# All Beginnings are Light
## A Study of Upbeat Phenomena at the Syntax-Phonology Interface*

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*Abstract:*

The present contribution investigates the motivations underlying a tendency for phonological phrases in English to start with upbeats, i.e., unstressed syllables. The empirical part consists of two case studies based on a corpus of Early Modern English prose, and focusing on the variable use of the preposition *of* introducing nominal complements of *(un)worthy* and objects of gerunds, respectively. The counts provide quantified evidence indicating that the upbeat phenomenon is not only a corollary of the need for a function word signaling the beginning of a new phrase, but also a rhythmically motivated preference that exerts an influence on the presence or absence of a grammatical marker in phrase onsets. The phonological requirement for an upbeat thus has consequences for the syntactic makeup of phrases. In light of such empirical facts, it is argued that models of grammar conceptualizing the syntax-phonology interface as a unidirectional mapping are not tenable.

*Keywords:*
- phonological phrase
- syntactic phrase
- upbeat
- grammatical marker
- *of* (preposition)
- *(un)worthy* and its complements
- gerunds and their (notional) objects
- syntax-phonology interface
- Early Modern English

## Introduction

The present study tackles the syntax-phonology interface and seeks to establish a more balanced conception of the interrelations between these two components of grammar than is attested in many linguistic treatments to the present day. A long and influential tradition, beginning with the advent of generative grammar, has it that this interface is largely unidirectional. Accordingly, the syntactic makeup of a grammatical structure determines its phonological realization, but the reverse is ruled out: phonological representations exert no influence whatsoever on the syntactic form of an utterance.[1] Rhythmic configurations in English have been described in considerable detail, though hardly ever with a view to their influence on grammatical structures.[2] It

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is common even in these specialized studies to find statements to the effect that the scope of rhythmic principles remains confined to rhythmic configurations proper, but that they have no effect on the grammatical (or lexical) domain (cf., e.g., Selkirk 1984:37; Couper-Kuhlen 1986:60). Neither does the framework known as systemic functional grammar (see, in particular, Halliday 2004) allow for any influences exerted by prosody on syntax, even though it establishes an explicit link between the two domains. A readjustment of this one-sided view has already been undertaken in Schlüter (2005) and Schlüter (2008). Both contributions concentrate on the grammatical repercussions of the preference for alternating stressed and unstressed syllables, which is the most important rhythmic principle effective *within* phonological phrases. The novelty of the present contribution consists in its focus on the *onsets* of such phrases and foregrounds a (syntactically and/or phonologically motivated) preference for light beginnings. Thus, while weak and strong elements tend to alternate within phrases, the initial element of these phrases tends to be weak rather than strong. It is the aim of the present analysis to provide empirical evidence for the effects of the upbeat constraint and to disentangle potential phonological and grammatical explanations for such a preference.

The phenomena that have been selected as test cases are taken from Early Modern English and concern the variable use of the preposition *of* introducing nominal complements of *(un)worthy* (e.g., *unworthy (of) praise*) and introducing objects of gerunds (e.g., *the keeping (of) bees*). These examples have been chosen because they involve an appropriate syntactic and prosodic structure and exhibit a substantial degree of variation in the period investigated (which has settled into stable patterns in Present-Day English). The present paper takes a snapshot of the interesting Early Modern situation and glosses over anterior and posterior developments only summarily. The variation phenomena considered mainly serve to illustrate the preference for light beginnings and might therefore be replaced or augmented by other potentially similar cases, a few of which are mentioned in the conclusion.

## Rhythm in English Phrases

The rhythm of English has been claimed to be molded by two opposing principles. On the one hand, plurisyllabic Germanic words that are members of the major lexical categories generally have (stem-)initial stress and thus form left-headed (i.e., trochaic) feet (Getty 2002:104; Halliday 2004:13).[3] Moreover, it seems likely that several Old and Middle English sound changes have conspired to assimilate phonological word shapes to a trochaic prototype (Ritt 2004:289-306). Similarly, Romance loanwords have in many cases shifted their stress to the first syllable. This applies in particular to nouns and adjectives, but also to the majority of verbs. Further indices speaking in favor of a basic trochaic rhythm are the preponderance of suffixation and encliticization over prefixation and procliticization; the Compound Stress Rule, which stresses the first element in a compound; and the preferred leftward direction of stress movements caused by the Stress Shift Rule (Obendorfer 1998:97-101; see also Allen & Hawkins 1978:176).

On the other hand, phrases most commonly begin with determiners, prepositions, or conjunctions, all of which represent typically unstressed function words and have their focal elements on their right. Therefore, linguists like Tarlinskaya (1984:12), Kelly and Bock (1988:399), and Obendorfer (1998:97-101) argue that the basic rhythm of English sentences is iambic. This conclusion agrees with Gil's (1987:121) so-called "Principle of Iambicity," which, according to

the author, underpins numerous aspects of verbal and non-verbal behavior at various hierarchical levels. Iambicity refers to the tendency for phonological, morphological, syntactic, semantic, pragmatic, intonational, and even extralinguistic structures like artificial language and music to consist of binary groupings with a light first and a heavy second constituent (Gil 1987:121-32).[4] Patterns consisting of a weak and a strong syllable are also known to prevail not only in English prose (cf. Aristotle's statement [*Poetics*:1449], according to which the iamb is the most speakable of meters, qtd. in Plank 1998:217; see furthermore Tarlinskaya 1984:12; Kelly & Bock 1988:399). The functional motivation of the Principle of Iambicity is assumed to lie in the habit, widely observed in human behavior, to proceed from lighter and easier units to heavier and more difficult ones.

Thus, while at word level English usually has heavy initial syllables, there is widespread agreement in the literature that phonological phrases frequently begin with light (unstressed) elements. For the purposes of the present study, there is no need to adopt either the trochaic or the iambic view of English rhythm. Under the trochaic view, the phrase-initial unstressed syllable would be considered as extrametrical; under the iambic view, no additional stipulations are necessary. In any case, the beginnings of phonological phrases have a tendency to be light.

To prevent confusion, the terminology used in the description of versified language (including terms such as "meter," "iamb," "trochee," and "foot") will henceforth be avoided. The initial unstressed syllable of a phonological phrase has variously been referred to in the linguistic literature as "precontour" (Pike 1945:65), "anacrusis" (Jassem 1952:39-40; Hirst 1998:58), or "upbeat" (Fijn van Draat 1967 [1910]:113-14).[5] The latter term, borrowed from musical theory, will be adopted for the following discussion (though, under the iambic view, unstressed initial syllables should not properly be labeled "upbeats" but are part of the first foot).

