shui3.
  high mountain  have fine water
  ‘There is fine water on the high mountains’

cao3 di4 you3 hao3 hua1.
  Grass land  have good flower
  ‘There is beautiful flowers on the grass’

ni3 wo3 shi4 peng2 youin1.
  You I  are friend friend
  ‘You and I are friends’

bi3 ci3 xin1 huan1 xi3.
  Each other heart happy happy
  ‘We are happy with each other’
\end{verbatim}


5.5.3 Lexical tones and meter

Although as stated back in Chapter 1, this research is not concerned with the meter of
classical Chinese verse, the use of lexical tones in the Jinti genre once triggered a
lively debate about the meter of this genre (cf. inter alia, Chen 1979, 1980; Schlepp
1980; Yip 1980). And we feel tempted to chip in with a different voice on this issue
on the basis of our discussion in this chapter.

As mentioned back in Section 5.1, lexical tones began to be consciously used in Jinti
verse, although it remains a moot point whether tones appeared around the same time
or earlier in the ambient language. That Chinese is widely known as a textbook case
of tone languages and that the tone is phonemic in Chinese seductively invites the
argument that Chinese poems have a ‘tonal meter’ in Lotz’s (1960) work on the
typology of meters, based on the assumption that a language only employs its
phonemically significant features in establishing meter for its verse. This position has been followed in works such as Chen (1979, 1980), Yip (1980, 1984) and Xue (1989).

We argue that this proposal on ‘tonal meter’ is untenable for at least three reasons. First, according to the advocates of ‘tonal meter’, tones play a vital role in the meter of the Chinese verse, and in fact constitute the meter. Notably, they are all merely concerned with the so-called ‘Regulated Verse’, which is the sub-genre Lūshi of the Jinti genre, as mentioned in Section 5.1. This sub-genre is conventionally believed to be characterized by the imposition of a rigid canon of tonal patterns. The question is thus: if we temporarily accept that tones constitute the meter for such verse, what about the other genres of classical Chinese verse? Will the fact that tones are absent in them lead us to conclude that they do not have meter? This obviously cannot be true. Moreover, as already mentioned in Section 5.1, the conventionally held assumption that all Lūshi (as well as the other Jinti sub-genre, i.e. Jueju) poems follow the strict and arbitrary tonal patterns, which serves as the de facto point of departure in these works, is thrown into doubt by the empirical study of Ripley (1980). Duanmu (2001) for example flatly concludes that this pattern is actually not valid.

Second, even if the tonal patterns had been strictly followed by the ancient poets, and were indeed essential to the establishment of meter, it is noteworthy that the tones have undergone significant change over the time (see e.g. Haudricourt 1954, 1961; Mei 1970; Pulleyblank 1978; also see Chapter 1 of Chen (2000) for a review). Accordingly, for the modern speaker, in the majority of cases the tones diverge from those back at the time when the verse was composed. Consequently, the tonal pattern is not so much a synchronic reality as a mere abstract diachronic construct. If the tonal meter theory was correct, will the meter of the verse be lost on the modern speaker who, in many cases, recites the verse in a drastically different tone pattern? The answer is again evidently negative.

Third, the advocates of ‘tonal meter’ have argued that the lexical tone serves as a basis for foot parsing. This raises the immediate concern why the two syllables within a foot should share the same tone; indeed, this was admitted to be merely an artificial and stipulative requirement in these works (e.g. Chen 1979; Xue 1989). This problem has been pointed out in Napoli (1979) and Schlepp (1980). Furthermore, in an attempt to capture this mapping between tones and foot structure, various rules have been proposed, which are often ad hoc.

All this indicates that tones cannot be of direct relevance to meter and that the so-called ‘tonal meter’ is but an untenable myth; indeed, the role of tone in the metrics of Chinese verse has been seriously challenged in Buring (1966) and Schlepp (1980). Rather we propose that tones only bear an indirect and secondary relation to meter. Specifically, the meter of classical Chinese verse is constituted by the boundary matching between the grammatical and the prosodic structures and lexical tones of the syllables in a line join together to form the melody on top of this underlying meter. This meter is referred to as ‘phrasing meter’ in my work elsewhere (Zuo 2000) and as such, bears considerable resemblance to the meter in Japanese verse (Hayes 2000a). However, hugely interesting it may be, this topic will not be belabored here, as it is not the main concern of the present study. We will briefly return to it in Chapter 7 below.
Chapter 6 Ci sub-grammar

6.1 General description of the raw corpus

Ci is the last major genre of classical Chinese verse; it was first developed in the late Tang dynasty and Five Dynasties (907 - 960) which witnessed the co-existence of Jinti and Ci at its early stage (cf. Appendix I). By the beginning of the Song dynasty (960 ñ 1279) Ci had grown into a full-fledged poetic genre with distinct features of its own, and continued to flourish throughout the Song dynasty, which is hailed as the apogee of Ci.

Ci originated from composing lyrics to the musical tunes of court and folk songs and as such was originally meant to be sung. However, under the influence of some pioneering poets such as Su Shi (1036-1101), it gradually shook off its link to music and by the 11th century had developed into a form of art verse which could be recited independently of tunes. As the tunes subsequently became lost and only words have survived into contemporary times, recitation is the only viable form of performance for the modern speaker. Still, its intimate link with musical tunes has clearly left its stamp. For one thing, Ci poems are characterized by a strong irregularity in the length of lines, stanzas and poems, which was dictated by the rather arbitrary configuration of corresponding tunes; for another, each tune also imposed a rigid scheme of rhyming and tones. At the same time Ci shares with Jinti the exclusive use of lexical syllables.

The Song dynasty gave birth to a large quantity of well-written and well-recited poems, most of which centered around two favorite themes: love and nostalgia. These poems have been collected in several influential anthologies, a most popular one being Bai Xiang Ci Pui (literally White Fragrance Ci Anthology), which was compiled by Shu Menglan in the Qing dynasty (1644 ñ 1911 AD) and contains 100 Ci poems by a great number of preeminent poets, each composed to a distinct tune. All these poems continue to enjoy great popularity today with the modern speaker, and together with Jinti poems, are among the best-cited classical Chinese verse. As such this anthology is well suited to serve as the empirical basis for the current study: the present corpus is composed of the randomly selected 50 poems out of these 100 poems collected therein, with the randomness being achieved by virtue of the selection of the odd-numbered ones.

These 50 poems consist of altogether 753 lines, and it is noteworthy that of all the five genres, Ci displays the greatest diversity in its line length, ranging from 2 to 9

---

1 This, of course, does not mean that verse became non-existent after Ci ñ only that no distinct new genre such as the five discussed so far was developed. The verse composed during the Ming and Qing dynasties that followed the Song dynasty mainly imitated the earlier genres, in particular Jinti and Ci (Yang and Yang 1983).

2 The tonal patterns for Ci verse differ from, and are in fact much more rigid than those for Jinti in the sense that every single position in a poem written to a given ëtoneí, which was referred to as ëmelodic tonal patterní (Levy 2000: 91) and indicated in the first part of the title, is specified for the tone that is allowed to occur there. The Ci tonal pattern is highly irregular and artificial ñ arguably much more so than that in the Jinti genre, which proves more revealing in further breaking down the myth of 'tonal meter', as discussed in Section 5.5.3 of the previous chapter.
syllables, albeit mostly from 3 to 7 syllables. As is to be seen below, the diversity in the length of Ci lines partly leads to the variety in their scansion, which bears directly on the sub-grammar.

6.2 Methodological issues and preview of the sub-grammar

This chapter follows the same analytical approach and organizational principle as previous ones. In developing the modern sub-grammar, constraints from the constraint pool are invoked and ranked on the basis of the Ci data. The section is organized according to the line types, and analytically non-crucial lines are also illustrated alongside the crucial ones.

As mentioned earlier, Ci lines display a large variety of lengths and grammatical structures. Unlike Jinti lines which are scanned in a uniform way, Ci lines are also characterized by a rich pattern of scansion which invokes a wide array of constraints from the constraint pool. For one thing, the lack of uniformity in the scansions of lines of various grammatical structures indicates that the faithfulness constraint Anchor is operative, and indeed, as is to be seen below, the higher-level Anchor constraint, i.e. Anch-oIP, also plays a critical role. For another thing, the core markedness constraints remain at work: the foot Binarity preference and the ban of PhP-final monosyllabic feet respectively call for the ranking BinMax >> BinMin and the inviolable *PhP-Final-Monoft, and the alignment between the right foot boundaries and the right IP boundary calls for AlignR (Ft, IP).

6.3 Ci sub-grammar

Ci lines in the present corpus range from 2 to 9 syllable long, even though the 2-, 8- and 9-syll lines are in the minority. The scansion of Ci lines of various lengths and structures also features diversity. Below, we present them according to the line type.

6.3.1 BinMin: evidence from 2-syll lines

Ten 2-syll lines occur in the corpus, which all share the grammatical structure [SS] and the optimal scansion (SS), as illustrated below:

(1) (i) [yan4 yan4] \rightarrow (yan4 yan4)
    listless/redupl
    She feels listless

(ii) [tuan2 shan4] \rightarrow (tuan2 shan4)
    round fan
    She holds a round fan

---

3 The shortest Ci line can contain only one single syllable and the longest as many as 11 syllables, though such lines, being rather rare, do not appear in our corpus. Regarding the one-syll line, it is interesting to note that the single syllable in such cases is either a lexical syllable or what was referred to as an ñexclamation syllableï back in Chapter 4.
(iii) \([\text{yan2 chu4}] \rightarrow (\text{yan2 chu4})\)
prolong wait
d(She) waits there for a prolonged time

(iv) \([\text{ren2 qiao1}] \rightarrow (\text{ren2 qiao1})\)
people quiet
dPeople have quieted down

That the 2-syll lines are scanned as (SS) rather than (S)(S) shows that monary feet are dispreferred when binary feet are possible, which calls for \text{BINMIN}.

### 6.3.2 \text{BINMAX} >> \text{BINMIN, and \text{"IP-FINAL-MONOFT: evidence from 3-syll lines}}

Altogether 125 out of the total 753 \(\text{Ci}\) lines consist of 3 syllables. They exhibit two grammatical structures, namely, [SS]S and S[SS], and are all scanned as (S)(SS). Some examples are given below:

(2) (i) \([\text{xiang1 wu4} bo2] \rightarrow (\text{xiang1} \quad \text{wu4 bo2})\)
fragrant haze thin
dThe fragrant haze is very thin

(ii) \([\text{ren2 san3} kou4] \rightarrow (\text{ren2} \quad \text{san4 hou4})\)
people disperse after
dAfter the crowd has dispersed

(iii) \([\text{zui4 fu2 rong2}] \rightarrow (\text{zui4} \quad \text{fu2 rong2})\)
intoxicate hibiscus
dEven the hibiscus flowers are intoxicated (by our passion)

(iv) \([\text{tou4 chong2 mu4}] \rightarrow (\text{tou4} \quad \text{chong2 mu4})\)
penetrate multiple curtain
d(The fragrance) penetrates the multiple layers of curtain

(v) \([\text{li3 hai2 luan4}] \rightarrow (\text{li3} \quad \text{hai2 luan4})\)
sort still messy
d(I tried to) sort out (my confused thoughts), but they are still messy

This uniform scansion of the 3-syll lines suggests two things. First, trisyllabic feet are unwelcome but monosyllabic feet are conditionally tolerable in verse scansion. This calls for \text{BINMAX} and its dominance over \text{BINMIN}. Second, that the monosyllabic foot, which is inevitable given the ban on trisyllabic feet, can only occur as the first foot, but not the final one in the IP calls for \text{"IP-FINAL-MONOFT}. Furthermore, it must be inviolable in the sub-grammar, together with \text{BINMAX}, as is evident from the loss of both (SS)(S) and (SSS). There is no crucial ranking between \text{"IP-FINAL-MONOFT} and \text{BINMIN} due to the lack of conflict between them. Thus the emergent sub-
grammar now is \(*\text{IP-FINAL-MONOFT}, \text{BINMAX} \gg \text{BINMIN},\) and the scansion of 3-syll lines under this sub-grammar is illustrated below. The grammatical structure of the line is unspecified due to its irrelevance to the scansion.

(3)

<table>
<thead>
<tr>
<th>SSS</th>
<th>BINMAX</th>
<th>(*\text{IP-FINAL-MONOFT})</th>
<th>BINMIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>(SS)(S)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(SSS)</td>
<td>*!</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(SS)(S)</td>
<td>*!</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6.3.3 More illustrations of the sub-grammar: 4-syll lines

4-syll lines are the most frequent line type in the corpus, taking up 261 out of the 753 lines. Three types of grammatical structures emerge, i.e. [SS][SS], [S][SS]S, and S[S][SS]. As far as scansion is concerned, 4-syll Ci lines display a uniformity that also characterizes the scansion of 4-syll lines in all the other genres: all lines are invariably scanned as (SS)(SS) irrespective of their grammatical structures. Below are some examples.

(4) (i) \([\text{yin}2 \text{ hua}1]\ [\text{zhao}4 \text{ ye}4]\ \rightarrow (\text{yin}2 \text{ hua}1) (\text{zhao}4 \text{ ye}4)

silvery flower lighten night
êThe silvery flowers (from the fireworks) lighten up the night skyï

(ii) \([\text{dui}4 [\text{chang}2 \text{ ting}2]] \text{ wan}3\) \rightarrow (\text{dui}4 \text{ chang}2) (\text{ting}2 \text{ wan}3)\footnote{It needs to be mentioned that whereas all of my informants agree that (SS)(SS) is the optimal scansion for lines of this structure in the verse context, for some, the more \textit{prose-likei} (S)(SSS) seems even better. However, crucially, in the latter scansion, the second syllable in the trisyllabic foot has to be reduced, and as we suggested earlier, we are only concerned with the verse scansion where MAX is inviolable. Furthermore, we suggest the scansion (SS)(SS) again bears testimony to the effect of the Gestalt principle in verse scansion (first discussed in Chapter 2), as such lines typically have as their neighbors other 4-syll lines which are more smoothly scanned as (SS)(SS). In saying this we are implying that lines such as (4)(ii) are experienced as somewhat tense, which is shown in Section 6.4 below.}

face long pagoda late
ê(We) face each other in the long pagoda till it is lateï

(iii) \(\text{shang}4 [\text{xun}2 [\text{fang}1 \text{ jiu}3]]\) \rightarrow (\text{shang}4\text{xun}2) (\text{fang}1 \text{ jiu}3)

still search fragrant wine
ê(I) am still searching for fragrant wineï

The sub-grammar developed so far is adequate to account for the given data, as shown below. Again the grammatical structure of the line is unspecified.
It is notable that as the sub-grammar stands now, (SS)(SS) incurs zero violation and appears to be a perfect winner here only because the sub-grammar so far is incomplete; as it is further developed with the addition of new constraints, we will see that (SS)(SS) will incur some violations, albeit still optimal for 4-syll lines.

### 6.3.4 *PHP-FINAL-MONOFT, ANCHOR, ALIGNR (FT, IP), and ANCHOR-ISO*<sub>PHP</sub>: evidence from 5-syll lines

For 5-syll lines, nine grammatical structures are identified, as tabulated below:

<table>
<thead>
<tr>
<th>Grammatical structures</th>
<th>Scansion</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i) [SS][S][SS]</td>
<td>(SS)(S)(SS)</td>
</tr>
<tr>
<td>(ii) [SS][S][SS]</td>
<td>(S)(SS)(SS)</td>
</tr>
<tr>
<td>(iii) [SS][S][SS]</td>
<td>(S)(SS)(S)</td>
</tr>
<tr>
<td>(iv) [SS][S][SS]</td>
<td>(S)(S)(SS)</td>
</tr>
<tr>
<td>(v) [SS][S][SS]</td>
<td>(S)(SS)(SS)</td>
</tr>
<tr>
<td>(vi) [S][S][SS][S]</td>
<td>(S)(S)(SS)</td>
</tr>
<tr>
<td>(vii) [S][S][SS][S]</td>
<td>(S)(SS)(SS)</td>
</tr>
<tr>
<td>(viii) [S][SS][SS]</td>
<td>(S)(SS)(SS)</td>
</tr>
<tr>
<td>(ix) [S][SS][SS]</td>
<td>(S)(SS)(SS)</td>
</tr>
</tbody>
</table>

Different from the uniformity characterizing the scansion of Ci lines discussed so far, 5-syll Ci lines may be scanned as (SS)(S)(SS) or (S)(SS)(SS), depending in a certain degree on the grammatical structure. More specifically, of the above nine types of grammatical structures, lines of (ii), (viii) and (ix) are all scanned as (S)(SS)(SS) and the others as (SS)(S)(SS). Below we present examples for all the grammatical structures together with their scansion:

1. [meng4 jun1] [jun1 [bu4 zhi1]] → (meng4 jun1) (jun1)(bu4 zhi1)
   *I dream of you but you don't know*

2. zai4 [xiang1 feng2] [he2 chu4] → (zai4)(xiang1 feng2) (he2 chu4)
   *Where shall we meet each other again?*

---

This bracketing structure is actually a shorthand for S[S[[SS][S]]] and S[[S][SS]][S].
(iii) \[ye4\ an4\] \[ru3\ ya1\ ti2\] \rightarrow \ (ye4\ an4)\ (ru3)\ (ya1\ ti2)

\text{leaf\ dark\ baby\ crow\ cry}

\text{The leaves are dark and the baby crows cry.}

(iv) \[shi4\ wen4\ \[ye4\ [ru2\ he2]\]] \rightarrow \ (shi4\ wen4)\(ye4)\ (ru2\ he2)

\text{try\ ask\ night\ like\ what}

\text{i (I) try to ask what the night is like.}

(v) \[cui4\ \[fu2\ \[xing2\ ren2\] shou3\]] \rightarrow \ (cui4\ fu2)\ (xing2)\ (ren2\ shou3)

\text{green\ stroke\ walk\ people\ head}

\text{The green (leaves gently) stroke the heads of people walking by.}

(vi) \[mei2\ zi3\ huang2\ shi2\] \[yu3\] \rightarrow \ (mei2\ zi3)\ (huang2)\ (shi2\ yu3)

\text{plum\ yellow\ moment\ rain}

\text{It rains when the plums become yellow.}

(vii) \[shi1\ ju4\ \[yu4\ cheng2\] shi2\] \rightarrow \ (shi1\ ju4)\ (yu4)\ (cheng2\ shi2)

\text{verse line almost finish moment}

\text{Just when the verse line is almost finished.}

(viii) \[xiang4\ \[jiao1\ yuan2\]] \[ta4\ qing1\] \rightarrow \ (xiang4)\ (jiao1\ yuan2)\ (ta4\ qing1)

\text{to\ suburb\ field\ step\ green}

\text{Let us go to the field in the suburb for a spring outing.}

(ix) \[qian1\ wan4\ bian4\] \[yang2\ guan1\]

\text{thousand\ ten\ thousand\ time\ sunny\ gate}

\text{For thousands of times, I go to the sunny gate (to wait for you coming back).}

\rightarrow \ (qian1)(wan4\ bian4)\ (yang2\ guan1)

Evidently, the scansion of 5-syll lines exhibits a certain sensitivity to their grammatical structures. This indicates that the emergent sub-grammar which solely contains markedness constraints is insufficient and that some faithfulness constraint needs to be invoked. First, consider the scansion of lines of the structure [SS][S[SS]] as illustrated in (i) above. Under the emergent sub-grammar, (SS)(S)(SS) and (S)(SS)(SS) score equally well, which is shown below:

<table>
<thead>
<tr>
<th>[SS][S[SS]]</th>
<th>BinMax</th>
<th>*IP-Final-Monoft</th>
<th>BinMin</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.[E] (SS)(S)(SS)</td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>b. (S)(SS)(SS)</td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>c. (SS)(SS)(S)</td>
<td></td>
<td>*!</td>
<td></td>
</tr>
<tr>
<td>d. (SS)(SSS)</td>
<td></td>
<td>*!</td>
<td></td>
</tr>
</tbody>
</table>

Compare these two candidates and it becomes evident that the desired winner (a) fares better in the boundary matching between the grammatical and the prosodic structures. This readily invokes ANCHOR. However, the scansion of the lines of this grammatical structure offers no evidence for the ranking of ANCHOR: no matter how it is ranked, (SS)(S)(SS) will always win over (S)(SS)(SS).
The evidence for the ranking of ANCHOR comes from the scansion of lines of the structures [SS][SS][S] [(7) (iii) above] and S[S[S[S]]] [(7) (iv)]. To begin with, for the former: that (SS)(S)(SS) wins over (SS)(SS)(S) constitutes crucial evidence for *IP-FINAL-MONOFT >> ANCHOR. This is shown below.

