

3. Phonology

3.1 Phonological units (segmental)

3.1.1 Distinctive segments

p, t, (c), k, (b), (d), (3), (g), f, ɔ, s, x, v, d, z, g, m, n, r, l, (j), i, e, a, o, u.

The parentheses around the elements (c) (b) (d) (3) (g) and (j) are used to indicate that the distinctive (phonemic, underlying) status of these segments is disputed by some Modern Greek linguists. Some of the arguments for the one rather than the other position will be presented below.

3.1.2.1.1. Plosives and affricates

(voiceless) p: labio-labial; t: apico-dental; c (ts): apico-alveolar; k: dorso-velar

(voiced) b: labio-labial; d: apico-dental; 3 (dz): apico-alveolar.

Voiceless plosives are always unaspirated. The dorso-velar plosives k and g are palatalised before one of the front vowels i and e. Compare [k'ori] 'daughter' (k'eri) 'candle' [k'ipos] 'garden', [a(n)gonas] 'elbow', [a(n)g'inara] 'artichoke'.

The voiced plosives b d g occur without prenasalization in word initial position where they contrast with other single consonants. In this environment they do not contrast with the clusters of nasal + voiced/voiceless plosive. Furthermore in word medial position, in the great majority of cases and indeed in most words of Greek origin, the voiced plosives may be preceded by either a full homorganic nasal or by some degree of nasalization. E.g. [ambeli] or [a beli] or [abeli] 'vineyard', [andras] or [a dras] or [adras] 'man'. In medial position, too, clusters of nasal + voiceless plosives are extremely rare and occur only in words of foreign origin such as [sampanja] 'champagne', [kantina] 'messhall', etc. However even these words may be pronounced with a voiced plosive and optional prenasalization by less educated people [DO WE WANT TO SAY INSTEAD: 'PEOPLE UNAWARE OF THEIR FOREIGN ORIGIN'????]. It can be argued, therefore, that in medial position too, if we exclude some foreign items, b d g with optional nasalization are in complementary distribution with nasal + voiceless plosive. On the basis of this evidence one can take the view that b d g are derived from nasal + voiceless plosives. This conclusion is further encouraged by the fact that in the majority of cases, (nasal) + voiced stop is represented in the spelling by the sequence of the letter for nasal XXX or XXX followed by the letters for voiceless plosive XXXXXXXX (d in very few cases is represented by XXXXX and g by XXXXX). A traditional phonemic analysis would, of course, ignore spelling. However an analysis which wishes to capture the native speaker's psychological reality cannot the possibility that this may be influenced by literacy and spelling. Thus some Modern Greek linguists have reached the conclusion that b, d, g are not distinct (phonemic) segments but instead are the phonetic realisation of sequences of nasal followed by voiceless plosive and that the presence or absence of nasality and perhaps the degree of this nasality depends on position in the word and other factors of a sociolinguistic rather than purely linguistic nature. Among the linguists who would not attribute distinctive status to b d g we may mention Hamp 1961,

Newton 1961 and 1972 and Warburton 1970. In the last study the author is prepared to recognise distinctive b, d, g but with a very small functional load and restricted to foreign words such as [robot] 'robot', [snob] 'snob', etc. On the other hand analyses made within traditional phonemic principles such as Koutsoudas 1961, Householder et. al. (1964) and Setatos 1974, consider b d g as distinct segments. In a very lucid presentation of this and other phonemic problems of Modern Greek, Householder (1964) argues that if we wish to adhere to the principles of phonemic theory we must consider b, d, g as independent phonemes, because of the presence in the language of (i) words such as [sampanja] etc. where nasal + voiceless plosive remain unaltered and (ii) words such as [robot], [snob] etc. where b, d, g are not optionally preceded by nasal or nasalization. These groups of words would indicate that b, d, g are not always reducible to underlying /mp/, /nt/, /nk/. However for some speakers words of (i) can appear with voiced plosive following the nasal and also for some speakers words of (ii) can have prenasalised plosives. Therefore we agree with Householder's conclusion that the solution to this problem depends "on (a) whose assertions about Greek speakers you are willing to believe, and (b) what dialect you choose to consider standard, but also involves canonical shapes, permitted clusters and distributional parallelism".