Before we can set out to investigate relevant configurations in corpus data, we need to clarify how phonological phrases can be defined (cf. Selkirk 1984; Nespor & Vogel 1986; Hayes 1990; Inkelas & Zec 1995). In the prosodic hierarchy, phrases are located between the smaller clitic groups (which basically consist of one word plus any potential pro- and enclitic elements) and the larger intonational phrases, which combine to form an utterance. Their overlap with syntactic phrases is only partial: phonological phrases tend to be more evenly sized (Nespor & Vogel 1986:178; Inkelas & Zec 1995:544), as illustrated by the example analyzed in Figures 1 and 2 (adapted from Hayes 1990:86).
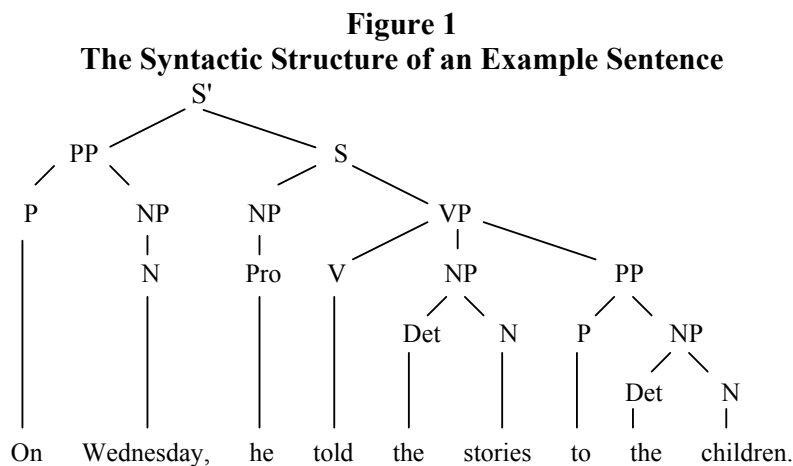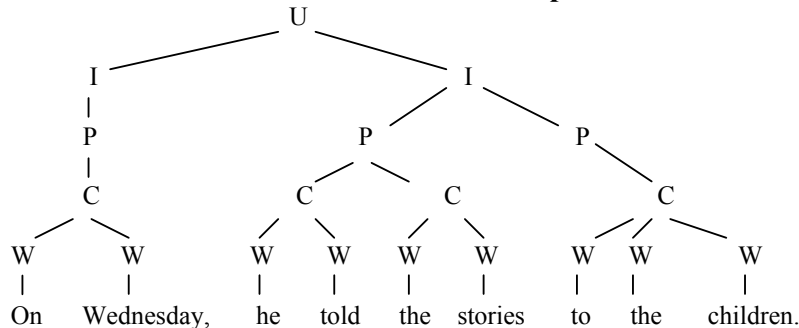
**Figure 1**
**The Syntactic Structure of an Example Sentence**

**Figure 2**
**The Prosodic Structure of an Example Sentence[6]**

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                              U
               ┌──────────────┴──────────────┐
               I                              I
               │                      ┌───────┴───────┐
               P                      P               P
               │              ┌───────┴──┐       ┌────┴──┐
               C              C          C        C
            ┌──┴──┐        ┌──┴──┐    ┌──┴──┐  ┌──┴─┐   │
            W     W        W     W    W     W  W    W   W
            │     │        │     │    │     │  │    │   │
            On  Wednesday, he  told  the stories to the children.
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There is thus a close relationship between syntactic and prosodic phrasing. As Halliday (2004:15) points out, features of prosody play a role in the discussion of grammar since prosodic chunking translates into grammatical units of a particular and important kind. In spoken language, syntactic divisions can be derived from prosodic groupings and pauses. Note, however, that one syntactic structure is not always aligned with the same prosodic structure: prosodic phrasing depends, among other things, on the information status of the material (given vs. new; cf. Halliday 2004:87-90), the speaking rate, the prosodic environment, the use of contrastive stress, and speaker idiosyncrasies.

The boundaries between units in the prosodic hierarchy translate into junctures, i.e., pauses or prosodic surrogates of pauses such as the lengthening of the terminal syllable: the more important the boundary, the longer the juncture between two prosodic units (Bolinger 1981:19).[6] The phonological phrase has been defined as the domain of rhythmic rules such as stress shift (Selkirk 1984:319; Nespor & Vogel 1986:177-8; see furthermore Inkelas & Zec 1995) and the Principle of Rhythmic Alternation (Schlüter 2005:264-7 and references therein). As pointed out above, at the beginning of a phonological phrase a different well-formedness constraint applies, irrespective of the rhythmic status of the end of the preceding phrase: the requirement for an upbeat.

## Phonological and Syntactic Explanations

The presence of an upbeat in the onset of phonological phrases can be accounted for in at least two different ways. This section contrasts the two approaches that will be played off against each other in the following empirical study. There is yet no reason to expect that the two conceivable accounts (which we will refer to as the phonological or rhythmic one and the syntactic or grammatical one) are mutually exclusive; rather, they can be simultaneously true and work synergistically.

In the sparse literature on the upbeat phenomenon, the tendency for phonological phrases to begin with an unstressed rather than a stressed syllable is commonly formulated as a purely phonological fact (Pike 1945:65; Jassem 1952:39-40; Hirst 1998:58). Only Fijn van Draat (1967 [1910]:113-14) points to the influence the preference may exert on the grammatical structure of phrases. He suggests the hypothesis that the presence of an upbeat is an ideal in its own right and

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that different grammatical processes actively conspire to fill the upbeat position. Writing long before the advent of computer-readable corpora, he was, however, unable to substantiate his hypothesis on a large empirical basis. Thus, one part of the present study is devoted to showing that phrase-initial grammatical elements may be added or left out, depending on whether an unstressed upbeat syllable needs to be supplied or not.

An equally likely hypothesis is that the tendency of larger prosodic units to begin with an unstressed syllable is merely a by-product of the fact that they usually begin with function words such as determiners, prepositions, and/or conjunctions, which often happen to be stressless. In this case, the target of the preference might not be the presence of an unstressed syllable, but of a function word to signal the grammatical status of the beginning phrase. Consequently, an unstressed phrase-initial syllable does not satisfy the requirement unless it is a grammatical marker.

The variable grammatical item under consideration in the two case studies outlined in the next section is the preposition *of* introducing noun phrases functioning as nominal complements of *(un)worthy* and as notional objects of gerunds. The two scenarios that are conceivable can be schematized as in Table 1. Noun phrases can be classified according to whether they begin with a determiner (i.e., a grammatical marker) or with a lexical element (a noun or attributive adjective). The latter may have an unstressed or a stressed initial syllable. The dependent variable is the use of *of* or its omission (Ø). The phonological and the syntactic accounts can be predicted to have different outcomes only in the case of non-initially stressed lexical items without a preceding grammatical marker.

**Table 1**
**A Contrastive Synopsis of the Phonological and the Syntactic Account**

| first element of noun phrase | determiner | noun or adjective with | |
|---|---|---|---|
| | | noninitial stress | initial stress |
| phonological explanation: phrase-initial unstressed syllable | Ø | Ø | *of* |
| syntactic explanation: phrase-initial function word | Ø | *of* | *of* |

Studies of grammatical variation involving variable syntactic markers in the openings of phrases have so far remained restricted to syntax-internal explanations. It is possible, however, that on closer inspection, such phenomena also involve a prosodic component. One case in point is the results presented in Fanego (2007). In her eighteenth-century data, she finds that gerundial *-ing*-forms functioning as heads of subject or object clauses tend to be preceded by the definite article, which in these cases is not motivated as a marker of definiteness. Its distribution is almost complementary to that of prepositions introducing gerundial clauses in other syntactic functions. The definite article as well as the prepositions preceding gerunds are, according to Fanego (2007:192), motivated as grammatical markers of subordination, helping to ensure the speedy recognition of the syntactic status of the gerundial clause. An example of each type is provided in (1) and (2).

(1)     ...he chose to make the first Declaration to herself; *the gaining* her Affections
        being the material Point, he considered all others of little Consequence. (Eliza
        Fowler Haywood: *The Fatal Secret*, 1725; *ECF*)

(2)     …; so that *in showing* my Resentment, or even *in seeking* Justice for my
        Brother's Goods, I might lose my own Life; … (Daniel Defoe: *A Journal of
        the Plague Year*, 1722; *ECF*)

Similarly, Fanego (2007:197-8) hypothesizes that the so-called "impertinent *by*" cropping up recently in American English nonstandard usage in examples like (3) has been recruited to introduce gerundial subject clauses as a structural signal of subordination. Since the use of clauses headed by gerunds in subject function is a novel development in American English and may therefore cause processing difficulties, Fanego explains the addition of *by* in terms of the need for an explicit grammatical signal.