(9)

<table>
<thead>
<tr>
<th>[SS][SS][S]</th>
<th>*IP-FINAL-MONOFT</th>
<th>ANCHOR-IO</th>
<th>ANCHOR-OI</th>
</tr>
</thead>
<tbody>
<tr>
<td>(SS)(S)(SS)</td>
<td>*</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>(SS)(SS)(S)</td>
<td>*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Second, for lines of the structure S[S[S[S]]], that (SS)(S)(SS) is the optimal scansion rather than (S)(S)(S)(SS) provides the ranking argument for BINMIN >> ANCHOR, as is indicated below:

(10)

<table>
<thead>
<tr>
<th>S[S[S[S]]]</th>
<th>BINMIN</th>
<th>ANCHOR-IO</th>
<th>ANCHOR-OI</th>
</tr>
</thead>
<tbody>
<tr>
<td>(SS)(S)(SS)</td>
<td>*</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>(S)(S)(S)(SS)</td>
<td>**<em>!</em></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Given that BINMAX >> BINMIN, by transitivity we have BINMAX >> ANCHOR. Thus ANCHOR is now fully ranked with the other three constraints, and the sub-grammar is:

(11)

```
  BINMAX
     *IP-FINAL-MONOFT
        BINMIN
          ANCHOR
```

The scansion of lines of the structure [SS][S[S]] can now be adequately accounted for below (cf. (8)):

(12)

<table>
<thead>
<tr>
<th>[SS][S[S]]</th>
<th>BINMAX</th>
<th>*IP-FINAL-MONOFT</th>
<th>BINMIN</th>
<th>ANCHOR-IO</th>
<th>ANCHOR-OI</th>
</tr>
</thead>
<tbody>
<tr>
<td>(SS)(S)(SS)</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(SS)(SS)</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(S)(SS)(SS)</td>
<td>*</td>
<td></td>
<td>*</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>(SS)(SS)(S)</td>
<td>*</td>
<td></td>
<td>*</td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>

Next, consider the scansion of lines of the structure S[S[S[S]]] as (SS)(S)(SS), illustrated in (iv) above. The inadequacy of the sub-grammar is revealed below:
The problem lies in the fact that under the current sub-grammar, (SS)(S)(SS), the real winner, emerges as equi-optimal with (S)(SS)(SS), the actually suboptimal form. This scenario is similar to that encountered in (8): a constraint needs to be invoked out of the &constraint pool that can capture the difference between (SS)(S)(SS) and (S)(SS)(SS). That the right boundaries of the feet and the right boundary of the IP are better aligned in the former than in the latter readily suggests ALIGNR (FT, IP): (SS)(S)(SS) incurs 5 (=2+3) violations of ALIGNR (FT, IP) whereas (S)(SS)(SS) incurs 6 (=2+4).

However, the constraint satisfaction/violation by these two candidates presented in tableau (13) falls short of offering evidence for the ranking of ALIGNR (FT, IP), as the desired winner incurs fewer ALIGNR (FT, IP) than the unwanted winner, but they score even regarding the other constraints. (SS)(S)(SS) would win no matter how ALIGNR (FT, IP) is ranked. The crucial evidence for its ranking comes from the scansion of lines of the structure S[[SS][SS]] (illustrated in (7) (ii) above): specifically, that (S)(SS)(SS) is optimal and (SS)(S)(SS) suboptimal shows ANCHOR >> ALIGNR (FT, IP). This is illustrated below:

<table>
<thead>
<tr>
<th>S[[SS][SS]]</th>
<th>ANCHOR-IO</th>
<th>ANCHOR-OI</th>
<th>ALIGNR (FT, IP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(SS)(S)(SS)</td>
<td>*</td>
<td>*</td>
<td>5</td>
</tr>
<tr>
<td>(SS)(S)(SS)</td>
<td>*</td>
<td>**</td>
<td>6</td>
</tr>
</tbody>
</table>

Now, recall that in (11), ANCHOR is ranked lowest in the constraint hierarchy, so by transitivity, the dominance of ALIGNR (FT, IP) by ANCHOR leads to the dominance of ALIGNR (FT, IP) by all the other three constraints in the hierarchy, i.e. BinMax, BinMin and *IP-Final-MonoFt⑥. In fact, the rankings BinMax >> ALIGNR (FT, IP) and *IP-Final-MonoFt >> ALIGNR (FT, IP) can also be independently arrived at on the basis of data, as respectively illustrated below:

<table>
<thead>
<tr>
<th>S[[SS][SS]]</th>
<th>BinMax</th>
<th>ALIGNR (FT, IP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(SS)(S)(SS)</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>(SSSSS)</td>
<td>*!</td>
<td>0</td>
</tr>
</tbody>
</table>
Before moving to other coding types, we re-visit the scansion of the coding type S[S[S[SS]]] (cf. (13)):

$$\begin{array}{|c|c|c|}
\hline
S[S[S[SS]]] & *\text{IP-FINAL-MONOFT} & \text{ALIGNR (FT, IP)} \\
\hline
\text{SS}(SS)(SS) & 5 & \\
\text{(SS)(SS)(S)} & \star & 4 \\
\hline
\end{array}$$

As it turns out, the present sub-grammar can adequately account for the scansion of the structures illustrated as (v), (vi), (vii) and (viii) above. For simplicity sake, the corresponding tableaux are omitted.

The only grammatical structure in (7) remaining unaccounted for is [[SS][SS]], which is scanned as (S)(SS)(SS). As it turns out, the current sub-grammar fails in this case:

$$\begin{array}{|c|c|c|c|c|c|c|}
\hline
S[S[SS]] & \text{BIN MAX} & *\text{IP-FINAL-MONOFT} & \text{BIN MIN} & \text{ANCHOR-IO} & \text{ANCHOR-OI} & \text{ALIGNR (FT, IP)} \\
\hline
\text{SS}(SS)(SS) & * & * & 5 & \\
\text{(SS)(SS)(S)} & \star & ** & * & 4 & \\
\text{(S)(SS)(SS)} & * & * & 6! & \\
\text{(S)(SS)(SS)} & * & *** & 9 & \\
\text{(SS)(SSS)} & \star & ** & 3 & \\
\hline
\end{array}$$

Under the present sub-grammar, the desired winner (S)(SS)(SS) loses to the de facto suboptimal form (SS)(S)(SS) on account of its violation of ANCHOR. The unwanted winner (SS)(S)(SS) well satisfies ANCHOR by virtue of a complete boundary matching between the grammatical and the prosodic structures, in contrast to the failure of (S)(SS)(SS) to preserve the grammatical boundaries. This suggests that the latterís failure to observe ANCHOR must be for a good reason: some other requirement must be overriding the ANCHOR requirement.

Carefully observe the pair and we note that the key difference lies in the parsing of the first three syllables. Relate this to the grammatical structure and it becomes evident that an SB boundary is present after the third syllable. On the one hand, that it has to surface in the optimal scansion calls for ANCHOR-\text{ISBOPhP} (and in fact indicates its inviolability as well). On the other hand, recall that this constraint requires that the output correspondent of this SB be the PhP boundary, which falls after the third syllable. This sheds light on the difference in the parsing of the first three syllables.
between the desired winner and the unwanted one, i.e. (S)(SS) versus (SS)(S). Apparently, the desired winner avoids the occurrence of a PhP-final monosyllabic foot even though this results in more violations of ANCHOR. This readily invokes *PHP-FINAL-MONOFT.

The simultaneous addition of ANCHOR-1SBOPhp and *PHP-FINAL-MONOFT7 triggered by this scansion renders it necessary to mark out the PhP boundary in the candidate, for which the sub-hierarchy proposed back in Chapter 2 still holds, i.e. BINARITY >> EVENNESS >> LONG-LAST (cf. Section 2.3.6.1.1.3). We now consider the ranking of these two new constraints. First, from the discussion above, it is evident that *PHP-FINAL-MONOFT >> ANCHOR. This is illustrated below:

(19)

<table>
<thead>
<tr>
<th></th>
<th>*PHP-FINAL-MONOFT</th>
<th>ANCHOR-IO</th>
<th>ANCHOR-OI</th>
</tr>
</thead>
<tbody>
<tr>
<td>[[SS][SS][SS]</td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(S)(SS)(SS)</td>
<td></td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>(SS)(SS)(SS)</td>
<td>*!</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Second, similar to *IP-FINAL-MONOFT, *PHP-FINAL-MONOFT does not conflict with BINMIN either. Third, *PHP-FINAL-MONOFT does not conflict with the other two highly ranked constraints, i.e. BINMAX and *IP-FINAL-MONOFT, for the straightforward reason that any candidate in violation of any of the three is doomed to fail and all three have to be inviolable in the sub-grammar. Fourth, as in the case of the Shijing sub-grammar (cf. Section 2.3.6.2.2 of Chapter 2), the introduction of the finer-grained NONFINALITY constraint *PHP-FINAL-MONOFT renders the coarser-grained *IP-FINAL-MONOFT superfluous, which is accordingly removed from the sub-grammar.

As for the ranking of ANCHOR-1SBOPhp in the Ci sub-grammar, similar to the case in the Shijing sub-grammar, it must be inviolable. The reason is that any form where this SB fails to emerge as the PhP boundary (e.g. (S)(SS)(SS)) or fails to emerge at all (e.g. (SS)(SS)(S)), is bound to lose. However, the scansion of 5-syll lines provides no evidence for the specific ranking of ANCHOR-1SBOPhp with the other constraints. As an analytical expedient, we temporarily posit it as dominating BINMIN. As is to be seen in Section 6.3.6 below, the scansion of certain 7-syll Ci lines provides crucial evidence for its specific ranking.

Hence, the sub-grammar is updated into:

7 Indeed, one might suggest that these two constraints always go hand in hand; the reason is that *PHP-FINAL-MONOFT is only triggered when an SB boundary is present in the input and surfaces in the optimal scansion as a PhP boundary. Thus a prediction is that if a sub-grammar contains *PHP-FINAL-MONOFT, it must at the same time contain ANCHOR-1SBOPhp, and both must be inviolable. Conversely, if a sub-grammar does not contain ANCHOR-1SBOPhp, it predictably does not contain *PHP-FINAL-MONOFT either, but only *IP-FINAL-MONOFT. As shown in the juxtaposition of the five sub-grammars in Chapter 7, this is indeed borne out. As is to be argued in Chapter 7, *IP-FINAL-MONOFT and *PHP-FINAL-MONOFT, evidently two constraints of the same family with different granularity, can be captured by parametrizing the constraint NONFINALITY (PROSUNIT), where PROSUNIT represents prosodic units at various levels of the prosodic hierarchy.
We conclude this section by re-visiting the scansion of lines of the structure \[[SS][SS][SS]\] in the tableau below where the PhP boundaries are marked out (compare (18)):

<table>
<thead>
<tr>
<th>[[SS][SS]]</th>
<th>BinMAX</th>
<th>*PHP-FINAL-MONOFt</th>
<th>ANCHOR-$I_{SIo\text{PhP}}$</th>
<th>BinMIN</th>
<th>ANCHOR-IO</th>
<th>ANCHOR-OI</th>
<th>ALIGNR (FT, IP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(SS)(S)(S)</td>
<td>*!</td>
<td>*</td>
<td>*</td>
<td></td>
<td>*</td>
<td>*</td>
<td>5</td>
</tr>
<tr>
<td>(SS)(SS)(S)</td>
<td>*!</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>(SS)(SSS)</td>
<td>*!</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>6</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>(SSS)(SS)</td>
<td>*!</td>
<td></td>
<td>*</td>
<td></td>
<td>*</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

### 6.3.5 ANCHOR-OI >> BINMIN >> ANCHOR-IO: 6-syll lines

The 112 6-syll lines in the corpus can be grouped into 10 grammatical structures, as charted below:

<table>
<thead>
<tr>
<th>Grammatical structures</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i) [SS][SS][SS]</td>
</tr>
<tr>
<td>(ii) [S][SS][SS]</td>
</tr>
<tr>
<td>(iii) [SS][S][SS]</td>
</tr>
<tr>
<td>(iv) [[SS]][SS][SS]</td>
</tr>
<tr>
<td>(v) [S][SS][SS][SS]</td>
</tr>
<tr>
<td>(vi) [S][SS][SS][S]</td>
</tr>
<tr>
<td>(vii) [[SS]][SS][S]</td>
</tr>
<tr>
<td>(viii) [SS][SS][SS][S]</td>
</tr>
<tr>
<td>(ix) [S][SS][SS][S]</td>
</tr>
<tr>
<td>(x) [S][SS][SS][SS]</td>
</tr>
</tbody>
</table>

Compared with the 6-syll lines in the other genres, the 6-syll Ci lines display a rich variety of grammatical structures. But their scansion features considerable uniformity: other than the lines of the structure (ix), which is scanned as (S)(SS)(S)(SS), lines of the other grammatical structures are all scanned as either (SS)(SS)(SS) (for (i), (ii), (iii), (vi), (vii), (viii), and (x)) or (SS)(SS)(SS) (for (iv) and (v)) depending on the
position of the SB boundary in the line. Below the ten grammatical structures are respectively illustrated with examples, along with the corresponding optimal scissions:

(23)  (i)  [chuang1 wai4]  [yue4 hua2]  [shuang1 zhong4]
window outside moon bright frost heavy
"Outside the window, the moon is bright and the frost heavy":

→ (chuang1 wai4) | (yue4 hua2) (shuang1 zhong4)

(ii)  wo3  [yu4  [[cheng2 feng1]  [gui1 qu4]]
I want ride wind return go
"I want to ride the wind and return (to my homeland)":

→ (wo3 yu4) | (cheng2 feng1) (gui1 qu4)

(iii)  [wu2 yan2]  [du2  [shang4  [xi1 lou2]]]
no word alone up west boudoir
"Without saying a word, (I) go up to the western boudoir alone":

→ (wu2 yan2) | (du2 shang4)(xi1 lou2)

(iv)  [[yi4 dian3]  [ming2 yue4]]  [kui1 ren2]
one bit bright moon peep people
"(When the curtain is slightly drawn), a bit of bright moon peeps (into the window) at the person"

→ (yi4 dian3) (ming2 yue4)(kui1 ren2)

(v)  [chun1 [dao4[nan2 lou2]]]  [xue3 jin4]
spring arrive south boudoir snow end
"The spring arrives at the southern boudoir and the snow is gone"

→ (chun1 dao4)(nan2 lou2)](xue3 jin4)

(vi)  ying1  [shi4 [[[huan4 sha1] ren2]  du4]]
should be wash silk person jealous
"It should be the case that the person washing the silk becomes jealous"

→ (ying1 shi4)](huan4 sha1)(ren2 du4)

(vii)  [[[liao4 qiao4]  [chun1 han2]]  zhong1]  jiu3
chilly spring cold wine
"(I drink some) wine in the chilly spring cold"

→ (liao4 qiao4)] (chun1 han2)(zhong1 jiu3)
(viii) [hu2 die2] [bu4 [su1 chun1] qu4]
the butterfly does not leave with spring

→ (hu2 die2) (bu4 su1) (chun1 qu4)

(ix) dan4 [[mu4 song4] [[fang1 chen2] qu4]]
only eye send fragrant dust leave
(I can) only see you leaving with the fragrant dust (behind you)

→ (dan4) (mu4 song4) (fang1) (chen2 qu4)

(x) dou1 [yuan2 [zi4 [you3 [li2 hen4]]]]
al because self have departure depression
It is all because the departure itself is depressive

→ (dou1 yuan2) (zi4 you3) (li2 hen4)

As it turns out, the sub-grammar reached in (20) can adequately account for the scansion of 6-syll lines of all these grammatical structures except for the grammatical structure S[[SS][SS][SS]] in (23) (ix). Below we first illustrate the working of the sub-grammar with only the scansion of (23) (iii) and (vi)\(^8\):

<table>
<thead>
<tr>
<th></th>
<th>BINMAX</th>
<th>*PhP-FINAL-MONOFT</th>
<th>ANCHOR-1_i{i}{p}</th>
<th>BINMIN</th>
<th>ANCHOR-IO</th>
<th>ANCHOR-OI</th>
<th>ALIGNR (Ft, IP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(SS)</td>
<td>*</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(SS)(S)</td>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(S)(SS)</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(S)(SS)(SS)</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>BINMAX</th>
<th>*PhP-FINAL-MONOFT</th>
<th>ANCHOR-1_i{i}{p}</th>
<th>BINMIN</th>
<th>ANCHOR-IO</th>
<th>ANCHOR-OI</th>
<th>ALIGNR (Ft, IP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(SS)</td>
<td>**</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(SS)(S)</td>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(S)(SS)(SS)</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(S)(SS)(SS)</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

But lines of the structure S[[SS][SS][SS]], scanned as (S)(SS)(S)(SS) expose the inadequacy of the current sub-grammar, as is shown below:

\(^8\) In the latter case, ANCHOR-1_i{i}{p} is vacuously satisfied because the line is of a unidirectional structure.
Here, (SS)(SS)(SS) is predicted as the optimal scansion while the real optimal scansion is (S)(SS)(S)(SS). Compare the satisfaction/violation of constraints by this pair of competitors, and we note that the desired winner scores better only in ANCHOR, but worse in both BINMIN and ALIGNR (FT, IP). Hence, the only way that can render it the winner is to capitalize upon its better satisfaction of ANCHOR by promoting the ranking of ANCHOR. However, tempting it might be, we cannot directly rank ANCHOR >> BINMIN, as we already argued back in (10) that BINMIN >> ANCHOR. This, nonetheless, is in fact not a ranking paradox as it appears to be. The reason is that BINMIN >> ANCHOR was reached in (10) on the implicit assumption that the two ANCHOR constraints stay together in the absence of crucial evidence calling for ranking them apart. The present case, however, constitutes exactly evidence of such a description, evidence that motivates the two ANCHOR constraints to be ranked apart.

To determine the specific ranking, we need to re-consider the ranking argument in (10), which is repeated here for expository reason:

Crucially, of the two ANCHOR constraints, only the dominance of ANCHOR-IO by BINMIN is motivated; the scansion of lines of this structure offers no crucial evidence for the ranking between BINMIN and ANCHOR-IO. In other words, of the two ANCHOR constraints, only ANCHOR-IO is fixed in its ranking but ANCHOR-OI remains mobile.

Now, with this new insight, re-consider the pair of desired and unwanted winners in (26) and we realize that they provide crucial evidence for promoting ANCHOR-OI over BINMIN. The ranking argument for ANCHOR-OI >> BINMIN is shown below:

We now quickly consider the ranking of ANCHOR-OI with the other constraints in the sub-grammar. To begin with, as BINMIN >> ANCHOR-IO >> ALIGNR (FT, IP), by transitivity, ANCHOR-OI dominates ANCHOR-IO and ALIGNR (FT, IP). Second, ANCHOR-OI must be ranked lower than BINMAX, because if it were the other way
around, then (S)(SS)(SSS), or to take a more extreme case, the parsing (SSSSSSS), would win, hence ANCHOR-OI satisfied, would win, which is obviously not true. Hence BinMax >> ANCHOR-OI. This is shown below:

<table>
<thead>
<tr>
<th></th>
<th>BinMax</th>
<th>ANCHOR-OI</th>
</tr>
</thead>
<tbody>
<tr>
<td>(S)(SS)(S)(SS)</td>
<td>⬤</td>
<td>*</td>
</tr>
<tr>
<td>(SSSS)(SSS)</td>
<td>⬤</td>
<td>*!</td>
</tr>
<tr>
<td>(SSSSSSS)</td>
<td>*!</td>
<td></td>
</tr>
</tbody>
</table>

Third, the fact that (S)(SS)(SS)(S) which best satisfies ANCHOR-OI loses to (S)(SS)(S)(SS) provides evidence for *PHP-FINAL-MONOFT >> ANCHOR-OI. This is shown below:

<table>
<thead>
<tr>
<th></th>
<th>*PHP-FINAL-MONOFT</th>
<th>ANCHOR-OI</th>
</tr>
</thead>
<tbody>
<tr>
<td>(S)(SS)(S)(SS)</td>
<td>⬤</td>
<td>*</td>
</tr>
<tr>
<td>(S)(SS)(S)(SS)</td>
<td>⬤</td>
<td>*!</td>
</tr>
</tbody>
</table>

However, there is yet no crucial evidence for the ranking between ANCHOR-ISBOphiP and ANCHOR-OI, and as ANCHOR-ISBOphiP is inviolable, we temporarily beg the ranking ANCHOR-ISBOphiP >> ANCHOR-OI. As is to be seen in the next section, the scansion of the 7-syll lines of the structure [[SS][S][S][SS]] offers crucial evidence for this ranking. The sub-grammar now becomes (cf. (20)):

We conclude this section with one further thought on the ranking of ANCHOR-OI >> ANCHOR-IO. Informally, this means that it is more important for each prosodic boundary to have an input correspondent than for each grammatical boundary to have an output correspondent. In other words, it is more offensive to insert new prosodic boundaries where a corresponding grammatical boundary is missing than to ignore the grammatical boundaries when the line is parsed.
6.3.6 \textbf{ANCHOR-I}_{SB}\textbf{O}_{PHP} \rightarrow \textbf{ANCHOR-OI}: evidence from 7-syll lines

Of all line types in \textit{Ci}, 7-syll lines display the greatest variety in their grammatical structures. Altogether 14 grammatical structures are identified. For brevity sake, the complete table of the coding types and grammatical structures is omitted.