The affricates c (ts) and 3 (dz) are extremely rare especially in words of Greek origin. MG linguists are divided as to whether these should be analysed as single underlying segments or as the phonetic realisation of underlying clusters. Thus Newton (1961, 1972) derives them from ts, and nts, respectively. Householder (1964) discusses this problem in some detail and finds that their distribution puts them together with simple consonants. For example, Householder argues that both [ts] and [dz] occur as initial consonants of the first and second syllables of a word with reduplicative structure such as [tsitsirizo] 'sizzle [???' [dzidzikas] 'cicada', etc. In this sort of reduplicative structure we can find other single consonants. [papas] 'priest', [mama] 'mother' etc, but not other clusters except r, in [ri ri] 'fishing boat'. Furthermore according to Householder's observations other clusters with initial voiceless plosive accompanied by g do not occur here, i.e. ps and ks are excluded from this environment. If the evidence was exactly as Householder presents it, it could be argued that [ts] and [dz] pattern as single consonants. However one can, in fact, find [ps] in this environment. Householder, himself, in a footnote offers [psipsina] 'pussycat' a very frequent item. We can also add [krikri] 'Cretan wild goat' and [frufru] 'ruffle'. Also there are ideophones with [ks] as in [ksuksu], which in expressions such as [ande bros ksuksu] means 'go on, get out'. There is, however, further evidence to support the single segment interpretation. In suffixes the majority of [ps] and [ks] clusters contain a morpheme boundary between the two segments while [ts] and [dz], with the only exception of [katse] 'sit' derived from /ka0ise/, constitute the first element of the suffix. Setatos (1974:5) attributes the noun-forming suffix [-dzis] indicating occupations, as in [taksidzis] 'taxi-driver', to the Turkish suffix [-ci], but he does not give [ts] and [dz] as single segments in his list of phonemes; instead, he accepts the cluster interpretation. However he recognises b, d, g as distinct segments so his [dz] is represented also phonemically as [dz]. Newton on the other hand, or any solution which has no

underlying b, d, g would have to represent [dz] as /ntz/ or as /nts/ and this will encounter problems parallel to those of b, d, g because of the existence of words such as [vintsi] 'winch' and of words such as [kazandzakis] (a proper name), where underlying /nts/ does not seem to give always [dz]. Here again one would have to decide whose dialect to consider standard, how exactly these items are pronounced and what importance one should attribute to foreign elements.

3.1.2.1.2 Fricatives

(voiceless): f: labio-labial; θ: apico-interdental; x: dorso-velar
 (voiced): v: labio-labial; ð: apico-interdental; ɣ: dorso-velar.

The dorso-velar fricative x is palatalised into x' before the front vowels i and e: compare [xara] 'joy' [x'eri] 'hand', [x'imonas] 'winter'. The situation with the corresponding voiced dorso-velar fricative ɣ is more complex. ɣ occurs as phonetic [ʝ] only before the low vowel a and the back vowels o and u, as in [ʝata] 'cat', [ʝonis] 'parents', [ʝuna] 'fur', while before front vowels we find [jeros] 'old man' and [jionas]. According to some interpretations (Newton 1972 for example and Setatos 1974) these instances of [j] are considered instances of palatalised ɣ'. Thus, underlying /ɣeros/ becomes [ʝ'eros] which may also be represented in a phonetically more accurate way as [jeros], etc. In this analysis all dorso-velar consonants k, (g), x, and ɣ have palatalised realizations before front vowels. If the sound [j] occurred only before i e while ɣ occurred only before a o u we would have these two sounds in complementary distribution and the above solution would be unproblematic. However we also find sound [j] before a, o, and u, as in [janis] 'John', [jorti] 'holiday', etc. These forms, which are both frequent and of Greek origin show that [ʝ] and [j] are not completely in complementary distribution, since they can both occur before back and low vowels. In fact one can point to minimal pairs [ʝati] 'little cat'/[jati] 'why', [ʝoma] 'rubber'/[joma] 'meal[????]' etc. One solution to this problem which has been endorsed by Newton (1972 and elsewhere) and Warburton (1970) and Warburton (1976) is to consider [j] before a o u as derived from the sequence /ʝi/. Thus [janis] is the phonetic representation of /ʝianis/ where initial ɣ is palatalised before i and unstressed i before another vowels reduces also to j, and the two instances of j coalesce into one [j]. However the above analysis derives [j] from two different sources i.e. from /ʝ/ and from /i/ and therefore it is in conflict with strict forms of traditional phonemic analysis as argued by Householder (1964). Furthermore there are further complications because the derivation of [j] from /i/ is not at all straightforward (see below 2.1.2.1.5). An alternative analysis proposed by Koutsoudas (1962) and Householder et al. (1964) and discussed in Householder (1964) considers /j/ (represented as ɣ) as a separate phoneme. The phoneme covers then all instances of phonetic [j] i.e. both those which the first solution above considers realisations of /ʝ/ before front vowels and those which could be said to derive from reduced unstressed /i/ in certain environments. This solution then would have as a consequence that ɣ has a defective distribution occurring only before a o u and is unlike its other dorso-velar counterparts which exhibit palatalised allophones before i and e.