(3)     *By trying to make his mother happy* proved unlucky for Paul. (American
        undergraduate essay; qtd. from Fanego 2007:197)

While Fanego does not mention this possibility, it is conceivable that part of the motivation for the use of the definite article in the absence of an introductory preposition as in (1) and part of the motivation for the addition of *by* before gerundial subject clauses as in (3) is rhythmic in nature. The use of *the* or *by*, respectively, provides an unstressed upbeat syllable for an incipient phonological phrase. In the examples quoted—as in many similar cases—both motivations give rise to the same result and are therefore hard to isolate.

Another case in point is provided by a study of a Present-Day English corpus by Temperley (2003:475). He produces evidence for an interplay between the variable use of the relative marker *that* and the presence of a determiner in the subject noun phrase of relative clauses: in case a determiner is present, the relative marker is more likely to be omitted than in case the subject noun phrase is determiner-less. Temperley (2003:477) adduces an explanation in terms of syntactic ambiguity avoidance: in his view, the use of *that* in sentences like (4) serves to exclude a temporary misanalysis of the sequence *biological toll logging* as a single noun phrase with an adjectival and a nominal premodifier. Alternatively, this compensatory relationship between determiners and relative markers can be interpreted as another upbeat phenomenon ensuring the presence of an unstressed syllable at the beginning of the relative clause.

(4)     The *biological toll (that) logging* can take on a landscape is well known, …
        (qtd. from Temperley 2003:477)

By comparing the relative contributions of the phonological and the syntactic explanations for the preference for upbeats, the present study bridges the gap between two separate traditions in linguistics. On the one hand, there is the purely phonological description of rhythm in English, represented by authors like Pike (1945), Jassem (1952), and Hirst (1998), and on the other, there is the study of grammatical variation, exemplified in the work of Fanego (2007) and Temperley (2003), which rarely takes into consideration phonological constraints. The combina-

tion of both approaches promises to yield novel insights into the nature of the interface between syntax and phonology.

As mentioned above, the following corpus analyses single out two variation phenomena from the Early Modern English period. The studies draw on the *Early English Prose Fiction* (*EEPF*) corpus, which comprises 211 narrative texts published between 1518 and 1700 by 96 known and a number of anonymous authors. The overall size of the corpus runs to 9.6 million words.

An important methodological caveat has to be included at the outset: not only is the connection between prosodic and syntactic phrasing a variable one (as pointed out above), but we are also dealing with a written corpus rather than a spoken one, so that prosodic phrasing can only be deduced from what is visible in the texts, i.e., syntax and punctuation. The following studies are based on the assumption that the parallels between phonological and syntactic phrases in written data are limited, but that they certainly exist. In a similar vein, Halliday (2004:14) claims that "[i]f we are given a text in writing, there will always be various possible ways of intoning it, each with a somewhat different meaning; but generally one or a small number of these possible intonation patterns will stand out as more natural and more likely." Admitting that we have no exact means of knowing where a phonological phrase begins or ends, he continues (2004:14), "we determine the boundaries on theoretical grounds, making generalizations which have the greatest explanatory force."

A corresponding procedure has been adopted for the present analysis: care has been taken to isolate prosodic units of approximately the size of the phonological phrases shown in Figure 2, i.e., intermediate between the clitic group and the intonational phrase. Their length corresponds roughly to a full-fledged noun phrase. Units below this minimal size, e.g., pronouns (variably preceded by the preposition *of*), have been excluded from consideration; units above this size, e.g., noun phrases modified by additional material, have been included since the beginning of a larger intonational phrase necessarily coincides with the beginning of a smaller, phonological phrase. This presupposes a relatively slow and careful speaking style where *(un)worthy* and its complements as well as gerunds and their objects belong to two different phonological phrases and are separated by an intervening phonological phrase boundary. In more rapid realizations, this would not be the case, but slower styles seem more appropriate for narrative texts of the Early Modern English period. Examples of the exclusions that this procedure forces in the two following corpus studies are given under the headings "Procedure I" and "Procedure II," respectively.

## *Of* Introducing Nominal Complements of *(Un)worthy*

The adjective *worthy* and its antonym *unworthy* in predicative and other non-attributive uses can take nominal complements which are nowadays regularly introduced by the preposition *of*. Originally, *(un)worthy* took nominal complements in the genitive, but the latest instances of inflected genitives following *worthy* date back to the early Middle English era (Mustanoja 1960:87). Since that time, the unmarked nominal complements have in due course been replaced by complements introduced by *of*, a process that spanned many centuries and was characterized by a considerable degree of variability (Fijn van Draat 1912:534; Denison 2001:132; Rohdenburg 2007:221, 226). Two examples from Early Modern English are given in (5a-b).

(5)    a.      … their resistance would not be long enough to render my reliefe *worthy that Name*. (Anon.: *Cynthia*, 1687; *EEPF*)

        b.      *...,* truely he was thereby so overjoy'd, that he perform'd many things *vnworthy of his yeares*, and Majesty; ... (Roger Boyle: *Parthenissa*, Part 2, 1655; *EEPF*)

In the *EEPF* corpus (1518 to 1700), the share of prepositional complements attains 67 percent of the total. In the comparable *ECF* corpus (1705 to 1780), the quota rises to 80 percent, in the *NCF* corpus (1782 to 1903) to 92 percent, and in the fictional prose section of the *BNC* (1960 to 1993) there is not a single instance of the *of*-less construction left.[8] Thus, the Early Modern English era boasts the most important variability and will come under scrutiny here.

    The prosodic boundary between *(un)worthy* and the following complement is relatively wide since it marks the beginning of a new noun phrase, which is usually separated from the preceding material by a substantial juncture. Thus, we expect the noun phrase to begin with an upbeat and investigate the way in which this upbeat position is filled. Keeping in mind the caveats entered above, the variable presence of the preposition *of* introducing nominal complements of *(un)worthy* provides an appropriate empirical basis on which the phonological and syntactic explanations sketched above can be played off against each other.

**Procedure I**

    The *EEPF* corpus was searched for all occurrences of *worthy* and *unworthy* (and their spelling variants). Only those examples involving a full noun phrase as complement were taken into consideration for the count. The matches were grouped into three categories according to the type of initial element of the complement expression: complements beginning with a determiner as in (6a-b) and complements beginning directly with a noun or adjective, which could either have an unstressed initial syllable, as in (7a-b), or a stressed initial syllable as in (8a-b).[10]

(6)    a.      Many other things *worthy the remémbrance* did he receive, which now I have forgot. (Anon.: *The Pinder of Wakefield*, 1632; *EEPF*)

        b.      ... I dare boldly pronounce it, that I hold my selfe *worthy of a Quéene*, if I could get her good will. (M.P.: *The Hairy-Giants*, 1671; *EEPF*)

(7)    a.      ... some disdayne others labours, that are themselues loytering ydel lyuers, that eyther cannot doo any thing *woorthy commendátion*, or if they be able, consume theyr tyme in scoffing, or else in ydle liuing. (William Averell: *A Dyall for Dainty Darlings*, 1584; *EEPF*)

        b.      ...: who for curtesie and passing mutual kindnesse, are *worthy of remémbrance*. (John Reynolds: *The Triumph of Gods Revenge*, Book 2, 1622; *EEPF*)

(8)    a.      Did you so (quoth Simonides) truely you were the more *worthie bláme*, I thinke you infortunate, in refusing suche an offer. (Alexander Oldys: *The Female Gallant*, 1692; *EEPF*)

b.　　... Telamon began to comforte her, and tell great tokens of his good will, and though *vnworthy of súch succésse*, yet did he craue Cleocritus his succession: … (Brian Melbancke: *Philotimus*, 1583; *EEPF*)

The (a)-sentences of each pair contain an example illustrating the older prepositionless type, and the (b)-sentences an example where *of* is already used to introduce the nominal complement in accordance with modern usage. From the point of view of rhythm, the two types of nominal complement in (6) and (7) already begin with an unstressed syllable and would thus render an additional upbeat in the form of the preposition *of* superfluous. This of course presupposes that the nominal complements form phonological phrases of their own, but this seems highly likely even for single nouns like *commendation* or *blame* since lack of a prosodic boundary would easily lead to misinterpretations of the sequence *worthy* + noun as an attributive structure. From a syntactic point of view, only the noun phrases in (6) already begin with a function word (a determiner), while those in (7) and (8) feature a fully-fledged content word that lacks a marker indicating its grammatical function.