The scansion of 7-syll \textit{Ci} lines is also characterized by a degree of diversity, unlike that of the 7-syll \textit{Jinti} lines which is uniformly (SS)(SS)(S)(SS). More specifically, 7-syll \textit{Ci} lines of most grammatical structures are scanned as (SS)(SS)(S)(SS) or (SS)(SS)(S)(SS), depending on whether a SB is present in the line, and if so, where it is. Two exceptions are lines of the structure \([[(SS)[S][S][SS]]\) and \([SS][S][S][SS]]\) which are respectively scanned as (S)(SS)(SS)(SS) and (SS)(S)(SS)(SS). Below we present examples of 7-syll \textit{Ci} lines of the 14 grammatical structures.

(32) (i) \([\text{zhuo2 jiu3} \text{ yi4 bei1]} \text{ jia1 wan4 li3}]\)
turbid wine one glass home ten thousand mile
drink a glass of turbid wine and miss my home thousands of miles away
\[\rightarrow (\text{zhuo2 jiu3}) (\text{yi4 bei1}) (\text{jia1}) (\text{wan4 li3})\]

(ii) \([\text{chang2 yan1}] [\text{luo4 ri4}] [\text{gu1 cheng2} bi4]\)
long smoke fall sun lone city close
The smoke from the chimneys is stretching long into the air, the sun is setting, and the city stands alone with its gate closed
\[\rightarrow (\text{chang2 yan1}) (\text{luo4 ri4}) (\text{gu1}) (\text{cheng2 bi4})\]

(iii) \([\text{qing1 chen2}] [\text{lian2 mu4} \text{ juan3 qing1 shuang1}]]\)
early morning curtain screen roll light frost
In the early morning, the curtain rolls up the light frosti
\[\rightarrow (\text{qing1 chen2}) (\text{lian2 mu4}) (\text{juan3}) (\text{qing1 shuang1})\]

(iv) \([\text{yu4 lou2}] [\text{shen1 suo3 [duo1 qing2 zhong3]}]\)
jade boudoir deep lock many passion seed
A lover full of passion is locked deep in the jade boudoir
\[\rightarrow (\text{yu4 lou2}) (\text{shen1 suo3}) (\text{duo1}) (\text{qing2 zhong3})\]

(v) \([\text{che1 ru2 liu2 shui3}] [\text{ma3 ru2 long2}]\)
carriage like flow water horse like dragon
The horse carriages (are so many that they look) like flowing water, and the horses (are so many that they look like) moving dragons
\[\rightarrow (\text{che1 ru2}) (\text{liu2 shui3}) (\text{ma3}) (\text{ru2 long2})\]
(vi) [zhi3 dian3] [[liu4 chao2] [[xing2 sheng4] di4]]
point评论 six dynasty view good place
(We) point to and comment on the places which used to be sites of attraction
during the Six Dynasties
-> (zhi3 dian3) | (liu4 chao2) (xing2) (sheng4 di4)

(vii) shi2 [[jian4 [[shu1 xing1] [du4 [he2 han4]]]]] sometimes see sparse star cross river river
éSometimes (I can) see the sparse stars crossing the milky way
-> (shi2 jian4) (shu1 xing1) | (du4) (he2 han4)

(viii) [dang1 ri4] [he2 [ceng2 [qing1 [fu4 chun1]]]]
that day how easy waste spring
éIn those days how (could we) ever have easily let the spring go
-> (dang1 ri4) | (he2 ceng2) (qing1) (fu4 chun1)

(ix) [[lian2hua1 lq Xia4] [liu3 [qing1 qing1]]]
lotus flower boudoir below willow green/redup.
éThe willows below the lotus flower boudoir are so green
-> (lian2hua1) (lia Xia4) | (liu3) (qing1 qing1)

(x) xian2 [[yin3 [yuan1 yang3]] [fang1 [jing4 li3]]]
leisure lead male duck female duck fragrant lane inside
éThe leisure leads the pair of ducks into the lane covered with fragrant flowers
-> (xian2 yin3) (yuan1 yang3) | (fang1) (jing4 li3)

(xi) wen2 [shui2 [you2 [zai4 [[ping2 lan2] chu4]]]]
ask who still at lean railing place
é(I) wonder who is still at the railing which I used to lean against
-> (wen2 shui2) | (you2 zai4) (ping2) (lan2 chu4)

(xii) [[lou2 qian2] lq4] [an4 [fen2 [xie2 lu4]]]
boudoir front green secretly divide side road
éThe greenness in front of the boudoir secretly divides into the side road
-> (lou2 qian2) (an4 fen2) (xie2 lu4)

(xiii) [lei4 yan3] [jing4 [wu2 yu3] [ning2 ye4]]
tear eye even no word freeze choke
éTears (fill in my) eyes, and I simply cannot say a word, choked back by my tears
-> (lei4 yan3) | (jing4) (wu2 yu3) (ning2 ye4)
(xiv) [xun2 hao3 meng4], [meng4 [nan2cheng2]]

search good dream dream difficult realize
d(Everybody) searches for good dreams, but dreams are so difficult to be realized

→ (xun2) (hao3 meng4) (meng4) (nan2 cheng2)

It is notable that of the lines of the 14 types of grammatical structures, all but those of the last three share the foot-level scansion (SS)(SS)(S)(SS), which is notably identical to the optimal scansion of all 7-syll Jinti lines. Lines of the last three grammatical structures appear to be scanned rather uniquely. As it turns out, the current sub-grammar can correctly account for the optimal scansion of the 7-syll lines of all these different grammatical structures. For simplicity sake, below we illustrate the working of the sub-grammar with (i) and (x) where the lines are scanned as (SS)(SS)(S)(SS) and (xii), (xiii) where the lines are scanned differently.

### Table 1: Scansion Information

<table>
<thead>
<tr>
<th>Type</th>
<th>BIN MAX</th>
<th>*PHP-FINAL-MONOFT</th>
<th>ANCHOR-ISOI</th>
<th>ANCHOR-ISOI</th>
<th>BIN MIN</th>
<th>ANCHOR-ISOI</th>
<th>ALIGNR (FT, IP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SS</td>
<td></td>
<td></td>
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<td></td>
</tr>
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</tr>
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<td>SS</td>
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</tr>
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</tr>
<tr>
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<td></td>
</tr>
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However, it needs to be reminded that in the sub-grammar reached so far, the ranking ANCHOR-ISBOPhp >> ANCHOR-OI is theoretically postulated on the basis of the inviolability of the former. The scansion of lines of the structure [[SS][S][S[SS]]] shown in (35) provides crucial evidence for the ranking. More specifically, the loss of the candidate (SS)(SS)(S)(SS) which satisfies ANCHOR-OI but violates ANCHOR-ISBOPhp shows the dominance of the former by the latter; for if ANCHOR-OI >> ANCHOR-ISBOPhp, then this candidate would win. This ranking argument is presented below:

\[
\begin{array}{|c|c|c|c|c|c|c|}
\hline
\text{SS|S|S[SS]]} & \text{BIN MAX} & \text{*PHP-FINAL-MONOFT} & \text{ANCHOR-ISBOPhp} & \text{ANCHOR-OI} & \text{BIN MIN} & \text{ANCHOR-IO} & \text{ALIGNR (FT, IP)} \\
\hline
\text{SS}(S)(SS)(SS) & * & 11 & & & & & \\
\text{(SS)(SS)(S)(SS)} & *! & * & * & 10 & & & \\
\text{(S)(SS)(SS)(SS)} & *! & * & * & * & & & \\
\text{SSS)(SS)(SS)} & *! & * & & & & & \\
\text{(SS)(SS)(S)(S)} & *! & ** & * & ** & 9 & & \\
\hline
\end{array}
\]

By transitivity, this ranking leads to ANCHOR-ISBOPhp dominating BINMIN, ANCHOR-IO and ALIGNR (FT, IP); that it does not conflict with the other two high-ranking constraints BINMAX and *PHP-FINAL-MONOFT has been discussed earlier, and the sub-grammar now becomes (compare (31)):

\[
\begin{array}{c}
\text{BINMAX ANCHOR-ISBOPhp}\end{array}
\]

We conclude the discussion on 7-syll Ci lines by briefly considering the line in (xiv), repeated below for convenience sake:
We argue that unlike the 6-syll Guti line which was argued to be in fact a 5-syll line plus a mono-syllabled line, the two 3-syll parts, even though separated by a comma, constitute one single IP, which is evidenced in the fact that they are performed under one single, unbroken intonation contour. The second foot runs smoothly into the third one without being interrupted by the comma. Also, the first and the third foot, both of which are monosyllabic, are invariably prolonged in performance, as indicated by the optimal scansion indicated above.

It deserves mentioning that this line occurs in a poem which consists of eight lines and where the other seven lines are all 7-syll ones. It is interesting that this peculiar line does not interrupt the rhythm of the verse; rather it snugly fits in. This, we suggest, is because the PhP-level parsing as indicated by the comma is actually the optimal one under the sub-hierarchy proposed for PhP boundary delimitation\(^9\). Assuming the foot-level parsing remains the same, we indicate how it wins over the other possible PhP-level parsing below:

\[\begin{array}{|c|c|c|c|}
\hline
[S][S][S] & BINARITY & EVENNESS & LONG-LAST \\
\hline
\text{\textregistered}(S)(SS)(S)(SS) & & & \\
(S)(SS)(S)(SS) & *** & **** & \\
(S)(SS)(S)(SS) & *!! & ** & * \\
\hline
\end{array}\]

**6.3.7 More illustrations of the sub-grammar: 8- and 9-syll lines**

As mentioned earlier, in the present Ci corpus, 3-, 4-, 5-, 6- and 7-syll lines comprise the overwhelming majority (737 out of 753). In contrast, 8- and 9-syll lines are minimal in number: 2 for the former and 4 for the latter. In this section, we briefly consider the scansion of these two line types.

First, the two 8-syll lines have different structures and scansion, as presented below:

\[\begin{array}{l}
ying1 [shi4 [[liang2 chen2] [hao3 jing3][xu1 she4]] \\
\end{array}\]

should be fine moment good scene vainly set 
\(\ddot{e}\) it should be the case that all the fine moments and good scenes are just set in vain

\[\rightarrow (ying1 \; shi4) \; (liang2 \; chen2) \; (hao3 \; jing3)(xu1 \; she4)\]

\(^9\) Another possible reason is the preservation of the so-called āvisual rhythmí (Wang 1958), which is created by the equal length across the lines in a Chinese poem due to the fact that every character, i.e. syllable, and punctuation mark, such as the comma here, takes up the same space in written form.
Both lines can be successfully accounted for by the current sub-grammar, as shown below:

<table>
<thead>
<tr>
<th>S[S[[[SS]][[SS]]][SS]]</th>
<th>BIN MAX</th>
<th>*PHP-FINAL-MONOFT</th>
<th>ANCHOR-I_{SB}O_{Phip}</th>
<th>ANCHOR-OI</th>
<th>BIN MIN</th>
<th>ANCHOR-OI</th>
<th>ALIGNR (FT, IP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>êw(SS)(SS)(SS)(SS)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>(S)(SS)(SS)(SS)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*!</td>
<td></td>
<td>19</td>
</tr>
<tr>
<td>(S)(SSS)(SS)(SS)</td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>13</td>
</tr>
<tr>
<td>(SS)(SS)(SS)(SS)</td>
<td>*!</td>
<td>*</td>
<td>*</td>
<td>**</td>
<td>**</td>
<td>**</td>
<td>16</td>
</tr>
<tr>
<td>(S)(SS)(SS)(SS)</td>
<td>*!</td>
<td>**</td>
<td>**</td>
<td>**</td>
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<td>**</td>
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<table>
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<tr>
<th>S[S[[S][S]][S][SS]]</th>
<th>BIN MAX</th>
<th>*PHP-FINAL-MONOFT</th>
<th>ANCHOR-I_{SB}O_{Phip}</th>
<th>ANCHOR-OI</th>
<th>BIN MIN</th>
<th>ANCHOR-OI</th>
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<td>*!</td>
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<td>**</td>
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<td>(S)(SS)(SS)(S)(SS)</td>
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<td>(SS)(SSS)(S)(SS)</td>
<td>*!</td>
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<td>**</td>
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<td>16</td>
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Two points are worth mentioning. First, both lines have a unidirectional grammatical structure and neither has an SB, hence ANCHOR-I_{SB}O_{Phip} is vacuously satisfied. Second, the scansion of the line of S[S[[S][S]][S][SS]] as (S)(SS)(SS)(S)(SS) rather than the evenly-chopped (SS)(SS)(SS)(SS) results from the dominance of ANCHOR-OI by BinMIN. Put informally, this implies that it is important not to insert new prosodic boundaries into where the grammatical boundaries are absent, i.e. not to split the grammatically linked syllables into two prosodic units, even though this would reduce the number of monosyllabic feet.

We now move on to the four 9-syll lines in the Ci corpus\(^1\). They display two grammatical structures and are all scanned as (SS)(SS)(SS)(S)(SS). This is illustrated below:

\(^1\) It is noteworthy that Ci is the only genre where 9-syll lines occur, and even here they occur at the very low frequency of 4 out of 753. In general, verse lines as long as 9-syll are very rare, which, as mentioned in Section 5.5.1 of Chapter 5, might be at least partly attributable to the cognitive factors such as the capacity of human short-term memory and partly to the physiological consideration that a line longer than 9 syllables risks extending beyond one breath stretch.
Both scansion can be adequately accounted for by the sub-grammar, as shown below:

(47)

<table>
<thead>
<tr>
<th>[SS][S][S][S][S][S]</th>
<th>BMAX</th>
<th>ENTT</th>
<th><em>HP</em></th>
<th>ANCHOR-IsQ al</th>
<th>ANCHOR-QI</th>
<th>BMIN</th>
<th>IO</th>
<th>ANCHOR-FT IP</th>
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<th>S[SS][S][SS][SS][S][S]</th>
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<th><em>HP</em></th>
<th>ANCHOR-IsQ al</th>
<th>ANCHOR-QI</th>
<th>BMIN</th>
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<th>ANCHOR-FT IP</th>
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We see that strictly speaking, the two optimal scansion, although identical in the foot structure, nonetheless differ in the PhP-level parsing, as a result of the presence versus absence of the SB, which in turn is due to the bi-directional versus unidirectional structure.

This discussion of the scansion of 9-syll Ci lines also concludes the development of the Ci sub-grammar, which is as follows:
6.4 Formal grounding of the metrical harmony

This section seeks to account for the native speaker’s judgment about the metrical harmony of Ci lines in terms of the satisfaction/violation of the constraints deployed in the sub-grammar and in so doing, formally ground the metrical harmony in the sub-grammar via the construct of OT harmony. The analytical procedure exactly follows that in the previous chapters. For practical considerations, only 3-, 4-, 5-, 6-, and 7-syll lines will be discussed; 2-, 8- and 9-syll lines are omitted because of their minimal token number (respectively 10, 2 and 4 in a total of 753 lines).

We start with 3-syll lines. As mentioned in Section 6.3.2, 3-syll lines have two grammatical structures, i.e. S[SS] and [SS]S, and are all scanned as (S)(SS). Thus the tableau des tableaux has two candidate parses:

(50) 3-syll lines

<table>
<thead>
<tr>
<th>Candidate parses</th>
<th>BINMAX</th>
<th>*PHP-FINAL-MONOFT</th>
<th>ANCHOR-ISSO</th>
<th>ANCHOR-OI</th>
<th>BINMIN</th>
<th>ANCHOR-IO</th>
<th>ALIGNR (FT, IP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>![S][S]</td>
<td></td>
<td>![S][S]</td>
<td></td>
<td>*!</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>b.</td>
<td>![S][S]</td>
<td>![S][S]</td>
<td>![S][S]</td>
<td></td>
<td>*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The parse (b) emerges as optimal, and its input S[SS] coincides with the grammatical structure cognized as being metrically most harmonious.

4- and 5-syll lines offer further support for this claim, namely, the grammatical structure in the optimal parse coincides with the metrically most harmonious one. For simplicity sake, the two corresponding tableaux des tableaux are directly provided below. In the case of 5-syll lines, due to the large number of grammatical structures, not all grammatical structures are presented.
(51) 4-syll lines

<table>
<thead>
<tr>
<th>Candidate parses</th>
<th>BIN MAX</th>
<th>*PHP-FINAL-MONOFT</th>
<th>ANCHOR-ISBOPHP</th>
<th>ANCHOR-IO</th>
<th>BIN MIN</th>
<th>ANCHOR-IO</th>
<th>ALIGNR (FT, IP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. [SS][SS]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>b. [SS][SS]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*!</td>
</tr>
<tr>
<td>c. [SS][SS]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>d. [SS][SS]</td>
<td></td>
<td></td>
<td></td>
<td>*!</td>
<td></td>
<td>**</td>
<td>2</td>
</tr>
</tbody>
</table>

(52) 5-syll lines

<table>
<thead>
<tr>
<th>Candidate parses</th>
<th>BIN MAX</th>
<th>*PHP-FINAL-MONOFT</th>
<th>ANCHOR-ISBOPHP</th>
<th>ANCHOR-IO</th>
<th>BIN MIN</th>
<th>ANCHOR-IO</th>
<th>ALIGNR (FT, IP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. [SS][SS]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>!</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>b. [SS][SS]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>!</td>
<td></td>
<td>6!</td>
</tr>
<tr>
<td>c. [SS][SS]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>!</td>
<td>*</td>
<td>*</td>
</tr>
</tbody>
</table>

However, 6-syll lines present certain apparent problems:

(53) 6-syll lines

<table>
<thead>
<tr>
<th>Candidate parses</th>
<th>BIN MAX</th>
<th>*PHP-FINAL-MONOFT</th>
<th>ANCHOR-ISBOPHP</th>
<th>ANCHOR-IO</th>
<th>BIN MIN</th>
<th>ANCHOR-IO</th>
<th>ALIGNR (FT, IP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. [SS][SS][SS]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>b. [SS][SS][SS]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>!</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>c. [SS][SS][SS]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>!</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>d. [SS][SS][SS]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6</td>
</tr>
</tbody>
</table>

Here instead of a single optimal parse, the constraint hierarchy selects two equi-optimal ones. As in similar cases encountered in discussing other genres, these two parses are not completely identical but differ in their PhP boundaries. This indicates that the constraint hierarchy for PhP boundary delimitation becomes critical in differentiating these two parses:

(54) 6-syll lines SSSSSS

<table>
<thead>
<tr>
<th>6-syll lines SSSSSS</th>
<th>BINARITY</th>
<th>EVENNESS</th>
<th>LONG-LAST</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. [SS][SS][SS]</td>
<td>*</td>
<td>**</td>
<td></td>
</tr>
<tr>
<td>d. [SS][SS][SS]</td>
<td>*</td>
<td>**</td>
<td>*</td>
</tr>
</tbody>
</table>
Parse (a) wins over (d) on account of satisfaction of LONG-LAST. Indeed, lines of the structure $[[SS][SS][SS]]$ are metrically most harmonious. Given that the sub-grammar comprises of both the foot-level and PhP-level parsing, we may suggest that for 6-syll lines, our claim that the metrical harmony can be grounded in the sub-grammar still holds.

7-syll lines constitute a similar scenario to 6-syll ones where the PhP boundary delimitation hierarchy plays a crucial role in selecting the optimal parse. As argued in (52) in Chapter 3, it is dominated by the foot-level parsing hierarchy, indicated below with a solid line between them.