3.1.2.1.3 Nasals

m: labio-labial; n: apico-dental. When m is followed by [j] the phonetic result is sometimes heard as mn'. Thus [mja] 'one' or with heavier palatalisation [mn'a]. n is palatalised before [j] and in some dialects also before [i]: [n'jata] 'youth' [n'iko] 'Nick'. Before dorso-velar plosives we find n, as in [paŋgos] 'bench'. In medial position preceding a velar consonant [ŋ] may either be considered an allophone of /n/ or better as the realisation of an archiphoneme N, because in the environment before a plosive or a fricative when these two are not separated by a boundary of some sort, the point of articulation of the nasal is neutralised, the nasal agreeing in point of articulation with the following consonant. Across morpheme boundaries an n is realized as its allophone [ŋ] when followed by a dorso-velar consonant.

3.1.2.1.4 Liquids

r: apico-alveolar flap; l: apico-dental approximant. l is palatalised before [j] as in [l'jono] 'melt' and in some dialects also before [i], as in [l'ikos] 'wolf'.

2.1.2.1.5 Semivowels

The answer to the question whether or not there are semivowels in Greek as distinct underlying segments depends on the view one takes about [j]. Opinions are divided. Thus Koutsoudas (1961), Householder et al. (1964) consider j(y) as a distinct segment while (Newton 1961, 1962 and elsewhere and Warburton (1970) and Warburton (1976) consider [j] as the phonetic realisation of either /j + Front vowel/ or of /i/. In 3.1.2.1.2. above we presented the evidence for and against relating some instances of [j] to j. There are also problems in the relation between i and j which we discuss briefly below.

Pairs like [mia] 'one fem' with its alternative pronunciation [mja], [Oios] 'uncle' also [Oj'os] etc., morphophonemic alterations like [pedi] 'child', [pedju] 'of the child', [mati] 'eye' [matja] 'the eyes' and many others would seem to suggest that [j] can be derived from i in environments where i is either preceded or followed by a vowel and it is unstressed. This analysis however is complicated by several factors.

(a) There are Greek words where an unstressed i next to a vowel does not reduce to j. E.g. [adial] 'licence', [stadio] 'stadium', [opion] 'opium', [midia] 'Medea' etc. and where minimal pairs are created occasionally. Thus [adia] 'licence' but [adja] 'empty', [opion] 'opium' but [opjon] 'whomever', etc.

It must be pointed out that the words where the sequence unstressed i + vowel does not reduce to j + vowel are words of Katharevousa origin and in Katharevousa there is no reduction of i to j. It may be argued, therefore, that this complexity is the result of the diglossic situation and that glide formation can be considered a completely productive rule which does not apply to Katharevousa elements. It is of course true that many of these Katharevousa words have passed into everyday common use and they are no longer felt as marked in any way. The treatment of this problem then would seem to depend on whether we wish to propose a single, homogeneous system for the

standard which is a mixed form (mixed not only in vocabulary but in morphology and phonology) or instead to present the phonology of the standard (the mixed) as a network of subsystems (at least two, Kath(arevousa) and Dim(otiki)) which coexist. If we choose the former then we probably have to propose a phoneme /j/. If on the other hand we choose the latter then [j] would be an allophone of /i/ in unstressed position adjacent to a vowel, except for the vocabulary which will be appropriately marked as Katharevousa, and where i remains syllabic.

(b) The analysis which derives [j] from i, even allowing for a different treatment for Kath. items is faced with another problem. It is clear that glide formation is sensitive to the presence or absence of a stress on the underlying i. Stress in verbs is completely predictable while in other categories its underlying position may or may not be predictable; in many cases, though, basic stress moves either to left or to the right in other members of the inflectional paradigm following specific rules. It seems therefore that stress rules and glide formation will be interdependent and here we have some interesting problems facing the glide formation rule.