　　Before we come to a comparison of the frequency of the preposition before different complement types, some exclusions have to be made which would otherwise distort the picture. For a start, before pronominal complements, *of* has an extraordinarily high incidence: pronominal complements of *(un)worthy* are the first to thoroughly establish *of* as early as the Early Modern English period and there are no more than 3 cases in 144 that occur without the preposition in the *EEPF* corpus. Thus, example (9a) forms an exception to the rule illustrated in example (9b).

(9)　a.　　… Blacius, who meeting in him all things *worthy it*, and your absence contributing a favourable opportunity, … (Anon.: *The Player's Tragedy*, 1693; *EEPF*)

　　b.　　But Candy was not *worthy of her*; … (Anon.: *The Tincker of Tvrvey*, 1630; *EEPF*)

The reason for the striking affinity of pronominal complements with the introductory preposition may have to do with the absence of prosodic salience in simple pronouns (Obendorfer 1998:57). Their semantics disqualifies them from carrying an accent since pronouns by definition represent given material. More importantly, pronominal complements are of no interest in the present context since their phonological substance is insufficient to constitute a phonological phrase in its own right even if amplified by the addition of the preposition *of*. Rather, the sequence *of* + pronoun in sentences like (9b) is pronounced as a tail to the predicative adjective *worthy*, which carries the main phrase-final prominence. The count therefore disregards pronominal complements.

　　A further type of example that is excluded from the study is exemplified in (10a-b).

(10)　a.　　... (as of old, when the Innocency of Shepherds, made them *worthy the society of* the deathlesse Dieties) ... (Anon.: Fortunatus, 1682; *EEPF*)

　　b.　　I say, reply'd Silvia, that this Fellow is mad and raves; that he is my Vassal, my Servant, my Slave; but, after this, *unworthy of the meanest of* these Titles. (Aphra Behn: *Love Letters between a Noble-Man and his Sister*, Part III, 1687; *EEPF*)

In both examples the head of the nominal complement is immediately followed by a preposition-al phrase featuring the preposition *of*. In case the complement itself is introduced by *of*, as in (10b), this leads to a relatively close adjacency of two identical words. The *Horror Æqui* Princi-ple (Rohdenburg 2003:236-42; Fanego 2007:176-7) predicts that the complement-introducing preposition *of*, which is only optional, will therefore tend to be suppressed (see Rohdenburg 2007:221 on the particular case in question here). Thus, all examples in which the complement expression contains *of* are discounted. In fact, the percentage of complement-introducing *of* is reduced to only 13 percent (10 out of 78 instances) in *horror æqui* contexts, a figure which dif-fers significantly from the average of 67 percent (782 out of 1173 instances) in the total for the period.[9]

Besides the *Horror Æqui* Principle, the Complexity Principle (Rohdenburg 1996:151) proves to be an influential factor co-determining the use of the preposition *of*: in cases of syntac-tic complexity, an additional *of* can be supplied to establish an explicit link between *(un)worthy* and its complement (Rohdenburg 2007:226-7). The quota of occurrence of *of* rises to 90 percent (18 out of 20 instances) in contexts with an insertion between *(un)worthy* and the complement as in (11a), and to 100 percent (39 out of 39 instances) in extraction contexts like (11b).[11] For this reason, examples involving such complexity factors are likewise excluded from the study.

(11) a.  … so cruel a censure to deprive him of all hopes, whom she thought *worthy* in the least degree *of* her affection. (George Whetstone: *An Heptameron of Ciuill Discourses*, 1582; *EEPF*)

   b.  …, or perish in the duty of attempting it: and thereby gain what she is *worthy of*, or loose him that is unworthy of her. (Anon.: *Love's Poesie*, 1686; *EEPF*)

**Results I**

Figure 3 visualizes the results for all instances of *(un)worthy* followed by a nominal com-plement (excluding pronominal complements, *horror æqui* and complexity contexts) according to the grammatical and rhythmic nature of the first element in the complement expression.

**Figure 3**
**The Distribution of the Preposition *of* Preceding Nominal Complements of *(un)worthy* According to the Kind of Initial Element of the Complement Expression in the *EEPF* Corpus**
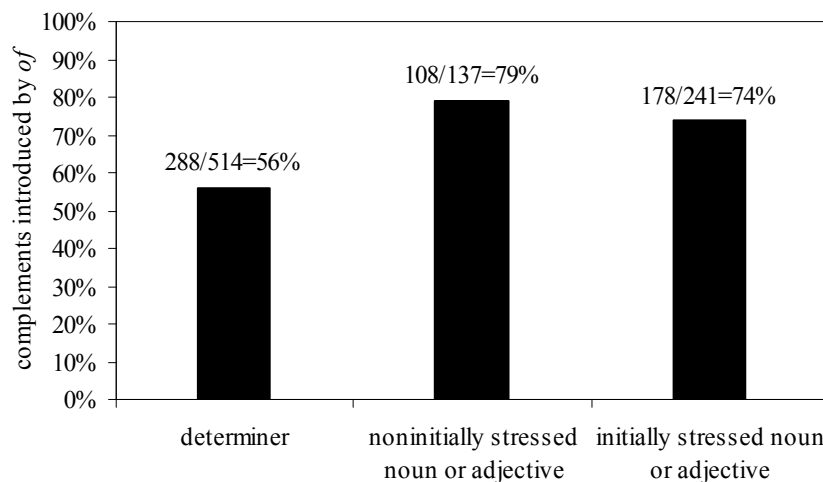


The frequency of an introductory *of* in the three categories of nominal complements hovers between 56 and 79 percent. Complements beginning with determiners have the lowest percentage of *of,* and among the complements with a noun or adjective as the first element, all of which have a comparatively high quota of *of*-insertion, the non-initially stressed ones are most frequently introduced by the preposition. The difference between non-initially and initially stressed exponents of the latter category turns out to be statistically insignificant. Instead, we find a highly significant division between determiners on the one hand and nouns and adjectives on the other.[12] The statistical test thus reveals two groups differing in their respective affinities with the introductory *of*: nominal complements beginning with a function word, be it an article, a possessive, demonstrative, or other determiner, dispense with the preposition relatively often, while complements beginning with a noun or adjective select it more frequently. Initially stressed nouns and adjectives do not take the preposition more often than noninitially stressed ones, though the first syllable of the latter group could readily function as an upbeat. This finding supports the syntactic explanation of the upbeat phenomenon.

The preliminary conclusion that can be drawn from this study is that the presence of an unstressed initial syllable in a phonological phrase is not enough to replace the introductory preposition *of.* Therefore, non-initially stressed nouns and adjectives necessitate the presence of the preposition to the same degree as initially stressed ones. It seems, on the contrary, that the variable preposition is used to ensure that the phrase begins with a function word apt to provide a clue to its syntactic status. This conclusion leaves the precise nature of the grammatical signal unspecified. The data in Figure 3 suggest that articles and other determiners can fulfill this function just as well as the preposition *of* and thereby render its addition redundant.