(55) 7-syll lines

<table>
<thead>
<tr>
<th>Candidate parses</th>
<th>BMMAX</th>
<th><em>#PHP-MONOT-</em></th>
<th>FINAL-OP</th>
<th>ANCHOR-OP</th>
<th>ANCHOR-MIN</th>
<th>ANCHOR-MIN (IP)</th>
<th>ALIGNR</th>
<th>BINARITY</th>
<th>EVENNESS</th>
<th>LONG-LAST</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. $[[SS][SS]][S[SS]]$ $(S)(SS)(S)(SS)$</td>
<td></td>
<td></td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. $[[SS][SS]][[SS][S]]$ $(S)(SS)(S)(SS)$</td>
<td></td>
<td></td>
<td>*!</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. $[[SS][SS]][SS][SS]]$ $(SS)(SS)(SS)$</td>
<td></td>
<td></td>
<td>*</td>
<td></td>
<td></td>
<td>$*$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. $[[SS][SS][SS]][SS][SS]]$ $(SS)(SS)(SS)$</td>
<td></td>
<td></td>
<td>*!</td>
<td>*</td>
<td>**</td>
<td>$*$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Thus, to summarize, Ci upholds our conclusion reached so far for the other genres, namely, for any given line type, the grammatical structure of the optimal parse under the sub-grammar always meshes with that shared by the metrically most harmonious lines.

---

11 It is of interest to note that my informants frowned upon lines of the structure $[[SS][SS][SS]]$ as "somewhat heavy-headed" but convergingly preferred lines of the structure $[SS][SS][SS][SS]]$, which puts the heavy part towards the end. This intuitive preference is exactly captured by LONG-LAST.
Chapter 7 Classical Chinese verse grammar: coexisting sub-grammars and formal grounding

This chapter echoes Chapter 1 by meeting the two research goals set out there. Section 7.1 unifies the five sub-grammars developed in the previous five chapters into one grammar, crucially via the construct of floating constraints, and argues that this unified grammar, which captures the modern speaker’s scansion of classical Chinese verse lines of all five major genres, in fact represents the coexistence of sub-grammars which are minimally different. In Section 7.2 we propose, on the basis of the discussion of metrical harmony for individual genres, that the native judgment on metrical harmony can be formally grounded in the grammar and thereafter compare the present proposal with earlier attempts of accounting for metrical harmony. Finally, Section 7.3 briefly revisits the additional issue of the meter of classical Chinese verse upon which the study has shed light.

7.1 Classical Chinese verse grammar as coexisting sub-grammars

As stated back in Chapter 1, the grammar entertained by the modern speaker in scanning classical Chinese verse lines from various genres is necessarily restrictive and flexible at the same time in order to both capture the consistency and accommodate the difference underlying his scansion of lines across genres. Below we will show that this dual property is respectively achieved via the common core ‘ranking skeleton’ comprised of the fixed ranking constraints and the mobility of ANCHOR floating along this ranking skeleton.

We first present the five sub-grammars developed in Chapters 2 to 6. The Hasse graph is used for its clarity in expressing constraint interaction.

(1) (I) *Shijing* sub-grammar

\[
\text{BINMAX GOODFtINTERJ *PHP-FINAL-MONOFT ANCHOR-} \text{O_{pup}}
\]

\[
\text{BINMIN}
\]

\[
\text{ANCHOR}
\]

\[
\text{ALIGNR (Ft, IP)}
\]
This juxtaposition clearly presents the inventory of the constraint pool: nine prosodic constraints are operative in the grammar, if we count ANCHOR-OI and ANCHOR-IO as one. Of them, ANCHOR-ISBOPHP and ANCHOR are faithfulness ones and the others markedness ones. Furthermore, they exhibit a dichotomy regarding their violability as charted below:
Regarding the inviolable constraints, four things are notable from the individual sub-grammars presented above. First, not all of them are relevant in every genre. More specifically, GOODFTINTERJ is only relevant in those genres containing interjection syllables, i.e. *Shijing* and *Guti*, while GOODFt’X’ is relevant only in *Jiuge*. Second, *PHP-FINAL-MONOFT and *IP-FINAL-MONOFT, which are from the same family NONFINALITY but of different granularity, do not co-occur in a sub-grammar. Third, ANCHOR-I_SPhP always co-occurs with *PHP-FINAL-MONOFT, which necessitates the explicit identification of PhP boundaries, and is predictably absent when a sub-grammar contains *IP-FINAL-MONOFT. Fourth, these six inviolable constraints do not conflict with each other.

Regarding the violable ones, it is notable that the two ANCHOR sub-constraints can either stay together or split, and when they do split, ANCHOR-OI always dominates ANCHOR-IO.

Given these two camps of constraints, for analytical reasons, the unified grammar is constructed in two parts. The first part consists of the array of non-conflicting inviolable constraints. In view of the mutual exclusion between *PHP-FINAL-MONOFT and *IP-FINAL-MONOFT, we propose NONFINALITY (PCat) where PCat is parametrizable into either PhP or IP\(^1\). Thus, this first part of the unified grammar is:

\[
\text{(3) } \text{BINMAX, GOODFtINTERJ, GOODFt’X’, ANCHOR-I_SPhP, NONFINALITY (PCat)}
\]

It is clear from what was mentioned above that of these five constraints, only BINMAX and NONFINALITY (PCat) are always relevant in all sub-grammars, the other constraints, when not relevant in certain sub-grammars, are vacuously satisfied.

As for the part of the violable ones, we first present the following (incomplete) five rankings:

\[
\text{(4) }
\begin{array}{|c|c|}
\hline
\text{Genre} & \text{Ranking of the violable constraints} \\
\hline
I. *Shijing & \text{BINMIN >> ANCHOR >> ALIGNR (FT, IP)} \\
II. *Jiuge & \text{ANCHOR-IO >> BINMIN >> ANCHOR-IO >> ALIGNR (FT, IP)} \\
III. *Guti & \text{BINMIN >> ANCHOR >> ALIGNR (FT, IP)} \\
IV. *Jinti & \text{BINMIN >> ALIGNR (FT, IP) >> ANCHOR} \\
V. *Ci & \text{ANCHOR-IO >> BINMIN >> ANCHOR-IO >> ALIGNR (FT, IP)} \\
\hline
\end{array}
\]

The task now is to identify the ‘ranking skeleton’, the floating constraint(s) and its (their) landing sites. A comparison of these five ranking hierarchies reveals that the ranking BINMIN >> ALIGNR (FT, IP) remains fixed across them, as highlighted above, which thus constitutes the ranking skeleton. In contrast, ANCHOR displays mobility in

---

\(^1\) For the feasibility of building parameters into the constraint, see the discussion on the generalized alignment constraint ALIGN (CAT1, EDGE1, CAT2, EDGE2) in McCarthy and Prince (1993a).
its ranking with $\text{BINMIN}$ and $\text{ALIGNR} (\text{FT, IP})$: it floats along this ranking skeleton. Furthermore, it may also split into $\text{ANCHOR-OI}$ and $\text{ANCHOR-IO}$ and as noted earlier, when this happens, the ranking is always $\text{ANCHOR-OI} \gg \text{ANCHOR-IO}$. The ranking skeleton provides three slots which are all possible landing sites for the floating and possibly splitting ANCHOR, and its docking at different sites results in different sub-grammars.

Thus the second part of the unified grammar can be expressed as:

$$
\begin{align*}
\text{(5)} & \quad \text{BINMIN} \gg \text{ALIGNR} (\text{FT, IP}) \\
(\text{II}) & \quad (\text{I}) & \quad (\text{V}) & \quad (\text{III}) & \quad (\text{IV}) \\
\text{ANCHOR}
\end{align*}
$$

The mobility of ANCHOR is indicated by the arrows pointing to its possible landing sites; the single and double lines respectively represent the cases where ANCHOR stays as one constraint in ranking and splits into $\text{ANCHOR-OI}$ and $\text{ANCHOR-IO}$. When it does split, the ranking is always $\text{ANCHOR-OI} \gg \text{ANCHOR-IO}$. The roman number indicates the genre whose ranking hierarchy is instantiated by the docking of ANCHOR at the corresponding sites.

Thus, combining (3) and (5), we have the unified verse grammar:

$$
\begin{align*}
\text{(6)} & \quad \text{BINMAX, GOODFTINTERJ, GOODFT'XY', ANCHOR-I}_{\text{SB}}\text{O}_{\text{PhP}}, \text{NONFINALITY} (\text{PCat}) \gg \\
\text{BINMIN} & \quad \gg \quad \text{ALIGNR} (\text{FT, IP}) \\
(\text{II}) & \quad (\text{I}) & \quad (\text{V}) & \quad (\text{III}) & \quad (\text{IV}) \\
\text{ANCHOR}
\end{align*}
$$

This is the grammar that accounts for the consistent, yet not completely identical, ways in which the modern speaker scans classical Chinese verse lines across genres. The dual property of flexibility and restrictiveness of this grammar is evident from its constitution: its flexibility is achieved via the mobility of ANCHOR and the restrictiveness guaranteed by the fixed ranking among the other constraints, as well as the restricted landing sites of the floating ANCHOR.

Three notes are in order regarding this grammar. First, as predicted in Chapter 1, the grammar is indeed a partial ranking due to the presence of the floating constraint ANCHOR. Depending on where ANCHOR lands, it may be instantiated into five sub-grammars, each being a full ranking responsible for the scansion of one genre. More specifically, as indicated in (6), when ANCHOR splits into two sub-constraints between which $\text{BINMIN}$ is sandwiched, the resultant full ranking is the sub-grammar for genres (II) ($\text{Jiuge}$) and (V) ($\text{Ci}$); when ANCHOR does not split and docks between $\text{BINMIN}$ and

---

2 It needs to be reminded that the constraint hierarchy for PhP boundary delimitation is tucked away in $\text{NONFINALITY} (\text{PCat})$ and takes effect only when PCat is parametrized into PhP, and as such also constitutes part of the grammar.
ALIGNR (FT, IP), the resultant full ranking is the sub-grammar for genres (I) (Shijing) and (III) (Guti); when ANCHOR docks below ALIGNR (FT, IP), the resultant full ranking is the sub-grammar for genre (IV) (Jinti).3

In this sense, the grammar (6) actually represents five coexisting sub-grammars. That an individual can simultaneously possess several grammars is uncontroversial, as in the case of multilingualism, multidialectalism, a speaker’s competence to switch among styles and registers. On each specific occasion of use, the speaker would reach into the grammar pool and select one suitable for the given occasion. The current case where a speaker is able to parse verse lines from different genres in different ways is another scenario where coexisting grammars, or sub-grammars, for that matter, are involved. When presented with a verse line from a given genre, the speaker would select the corresponding one of the sub-grammars represented by the grammar, specifically, by allowing the floating constraint ANCHOR to land in one of its landing sites.

Second, of the nine constraints, ANCHOR is the only floating one. This is a welcome result in view of previous works related to the mobility of constraints. For example, Itô and Mester (1998) showed on the basis of the stratification in the phonological lexicon of Japanese, that only faithfulness constraints can float. Gnanadesikan (1995) provides evidence from child language acquisition that points to the mobility of faithfulness constraints in comparison to the immobility of markedness ones. Van Oostendorp’s (1997) study on speech registers and Anttila and Cho’s (1998) work on certain synchronic variation and diachronic change in both English and Finnish yield similar findings about the mobility of faithfulness constraints. It remains to be explored whether the mobility of faithfulness constraints is principled rather than merely stipulative.

Third, in a related way, we wish to emphasize that although the model of floating constraints can be potentially very powerful, the grammar in (6) affords to be sufficiently restrictive by constraining the nature, number, and landing sites of floating constraints. More specifically, only one faithfulness constraint is allowed to float, and it has only three possible landing sites. Consequently, the five sub-grammars resulting from the different landing of the floating constraint are minimally different, which is desirable as it minimizes computational load for the speaker in entertaining coexisting grammars.

Finally, as mentioned in Section 1.2.2.2 of Chapter 1, of the several models proposed to account for variation, there is yet no conclusive evidence for which is superior. However, the present study seems to indicate that the floating constraints model, when restricted to a certain extent, as is the case here, is both formally appealing and explanatorily adequate. More specifically, in terms of the representation and acquisition of grammars, allowing ANCHOR to float is the only computationally efficient way to unify the sub-grammars, as it captures the maximally shared ranking

---

3 The different docking of ANCHOR along the ranking skeleton indicates that scansion of lines from different genres differ in the weight attached to the boundary matching between the grammatical and the prosodic structures, and as such conforms to the native speaker’s impressionistic report of the scansion ‘styles’: genres (II) and (V) are felt to be scanned in a more ‘prose-like’ way where meaning and syntax are honored to a degree while genre (IV) is scanned in a virtually mechanical manner which ignores the syntax. The scansion ‘style’ of genres (I) and (III) lies in between.
skeleton and minimal difference between the sub-grammars. The other models such as partially ordered grammars and multiple grammars can do the job, but in a less restrictive and elegant way.

7.2 Formal grounding of the metrical harmony

In the previous five chapters, we argued that for each genre the native speaker’s judgment on metrical harmony can be formally grounded in the corresponding sub-grammar. Specifically, for each line type in every genre, the lines cognized as being metrically most harmonious are exactly those whose corresponding parse from their shared grammatical structure to their corresponding scansion is optimal under the corresponding sub-grammar. In general terms, we may suggest that the metrical harmony can be formally grounded in the verse grammar. Below we briefly compare the present proposal with earlier attempts of accounting for metrical harmony.

It is widely observed that the native speaker can pass intuitive judgments on the metrical harmony of verse lines, and how to formally account for the metrical harmony, which is also referred to, from an opposite angle, as metrical tension and metrical complexity (cf. Halle & Keyser 1971; Kiparsky 1977), has been a central issue in theoretical verse studies, in particular generative metrics. Of them, Kiparsky (1977; also 1975) is the representative and more elaborate one where he proposes a metrical tension index for English verse lines. This index measures the metrical tension by merely counting the number of mismatches between the stress pattern of the line and the basic metrical pattern, the latter vaguely couched as an independent template ‘generated by some combinatorial process’ (p.190). More specifically, as both the linguistic stress pattern and the basic metrical pattern with its specific metrical positions (such as SWSWSWSWSW in the pentameter) are postulated to be of a tree structure (Liberman 1975), at least two sources of mismatches may be identified: labeling and bracketing. However, that this index turns out somewhat inadequate is evident from Kiparsky’s own admission quoted below:

> There obviously remain some delicate problems in weighting the different elements of complexity in the right way. For example, what exactly is the relative importance of bracketing and labeling mismatches? Labeling mismatches seem to be more salient, but how much, and why? At this point there is not much that can be said in reply to such questions; but there is some progress in our even being able to raise them’ (p.227).

Notably, the problem identified here which involves weighting different channels of mismatches contributing to the metrical complexity and remains unsolved in the pre-OT era, strongly invites an OT-etic solution in terms of constraint ranking. However, what bears on the current discussion is not to propose an OT account for the metrical harmony of English verse lines, but to point out that Kiparsky’s approach to metrical harmony appears less attractive because it entails an identification of specific rules, and a numerical counting of the violation of such rules, in addition to the vaguely defined metrical patterns.

---

4 Such an attempt should evidently be feasible; see the tentative though not unproblematic discussion in Golston (1998).
By comparison, our proposal is to ground the metrical harmony straightforwardly in the grammar and no additional machinery is necessary. More specifically, first, as stated early in Chapter 1, no separate metrical patterns are postulated and the grammar, developed in the OT framework as a constraint ranking hierarchy, is solely comprised of prosodic constraints operative in the ambient language. Second, there is no need to pinpoint specific rules, or constraints, for that matter, contributing to metrical harmony. Indeed, the metrical harmony is not reducible to the observation of any one single constraint: Anchor, BinMin, AlignR (FT, IP), Binarity, and Long-Last have all been shown to be responsible and which constraint is crucial in determining metrical harmony falls naturally out of the constraint interaction reflected in their relative ranking, i.e. the grammar. Third, instead of resorting to the numerical counting which incurs the problem of accommodating violations of rules of different weight, in the present proposal, the metrical harmony is directly measured via the formal construct of OT harmony which is in turn gauged in terms of satisfaction/violation of interacting constraints whose different weights are captured in the ranking hierarchy. We have seen that constraint ranking can be crucial to account for metrical harmony in certain cases, such as the 6- and 7-syll JiuGe lines (cf. (57) and (58) in Chapter 3).

In short, under the present proposal, there is no need for a separate metrical tension or harmony index; the metrical harmony can be directly gauged via OT harmony in the grammar per se, which is also responsible for the scansion of the verse lines. As suggested in Chapter 1, an adequate verse grammar must be able to account for both the scansion of the verse lines and the native judgment of metrical harmony, in the same way that a grammar must be able to account for both the production of well-formed sentences and the native judgments on the well-formedness of sentences. In this light, in addition to offering a formal account of the cognitively oriented notion of metrical harmony, this proposal regarding the formal grounding of metrical harmony also testifies to the explanatory adequacy of the verse grammar.

7.3 Additional issue: the meter of classical Chinese verse

Although as stated in the introductory chapter, this study is not a study of meter or metrics, we nonetheless wish to conclude the chapter by briefly addressing a commonly asked question for any study on verse, i.e. what constitutes the meter of classical Chinese verse. The present study has offered valuable insight into this issue, which has so far remained elusive in works on Chinese verse. Back in Section 5.5.3 of Chapter 5, we already demystified the so-called ‘tonal meter’ and briefly argued that the meter of Jinti verse is ‘phrasing meter’; here we go one step further and argue that this is the meter for all genres of classical Chinese verse.

---

5 Indeed, abundant evidence has been cited since Kiparsky (1977) to show that the rules are ‘normative’ rather than ‘absolute’ (e.g. Youmans 1989), and as such are apparently better understood as violable constraints.

6 Here we follow Schlepp (1980) in regarding meter as the linguistic basis for the rhythm (cf. also Chatman 1965): while rhythm is empirically perceptible meter is more abstract. For example, English and French poems respectively employ stress and syllable counting as the primary linguistic element to achieve rhythm, and the meters are respectively referred to as accentual and syllabic meter.
The crucial evidence comes from the fact that the metrically most harmonious lines of all genres are uniformly characterized by a complete mapping between the grammatical and the prosodic structures of the lines – at both the foot and the PhP level. This is formally captured as the satisfaction of the faithfulness constraint ANCHOR, modulo fine tuning by ALIGNR (FT, IP) and the three constraints regulating the well-formedness of PhP parsing, and in fact indirectly the position of SB in the line, i.e. BINARITY, EVENNESS and LONG-LAST. This uniform pattern becomes evident if we present the grammatical structures of the metrically most harmonious lines for all line types across genres, side by side with the optimal scansions of lines of such structures. The PhP boundaries of 3- and 4-syll lines are not marked out due to irrelevance.

(7)

<table>
<thead>
<tr>
<th>Line type</th>
<th>Metrically most harmonious grammatical structures across genres</th>
<th>Corresponding optimal scansion</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-syll</td>
<td>S[SS]</td>
<td>(S)(SS)</td>
</tr>
<tr>
<td>4-syll</td>
<td>[SS][SS]</td>
<td>(SS)(SS)</td>
</tr>
<tr>
<td>5-syll</td>
<td>[SS][S[SS]]</td>
<td>(SS)(S)(SS)</td>
</tr>
<tr>
<td>6-syll</td>
<td>[SS][S][SS][SS]</td>
<td>(SS)(SS)(SS)</td>
</tr>
<tr>
<td>7-syll</td>
<td>[[SS][SS]][S[SS]]</td>
<td>(SS)(SS)(S)(SS)</td>
</tr>
</tbody>
</table>

Assuming that the metrically most harmonious lines are the most rhythmical and hence constitute the best exponent of the meter, we observe that for each line type, the grammatical phrasing of such lines always fully matches the prosodic phrasing. This clearly indicates that the grammatical phrasing serves as the linguistic basis for rhythm, and we thus label the meter as ‘phrasing meter’

Cross-linguistically, Hayes (1995) suggests that Japanese verse achieves rhythm via the strong tendency to ‘align phonological breaks with metrical breaks’, which is in fact also a form of phrasing meter.

As for the role of the tone, we suggest, on the basis of our argument in Section 5.5.3 of Chapter 5, that it fulfils an ‘ornamental’ purpose by formulating a melodic contour via interpolation between individual lexical tones of the syllables in the line, a contour that rides on top of the rhythm achieved by the boundary mapping and enriches the musicality of the verse recitation. Indeed, although the meter of classical Chinese verse has so far been elusive, that some linguistic device other than the tone constitutes the meter of classical Chinese verse has been informally expressed by a number of authors (e.g. Buring 1966; Schlepp 1980; Chen 1994). Of particular pertinence is Young’s (1984) remark that ‘the line and caesura structure would suggest a rhythm, and the tones a melody’. This impressionistic but incisive statement is thus substantiated by the present study: ‘the line and caesura’ can actually be more precisely expressed as the location of grammatical boundaries, which constitutes the meter of classical Chinese verse.