Problem 1) The form [ʝajdaros] 'donkey'. If we accept the analysis which has no underlying distinctive j but derives this from i, the underlying representation of the above item would have to be /aidaros/. Now we must decide where to put basic stress on this word. MG of either Katharevousa or Dimotiki variety contains a stress constraint which requires that a word be stressed on either the ultima, or penultimate, or antepenultimate syllable but not further to the left from antepenultimate. This is an unexceptional rule. Accordingly the stress must be placed on the i in [_aidaros] (this being a noun which happens to have antepenultimate stress) but then glide formation cannot operate on i because in this case it is protected by stress. Newton's (1972) solution is to apply glide formation here and simultaneously to shift stress to adjacent vowel. Warburton's (1976) objection is that such a rule is counterintuitive and cannot be maintained because of the existence of a large number of words such as [vivlio] 'book', [maria] 'Mary' etc where the proposed rules do not apply (unless of course one is prepared to characterise the counterexamples as Katharevousa). Warburton accounted for [ʝajdaros] by appealing to paradigmatic symmetry pressures. Thus because Genitive Singular and Plural and Accusative Plural forms are stressed on the penult: [ʝajdaru], [ʝajdaron], [ʝajdarus], and in such forms i is unprotected by stress, a glide is formed in the stem. This stem is then generalised in the remaining paradigm by first moving the stress from i to the adjacent vowel. Marti Nyman (1981) objects to this sort of global constraint and suggests instead that for this stem (and some other cases as we will see) the j is present in the underlying representation i.e. it is a distinct segment.

Problem 2) If we compare the following paradigms,

Nom. Sg	an0ropos	stadio	pedi	spiti
	'man'	'stadium'	'child'	'house'
Gen. Sg	an0ropu	stadiu	pedju	spitju

we may want to conclude that in nouns of a certain class the stress falls on the penultimate syllable in Genitive Singular, as can be clearly seen in the first and second examples. If the same rule is said to apply to the last two examples and in accordance with the analysis which does recognize underlying j we would have /pediu/, /spitju/. But here again the i would be protected.

Newton again would apply simultaneously stress shift and glide formation but we have already mentioned the objections to this. Warburton (1976) argues that the four cases given above do not follow the same stress rule but that in the last two nouns ending in -i a restructuring has taken place. Here the rule specifies not that the stress falls on penultimate but that it falls on the inflectional ending -u. The motivation for this restructuring is again considered to be avoidance of stem allomorphy in an inflectional paradigm.

Problem 3) The verb [teljóno] 'finish' has past tense [téljosa]. If we start with underlying representations /teliono/ and /teliosa/ the stress rules would give /telióno/ and /telíosa/ and after glide formation [teljóno] but [telíosa]. In the past tense form i cannot produce a glide since it is stressed. Philippaki-Warburton (19XX) appeals again to paradigm pressures because within the paradigm of past tense several forms have an "exposed" i, e.g. 1PL [telíosome], 2PL [telíosate], 3PL [telíonane]. Here glide formation can apply and this stem with the glide is then generalised to the rest of the paradigm. This would mean that /teliosa/ becomes after stress /telíosa/ but then after the generalisation of the stem with the glide becomes the unacceptable *[teljósá] with the stress on the adjacent vowel. Warburton (1976) argues that the problem with this form is that it violates the "stress antipenult in Past" rule which is also exceptionless for this type of verb. To comply with this rule then /teljósá/ becomes the correct [téljosa]. Nyman again objects to the paradigm explanation. For him the verb has a j in its underlying form i.e. /teljon-/ (there is also an alternative pronunciation [telióno / telíosa] but this would be assigned to Katharevousa vocabulary and so would be immune to glide formation).

Problem 4) Finally [aʎapjeme] 'I am loved' presents a problem. If the stem is /aʎapi/ and the ending -eme, the stress rules would assign stress on the last vowel of the stem, thus /aʎapiéme/. The same problem is created and again the same disagreement arises between Warburton (1976) who appeals to other forms of the paradigm e.g. 1PL [aʎapjomaste] and 2PL [aʎapjósaste] to explain [aʎapjeme] from [aʎapiéme] as the result of pressure to eliminate stem allomorphy, and Nyman who prefers to postulate underlying /j/ to avoid reference to paradigms. Here, there may be another alternative. We may consider the stem to be /aʎapi-e-/ and the ending -me. So the "stress final vowel of stem" rule would give /aʎapiéme/ and glide formation would yield correct [aʎapjeme]. It must be noted that although Nyman opts for a solution that includes underlying j his j has very limited use. That is, it is restricted only to those forms where j does not alternate with i. It is clear that this problem has been resisting a satisfactory solution and this, we feel, must be due to various complex factors. Should we separate Katharevousa origin items from Dimotiki ones and treat them separately or since this mixture is now present in everyday common usage and there is no psychological distinction made between [stadio] and [vivlio] on the one hand and [pedja] etc. on the other, should one try to give a single homogeneous system? Does 'standard' have to mean homogeneous or is it possible to accept some degree of mixture of systems? To what extent should we include evidence from literacy and spelling? Most native speakers (all literate ones) connect [j] either with ɣ or with i as their spelling indicates. Some may argue that spelling should be taken into consideration but others (of a more traditional position) disallow spelling as appropriate evidence and consider the literate

speakers' intuitions and judgments as interfering and confusing. We feel that as long as fundamental questions such as what the nature of "standard" is and what we are supposed to attempt to capture in our analyses are not answered one way or another the problems we have encountered in MG and others like these in other languages will remain.