By way of an account for the paramount importance of a grammatical signal introducing complements of *(un)worthy*, reconsider examples (7a) and (8a), where such a signal is absent: these examples might be (temporarily) misanalyzed by readers as combinations of an attributive adjective and a noun, especially given the fact that the complement-taking use of *(un)worthy* is

more marked than its use as premodifier of a noun. Such local ambiguities are avoided in all of the other examples quoted above, be they introduced by a determiner as in (6a), by *of* as in (7b) and (8b), or by both as in (6b). This might account for the predominance of the syntactic constraint over the rhythmic one in the case of *(un)worthy*.[13]

It has to be admitted that the requirement for an upbeat only exerts a moderate influence on the distribution of the variable preposition, raising its incidence by 18 to 23 percentage points. Where applicable, the *Horror Æqui* Principle, the Complexity Principle, and the particular status of pronominal complements have far more important repercussions on the use of *of*. Yet, the statistical evidence speaks clearly in favor of the syntactic motivation for the occurrence of a phrase-initial function word.

## *Of* Introducing Objects of Gerunds

In Early Modern English, the objects of gerunds were, like nominal complements of *(un)worthy*, optionally introduced by the preposition *of*. The occurrence of the preposition in this context is a consequence of the fact that gerunds originally were abstract deverbal nouns of action formed with the suffix *-ing*. Thus, the gerund started out with a noun-like syntax: for instance, it could function as a subject, object, predicative, or prepositional complement, and its notional object could be appended in the form of an *of*-phrase (Visser 1973:1993; Jack 1988:15; Fanego 1996:97-8; 2004:6-11). In late Middle English, the deverbal noun adopted some verbal features, possibly facilitated by a contamination between the gerund and the verbal *-ing*-form.[14] This started a process of increasing verbalization, resulting in the creation of the gerund (Mustanoja 1960:593; Jack 1988:17; Nehls 1988:185-9; Fanego 1996:98; Nevalainen & Raumolin-Brunberg 2003:65-6). The different syntactic patterns characteristic of this process are illustrated in examples (12a-d), which do not, however, imply a chronological order of appearance (Jack 1988:43-4; van der Wurff 1993:364-5; Fanego 1996:97-8; Rissanen 1999:292; Nevalainen & Raumolin-Brunberg 2003:65).

(12) a. ..., which had made him yield to *the taking of Zóra* into his Family at the first request, which Repset had made him. (Peter Bellon: *The Court Secret*, 1689; *EEPF*)

b. … it had so well succeeded to the remouing all other hinderances, that only her resolutiō remained for *the taking their háppy iournie*, … (Sir Philip Sidney: *The Covntesse of Pembrokes Arcadia*, 1593; *EEPF*)

c. ..., and making force and furie waite vppon discretion and gouernement, he might seeme a braue Lion who taught his yong Lionets, how *in taking of a práy*, to ioine courage with cunning. (Sir Philip Sidney: *The Covntesse of Pembrokes Arcadia*, 1593; *EEPF*)

d. Why then should this Woman be accused of extream Levity, only *for taking occásion* by the Foretop, and, at first Encontre, making sure of what, perhaps, she otherways might have lost. (Walter Charleton: *The Ephesian and Cimmerian Matrons*, 1668; *EEPF*)

The degree to which a particular construction has verbal properties can be determined by studying syntactic features both before and after the gerundial *-ing*-form. By these measures, the construction in (12a) is entirely nominal in form: it is introduced by an article and takes a notional object in the shape of an *of*-phrase. In (12b), the use of the article remains, but the gerund exhibits a verb-like complementation with a direct object lacking the preposition *of*. The construction in (12c) combines the absence of a determiner, typical of verbs, with a notional object encoded in an *of*-phrase, a typically nominal characteristic. Examples (12b) and (12c) thus constitute "syntactic blends" in Nehls' (1988:185) terms, "hybrids" in Fanego's (1996:133; 2004:23) and Aarts' (2004:17) terms, or "transcategorical constructions" in Malouf's (2000:133) terms. Finally, (12d) contains a gerund that dispenses with any kind of determiner and also takes a direct object. According to both criteria, (12d) therefore represents the most verbal type of gerund, which has become the rule in Present-Day English (except with possessive pronouns as determiners).

In three detailed analyses, Fanego (1996, 2004, 2007) investigates the time course of the evolution of gerundial *-ing*-forms. She finds that the adoption of verbal features started with the emergence of direct (prepositionless) objects following the gerund, the first occurrences cropping up at a time around the year 1300 (Fanego 1996:89, 2004:8; see also Nehls 1988:188-9). The use of *of*-phrases for notional objects fell into disuse in the standard language only in the mid-nineteenth century (Visser 1973:133). Similarly, the use of determiners preceding the gerund persisted for a relatively long time (Fanego 1996:133; Denison 1998:268-70 on Late Modern English). Interestingly, Fanego (1996:132, 2004:10-11) notes that those gerunds that had given up the use of preceding determiners and which were thus further advanced on the way towards verbalization in one dimension also spearheaded the large-scale replacement of *of*-phrases by direct objects. This changeover had reached 77 percent by 1640 and was nearly completed by 1700. It was only in the second half of the seventeenth century that it began to extend to the more nominal gerunds preserving the determiner (Fanego 1996:134-5).[15] This structure did not, however, enjoy large success; according to van der Wurff (1993:367), by 1900, gerundial constructions had become polarized towards one of the two extremes: they had to be either completely nominal (similar to abstract nouns)[16] or completely verbal (similar to the spreading progressive verb forms; see van der Wurff 1993:372-3). This clustering of verbal features on the one hand and nominal features on the other may be interpreted to lend support to Aarts' (2004:35) hypothesis that language disfavors the hybridization between characteristics of different grammatical categories. As a consequence, the boundary between nominal and verbal gerunds has been sharpened, though hybrids have not been completely eliminated (e.g., gerunds with possessive pronouns or genitive noun phrases as notional subjects and with object expressions without *of*).

Crucially for this analysis, the different syntactic types illustrated in (12a-d) coexisted for a considerable time and present an intricate variation profile in the Early Modern English period. The following study takes a synchronic snapshot of this interesting period as represented by the *EEPF* corpus of fictional prose. The variable use of the preposition *of* is employed to shed additional light on the question of the phonological or syntactic motivation of upbeats to phonological phrases. In fact, except in the case of pronominal objects, the object expression can be assumed to represent a prosodic unit of its own, which can be expected to begin with an upbeat of some kind. As in the preceding study of *(un)worthy* and its complements, if the prosodic account of the upbeat phenomenon holds true, an unstressed syllable of any grammatical description should suffice to satisfy the constraint. If, however, the grammatical account has a greater ex-

planatory potential, the first syllable should above all be a grammatical signal indicating the function of the object expression.

**Procedure II**

As a first step in the analysis, a suitable number of gerundial *-ing*-forms followed by direct objects or *of*-phrases had to be culled from the corpus. For this purpose, 25 transitive verbs of moderate to high frequency were chosen. The set includes *avoid, beget, bestow, carry, cheat, fetch, frame, gain, get, join, keep, kill, lament, make, murder, preserve, punish, rob, save, shed, spare, steal, take, tell,* and *wear*. Subsequently, the *EEPF* corpus was searched for the *-ing*-forms of these verbs. To restrict the results of the search to gerundial *-ing*-forms, two strategies were adopted. The first search was limited to *-ing*-forms preceded by the definite article *the*, retrieving examples like (12a-b) above, and the second to *-ing*-forms immediately following any of the prepositions *at, by, for, from, in, of,*[17] *to, with,* and *without*, retrieving examples like (12c-d) above. Note that the former type of *-ing*-form may in addition be preceded by another preposition. As the examples indicate, both types of *-ing*-forms can occur with or without *of* introducing the following object phrase. The results of the two corpus searches are, however, kept separate, since the more verbal and the more nominal *-ing*-forms differ widely in their affinity with direct objects and *of*-phrases, as was to be expected on the basis of Fanego's (1996, 2004) findings summarized above.