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7 The idea might be easier to comprehend if we temporarily borrow the construct of metrical template and consider the optimal scansion as some sort of template onto which the grammatical structure maps to achieve full boundary matching. This is comparable to the scenario of stress-based English meter where a metrically optimal line achieves a full mapping of its linguistic stress pattern with the template of say, pentameter.

8 It needs to be pointed out that Hayes postulates an independent metrical hierarchy, which we dispense with in accordance with the principles of prosodic metrics (Golston 1998) as stated in Chapter 1.
Chapter 8 Operativeness of modern constraints in ancient verse grammar

The previous chapters have been devoted to the development of the modern grammar which is the main concern of this study. The grammar (as well as the five sub-grammars) is modern in the sense that it captures the modern speaker’s scansion of classical Chinese verse. At the same time, the apparent ancient nature of the corpus implies the relevance of a historical dimension of the issue, which will be addressed in this chapter. We will be arguing that the constraints deployed in the modern grammars (to be simply referred to as the ‘modern constraints’ below) were all operative in the ancient verse grammar, and that it stands to reason that the core constraints crucial for the scansion of verse lines have remained unchanged all the way till the modern times.

Methodologically, two points are worth noting. First, unlike the development of the modern grammar which directly employs the modern speaker’s scansion, in exploring the historical side of the picture, the ancient speaker’s scansion and performance is no longer accessible and the only available data is constituted by the corpus per se. Below evidence will be excavated from various channels in the corpus to show that the modern constraints were also operative in the ancient grammar. Such evidence includes rhyming patterns, parallelism and repetition, distribution of the disyllabic morphemes, distribution of the strongest grammatical boundary in the line, and the frequency pattern for a given line type in a genre. The coding scheme and ripe corpus presented in Appendix II considerably facilitate the extraction of relevant data. Second, while modern speakers may well be treated as a homogeneous population entertaining the same modern grammar (which is, though, instantiable into multiple sub-grammars), ancient speakers constituted a heterogeneous readership which features a considerable variation in their chronological orientation. Accordingly, instead of saying one ancient grammar, it is more appropriate to refer to multiple ancient grammars, one for each genre entertained by the ancient speaker of the corresponding literary period. Despite this, for practical considerations, instead of treating each genre individually by discussing the relevance of each constraint for each genre, below we will selectively present the most convincing evidence from different genres for the relevance of individual modern constraints in ancient grammars.

8.1 BINMAX and BINMIN

As BINMAX and BINMIN respectively ban the occurrence of trisyllabic and monosyllabic feet and together express a preference for disyllabic feet, to prove their operativeness in the ancient grammar, we need to show that disyllabic feet were also the preferred foot structure for the ancient speaker. The most compelling evidence for this comes from Shijing lines which are distinctly characterized by the prevalence of rich rhyming patterns, reduplication and structural parallelism\(^1\). Moreover, the Shijing data also shows that the foot in ancient grammar was trochaic.

\(^1\) It is of interest to mention in passing that the pervasive occurrence of such linguistic patterns in Shijing is not accidental. Rather it is argued to be attributable to the fact that on the one hand, the only viable transmission form for verse as ancient as Shijing was through oral performance, and on the other
An overwhelming majority (1134 out of 1320 line) of Shijing lines are 4-syllable ones where such features are most telling. We first consider the rhyming patterns. To begin with, the (two or more) rhyming parts may occur either within one line or across lines, which entails a distinction between two types of rhyming, respectively referred to as intra- and inter-linear rhyming. The crucial fact is that for intra-linear rhyming in a 4-syll line, the two rhyming syllables are invariably the second and the fourth ones, as in the following examples (where the rhyming syllables are marked out in bold form):

(1) \[ \text{yuan2 ju1 yuan2 chu4} \]
where live where reside
‘Where shall I live and where shall I reside?’

(2) \[ \text{ru2 qie1 ru2 cuo1} \]
like carved like polished
‘(That gentleman is) so well-carved and finely polished’.

By comparison, for inter-linear rhyming, the two rhyming units can be the last syllables of two lines, hence monosyllabic, as in

(3) \[ \text{she4 bi3 gao1 gang1}, \]
climb that high mound
\[ wo3 ma3 xuan2huang2. \]
my horse weak dizzy
‘(I) climbed up that high mound and my horse felt weak and dizzy’.

Or, interestingly, disyllabic, as in

\[ \text{ru2 qie1 ru2 cuo1} \]
like carved like polished
‘(That gentleman is) so well-carved and finely polished’.

\[ she4 bi3 gao1 gang1, \]
climb that high mound
\[ wo3 ma3 xuan2huang2. \]
my horse weak dizzy
‘(I) climbed up that high mound and my horse felt weak and dizzy’.

hand, the audience facing the oral poet was of a fluid and unstable nature. As a consequence, rhyming, repetition, parallelism, along with alliteration, assonance, balance, antithesis etc. become crucial in verbally transmitting the verse and attracting the audience by enhancing its memorability in the absence of orthographical aid. For an excellent discussion about the earliest poetry across cultures and the range of common features shared thereby, see Thompson (1978).

Note that the modern pronunciations are presented here in the pinyin form, which is the official romanization of Chinese characters, solely for convenience sake. Crucially, our perspective in this chapter shifts back to the ancient one, and the rhyming syllables that are marked out did rhyme in their ancient pronunciations which are not presented here. For many characters, their ancient phonological representations share the same nucleus as their modern ones, as is the case with the two rhyming syllables in (1) (and (3) below). By comparison, some syllables have undergone considerable changes in their phonological structures, as is shown by the two rhyming syllables in (2) and (4) below which obviously do not rhyme any more. For reconstruction work on ancient phonological structures of classical Chinese syllables, see Li (1979, 1986), Yu (1985), Lan et al. (1989), and Yu (1995).

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Shijing displays a rich variety in terms of the position of the two lines involved in inter-linear rhyming: typically they are adjacent, but they can also be alternate lines in a stanza, such as the first and the third lines in a four-line stanza, or they can be corresponding lines across stanzas, such as the first lines in two neighboring stanzas. However, the position of the two rhyming lines has no immediate bearing upon the present discussion and will not be dealt with here. We will directly present the two rhyming lines without indicating their positions in the poem.
Ancient Verse Grammar

(4)  
\text{han} \ 4 \quad \text{zhi} \ 1 \quad \text{guang} \ 3 \ \text{yi} \ 3 \\
Han (state name) \ prt \ wide \ interj \\
‘Ah, the State of Han is so big’, \\

\text{jiang} \ 1 \ \text{zhi} \ 1 \ \text{yong} \ 3 \ \text{yi} \ 3 \\
river \prt \long \interj \\
‘Ah, the river is so long’ \\

(5)  
\text{sheng} \ 4 \ \text{bi} \ 3 \ \text{xu} \ 1 \ \text{yi} \ 3 \\
climb \ that \ mound \prt \\
‘Ah, I climb up that mound’, \\

\text{yi} \ 3 \ \text{wang} \ 4 \ \text{chu} \ 3 \ \text{yi} \ 3 \\
in \ order \ to \ see \ Chu \ state \prt \\
‘Ah, in order to see the State of Chu’ \\

These rhyming data provides valuable insights into the ancient scansion of the lines. First, the intra-linear rhyming such as (1) and (2) shows that in the ancient scansion, a 4-syll line was optimally parsed into two disyllabic feet so that the two rhyming syllables were actually the final syllables of the two feet thus parsed. That the other possible pair of syllables in a 4-syll line, say, the first and the third, or the second and the third, display no regular rhyming patterns indicates that other potential parsings were not realized. In other words, for a 4-syll line, (SS)(SS) was the optimal scansion for the ancient speaker as well, whereas other parsings such as (S)(SS)(S), (SSS)(S) or (S)(SSS) were sub-optimal. Thus, binary feet were also preferred over monary or ternary ones in the ancient scansion. In terms of constraints, this generalization offers support for that the two binarity constraints, i.e., B_{\text{INMAX}} and B_{\text{INMIN}} were also operative in the ancient grammar.

Before we turn to inter-linear rhyming, it merits mentioning that additional evidence for the preference of binary feet in the ancient grammar comes from lexical reduplication, structural repetition and parallelism. More specifically, in a 4-syll line, reduplication, which contains two identical syllables, almost always occurs as the first and the second, or the third and the fourth syllables. This is illustrated below:

(6)  
\text{tao} \ 2 \ \text{zhi} \ 1 \ \text{yao} \ 1 \ \text{yao} \ 1 \\
peach \prt \ thriving/redup. \\
‘The peach tree is thriving’, \\

\text{zhuo} \ 2 \ \text{zhuo} \ 2 \ \text{qi} \ 2 \ \text{hua} \ 2 \\
bright/redup. \ its \ blossom \\
‘Its blossoms are bright’.

In contrast, it is very rare for the two syllables in a reduplication to appear as the second and the third syllables; only one out of the 1320 lines in our corpus has reduplication in such positions:
A similar pattern is displayed by repetition and parallelism, which is respectively characterized by a complete and partial structural identity, and which, like rhyming, can occur both intra- and inter-lineally. Specifically, in a 4-syll line, the unit involved in repetition or parallelism is always disyllabic. Examples abound, and below we just present verse lines respectively illustrating intra-linear repetition ((8)), intra-linear parallelism ((9)), inter-linear repetition and inter-linear parallelism ((10)):

(8)  le4 jiao1 le4 jiao1
    revel countryside revel countryside
    ‘(They) revel in the countryside’.

(9)  wu4 jian3 wu4 fa2
    not cut not saw
    ‘Do not cut or saw (the plum trees)’.

(10) zuo3 you4 cai3 zh1
    left right pick them
    ‘I pick them on both my left and right sides’

    zuo3you4 mao4 zh1
    left right select them
    ‘I pick them on both my left and right sides’

Turning to inter-linear rhyming, we note that (3) offers little novel insight: the two rhyming syllables are the second syllables of the two corresponding feet across the lines. It is, after all, cross-linguistically common for the last syllables of verse lines to rhyme. By comparison, the rhyming units in (4) and (5) are evidently constituted by disyllabic feet, given what we have argued so far about the ancient scansion of 4-syll lines. However, it is immediately noteworthy that in such cases the first syllables in the two rhyming feet are always full, lexical syllables which differ and rhyme, whereas the second syllables in the two rhyming feet are always identical, and never full, lexical ones but in most cases, interjections (and occasionally object pronouns ‘zh1’).

4 Examples of verse lines with disyllabic rhyming units whose second syllables are ‘zh1’ are as follows:
    zuo3 you4 liu2 zh1.
    left right float it
    ‘(It) floats everywhere (on the river),’

    wu3 mei4 qiu2 zh1.
    awake asleep desire her
    ‘(I) desire her no matter when I am awake or asleep’.

In such cases, the syllables preceding ‘zh1’, which also rhyme, are always verbs who take ‘zh1’ as their complements. In fact, as argued in Zuo (2000), ‘zh1’ in this usage is and was underlyingly weak for modern and ancient speakers alike. We do not go into detail here due to lack of direct relevance. For more discussion, see Zuo (2000) (also Chen (2001) for arguments based on prose text).
We argue that this rhyming data reveals two things. First, as far as the rhyming is concerned, only the first syllables in the disyllabic feet count, since generally speaking rhyming syllables are necessarily different. Second, the rhyming between the first syllables in the disyllabic feet and the identity between the second ones therein render cases like (4) and (5) a clear example of feminine rhyme. It has been argued that ‘feminine rhyme occurs in trochaic meters or in hypercatalectic iambic (or anapestic) meters’ (Smith 1923: 126). Obviously, none of the lines in (4) and (5) are hypercatalectic (i.e. having an extra syllable at the end of a verse line). The occurrence of feminine rhyme in *Shijing* lines constitutes compelling evidence for the foot being trochaic, in addition to binary.

To recapitulate, we have argued on the basis of the rhyming patterns, repetition and parallelism in *Shijing* lines that binary and trochaic feet were also preferred in the ancient scansion. Evidence of a similar description from other genres can also be cited, which enables us to conclude that BinMAX and BinMIN were operative in the ancient grammar. As argued back in Chapter 2, Binarity and Trochee constitute the bedrock for GoodFTINTERJ. Below, we are going to present more evidence from *Shijing* showing that the ancient speaker observed the same well-formedness pattern of feet containing interjection syllables as his modern counterpart.

### 8.2 GoodFTINTERJ

The evidence for the operativeness of GoodFTINTERJ comes from the distribution of interjection syllables in 4-syll *Shijing* lines. Rather than freely occurring anywhere, interjection syllables display a very restricted distribution in such lines, namely, only at the second and/or the fourth positions but never at the first or the third ones. Again

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5 Haft (p.c.) points out to me that there are indeed cases in Chinese verse where the two rhyming syllables are identical; however, such cases are very rare, while here the final syllables are always identical, which says that they cannot be the real rhyming unit. In fact, in his online *Glossary of Poetic Terms*, Shubinski (2001) defines rhyme as ‘a type of echoing which utilizes a correspondence of sound in the final accented vowels and all that follows of two or more words, but the preceding consonant sounds must differ’ (my italics). Furthermore, the rhyming between the penultimate syllables calls for an explanation.

6 To get a better understanding of the connection of feminine rhyme with disyllabic trochees, compare the feminine rhyme in the 4-syll lines of (4) and (5) to that in the following 4-syll English verse line from Algernon Charles Swinburne’s (1837-1909) *Song in Season*:

```
Thou whose beauty
Knows no duty
Due to love that moves thee never....
```

A further argument for the connection between feminine rhyme and trochee in the Chinese context comes from Chao’s (1927) ‘polysyllabic rime’ (Duanmu, p.c.) which requires the identity from the stressed syllable to the end of the foot. And notably in such cases, the non-head syllable is clearly weak, as is shown in the neutralization of its tone as well as reduction of segmental quality. This is illustrated below (where neutral tones are indicated by the digit 0):

```
zhe4 shi4 (ta1 de0), ba3 shi4 (fa1 de0)    
‘This is his, not issued’.
```

```
zhe4 ge4 (huai4 le0), ba3 ta1 (mai4 le0) 
‘this one is broken; sell it’.
```

7 One further interesting observation regarding the distribution of interjection syllables in 4-syll *Shijing* lines is that such syllables seem to occur much more readily at the fourth position than at the second one. If there is only one interjection in the line, then it is bound to be at the fourth position, while a line with an interjection at the second position always has another one at the fourth position. There are no
examples abound: the occurrence of the interjection at the second and fourth positions is typically accompanied by intra-linear repetition or parallelism, as in the following lines:

(11)  
\[
\begin{array}{c}
\text{you1} \\
\text{zai3} \\
\text{you1} \\
\text{zai3}
\end{array}
\]
\text{pensive interj pensive interj}
‘Ah, how pensive I am’.

(12)  
\[
\begin{array}{c}
\text{kuan1} \\
\text{xil} \\
\text{chuo4} \\
\text{xil}
\end{array}
\]
\text{broad interj generous interj}
‘Ah, how broad-minded and generous (he is)’

We already argued above that the ancient scansion of 4-syll lines was (SS)(SS), each foot being trochaic. Therefore, the fact that interjection syllables can only occur at the second and fourth positions in such lines shows that they cannot serve as the head of a trochee. This constitutes evidence that in comparison to lexical syllables which were strong, interjection syllables were underlyingly weak for the ancient speaker in the same way as they are for the modern speaker. It follows from this that for the ancient speaker, the well-formedness pattern of feet containing interjection syllables must have been the same as that for the modern speaker, namely, the interjection syllable could only occur as the non-head in the disyllabic trochee. In terms of OT constraints, this generalization is then directly translatable into GOODFTINTERJ, proposed for the modern grammar. Indeed, the identity between the interjection syllables between the lines featuring feminine rhyme as illustrated in (4) and (5) above also hints that such syllables have to be adjoined to the preceding lexical syllables and cannot form monosyllabic feet on their own.

8.3 ANCHOR-I<sub>SB</sub>O<sub>PHP</sub>

To argue for the relevance of ANCHOR-I<sub>SB</sub>O<sub>PHP</sub>, we need to show that when an SB (strongest boundary) is present in the grammatical structure of the line, namely, when a line is of a bi-directional structure, this boundary must emerge in the scansion of the line as the PhP boundary. As SB represents the biggest grammatical break in the line, we assume that its prosodic correspondent also constitutes a higher-level prosodic boundary, which can only be PhP boundary given that the line is prosodically an IP. Thus, we only need to prove that the SB in a line, if present, must have a correspondent in its scansion.

The most convincing evidence comes from the distribution of SB boundaries in Ci lines. Here the analytical convenience offered by the coding scheme presented in
Appendix II becomes evident: the SB is represented as the line-medial coding 4 boundary (to be simply referred to as the M4 boundary) whose distribution is straightforwardly shown in the ripe corpus presented there. To begin with, the operativeness of BinMax and BinMin argued above (which can also be independently supported by the distribution of disyllabic morphemes in Ci lines, see Zuo (in prep)) enables us to infer the ancient scansion of 4- and 6-syll lines as respectively (SS)(SS) and (SS)(SS)(SS). Now consider the SB, i.e. M4 boundary, distribution in these two line types. For 4-syll lines, this issue is trivial, since only the coding 4 boundary after the second syllable qualifies as an SB, and given the ancient scansion as (SS)(SS), clearly ANCHOR-\text{ISBOPHIP} was met.

The SB distribution pattern in 6-syll Ci lines is more telling, as shown below. The hyphen (-) is used to indicate the relevant boundary.

(13) Distribution of SB in 6-syll Ci lines

<table>
<thead>
<tr>
<th>Distribution of SB</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>SS-SSSS</td>
<td>72</td>
</tr>
<tr>
<td>SSS-SSS</td>
<td>0</td>
</tr>
<tr>
<td>SSSS-SS</td>
<td>14</td>
</tr>
</tbody>
</table>

Evidently, of the three possible positions for SB in a 6-syll line, SB only occurs after the second or the fourth syllable, never after the third syllable. Given the optimal scansion of 6-syll lines as (SS)(SS)(SS) reached independently above, the non-occurrence of SB after the third syllable constitutes compelling evidence that SB must always surface in the output. Otherwise, it would appear enigmatic why SB does not occur after the third syllable, which is a theoretically possible position for SB. This way, we have argued for the active engagement, and in fact, inviolability, of ANCHOR-\text{ISBOPHIP} in the ancient grammar.

8.4 NONFINALITY (PCAT)

As suggested earlier, *IP-FINAL-MONOFT and *PHP-FINAL-MONOFT are treated as differently parametrized versions of NONFINALITY (PCAT) and indeed, as the right edge of the line-final PhP necessarily coincides with that of the IP, a ban of PhP-final monosyllabic feet would encompass a ban of IP-final ones. Hence we only need to prove the operativeness of *PHP-FINAL-MONOFT in the ancient grammar. Evidence for this comes from the distribution of lexical items whose constituting syllables are inseparable in Ci lines. Such lexical items include disyllabic morphemes, place and person names, reduplications, and the boundary between its constituting syllables is coded as 1 in the coding scheme (see Appendix II). We assume that the two component syllables in such lexical items resist to be separated in scansion. This can be understood by considering the two syllables in a disyllabic morpheme: a foot cannot break up a disyllabic morpheme. Therefore the distribution of coding 1 boundaries in the corpus would offer a hint to the ancient scansion of the line and accordingly the relevance of *PHP-FINAL-MONOFT.

\footnote{Coding 4 boundaries at both the line-initial and penultimate positions do not count as M4 ones, because such lines have a unidirectional grammatical structure.}
As *PHP-FINAL-MONOFT imposes a ban on the occurrence of monosyllabic feet at the end of PhP, to argue for its relevance to the ancient scansion apparently involves the PhP boundary delimitation by the ancient speaker. Regarding this issue, we assume that the sub-hierarchy proposed for PhP boundary delimitation in the modern grammar equally applied in the ancient one. Furthermore, as shown in the last section, the SB in a line, if present, must correspond to the PhP boundary in the output. At the same time, in addition to this line-medial PhP boundary, the end of the line, i.e. the IP, constitutes another PhP boundary. Hence, to show that *PHP-FINAL-MONOFT played a role in the ancient grammar, we need to consider the occurrence, or, for that matter, non-occurrence, of monosyllabic feet at the end of both these PhP boundaries.