The categorization scheme for the types of object expressions is identical with the one adopted for the previous study of the complements of *(un)worthy*. The three groups are represented by the examples in (12): object expressions beginning with a determiner as in examples (12b-c), those beginning with a non-initially stressed content word as in example (12d), and those beginning with an initially stressed content word as in example (12a).

As before, a number of examples had to be excluded from the data. The first kind of exclusion concerns personal pronoun objects, which are of no interest here because they do not form phonological phrases of their own. Note that their behavior as objects of gerunds is not as deviant in this case as it is when they complement the adjective *(un)worthy*: they are introduced by the preposition *of* in 74 percent (39 out of 53) of the cases involving the more nominal gerunds as in examples (13a) and (13c) compared to 82 percent (344 out of 419) of the full noun phrase objects, and in 10 percent (19 out of 184) of the cases involving the more verbal gerunds as in examples (13b) and (13d) compared to 13 percent (192 out of 1470) of the full noun phrase objects.

(13)    a.    … that Castle, for the King of Morea, bestowed *the keeping of it* on Clorimundus his Esquire. (Lady Mary Wroth: *The Countesse of Mountgomeries Urania*, 1621; *EEPF*)

        b.    … ran first to one, and then to another, to let them *from carying of hir* away, for whome they came. (William Painter: *The Palace of Pleasure*, 1567; *EEPF*)

        c.    …, to haue raizd all the townes within ten miles of London, for *the keeping her* out. (Thomas Dekker: *The VVonderfull Yeare*, 1603; *EEPF*)

        d.    … his father deceiued his hopes, *in carrying him* from Rome to Caprea: … (John Reynolds: *The Triumph of Gods Revenge*, 1622; *EEPF*)

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Secondly, the corpus searches yielded a large number of contexts giving rise to *horror æqui* effects. To avoid a distorting influence, all instances where the sequence of *-ing*-form (+ *of*) + object is preceded or followed by another instance of the preposition *of* are excluded. This concerns examples where the object expression itself contains an *of* as in example (14a), where it is immediately followed by a prepositional phrase with *of* as in example (14b), or where the gerund is introduced by *of*, as in (14c-d).

(14) a. ..., for that the greatest part was yet remaining, which was *the taking the root of* the Horns out of the Skull; ... (Anon.: *Fortunatus*, 1682; *EEPF*)

b. …; besides, it is useful for a single Hit at Tick-tack, or for taking points, *by joyning two together of* a different sort. (Richard Head and Francis Kirkman: *The English Rogue*, Part 4, 1671; *EEPF*)

c. On another side, the Refusal which that Providence had made me *of the gaining our Process* so just and so reasonable, … (Anon.: *Alcander and Philocrates*, 1696; *EEPF*)

d. …; but that euery Citizen do eate either in the streetes or in an open window, vpon paine *of eating his next meale* with his heeles vpward. (John Healey: *The Discovery of a New World*, 1609?; *EEPF*)

The *Horror Æqui* Principle turns out to be a very strong determinant of the occurrence of *of* introducing object expressions. In connection with the more nominal type of gerunds introduced by the definite article (examples (14a) and (14c)), the frequency of *of* in *horror æqui* contexts is reduced to 60 percent (24 out of 40), which compares to 84 percent (320 out of 379) outside of these sensitive contexts. With the more verbal type of gerunds lacking the article (examples (14b) and (14d)), the frequency of the optional *of* in *horror æqui* contexts reaches a single percentage point (6 out of 457 hits), while in other contexts it runs to 18 percent (186 out of 1013 hits).[18]

A further factor impinging on the presence or absence of the preposition *of* is not controlled for in the following analysis. This concerns the lexicalization of verb + object combinations forming a type of complex verbal structure, of which the corpus search retrieved a considerable number. Many of these are independently excluded from the data used in this study on account of the fact that they are regularly followed by a prepositional phrase introduced by *of* and thus fall under the category of *horror æqui* contexts.[19] However, an equally large number of such complex verbal structures do not involve the preposition *of*, for instance *keeping a council*, *keeping a promise*, *keeping a secret*, *keeping accounts*, *keeping company*, *keeping one's word*, *making an answer*, *making an exception*, *shedding blood*, *shedding tears*, *taking heed*, *taking offence*, *taking part with*, *taking pleasure in*, *taking revenge*, and *taking vengeance*. Two examples from the dataset on which the following count is based are given in (15a-b).

(15) a. …: first he recorded to himselfe the ingratitude of his friend, and the small regard he had to participate it vnto him, that he woulde seeme to depart *without taking leaue* in his owne person, … (Austen Saker: *Narbonus*, 1580; *EEPF*)

b. And I must acknowledge, in that desperate Condition, I vented my Fury, *by taking Revenge* on Your Ministers. (Anon.: *Q. Elizabeth. and the E. of Essex*, 1680; *EEPF*)

Brinton and Akimoto (1999:16-17) and Traugott (1999:250-60; see furthermore Denison 1998:225) point out that from Middle English times onwards these constructions have evidenced a dramatic increase in frequency, which went hand in hand with a noticeable process of lexicalization. As a consequence, they underwent a freezing of form and meaning: the nouns became increasingly decategorialized and invariable in number, and their syntactic flexibility in terms of the range of determiners and modifiers they could take was reduced; the verbs were increasingly fused with their objects and the two became more and more inseparable. We can assume that this development had at least two effects with regard to the incidence of the preposition *of* intervening between the gerundial form of the verb and the object: on the one hand, a closely integrated verb-object collocation will be relatively resistant to the introduction of an intervening preposition even when the verb appears in its *-ing*-form; on the other, the gerund and its object will also tend to be joined into a single phonological phrase and therefore not require the presence of an upbeat element before the object. Nevertheless, Brinton and Akimoto and Traugott assert that in Middle and Early Modern English, such complex verbal structures preserved a greater degree of variability as to the constituent verbs, prepositions, and nouns, and a fuller range of nominal modifiers (including determiners and number contrasts) than they possess in Present-Day English. In fact, many of the corpus examples, for instance (16a-b), testify to this flexibility in that they involve additional determiners and modifiers and retain an *of* introducing the object.

(16) a. Euphues … determined sodeinly to depart, yet not *without taking of his leaue curteously*, … (John Lyly: *Euphues and his England*, 1580; *EEPF*)
b. Such therefore have published their own shame by their sin, and God, his anger, *by taking of open vengeance*. (John Bunyan: *The Life and Death of Mr. Badman*, 1680; *EEPF*)

On account of this persisting variability, it was impossible to determine which of these examples should be considered as lexicalized or not. Consequently, none was excluded from the following analysis, but we have to reckon with a reduction in the quota of *of*-selection in connection with certain verb-object collocations. What is more, we cannot be entirely sure that we are actually dealing with the onsets of phonological phrases in every instance: in examples like (15a) and (15b), collocations such as *taking leave* and *taking revenge* are perhaps more likely to be part of the same phonological phrase, so that the addition of *of* would be disfavored on account of the avoidance of sequences of unstressed syllables within a phrase. However, since the search strategy employed retrieved a highly heterogeneous set of gerund + object combinations and even those combinations that were involved in lexicalization processes had not yet attained the degree of fixedness they have today, we can expect most of the examples that entered the analysis to involve a phonological phrase boundary. This being said, we can now turn to the results of the corpus analysis.

**Results II**

Figure 4 concentrates on the older, more nominal type of gerunds, those with a definite article. As stated above, pronominal objects and examples preceded or followed by *of* have been excluded since they lead to major distortions of the results.

**Figure 4**
**The Distribution of the Preposition *of* Introducing the Objects of Gerunds Preceded by the Definite Article According to the Kind of Initial Element of the Object Expression in the *EEPF* Corpus**
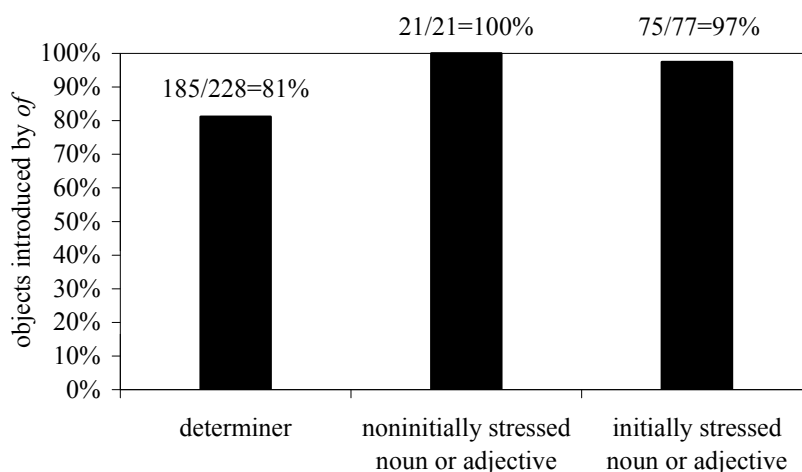


As was the case in the data for complements of *(un)worthy* (Figure 3), the category of non-initially stressed nouns and adjectives appears to tally with their initially stressed counterparts. However, the 21 exponents of this category are too few to warrant a statistical comparison to the objects introduced by determiners or to those beginning with an initially stressed noun or adjective. The contrasts between the latter two categories are highly significant,[20] but this was to be expected on account of both the syntactic and the phonological motivation for the upbeat phenomenon. As a result, the data in Figure 4 are not entirely conclusive.

In the face of this insufficient evidence, the data on the more verbal type of gerund introduced by one of the prepositions *at*, *by*, *for*, *from*, *in*, *to*, *with*, and *without* provide some further insights. Figure 5 visualizes the results, which again exclude all pronominal objects and *horror æqui* contexts.

**Figure 5**
**The Distribution of the Preposition of Introducing the Objects of Gerunds Preceded by One of the Prepositions *at*, *by*, *for*, *from*, *in*, *to*, *with*, and *without* According to the Kind of Initial Element of the Object Expression in the *EEPF* Corpus**
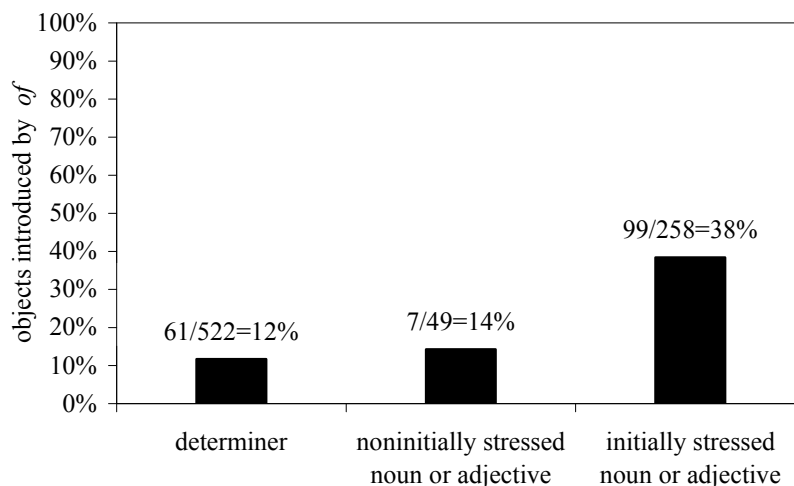


The most obvious conclusion that can be drawn from the comparison of this diagram with the preceding one is that the percentage of all types of object expressions introduced by *of* is remarkably lower after these more verbal gerunds than after gerunds with a preceding definite article. This accords well with Fanego's (1996:132) findings outlined above. Secondly, the verbal type of gerund is clearly more frequent in our Early Modern English data than the nominal type, which ensures a relatively high number of examples, in particular in the decisive category of object expressions beginning with non-initially stressed lexical words.

It is immediately clear that the data in Figure 5 suggest a different grouping of the three categories of object expression than those in Figures 3 and 4. While the latter distinguished between function and content words, this diagram groups together object expressions beginning with determiners and content words featuring an unstressed initial syllable. The percentage of introductory *of* preceding these objects oscillates within a narrow range of between 12 and 14 percent. In contrast, the percentage before objects beginning with an initially stressed noun or adjective soars to 38 percent, which distinguishes them significantly from the other two categories.[21]

With regard to the two hypotheses under scrutiny here, this finding speaks clearly in favor of a phonological motivation of the upbeat phenomenon. It appears as if the grammatical status of the initial syllable of the object expression plays no role as long as it is unstressed. Even noninitially stressed nouns and adjectives often do without the preposition, though this leads to a complete absence of grammatical function words at the beginning of the object phrase. This finding diverges from the preliminary conclusion drawn from the previous study of the complementation of *(un)worthy*, in which the requirement for a grammatical marker seems to outweigh the phonological upbeat function. In contrast with the case of *(un)worthy*, the grammatical constraint may be less important here because there is no danger of a genuine syntactic ambiguity arising: transitive verbs are expected to be followed by an object expression, so there is little need to

mark its function with a grammatical signal. However, there is a clear preference for these object expressions to have an unstressed upbeat syllable.

## Conclusion

To sum up, the present study has taken a snapshot of the variable use of the preposition *of* in two syntactic contexts: the first corpus analysis dealt with *of* introducing nominal complements of the adjective *(un)worthy*, and the second focused on *of* preceding the notional objects of (nominal and verbal) gerunds. As has been shown, the frequency of use of the preposition is above all a matter of the historical stage under consideration: in the diachronic increase of *of* after *(un)worthy* and in the decline of *of* before objects of gerunds, the Early Modern English period investigated here represents a transitional stage with massive variability. The corpus analyses have indicated that, on the synchronic level, the incidence of *of* is furthermore co-determined by such factors as the choice between pronominalized vs. full noun phrase constituents, the avoidance of identity effects (*horror æqui*), and the signaling of syntactic contingencies in cases of increased complexity (plus, possibly, the degree of lexicalization of a verb-object collocation, which has not been controlled for). When the distorting influences of these factors are excluded, there remains a considerable variance of around 20 percentage points that can be attributed to the requirement for an upbeat: in each of the datasets investigated, noun phrases with an unstressed function word (a determiner) as their initial element differ significantly from determiner-less ones beginning with an initially stressed lexical item (a noun or an adjective). Thus, the most important and least controversial result of the present study is the finding that the preference for an upbeat in phonological phrases has strong empirical support in its favor.

The corpus studies have in addition attempted to investigate the functional motivations underlying the upbeat phenomenon. Two accounts were introduced, one centering on the rhythmic function of an upbeat, the other on the preference for a syntactic signal at the beginning of a phrase. It may be the case that both reinforce each other and that an attempt to isolate one or the other introduces an artificial contrast where there is none. After all, function words are mostly unstressed, whereas content words, even with an unstressed initial syllable, have greater rhythmic prominence because they contribute important information to the meaning of the sentence. Whether the upbeat position is preferably filled by an item of a certain prosodic or grammatical nature, its ultimate function presumably is to signal the beginning of a new unit and to prepare the hearer or reader for an important piece of new syntactic and semantic information.

With regard to the question of whether the syntactic or the rhythmic approach has greater explanatory potential, the corpus analyses have yielded contradictory results. Three counts were conducted that were designed to tease apart the effects of the two explanations: the first favored the syntactic account, the second suffered from a lack of data in the crucial category, and the third supported the phonological account. A tentative explanation for these divergent results invokes different probabilities of syntactic ambiguity arising in the two constructions, which make a grammatical signal less dispensable in the first case study than in the second. Even so, what can be stated with a reasonable degree of certainty is that the results suffice to show that both explanations have a certain relevance. A purely syntax-internal account would run the risk of ignoring the phonological side of things. Ultimately, more research into upbeat effects will be needed to decide the issue.