We start by showing that *PHP-FINAL-MONOFT was operative for the line-final PhP boundary, which was simultaneously the IP boundary. This is evidenced in the distribution of coding 1 boundaries in 3- and 4-syll Ci lines, where the PhP boundary was (and is) co-terminous with the IP boundary. The distribution is charted below:

(14) Distribution of coding 1 boundary in the 3-syll Ci lines

<table>
<thead>
<tr>
<th>Distribution of the coding 1 boundary</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>S-SS</td>
<td>0</td>
</tr>
<tr>
<td>SS-S</td>
<td>7</td>
</tr>
</tbody>
</table>

As a foot cannot cut into a disyllabic morpheme, this highly regular pattern strongly indicates that 3-syll lines were scanned as (S)(SS) rather than (SS)(S). The distribution of the coding 1 boundary in 4-syll Ci lines presents a similar pattern:

(15) Distribution of coding 1 boundary in the 4-syll Ci lines

<table>
<thead>
<tr>
<th>Distribution of the coding 1 boundary</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>S-SSS</td>
<td>6</td>
</tr>
<tr>
<td>SS-SS</td>
<td>0</td>
</tr>
<tr>
<td>SSS-S</td>
<td>8</td>
</tr>
</tbody>
</table>

By the same token, this readily suggests (SS)(SS) as the ancient scansion. Given that the PhP boundary in both 3- and 4-syll lines coincides with the IP boundary, i.e. (S)(SS) and (SS)(SS), this shows that *PHP-FINAL-MONOFT, or for that matter, *IP-FINAL-MONOFT, was operative in the ancient grammar.

We move on to consider the relevance of *PHP-FINAL-MONOFT at the line-medial PhP boundaries. Obviously, a line has to be at least five syllable long in order to have a line-medial PhP boundary in addition to the line-final one. Furthermore, for analytical reason, we will only consider those lines containing an SB: the PhP boundary in such cases can be determined directly without resort to the foot-level

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9 An independent and compelling piece of evidence for (S)(SS) being the optimal scansion of 3-syll lines by the ancient speaker comes from the extremely popular verse piece San Zi Jing (Three Word Doctrine) which was composed by Wang Yinglin in the Song dynasty, i.e. the same historical period as when Ci was composed. It is solely comprised of 3-syll lines, and of the total 377 lines, 329 are of the structure S[SS], and furthermore 27 of the remaining 48 lines are for enumerative purpose, leaving only 21 lines of the structure [SS]S. We argue that the overwhelming predominance of the S[SS] structure strongly hints at the recitation of the lines as (S)(SS), thus avoiding the IP-final monosyllabic foot.
parsing thanks to the operativeness (and in fact inviolability) of ANCHOR-I\textsubscript{SB}O\textsubscript{PhP} in the ancient grammar argued above.

In the same line of reasoning, the evidence once again comes from the coding 1 boundary distribution before this pre-determined PhP boundary which corresponds to the SB. As is evident from the ripe corpus for Ci presented in Appendix II, only 6- and 7-syll lines contain coding 1 boundaries. Furthermore, in both line types, the SB occurs exclusively after the second or the fourth syllable, and so does the corresponding PhP boundary. Hence for coding 1 boundaries, only the three possible positions provided by the first four syllables are relevant. The distribution pattern is as follows. For clarity sake, the PhP boundaries are marked out with ‘|’ and the relevant positions where coding 1 boundaries occur with the hyphen ‘-’.

\begin{tabular}{|c|c|c|c|}
\hline
Line type & PhP boundary determined by SB & Distribution of coding 1 boundaries within the first PhP & Frequencies \\
\hline
6-syll lines & SS|SSSS & S-S|SSSS & 7 \\
 & SSS|SS & S-SS|SS & 1 \\
 & SSSS|SS & SS-SS|SS & 0 \\
 & SSS-SSS & SSS-SSS & 2 \\
7-syll lines & SS|SSSS & S-S|SSSS & 2 \\
 & SSS|SSSS & S-SSS|SSS & 7 \\
 & SSSS|SSSS & SS-SSS|SSS & 0 \\
 & SSS-SSSS & SSS-SSSS & 5 \\
\hline
\end{tabular}

It is notable that for both line types, when the PhP boundary falls after the fourth syllable, the distribution of coding 1 boundaries in the first PhP displays a similar pattern to that in 4-syll lines (cf. (15)): the coding 1 boundary never occurs between the second and the third syllables. Together with the ancient speaker’s binarity preference argued above, this pattern, we suggest, strongly indicates that in such cases, the first PhP was parsed by the ancient speaker as (SS)(SS), rather than otherwise, say, (S)(SS)(S). As for the lines where the PhP boundary falls after the second syllable, the two syllables in the first PhP were parsed into a disyllabic foot due to the foot binarity preference. In both cases, the first PhP always ends with a disyllabic foot and PhP-final monosyllabic feet were avoided.

Thus we have argued for the avoidance of monosyllabic feet at the end of both PhP’s in the IP on the basis of the coding 1 boundary distribution. Translated into a constraint, this is tantamount to the operativeness of NONFINALITY (PCat) with PCat being both IP and PhP in the ancient grammar.

### 8.5 GOODFT’XI’

GOODFT’XI’ essentially specifies the well-formedness pattern of feet containing ‘xi’: (Sxi) and (xi) are well-formed and (xiS) ill-formed. Accordingly to argue for the relevance of GOODFT’XI’ in the ancient grammar, we need to provide evidence for the observation of this well-formedness pattern in the ancient scansion.

To begin with, that ‘xi’ can form a legitimate foot by itself is obvious from the fact that 5-syll Jiuge lines were scanned as (SS)(xi)(SS), supported by the following three
pieces of evidence. First, in all such lines, ‘xi’ occurs exclusively after the second syllable, i.e. SSxiSS. Given the foot binarity preference in the ancient grammar, the two syllables on each side of ‘xi’ were parsed into a disyllabic feet. Second, the two disyllabic units flanking ‘xi’ typically constitute structural parallelism, illustrated by the pairs ‘yao2 xi2’ and ‘yu4 zhen3’, ‘gao1 fei1’ and ‘an1 xiang2’ shown below:

(17)  [yao2 xi2]  xi1  [yu4 zhen3]
gem mattress  xi  jade  pillow
‘Ah, the mattress is ornamented with gems and the pillows with jades’

(18)  [gao2 fei1]  xi1  [an1 xiang2]
high  fly  xi  stable  flow
‘Ah, how high you fly, and how stable you flow (in the heaven)’

The third piece of evidence comes from the distribution of coding 1 boundaries in 5-syll lines: such boundaries only occur between the two syllables on either side of ‘xi’ and never straddle ‘xi’. The reasoning behind the use of this evidence was discussed in Section 8.4 above. Consider the coding 1 boundary between the two reduplicative syllables in the following examples:

(19)  hu4 hu4  xi1  qiu1  feng1
onomatopoeia\(^{10}\)  xi  autumn  wind
‘Ah, the autumnal wind is blowing heavily’

(20)  fei1  long2  xi1  pian1 pian1
fly  dragon  xi  elegant
‘Ah, how elegantly the dragon is flying’

These converging pieces of evidence show that the two syllables on each side of ‘xi’ in a 5-syll Jiuge lines formed a foot. Assuming that PARSE-SYL was also inviolable for the ancient speaker, the only possible parsing for this lone ‘xi’ is to form a monosyllabic foot on its own. Thus (xi) was legitimate in the ancient scansion.

Now we consider the illegitimacy of (xiS). That ‘xi’ cannot head a disyllabic foot is evident from the mere absence of ‘xi’ at the beginning of a line. This is not only true with Jiuge lines, but also so with the lines of all the other Chuci sub-genres. In this connection, we assume that line-initial monosyllabic foot (xi) was also unwelcome in the ancient scansion for the same reason as proposed in Chapter 3. Indeed, the distribution of coding 1 boundaries illustrated in (20) above also shows that the final three syllables could not have been possibly scanned as (xiS)(S).

Finally, the well-formedness of (Sxi) is straightforward given that we argued in Section 8.1 that the foot in ancient scansion was trochaic: (Sxi) where a strong full lexical syllable serves as the head was evidently a well-formed trochee.

To summarize, we have shown that in the ancient scansion, ‘xi’ could either form a monosyllabic foot on its own or be adjoined to a preceding full lexical syllable to

\(^{10}\) ‘Hu4 hu4’ is an onomatopoeic reduplication vividly describing the sound of heavy wind blowing.
form a disyllabic trochee, but could not serve as the head of a disyllabic foot. This is exactly what $\text{GOODFT}'X_l'$ is all about. Thus, $\text{GOODFT}'X_l'$ was operative in the ancient grammar.

### 8.6 ANCHOR and ALIGNR (FT, IP)

Evidence for ANCHOR and ALIGNR (FT, IP) comes from the frequency pattern in the corpus: for a given line type (in terms of syllable numbers) in a given genre, lines of different grammar structures occur with different frequencies. This is clearly shown in the ripe corpus in Appendix II where the analytical convenience offered by the coding scheme becomes evident again.

The line of argument for the operativeness of ANCHOR and ALIGNR (FT, IP) in the ancient grammar is as follows. To begin with, following Kiparsky (1977) and Youmans (1989), we assume that in a sufficiently large corpus, a correlation exists between the frequency of grammatical structures beyond a certain threshold and the metrical harmony of lines of such structures as cognized by the native speaker. This enables us to conclude that the most frequent grammatical structure in each genre was cognized as metrically most harmonious by the ancient speaker.

Second, we assume that as in the case of the modern grammar, the metrical harmony of a certain line type in a given genre cognized by the ancient speaker was also grounded in the ancient grammar for this genre. Accordingly, the analytical procedure is the same as that used in formally accounting for the metrical harmony of the modern speaker, in particular the use of the tableau des tableaux; the only difference lies in that while for the modern grammar, the optimal parse, i.e. the metrically most harmonious line in each genre can be directly elicited from the speaker, for the ancient grammar, it can only be indirectly inferred from the frequency pattern distinctly exhibited in the ancient corpus which presumably reflects the ancient speaker’s cognization of metrical harmony.

Third, it should become evident from the discussion in the previous sections of this chapter that with the exception of BINMIN, all the other constraints discussed therein, i.e. BINMAX, GOODFTINTERJ, ANCHOR-$I_{SBOPhP}$, NONFINALITY (PCAT) and GOODFT$'X_l'$, were not only operative but in fact also inviolable in the ancient grammar. BINMIN was obviously dominated by BINMAX as monosyllabic feet were allowed but not trisyllabic ones. Below we are going to show that the frequency data, which is apparently ancient in nature, does provide evidence for the operativeness of the two violable constraints ANCHOR and ALIGNR (FT, IP), although it falls short of enabling us to spell out the ancient grammar in full.

The most compelling evidence for the relevance of ANCHOR in the ancient grammar comes from the frequency pattern in 4-syll $Shijing$ lines, which, as evident from the ripe corpus in Appendix II, occupy an overwhelming percentage (85.91%) of the $Shijing$ corpus and its sub-corpus is thus sufficiently large. Below the tableau des tableaux is constructed in the same spirit as that used in the modern grammar. The optimal parse was the most harmonious one for the ancient speaker, i.e. the parse corresponding to the most frequent grammatical structure in the 4-syll $Shijing$ line sub-corpus, i.e. [SS][SS] (corresponding to the coding types 2425, 1425, 2415, 1415, 2435 and 3435 in the ripe corpus). The ancient scansion for all 4-syll $Shijing$ lines was
(SS)(SS), as discussed in Section 8.1 above. The solid line on the left of ANCHOR shows the inviolability of the bunch of constraints dominating it.

(21) 4-syll Shijing lines

<table>
<thead>
<tr>
<th>Candidate parses</th>
<th>BINMAX</th>
<th>BINMIN</th>
<th>GOODFT</th>
<th>INTERJ</th>
<th>NONFINAL</th>
<th>ANCHOR-1stOmp</th>
<th>IO</th>
<th>ANCHOR-IO</th>
<th>OI</th>
<th>ANCHOR-OI</th>
</tr>
</thead>
<tbody>
<tr>
<td>![SS][SS]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>![SS][SS]</td>
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<td>![SS][SS]</td>
<td>![SS]</td>
<td>![SS]</td>
<td>![SS]</td>
<td>![SS]</td>
<td></td>
<td>![SS][SS]</td>
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<td>![SS][SS]</td>
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<td>![SS][SS]</td>
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<td><img src="SS" alt="SS" /></td>
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<td><img src="SS" alt="SS" /></td>
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<tr>
<td>![SS][SS]</td>
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<td><img src="SS" alt="SS" /></td>
<td></td>
<td><img src="SS" alt="SS" /></td>
</tr>
</tbody>
</table>

Here ANCHOR is crucial in selecting [SS][SS] as the winner. Further evidence for the relevance of ANCHOR is provided by the frequency pattern of 5-syll Guti lines, as shown below:

(22) 5-syll Guti lines

<table>
<thead>
<tr>
<th>Candidate parses</th>
<th>BINMAX</th>
<th>BINMIN</th>
<th>GOODFT</th>
<th>INTERJ</th>
<th>NONFINAL</th>
<th>ANCHOR-1stOmp</th>
<th>IO</th>
<th>ANCHOR-IO</th>
<th>OI</th>
<th>ANCHOR-OI</th>
</tr>
</thead>
<tbody>
<tr>
<td>![SS][SS]</td>
<td>![SS]</td>
<td>![SS]</td>
<td>![SS]</td>
<td>![SS]</td>
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<td>![SS][SS]</td>
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<td>![SS][SS]</td>
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<tr>
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<td><img src="SS" alt="SS" /></td>
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<tr>
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<td></td>
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<td>![SS][SS]</td>
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<td><img src="SS" alt="SS" /></td>
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<td>![SS][SS]</td>
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<td>![SS][SS]</td>
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<td><img src="SS" alt="SS" /></td>
<td></td>
<td><img src="SS" alt="SS" /></td>
</tr>
</tbody>
</table>

Here again ANCHOR is crucial in accounting for the metrical harmony experienced by the ancient speaker reflected via the frequency pattern. In other words, the most frequent lines were those best satisfying ANCHOR. If ANCHOR were irrelevant in the ancient grammar, then the highly regular and apparently non-trivial frequency pattern would remain mysterious.

Evidence for the operativeness of ALIGNR (FT, IP) in the ancient grammar comes from the frequency pattern of 5-syll Ci lines where the grammatical structure [SS][S[SS]] (corresponding to the coding types 24325, 14325 and 14325 in the ripe corpus) occurred most frequently. The dotted line between ANCHOR and ALIGNR (FT, IP) shows the lack of evidence for their ranking.
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(23) 5-syll CI lines

<table>
<thead>
<tr>
<th>Candidate parses</th>
<th>\text{BINMAX}</th>
<th>\text{BINMIN}</th>
<th>\text{GOODFT}</th>
<th>\text{INTERJ}</th>
<th>\text{NONFIN}</th>
<th>\text{ANCHOR}_{-I}</th>
<th>\text{ANCHOR}_{-O}</th>
<th>\text{ANCHOR}_{(FT, IP)}</th>
<th>\text{ALIGNR}</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. \text{REF} ([SS][S][SS]) \text{B}\text{(SS)(S)(SS)}</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td>ANCHOR_I</td>
<td>KL</td>
<td>KL</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>b. S([SS][S][SS]) \text{B}\text{(S)(SS)(SS)}</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6!</td>
</tr>
<tr>
<td>c. [SS][S][S][SS] \text{B}\text{(SS)(SS)(SS)}</td>
<td>*</td>
<td></td>
<td>*!</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5</td>
</tr>
</tbody>
</table>

Here we see both \text{ANCHOR} and \text{ALIGNR} \text{(FT, IP)} are crucial in accounting for the highest frequency enjoyed by lines of the structure [SS][S][SS]. If \text{ALIGNR} \text{(FT, IP)} were irrelevant in the ancient grammar, then one would expect equal frequency between S[[SS][SS]] and [SS][S][SS], which runs against the fact.

As a final note, we wish to add that the operativeness of \text{ANCHOR} and \text{ALIGNR} \text{(FT, IP)} in the ancient grammar is evident if we consider how they should be interpreted informally. \text{ANCHOR} is in essence a constraint responsible for the boundary matching between the grammatical and prosodic structures of the verse line and as such embodies the syntax-prosody interaction. As we are only interested in the performance style where the ancient speaker parsed the line with a sensitivity to the structure and meaning of the verse line rather than the linguistically uninteresting ‘dumb’ scansion which blindly chops the line into binary units (Jackendoff 1989; also referred to as the ‘minstrel’ scansion in Tsur 1998), it stands to reason that \text{ANCHOR} was in general operative in the ancient speaker’s scansion (with the \text{Jinti} genre being a possible exception). On the other hand, \text{ALIGNR} \text{(FT, IP)}, in requiring the alignment between the right boundaries of the feet contained in the line and the right boundary of the IP, i.e. the line end, actually requires that all feet in the line are flushed as much to the right as possible. This, we suggest, boils down to the requirement that the directionality of parsing the line be from left to right, which is shown to be true for the prosodic parsing in general for Chinese speakers (Chen 2000).

8.7 Concluding remarks

In this chapter we have argued, solely on the basis of data from the ancient corpus, that all constraints deployed in the modern grammar also played a role in the ancient ones. Although the data falls short of allowing us to fully spell out the ancient grammars, there are nonetheless certain indications that the ancient grammars most likely borne a considerable resemblance to the modern one. One is that as we have shown, those constraints that are inviolable in the modern grammar were also inviolable in the ancient ones. Another indication comes from the highly notable fact that for all the genres, the most frequent structures in the corpus (when the sub-corpus for the line type is sufficiently large), i.e. those cognized as being metrically most harmonious by the ancient speaker, always coincide with the most harmonious ones cognized by the modern speaker. This consistent convergence cannot be accidental; rather we believe that it strongly suggests that the ancient speaker might have shared

\[\text{11 Acturally, in his work on the metrics of classical Chinese verse, Duanmu (2001) assumes, without much argument, that the prosodic structure ‘should be similar’ for the modern and ancient speakers. The discussion in this chapter may be understood as substantiating this assumption.}\]
the same grammar as the modern one and that the core constraints responsible for verse line scansion have been passed on from the ancient all the way to the modern times, and insofar as the verse grammar is concerned, little has changed\textsuperscript{12}. We leave the full articulation of the ancient grammar for each genre for future research.

\textsuperscript{12} An alternative way to comprehend the resemblance between the modern grammar and the ancient one is that the modern speaker’s verse grammar is in fact indirectly shaped by the ancient speaker’s via the various linguistic patterns built into the ancient corpus, such as the rhyming patterns, distribution of the coding 1 and 4 boundaries, and the frequency profile. The influence of the frequency pattern on developing the modern speaker’s grammar is particularly effective: for a given line type, the most frequently occurring grammatical structure, which was apparently most preferred by the ancient speaker, receives most exposure with the modern speaker, who most likely grows familiar to such lines and accordingly experiences, almost in a hereditary way, them to be metrically most harmonious. This convergence of metrical harmony judgment serves to mold the modern grammar in such a way that it resembles the ancient counterpart.
In retrospect

This study mainly addresses two questions: (i) what is the verse grammar that governs the modern speaker’s scansion of classical Chinese verse lines? (ii) how can his apparently intuitive judgment of metrical harmony of verse lines be accounted for in a principled way? For the first question, we have argued that the modern verse grammar represents the coexistence of five minimally different sub-grammars respectively for the five genres. Formally, the grammar is couched as a partial ranking order on a set of constraints which is instantiable into five full ranking orders. The partial ranking order features one ranking skeleton shared by all the five sub-grammars and one floating constraint ANCHOR that can land in several specified positions along the ranking skeleton. The different landing sites of this floating constraint give rise to various instantiations of this grammar, i.e., various sub-grammars. That the sub-grammars are minimally different is captured by the fact that on the one hand, they all share one ranking skeleton and on the other hand, only one constraint floats with its possible landing sites restricted. The representation of the grammar as such also points to the formal elegance and explanatory adequacy of the floating constraints model, when restricted in a certain way, in dealing with variation.