Be that as it may, future research on the factors determining grammatical variation (e.g., the presence or absence of a variable syntactic marker) will gain descriptive and explanatory adequacy if it takes into consideration the need for an upbeat in the onset of phonological phrases. Three cases where upbeats may come into play have been pointed out to me by Günter Rohdenburg (personal communication):

- There is preliminary corpus evidence that the introduction and establishment of the preposition *from* after the verb *refrain*, which was under way in the seventeenth and eighteenth centuries, was faster in connection with object expressions lacking an appropriate upbeat (e.g., *refrain (from) anger/tears*).
- Similar observations have been made concerning the verb *expel* and semantically similar verbs (Rohdenburg 1995:109-13). While in Present-Day English, the expression denoting the domain from which someone is expelled has to be introduced by a preposition (e.g., *from* or *out of*), this preposition was variable in Early and Late Modern English. In this period, expressions containing an upbeat were treated differently from those not containing an appropriate initial element: in cases like *be expelled (from) the country*, the preposition continued to be variable while in cases like *be expelled from heaven*, it became obligatory early on.
- In addition, the generic use of the indefinite article in combination with singular nouns in cases like *I like a dark red rose* or *he smokes a pipe* may be motivated by the preference of an upbeat-containing object expression over one lacking an upbeat (e.g., indefinite plurals like *dark red roses* or *pipes*).

An interesting general insight that emerges from the present study is the fact that syntactic variation is obviously sensitive to phonological (or, more precisely, rhythmic) well-formedness constraints. At least one of the three counts presented above has provided significant evidence for a contrast between initially and non-initially stressed object expressions, which can be attributed to the rhythmic difference between them. In other words, the interface between syntax and phonology has to be bidirectional, allowing for phonological preferences to have repercussions on syntactic choices. In view of previous findings presented in works like Zec and Inkelas (1990), Inkelas and Zec (1995), and Schlüter (2005), this is nothing new, but the relevance of upbeats in this respect certainly is.

## Notes

1. The so-called Principle of Phonology-Free Syntax found its first expression in Zwicky (1969:411): "Strictly phonological information is never required for the operation of the syntactic component." This maxim has for a long time been uncontroversial among phonologists working in the generative tradition, e.g., Chomsky and Halle (1968), Selkirk (1984), Kaisse (1985), Zwicky and Pullum (1986), Pullum and Zwicky (1988), and Hayes (1990).

2. This branch of phonology is variously known as metrical stress theory, prosodic phonology, or metrical phonology. Important representative works are Liberman and Prince (1977), Hayes (1984, 1985, 1995), Selkirk (1984), Giegerich (1985), Couper-Kuhlen (1986), Nespor and Vogel (1989), and Kager (1995).

3. The basic trochaic foot has remained characteristic of all Germanic languages, though the precise definition of what qualifies for its strong left branch has changed in Middle English as in many other related languages (for more detailed discussion, see Dresher & Lahiri 1991:251-5, 281-283; Lahiri, Riad & Jacobs 1999:338-44; Lahiri 2001:1356).

4. Halliday's (2004:15) tone group (a prosodic structure grouping together one or more feet) is another example of this: it has an optional pretonic segment to the left and an obligatory tonic segment to the right.

5. Pike's concept of "precontour" obviously has a wider meaning than the other two; it can comprise a comparatively large number of syllables. For more details, see the works quoted.

6. In this representation, the elements featuring on the different levels of the prosodic hierarchy are symbolized by letters ($W$ = word; $C$ = clitic group; $P$ = phonological phrase; $I$ = intonational phrase; $U$ = utterance).

7. In addition, the duration of a juncture depends on other factors such as the speaking rate, the prosodic structure of the remainder of the sentence, the location of the main accent, and many other factors (whose effects cannot be controlled for in a quantitative corpus study) and can also be manipulated at the discretion of the speaker (Bolinger 1981:19).

8. Details of the corpora are given in the reference section.

9. Accents have been added to indicate the location of stresses in the noun phrases under consideration.

10. The chi-squared test yields highly significant results for this contrast: $\chi^2 = 91.29$, df = 1, p = $1.24 \cdot 10^{-21}$ (***).

11. The differences between these two complexity contexts and the average for the period reach statistical significance. For insertions, the chi-squared test yields: $\chi^2 = 4.85$, df = 1, p = 0.028 (*); for extractions, the results are: $\chi^2 = 19.19$, df = 1, p = $1.18 \cdot 10^{-5}$ (***).

12. The results of the chi-squared test applied to the comparison of the three categories are: determiners vs. noninitially stressed nouns: $\chi^2 = 23.60$, df = 1, p = $1.19 \cdot 10^{-6}$ (***); determiners vs. initially stressed nouns: $\chi^2 = 22.07$, df = 1, p = $2.63 \cdot 10^{-6}$ (***); noninitially vs. initially stressed nouns: $\chi^2 = 1.17$, df = 1, p = 0.28 (n.s.).

13. I owe this attempt at an explanation to an anonymous reviewer, to whom I am deeply indebted.

14. For a critical evaluation of the various explanations that have been proposed to account for the emergence of the gerund, including the frequently encountered view that the present participle contributed some of its verbal properties, see Jack (1988:24-27).

15. The data provided by Nevalainen and Raumolin-Brunberg (2003:66) suggest that the changeover to direct objects spanned more than three centuries and gained ground somewhat earlier in more informal types of writing (personal letters): in their corpus, the share of direct objects already exceeded 50 percent by the beginning of the seventeenth century.

16. Note that "completely nominal" does not entail that the gerunds had to be preceded by a determiner: other abstract nouns can also occur determiner-less, e.g., *in pursuit of a prey*.

17. The data for *of* + gerund were subsequently excluded from the main part of the analysis since they invariably led to strong *horror æqui* effects; cf. the discussion later in the the Procedure II section.

18. Both contrasts are highly significant as measured by the chi-squared test: gerunds with article: $\chi^2 = 14.70$, df = 1, p = 0.00013 (***); gerunds without article: $\chi^2 = 80.61$, df = 1, p = $2.75 \cdot 10^{-19}$ (***).

19. Examples include the expressions *keeping silence of, making discovery of, making election of, making mention of, making money of, making profession of, making proof of, making return of, making show of, making use of, taking advantage of, taking apprehension of, taking hold of, taking leave of, taking notice of, taking possession of,* and *taking revenge of*.

20. The results of the chi-squared test are: determiners vs. non-initially stressed nouns: $\chi^2 = 4.79$, df = 1, p = 0.029 (n.s.); determiners vs. initially stressed nouns: $\chi^2 = 12.10$, df = 1, p = 0.00050 (**); non-initially vs. initially stressed nouns: $\chi^2 = 0.56$, df = 1, p = 0.46 (n.s.). While these results are certainly highly suggestive, the number of expected occurrences of non-initially stressed nouns or adjectives without *of* falls below the statistical minimum of five, so the preconditions for the chi-squared test are not met.

21. While the results of the chi-squared test comparing the two types of non-initially stressed objects to the initially stressed type are highly significant throughout, the differences between the non-initially stressed types are far from reaching significance: determiners vs. non-initially stressed nouns: $\chi^2 = 0.29$, df = 1, p = 0.59 (n.s.); determiners vs. initially stressed nouns: $\chi^2 = 75.41$, df = 1, p = $3.82 \cdot 10^{-18}$ (***); non-initially vs. initially stressed nouns: $\chi^2 = 1.057$, df = 1, p = 0.0012 (**).

# References

## Corpora

*The British National Corpus* (*BNC*). 1995. Version 1.0. BNC Consortium/Oxford University Computing Services. [100,000,000 words; wridom 1 (imaginative prose): 20,000,000 words]

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