Regarding the second question, we have argued that the native judgment of metrical harmony can be grounded in the verse grammar thus developed. More specifically, the metrical harmony cannot be reduced to the working of any single constraint: ANCHOR, ALIGNR (FT, IP), LONG-LAST, and BINARITY have all been shown to play a role in accounting for metrical harmony in various genres. Therefore, we deem it less productive to attempt to specify which constraint (or rule, for that matter) is responsible for metrical harmony (as in Kiparsky 1977, among others). Rather the metrical harmony is more revealingly captured by the grammar per se: for a given genre, which specific constraint is responsible for the metrical harmony of its lines follows naturally from the constraint interaction, and metrical harmony can be formally correlated with OT harmony, which refers to how well a candidate form satisfies the constraints given their ranking in the (sub-)grammar.

In addition, the following two issues are briefly discussed. First, we have suggested that classical Chinese verse features a phrasing meter which is constituted by the boundary matching between the grammatical and the prosodic structures and that the so-called ‘tonal meter’ is a mere myth. Lexical tones play no more than a decorative role in the meter of classical Chinese verse by serving as a melodic contour superimposed on the phrasing meter. In a related manner, the boundary matching between these two structures is also shown to contribute to the ‘sense’ of metrical harmony cognized by the native speaker.

The second issue dealt with is the relevance of modern constraints in ancient verse grammars. More specifically, we have argued, on the basis of the evidence from the ancient corpus per se such as rhyming patterns, parallelism and repetition, and frequency patterns constituted by lines of different grammatical structures, that all the constraints, both the violable and inviolable ones, deployed in the modern verse grammar, played a crucial role in the ancient grammars as well. However, the data falls short of enabling us to spell out the complete ancient grammars. Nonetheless, it stands to reason that the core constraints responsible for verse scansion have remained
unchanged over the time and are in fact inherited by the modern speaker in his scansion of classical Chinese verse.
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Appendix I

A Chronology of Chinese History 
and Corresponding Literary Periods for Major Poetic Genres

<table>
<thead>
<tr>
<th>Dynasty</th>
<th>Dates</th>
<th>Corresponding literary periods for major poetic genres¹</th>
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</thead>
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<tr>
<td>Xia</td>
<td>Ca. 2100-1600 BC</td>
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</tr>
<tr>
<td>Shang</td>
<td>1600-1066 BC</td>
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<tr>
<td>Western Zhou</td>
<td>1066-771 BC</td>
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<tr>
<td>Eastern Zhou</td>
<td>Spring and Autumn</td>
<td></td>
</tr>
<tr>
<td></td>
<td>770-476 BC</td>
<td>Shijing</td>
</tr>
<tr>
<td></td>
<td>Warring States</td>
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</tr>
<tr>
<td></td>
<td>475-221 BC</td>
<td>Chuci</td>
</tr>
<tr>
<td>Qin</td>
<td>221-206 BC</td>
<td></td>
</tr>
<tr>
<td>Western Han</td>
<td>206 BC-23 AD</td>
<td></td>
</tr>
<tr>
<td>Eastern Han</td>
<td>25-220</td>
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<td>Three Kingdoms</td>
<td>Wei</td>
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<tr>
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<tr>
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<td>Shu</td>
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<td>265-316</td>
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<td>317-420</td>
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</tbody>
</table>

¹ Two notes are in order. First, for relevance reason, only the five major poetic genres are presented. Other literary genres such as prose, fiction, drama are omitted. Second, the boundaries between the literary genres are in fact not as clear-cut as presented here, but are rather blurry.
Appendix II Guidelines for corpus processing and the ripe corpus

This appendix comprises of two parts: Part I presents the guidelines for processing the corpus of verse lines: Section 1 briefly considers the analytical advantages coding offers as a means of corpus processing and Section 2 spells out the coding scheme. Part II presents the ripe corpus for each of the five genres which features the frequency pattern for each coding type.

Part I Guidelines for corpus processing

1 Coding as a means of corpus processing

The coding scheme to be proposed below represents the grammatical structure of the verse line by encoding the boundary strength between two surface adjacent syllables. This strength is attributable to the grammar, mostly syntax, occasionally supplemented by lexicon, semantic interpretation and pragmatic considerations. As such, coding may be regarded as an alternative to bracketing in representing the grammatical structure of the line. While bracketing suffices in the development of the modern verse grammar, coding is necessary in exploring the ancient grammar, because it offers considerably analytical convenience by better revealing the distinct patterns in the corpus that would be obscure otherwise. In particular, the numerical coding system greatly facilitates the distilling of the frequency patterns of lines of various grammatical structures and highlights the distribution patterns of both the weakest and the strongest boundaries, which is respectively coded as 1 and 4 below. As shown in Chapter 7, both patterns constitute important evidence for the operativeness of the modern constraints in the ancient grammar.

In addition, coding offers certain additional advantages, two of which deserve brief mentioning. First, the coding scheme enables us to record the boundary strength without pinpointing the specific formal status of the syntactic constituents involved, which are often disparate. There is no fixed, one-to-one correspondence between the syntactic constituent and the boundary strength and constituents of disparate statuses may give rise to comparable boundary strength. This is illustrated in the following three verse lines where the syntactic bracketing and labels are given for illustrative purpose:

\[
(1) \quad [\text{chu1ri4}]_{\text{NP}}[[\text{jing1 men2}]_{\text{NP}} \text{ shan1}]_{\text{NP}} \\
\text{first sun Jingmen mountain} \\
\text{The sun (rises on) the Jingmen mountain}
\]

1 In theory, it is also possible to just use bracketing to obtain such patterns from the corpus. However, the difficulty in reading and keeping track of brackets would result in the corpus to be processed in a much more cumbersome and less efficient fashion.
The three boundaries marked out with the arrows are equally strong in that they all represent the strongest structural boundaries within the line and as such will be uniformly encoded as 4 in our coding scheme (to be introduced below). However, as indicated by the syntactic labels, the syntactic constituents involved differ considerably in nature.

Second, in a related manner, a numerical coding scheme caters to the relative nature of boundary strength. The domain of the coding is limited to the verse line, and the strength of a boundary between two adjacent syllables in a line is always gauged in relation to that of the other boundaries in the same line. Across the lines, syntactic constituents of different statuses might trigger the same boundary strength; conversely, syntactic constituents of the same status might feature different boundary strengths. But the numerical coding scheme enables boundaries of different origins to be represented uniformly.

As a final note, we wish to emphasize that coding is, in essence, a notational shorthand which offers the above-mentioned analytical convenience but carries no theoretical import. It can be translated into bracketing, although they are not in a one-to-one relation. Several coding types may correspond to the same bracketing structure, as shown in Chapter 7.

2 The coding scheme

This section presents the coding scheme which is a numerical way to encode the boundary strength by uncovering and incorporating the linguistic factors responsible for this strength. Evidently, linear adjacency of two syllables is the premise for the following discussion on the boundary strength and the coding scheme.

The scheme is five-scaled with the numbers ranging from 1 to 5, where 1 indicates the weakest boundary and 5 the strongest. The smaller the number, the weaker the boundary. This is indicated below:

![image](https://via.placeholder.com/150)

The coding process contains three steps: (i) pre-assignment, (ii) assignment and (iii) post-assignment, which are respectively discussed below.

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2 Five scales are chosen in an effort to achieve a balance between descriptive sufficiency and analytical efficiency (cf. Chen 2000: 563; Hayes 2000).
2.1 Pre-assignment

The purpose of pre-assignment is to encode those boundaries whose strength can be straightforwardly determined in order to clear the road for the more elaborate assignment stage which takes recourse to syntax and lexicon. The codings 1, 3, and 5 are assigned at this stage.

First, coding 1 is assigned to weakest boundaries which, in the context of classical Chinese verse, include the boundary (i) between the reduplication and disyllabic morphemes, and (ii) between the component syllables in opaque proper names, i.e. place and person names. In both cases, nothing can be inserted in between and the two syllables cannot be split in scrambling. Reduplication is quite common in classical Chinese and used widely in verse, typically in onomatopoeic words such as ʂiaol xiaolí (the sound of falling leaves) or adjectives reduplicated for more vivid effect, e.g. ʂing1 qing1lí (green). Disyllabic morphemes are relatively rare due to the overwhelmingly monosyllabic nature of classical Chinese; some typical examples are the names of flora and fauna, for instance, ʂpi4 li2í (a kind of plant) and ʂul jiu1lí (a kind of seabird).

Second, coding 5 is, rather trivially, assigned to, and only to the boundary following the line-final syllable, for the simple reason that the end of the line, with no syllable to follow, vacuously qualifies as the strongest boundary in the line. A noteworthy point here is that a verse line may correspond to a wide array of syntactic constituents such as a phrase, a phrase coordination, a sentence, a compound sentence consisting of two or more small clauses. These are respectively illustrated below:

(5)   shi2 nian2 li2  luan4 hou4
ten year separation chaos after
ēAfter ten yearsı separation and chaosı

(6)   gu3 dao4 xi1 feng1 shou4 ma2
ancient road west wind thin horse
ēThe ancient road, the west wind, and the thin horseı

(7)   gu4 ren2 ju4 ji1 shu3
old folks prepare chicken rice
ēThe old friends have prepared chicken and riceı

(8)   zhu3 xuan1 gu1 huan4 nu3
bamboo noisy return washing girl
ēThe bamboo (leaves) become noisy, (and) the washing girl returnsı

Finally, coding 3 is assigned to all the remaining boundaries, but only temporarily as a default coding to be modified below.

---

3 By opaque we refer to those proper names whose meaning cannot be compositionally derived, e.g. ʂzhu1 ge3í (person name) or ʂwe4 yang2í (place name). This is in contrast to those -transparent proper nouns where the meaning can be so derived, for example, place names such as ʂjing1 zhou1 lí where ʂzhou1 means ʂci1 ty1, and personís names such as ʂwang2 gong1 lí where ʂgong1 means ʂdor4í. Such transparent proper names are in fact compounds or NPIs, which, as is to be argued shortly, feature binding factors.
2.2 Algorithm for the assignment

This phase of the coding process is targeted at the boundaries temporarily assigned coding 3 in the pre-assignment phase, which entails a close scrutiny of the grammatical structure of the verse line. The algorithm features binding factors and alienating factors: at those boundaries where binding factors are present, the current coding (which is the default 3) is reduced by one, thus becoming 2, whilst at boundaries where alienating factors are present, the coding 3 is increased by one, thus becoming 4. Below the binding and alienating factors are respectively spelled out.

2.2.1 The binding factors

Three types of binding factors can be identified: (i) certain semantic relations encompassed in the argument structure; (ii) inclusion in the lexicon; (iii) cliticization.

2.2.1.1 Semantic relations in the argument structure

The construct of argument structure (Williams 1981, 1994) is adopted to capture the relevance of syntactic structures to boundary strength. Briefly speaking, the argument structure of a lexical item, typically a predicate, is the lexical representation of its grammatical information (Grimshaw 1990). A distinction is drawn between internal and external arguments of a predicate in terms of whether an argument appears within the maximal projection of a predicate or not.

Two semantic relations, namely, the theta relation and functor relation, constitute the first binding factor. First, the theta relation refers to the syntactic relation between the predicate and its argument(s). In particular, the juncture between the predicate and its internal argument, most typically, that between a verb and its object NP, is the tightest of all grammatical relations, and is essentially as tight as it can getí (Williams 1994:29). In other words, such boundaries are the weakest. So is the boundary between a preposition and its complement NP in a PP. Examples are the VPIs [ba3 jiu3] and [wen4 qing1 tian1] and the PP [sui2 chun1] in the two verse lines below. The boundaries involving the theta relation are marked out.

(9) [ba3 jiu3] [wen4 qing1 tian1]
hold wine ask blue sky
Holding the wine, (I) ask the blue sky

(10) [hu2die2 bu4 [sui2 chun1] qu4
butterfly not with spring leave
The butterflies do not leave with the spring

In this connection, the boundary between the predicate and its external argument, typically that between the verb and its subject NP, is not characterized by the binding factor. This is because unlike the internal argument which is in an immediate sisterhood relation with the verb, the external argument lies external to the maximal

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4 One should be careful not to confuse the use of junkure in Williams (1994) with that of boundary here: a tight juncture is a weak boundary.

5 It does not constitute an alienating factor either; the coding at such boundaries retains the default 3, subject to promotion to 4 in the post-assignment stage.
projection of the verb, and the theta role is only assigned via the x-bar projection. As such, the external argument is not strictly lexical to the verb. Indeed, according to Williams (1994:21), the subject-predicate juncture is a double-headed, phrase-to-phrase link, in contrast to the verb-object juncture which is single-headed and lexical. The relatively strong boundary between the verb and its external argument compared to that between the verb and its internal argument is evident from the much greater mobility enjoyed by the subject NP than the object NP, which often brings the subject NP out of linear adjacency with the predicate.

The second relation in the argument structure theory that serves as a binding factor is the functor relation. It differs from the theta relation in that it is neutral regarding theta roles. However, it is similar to the theta relation, or more precisely, the relation between the predicate and its internal argument in that both observe absolute locality and nothing can be inserted in between. Williams (1994:45) presents an inventory of constructions characterized by the functor relation, which are essentially reducible to the modifier + modifiee type. Among them, the relevant ones in the current context of classical Chinese verse are: (i) modifier + noun; (ii) (verbal) adverb + verb; (iii) negation + VP/AP.

First, in the modifier + noun construction, the modifier is either an adjective or noun. In both cases, the boundary between the modifier and the modifiee, i.e. the head noun, is weak. For example,

\[(11) \quad \text{[shen1 yuan4] suo3 [qing1 qiu1]} \]
\[\text{deep yard lock lonely autumn} \]
\[\text{éThe lonely autumn is locked inside the deep yardi} \]

\[(12) \quad \text{[chun1 hua1] [qiu1 yue4] he2 shi2 liao3} \]
\[\text{spring flower autumn moonwhitime disappear} \]
\[\text{éWhen will the spring flowers and autumn moons disappear?i} \]

which respectively contain NPIs of the structure A+N and N+N, and where the relevant boundaries marked out are all weak.

A further piece of evidence for the weak boundary in the émodifier + nouní structure is the strong tendency to lexicalization displayed by such structures. Indeed, Duanmu (1998, 1999) argues that such structures are all compounds rather than noun phrases in modern Chinese. A similar picture is presented for such structures in classical Chinese in Feng (1998), which suggests that in classical Chinese, A/N+N structures were most likely to undergo idiomatization and become lexicalized into nominal compounds, especially when they were used with considerable frequency\(^6\).

\(^6\) Apparently, this bears on the issue of the distinction between noun phrases and nominal compounds, which, albeit interesting, is of little immediate relevance to the present discussion of boundary strength, since whether a given A/N + N structure is phrasal or lexical, the binding factor, being either the functor relation or the listed entry in the lexicon, is always present and thus the boundary between the two components is always weak. We will return to this issue when discussing the factor of inclusion in the lexicon below.
The second construction featuring the functor relation is (verbal) adverb + verbí. The verbal adverb, which modifies the VP, is distinguished from the sentential adverb, which modifies the sentence. This is illustrated below with the sentential adverb ëxing4í and the verbal one ëdu2í:

(13)  
\[ \text{\textit{xing4} } [\text{\textit{yan3} } \text{\textit{ming2}s}][\text{\textit{shen1} } \text{\textit{jian4}s}] \]

luckily eye bright body healthy
ëLuckily I am still bright-eyed and in good healthí

(14)  
\[ \text{\textit{lou2} } \text{\textit{shang4} } \text{\textit{hua1} } \text{\textit{zhi1} } \text{\textit{xiao4} } [\text{\textit{du2} } \text{\textit{mian2}]_{\text{VP}} \]

boudoir above flower branch laugh lone sleep
ëThe girl upstairs in the boudoir laughs at me sleeping aloneí

In terms of semantic relation, both subcategories of adverbs entertain a functor relation with their modificiees. However, only the verbal Adverb + VPí structure, as that in (14), contains the binding factor and accordingly the internal boundary is weak. The reason is that the modificiee of the sentential adverb, i.e. the sentence (IP), occupies a structurally higher node than VP; in other words, the sentence has a more elaborate branching structure than VP. As is to be seen in the next section, branching constitutes an alienating factor, which strengthens the boundary between the sentential adverb and the sentence it modifies. Indeed, the boundary between the sentential adverb and the sentence it modifies is typically the biggest break in a line and coded as 4. The cancellation effect between the binding and the alienating factors in the case of sentential adverbs renders the boundary between a sentential adverb and the modified sentence stronger than that between a verbal adverb and the modified verb.

It deserves mentioning here that similar to the ëA/N + NPí structure, the ëverbalí Adverb + VPí structure is also susceptible to lexicalization, which further indicates the close tie between the adverb and the verb7.

Third, the negation construction is another type of the ëmodifier + modificieeí structure, with the modifier being the negator ëbu4í and ëwei4í (meaning ënotí) and the modificiee typically being VP or AP, as shown in the following examples:

(15)  
(i)  
\[ \text{\textit{meng4} } \text{\textit{jun1} } \text{\textit{jun1} } \text{\textit{bu4zhi1} } \]

dream you you not know
ëI dream of you, but you do not knowí

(ii)  
\[ \text{\textit{heng2} } \text{\textit{zhi1} } \text{\textit{wei4} } \text{\textit{ye4} } \]

horizontal branch not leave
ëThe horizontal branches have not yet grown leavesí.

---

7 It needs to be realized, however, that there are far fewer verbal compounds deriving from the latter structure due to the smaller number of verbal adverbs. Some examples are ëshen4 si1í (carefully consider) and ëchang2 tan4í (give a long sigh over).
The functor relation in such constructions renders the boundary between the negator and the following VP/AP weak. In fact, the weak boundary can also be accounted for by treating the negator as a lexical item not specified for category, following Williams (1994:49), rather than as an adverb. This way, 非 is a head that takes what it modifies as the complement constituting a so-called NotPi, and the modifiere serves as a NotP internal argument. If this account holds, then the binding factor between the negator and what it negates is attributable to a relation equivalent to that between the predicate and its internal argument. Whichever option is taken, the boundary in the negation construction is weak.

A further indication of the weak boundary between the negator and the constituent it negates is that the negation construction 非 is also susceptible to lexicalization, in particular when the VP/AP only comprises a monosyllabic verb or adjective, e.g. 非 (not much/many), 非 (not want), and 非 (not know) in (15).

The range of syntactic construction types covered in the above discussion about the first binding factor, namely, theta and functor relations, actually encompass the majority of syntactic structures in classical Chinese verse lines, which are distinctly characterized by a minimal use of function words. The following table summarizes these constructions and their respective semantic relations. Due to the presence of the binding factor, the boundaries in such constructions are all weak. The two semantic relations are respectively shortened as theta and functor. In the case of the negation construction, corresponding to the two viable accounts mentioned above, both the functor and the theta relations are presented as the possible semantic relation.

<table>
<thead>
<tr>
<th>Syntactic construction Type</th>
<th>Binding factor</th>
<th>Boundary</th>
<th>Semantic relation</th>
</tr>
</thead>
<tbody>
<tr>
<td>V + NP</td>
<td>Yes</td>
<td>Weak</td>
<td>Theta</td>
</tr>
<tr>
<td>P + NP</td>
<td>Yes</td>
<td>Weak</td>
<td>Theta</td>
</tr>
<tr>
<td>A/N + NP</td>
<td>Yes</td>
<td>Weak</td>
<td>Functor</td>
</tr>
<tr>
<td>Verbal Adv+VP</td>
<td>Yes</td>
<td>Weak</td>
<td>Functor</td>
</tr>
<tr>
<td>Negator + VP/AP</td>
<td>Yes</td>
<td>Weak</td>
<td>Functor /theta</td>
</tr>
</tbody>
</table>

8 Indeed, two of the five genres exclusively use lexical categories, and as is to be seen below, in the other three genres, only a very small number of function words are used.
2.2.1.2 Inclusion in the lexicon

The second binding factor is lexical in nature: a compound that is listed in the lexicon has a binding factor between its component syllables. Such compounds could be nominal, verbal or adjectival, and their internal structures could be coordination or subordination (i.e. modification). Some examples of compounds are given below and the relevant boundaries are marked out.

(18) N+N coordination:

[feng1 yu3] rao4 cheng2 ai1
wind rain surround city sad
èThe wind and rain surround the city sadlyi

(19) N+N modification

[chun1 hua1] [qiu1] yue4] he2 shi2 liao3
spring flower autumn moon which time disappear
èWhen will the spring flowers and autumn moons disappear?i

(20) A+N modification; N+N coordination

qi1 qi1 [fang1 cao3] yi4 [wang2 sun1]
luxurious fragrant grass miss kings lords
èThe fragrant grass is so luxurious, and I am missing the kings and lordsi

(21) N+N coordination; A+A coordination

[shen2 hun2] [mi2] luan4
spirit spirit confused chaotic
èThe spirits are confused and chaotici

(22) A+N modification; V+V coordination

[yu4 jie1] kong1 [chu4 li4]
jade stairs futile stand stand
è(I) futilely stand on the jade stairsi

(23) verbal Adverb+V modification

[xie2 yi3] xun1 long2 zuo4 dao4 ming2
obliquely lean fragrant pillow sit till dawn
è(She) obliquely leans against the fragrant pillows and sit (in bed) till dawni

Compare the compounds of the modification type presented here with the modifier + modifiee constructions discussed earlier and the borderline between compounds and phrases in such cases seems blurry. This is especially true of the boundary between disyllabic NP or VP and disyllabic noun or verb compounds, as widely acknowledged among Chinese linguists (cf. Feng (1998) for classical Chinese and Duanmu (1998) for modern Chinese). In most cases, the crux seems largely a matter of frequency of usage: according to Feng (Ibid.), compounds may be regarded as idiomatized phrases, i.e., phrases that have become lexicalized due to their high frequency of usage.

9 Actually, this argument has already been exploited in the above discussion when we cited the proneness for lexicalization as an indication of a weaker boundary.
However, this ambiguity has no bearing on the boundary strength under discussion here: whether a \( \varepsilon N+N \), \( \varepsilon A+N \), or \( \varepsilon A+V \) structure constitutes a phrase or compound, the boundary between the two adjacent syllables involved is weak.\(^{10}\)

2.2.1.3 Cliticization

As mentioned earlier, classical Chinese verse is characterized by the parsimony, and in some genres, absence, of function words. With one exception, all the boundaries involving the few function words that do occur can be accounted for via the two binding factors discussed so far. This exception is the boundary involving the function word \( \varepsilon hili \) in three usages, i.e. as the possessive marker, the particle linking subject and predicate, and the demonstrative pronoun, as respectively illustrated below:

(24) (i) \( gao1 \, yang2 \, zhi1 \, pi2 \)

lamb sheep is skin
\( \varepsilon \)The skin of the lambs and sheep

(ii) \( zhi2 \, zi3 \, zhi1 \, shou3 \)

hold you is hand
\( \varepsilon \) (I) hold your hand

(25) (i) \( han4 \, zhi1 \, guang3 \, yi3 \)

han (state name) particle wide particle
\( \varepsilon \) The state of Han is wide

(ii) \( zi3 \, zhi1 \, bu4 \, shou1 \)

you prt not nice
\( \varepsilon \) You are not nice

(26) \( zhi1 \, zi3 \, yu2 \, gu1 \)

this person go return
\( \varepsilon \) This person is going

In all usages, \( \varepsilon hili \) serves as a proclitic (Chen 1996: 598), and its rightward cliticization constitutes a strong binding factor between \( \varepsilon hili \) and its following syllables.

Although these three usages of \( \varepsilon hili \) are the only cases of cliticization as a binding factor, the above discussion prompts us to quickly examine one further usage of \( \varepsilon hili \) and the other function words, which has so far remained undiscussed.

First, in addition to the above-mentioned three usages, \( \varepsilon hili \) can also be used as the object pronoun, as shown below:

\(^{10}\) One might also argue that the binding factor, being essentially a semantic relation (functor relation), is to some extent independent of the grammatical status of the structure.
(27)  
\[ qiu^2 \ zhi^1 \ bu^4de^2 \]
\[ desire \ her \ no \ obtain \]
\[ \hat{q}(I) \ desire \ her, \ but \ (I) \ cannot \ get \ (her) \]

\[ \hat{zhi}^1 \] in this usage behaves like a full noun and the boundary between it and the preceding verb in this usage is that between the verb and its internal argument and thus weak.

The other function words occurring in our corpus are the possessive pronoun \[ \hat{q}i^2 \hat{z}i \], the conjunction \[ \hat{q}ie^3i \] (and) and \[ \hat{e}r^3i \] (and), and several interjections. They are respectively illustrated below:

(28)  
\[ dai^4 \ qii^2 \ ji^2 \ xil \]
\[ wait \ his \ kindness \ interj \]
\[ \hat{e}Ah, \ (I) \ wait \ for \ his \ kindnessi \]

(29)  
\[ xun^2 \ mei^3 \ qie^4 \ yi^4 \]
\[ bright \ beautiful \ and \ different \]
\[ \hat{e}(She \ is) \ so \ bright, \ beautiful \ and \ differenti \]

(30)  
\[ xin^1 \ er^3 \ chang^2 \ xil \]
\[ slim \ and \ long \ interj \]
\[ \hat{e}Ah, \ (he \ is) \ slim \ and \ talli \]

The boundary between the possessive pronoun \[ \hat{q}i^2 \hat{z}i \] and its following N in (28) is comparable to the A+N structure and thus weak. The conjunction in (29) and (30) heads a constituent like the \[ \hat{e}andPí \] in English (Williams 1994:16), which is similar to the negation structure in that the constituent following the conjunction serves as its internal argument, and accordingly the boundary is weak.

By comparison, interjections constitute an alienating factor, which will be discussed in the next section.

To sum up, three binding factors are identified: first, the two semantic relations encompassed in the argument structure theory, i.e. the theta relation and the functor relation; second, the inclusion as a lexical entry; third, cliticization. In terms of coding, the presence of any one of these binding factors at a boundary triggers the boundary strength to be reduced by 1.

### 2.2.2 The alienating factors

Two alienating factors are identified: branchingness of a structure and presence of interjections. Regarding the former, two points merits attention.

1. First, we stipulate that the coding of a boundary is only increased by one no matter whether the structure branches on one or both sides of it. Second, the alienating and the binding factors work independently of each other. For example, in a \[ \hat{e}Verb + object \ NPi \] structure where the NP branches, the boundary between V and NP features both a binding factor and an alienating one, respectively due to the theta relation and the

---

\[ 11 \] We assume the relevance of branchingness in syntax, as is evident from the order of verb clusters (Haegeman and van Riemsdijk 1986) and c-command.
branchingness of the internal argument NP. This is illustrated by the boundary between the verb "tou4" and its complement NP "bo2 luo2 shang3" below:

(31) ye4 han2 weil tou4 [bo2 luo2 shang3]
    night chill slightly penetrate thin gauze skirt
    The night chill slightly penetrates her thin gauze skirt

Thus, the coding at this boundary first moves from the default 3 (assigned at the pre-assignment stage) to 2 (=3-1) due to the theta relation, and then is increased by 1 due to the branchingness, thus eventually arriving at 3 (=2+1).

A second alienating factor is the interjection: we contend that interjections, which are, by their very nature, semantically empty and syntactically unattached, stand in a loose relationship with their surrounding syllables. Accordingly the boundary between an interjection and its neighbors is strong and its coding is increased by one. More specifically, the boundary before a line-final interjection always constitutes the biggest break in the line, while a line-medial interjection triggers strong boundaries on both of its sides. In our corpus, there is only one line-medial interjection, i.e. "xi1", and the two boundaries bordering it are both strong, as shown below:

(32) [jia4 fei1 long2] xi1 [bei3 zheng1]
    ride fly dragon xi north march
    (I) ride the flying dragon and go to the north

2.2.3 Overview of the algorithm for coding assignment

Below is an overview of the algorithm for encoding boundary strength at the assignment stage:

(33) Coding of boundary strength at the assignment stage
    Binding factors (-1) Alienating factor (+1)
        Semantic Listed in the lexicon Cliticization Branching Interjection
        Theta Functor

2.3 Post-assignment

If the assignment stage is mainly concerned with the local addition or deduction of boundary strength coding, the post-assignment stage examines the well-formedness of the global coding profile emerging out of the pre-assignment and the assignment stages and straightens up possible irregularities. This entails a top-down perspective which differs from the bottom-up one at the assignment stage.
The following coding profile template is assumed for every verse line: one and only one 5 which necessarily occurs line-finally, one and only one 4 which encodes the strongest boundary within the line (except for two cases to be discussed below), zero or more 1ís, zero or more 2ís and zero or more 3ís. The coding profile reached at the end of the assignment stage is compared against this template and when the template fails to be met, adjustments are made accordingly.

Specifically, adjustments are called for when (i) more than one 5 is assigned, and/or (ii) no 4 or more than one 4 is assigned. Such cases could arise as a result of the implementation of the algorithm at the assignment stage, which is in turn based on the coding reached at the pre-assignment stage. First, of the multiple 5ís, only one is assigned at the pre-assignment stage and all the others are derived at the assignment stage from the default coding 3. We refer to these 5ís respectively as ëunderivedí and ëderivedí. Given the template outlined above, all the derived 5ís are demoted into 4ís.

Second, we stipulate that there is only one 4 in the coding template which marks the strongest boundary in the line. As a consequence, when the coding at the end of the pre-assignment and the assignment stages contains no 4ís, the 3 at the strongest boundary in the line is promoted into 4; when the coding contains multiple 4ís, all the others except the one at the strongest boundary are demoted into 3ís. Evidently, the post-assignment stage is not as trivial as the pre-assignment stage since it involves the determination of the strongest boundary in the line, which is discussed below.

### 2.3.1 Coding 4 at the strongest boundary in the line

In most cases, the strongest boundary in the line can be determined on syntactic grounds, although as in the case of the coding 5 boundary, the coding 4 boundary may correspond to various syntactic categories. For example, the boundaries marked out in the three lines presented above in (1), (2) and (3) are actually all coding 4 boundaries and they respectively represent the boundary between two coordinated NPIs, between two sentences, and between the line-initial sentential adverb and the sentence it modifies. The following verse lines illustrate yet more possibilities of the syntactic constituents corresponding to the coding 4 boundary:

(34)  
\[\text{qing1 quan2 shi2 shang4 liu2}\]
\[\text{clear stream stone on flow}\]
\[\text{èThe clear stream flows on the stonesè}\]

(35)  
\[\text{tan4 wei2 yao1 dai4 sheng4}\]
\[\text{sigh tie waist belt extra}\]
\[\text{è(I) sigh over the fact that my waist belt becomes longer (because Iím pining away)è}\]

---

12 These two demoting steps need to proceed in this sequential fashion with the demoting of derived 5ís preceding that of 4ís. The reason is that the demoting of 5ís results in yet more 4ís.
The coding 4 boundaries in these three examples are respectively that between the subject NP and the VP, that between the V and the object NP, and that between the small clause and the interjection\textsuperscript{13}.

In some cases, syntax needs to look to the semantic interpretation of the line and the associated pragmatic considerations to produce a correct parsing of the line. This is illustrated in the following two cases. One is when a verse line contains no verbs and only juxtaposed NPIs, as in (6) above, which is repeated below:

\begin{align*}
\text{(37)} & & \text{gu}3 & \text{dao}4 & \text{xil} & \text{feng}1 & \text{shou}4\text{ma2} \\
& & \text{ancient road} & \text{west wind} & \text{thin horse} \\
& & \text{"The ancient road, the west wind, and the thin horse\text{"} }
\end{align*}

To determine the relative strength of the two boundaries between the three NPIs marked out above entails reference to the semantic interpretation of the line and certain pragmatic considerations. The line should be interpreted as \text{"a thin horse (toils) on the ancient road in the west wind\text{"} where the first two NPIs describe the backdrop against which the referent of the third NP is embedded. Hence, the first two NPIs are more closely connected to each other, and boundary (i) is weaker than boundary (ii); accordingly, boundary (ii) represents the strongest boundary within the line and is assigned coding 4.

A similar scenario is when the line contains more than one verb. Consider:

\begin{align*}
\text{(38)} & & \text{feng}1 & \text{hui2} & \text{lu4} & \text{zhuan3} & \text{bu2\text{jian}4 jun1} \\
& & \text{mountain return} & \text{road wind} & \text{not see you} \\
& & \text{"The mountain reappears, and the road winds, and (I) cannot see you anymore\text{"} }
\end{align*}

where the semantic interpretation of the line implies that boundary (ii) is stronger than boundary (i) and thus assigned coding 4.

The result of this trimming is that the only 5 is the underived one marking the boundary after the line-final syllable, and the only 4 is the one marking the strongest boundary in the line. All other 4s and 5s will be reduced to 3s.

An illustration of the post-assignment operations necessitates that of the coding at the previous two stages, and the complete coding process is illustrated with the following verse line:

\begin{align*}
\text{xin1 zhil you1 yi3} \\
& & \text{heart prt worry interj} \\
& & \text{"Ah, my heart worries\text{"} }
\end{align*}

\textsuperscript{13} Example (36) compellingly illustrates the relative nature of boundary strength: the boundary between V and its object NP is weak due to the theta relation, but here in the absence of any stronger boundary, it nonetheless constitutes the strongest break in the line and is therefore coded as 4.
First, the pre-assignment stage trivially yields the coding pattern 33335.

Second, at the assignment stage, the following operations are executed. First, the coding 3 between 
"xiang1" (hometown) and "shu1" (letter) is reduced by one, because they are of the \( \mathcal{N}+\mathcal{N} \) structure where the first noun modifies the second\(^{14} \). Second, a similar reduction happens to the coding 3 between "he2" (which) and "chu4" (place). Third, the coding 3 between "shu1" and "he2" is increased by one because of the branching structure on both sides. Note that here as mentioned earlier, in case of branching as the alienating factor, the coding of a boundary is only increased by one no matter whether the branching occurs on one or both sides of it. Fourth, the coding 3 between "chu4" and "da2" is increased by one because of the branching structure of the verbal complement, i.e. "he2 chu4i". Fifth, the coding 4 thus derived between "chu4i" and "da2i" is decreased by one because of the theta relation between the internal argument "he2 chu4i" (which place) and the verb "da2i" (arrive). Thus we have 24235.

It turns out that this coding pattern perfectly conforms to the coding profile template where coding 4 indeed marks the biggest break in the line, which is the boundary between the external argument and the predicate. As such, it need not undergo post-assignment.

For clarity sake, the complete coding process is illustrated below:

\[
\begin{array}{cccccc}
\text{xiang1} & \text{shu1} & \text{he2} & \text{chu4} & \text{da2} \\
\text{hometown} & \text{letter} & \text{whichplace} & \text{arrive} \\
\text{Where shall (my) letter home arrive?} \\
\end{array}
\]

(i) Pre-assignment: \[3 \quad 3 \quad 3 \quad 3 \quad 5\]

(ii) Assignment: \begin{align*} 
\text{Functor} & \quad \text{Branching} & \quad \text{Functor} & \quad \text{Branching} \\
2 & \quad 4 & \quad 2 & \quad 4 \\
\text{Theta} & \quad & \quad & \quad 3 \\
\end{align*}

(iii) Post-assignment: None

\[ \Rightarrow \text{Final coding: 24235} \]

2.3.2 Exceptions regarding Coding 4

Now back to the post-assignment stage, as hinted earlier, two exceptions to the overall coding template mentioned above are permitted: first, for verse lines containing line-
medial interjections, the coding necessarily contains two 4ís, and second, for certain two-syllabled lines, coding 4 may be legitimately absent.

In the former case, the boundaries on both sides of the interjection constitute the strongest boundary within the line, and as such are encoded as 4. This line type is most common in the second genre, *Chuci* and continues to encroach upon some earlier poems of the third genre, *Guti*, with ëxií being the line-medial interjection. Two examples, respectively coded as 324425 and 24425, are as follows:

(41)  
\[ yu4 \ tan2 \ tang1 \ xi1 \ mu4 \ fang1 \]
bathe orchid water xi shower fragrance
ë(1) bathe myself in the orchid water and shower myself in fragrancei

(42)  
\[ wu3 \ yin1 \ xi1 \ fan2 \ hui4 \]
five sound xi exuberant luxurious
ëThe five sounds are exuberant and luxuriousi

The latter case only happens with certain two-syllabled lines, where the two syllables constitute a structure containing one of the binding factors identified above, for example, an NP of the ëmodifier + modificieeí structure, or a noun compound, as illustrated below:

(43)  
(i)  
\[ tuan2 \ shan4 \]
round fan
ëthe round faní

(ii)  
\[ guan3 \ xian2 \]
pipe string
ëthe pipe and string (music)i

In such lines, our practice is to allow for the absence of 4ís, and represent the tighter boundary between the two syllables by encoding the boundary strength as 25, which is exempt from subsequent post-assignment inspection.

Of course, 45 is still a possible coding type for two-syllabled lines, and predictably when these two syllables constitute a constituent containing no binding factor. For example, the following line is a ëN+Vi structure:

(44)  
\[ ren2 \ qiao1 \]
people quiet
ëPeople have quieted downí

### 2.4 Illustration of the coding scheme

To summarize, the coding scheme to encode the boundary strength of a verse line includes three stages: pre-assignment, assignment and post-assignment, with the algorithm for the assignment stage constituting the core. This algorithm works straightforwardly by identifying the formal grammatical factors bearing upon the boundary strength as binding or alienating. Methodologically, the coding scheme features an integration of bottom-up and top-down perspectives: at the pre- and post-assignment stages, the perspective is a top-down one whilst the bottom-up perspective
is adopted at the assignment stage where the syntactic, semantic and lexical aspects of the line are considered.

We conclude this section by illustrating the application of the coding scheme with the following two examples.

(45)  
\[ huan2 \ qin3 \ meng4 \ jia1 \ qi1 \]  
return sleep dream good time  
(She) goes back to sleep, dreaming of good timesi

\begin{itemize}
  \item[(i)] Pre-assignment:  
  \begin{itemize}
    \item 3
    \item 3
  \end{itemize}

  \item[(ii)] Assignment:  
  \begin{itemize}
    \item Theta
    \item Theta
    \item Functor
    \item 2
    \item 2
    \item Branching
    \item 3
  \end{itemize}

  \item[(iii)] Post-assignment:  
  \begin{itemize}
    \item Promotion
    \item 4
  \end{itemize}

  \[ \rightarrow \text{Final coding: 24325} \]
\end{itemize}

(46)  
\[ bai2 \ tou2 \ gong1 \ nv3 \ zai4 \]  
whitehead court lady is (there)  
The white-haired court lady is (still) therei

\begin{itemize}
  \item[(i)] Pre-assignment:  
  \begin{itemize}
    \item 3
    \item 3
    \item 3
    \item 3
    \item 5
  \end{itemize}

  \item[(ii)] Assignment:  
  \begin{itemize}
    \item Compounding
    \item Compounding
    \item Branching
    \item 2
    \item 2
    \item 2
    \item 4
    \item Branching
    \item 3
  \end{itemize}

  \item[(iii)] Post-assignment: None

  \[ \rightarrow \text{Final coding: 23245} \]
\end{itemize}
## Part II The ripe corpus

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**Appendix II**

196
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| 1324325                       | 7      | 2.12%      |
| 1423325                       | 6      | 1.82%      |
| 1433235                       | 1      | 0.30%      |
| 1433325                       | 1      | 0.30%      |
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 Boundary Strength Coding Type

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**7-syll**

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| Corpus | 1334325 | 1 | 0.90% |
| Corpus | 1423325 | 1 | 0.90% |
| Corpus | 1433235 | 1 | 0.90% |
| Corpus | 2314235 | 2 | 1.80% |
| Corpus | 2314325 | 2 | 1.80% |
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| Corpus | 2324325 | 20 | 18.02% |
| Corpus | 2324335 | 2 | 1.80% |
| Corpus | 2334315 | 1 | 0.90% |
| Corpus | 2334335 | 1 | 0.90% |
| Corpus | 2343325 | 1 | 0.90% |
| Corpus | 2413235 | 1 | 0.90% |
| Corpus | 2413325 | 1 | 0.90% |
| Corpus | 2423135 | 2 | 1.80% |
| Corpus | 2423235 | 5 | 4.50% |
| Corpus | 2423325 | 10 | 9.01% |
| Corpus | 2433225 | 1 | 0.90% |
| Corpus | 243325 | 11 | 9.91% |
| Corpus | 2433325 | 4 | 3.60% |
| Corpus | 3244325 | 1 | 0.90% |
| Corpus | 3324325 | 9 | 8.11% |
| Corpus | 4313235 | 1 | 0.90% |
| Corpus | 4323235 | 1 | 0.90% |
| Corpus | 4323315 | 1 | 0.90% |
| Corpus | 4323325 | 6 | 5.41% |
| Corpus | 4333235 | 2 | 1.80% |
| Total | 111 | 100% |

**8-syll**

| Corpus | 43232325 | 1 | 50% |
| Corpus | 43323325 | 1 | 50% |
| Total | 2 | 100% |

**9-syll**

| Corpus | 243323235 | 1 | 25% |
| Corpus | 431323235 | 1 | 25% |
| Corpus | 432323235 | 2 | 50% |
| Total | 4 | 100% |