Before closing this section we must add that unstressed i remains syllabic also in the environment of another i, as in [piitis] 'poet', [diiko] 'I govern', etc., and it may remain syllabic after a consonant cluster with final r, as in [aɹrios] 'wild', [xriazome] 'I need'. Finally the pronunciation of j varies from a palatal consonant to a weak glide depending on the phonetic context

3.1.2.2.1 Vowels

Modern Greek has a very common symmetrical five vowel system.

i: high front; e []: mid front (but lower than its corresponding mid back o); a: open low; o: mid-back rounded; u: close-back rounded. All vowels are slightly longer when stressed.

In 3.1.2.1.5. we discussed the problems surrounding the interpretation of [j]. Under one interpretation i has allophone [j] when unstressed and accompanied by another vowel except another [i] (see 3.1.2.1.5.) u also has an allophone [w] in unstressed position accompanied by another vowel e.g. [frawla] 'strawberry'. These two non-syllabic allophones of the high vowels create phonetic diphthongs (see below).

3.1.2.3-4

None of the above segments occur only in loan words nor are there any restrictions on their occurrence in any word classes.

3.2 Phonotactics

3.2.1.1. Word final consonants

In vocabulary of Greek origin and more specifically Dimotiki only two of the consonants may occur in final position n and s. Of the two, n is much rarer and tends to be either deleted e.g. Genit. Pl. [tonanOropon] - [tonanOropo] 'of the men' or it is optionally accompanied by an epenthetic e, e.g. [rafun] 'they write' - [rafune]. The liquid r may occur finally in words of Katharevousa origin such as e.g. [iper] 'for', [idor] 'water' etc. A variety of consonants may occur in final position in words of foreign origin [ruz] 'rouge', [klab] 'club' etc. Onomatopoeic items may also end in consonants other than n or s. e.g. [bum-bum] 'boom-boom', [axvax] 'oh' [driŋg] 'noise of the phone' etc.

3.2.1.2 Word initial consonants

All consonants may occur in word initial position. However if we adopt the analysis by which all [j] belong to phoneme /j/ and/or to phoneme /i/ and none to /j/ then we have to say that /j/ does not occur word initially (or syllable initially in fact) before a front vowel. Such an analysis would seem to single out /j/ in that it would attribute to it a defective distribution.

3.2.2.1.1 Word initial consonant clusters

Modern Greek allows for a great variety of consonant clusters in initial and medial position. The maximum number of consonants which can combine to form an initial cluster is three. Three-consonant initial clusters consist of an s followed by a voiceless stop or fricative followed by a liquid or n although not all possible combinations of these are permitted. The permitted three-consonant clusters are spl [splina] 'spleen', spr [sproxno] 'push', sfr [sfrajida] 'stamp', str [stratos] 'army', skr [skrapas] 'idiot', skl [skliros] 'hard', skn [sknipa] 'kind of mosquito'. Thus r can follow all s + voiceless plosive combinations, while l occurs only after p and k and n occurs only with the velar k. On the other hand only one of the voiceless-fricatives namely f can occur as the second segment of an initial three-consonant cluster.

The two-consonant clusters occurring in initial position are as follows:

- voiceless plosive + s: ps, ts, ks e.g. [psari] 'fish', [tsai] 'tea', [ksenos] 'stranger'
- voiceless plosive + r: pr, tr, kr e.g. [protos] 'first', [trapezi] 'table', [krevati] 'bed'
- Voiceless labio-labial/dorso-velar plosive + l/n: pl, pn, kl, kn, e.g. [pleno] 'I wash', [pnevma] 'spirit', [klino] 'I close', [knizmos] 'itching'.
- Voiceless apico-dental + m: tm e.g. [tmima] 'section'.
- fricative + liquid except *dl: fl, fr, Ol, Or, xl, xr, vl, vr, dr, -l, -r, e.g. [flo_a] 'flame', [friki] 'horror' [Olipsi] 'sadness', [Orasos] 'insolence', [xlomos] 'pale', [xrimata] 'money', [vlepo] 'I see', [vrisko] 'I find', [dromos] 'road', [likos] 'sweet', [ria] 'old lady'.
- s + voiceless fricative/plosive: sp, st, sk, sf, s0, sx, e.g. [spiti] 'house', [sti0os] 'chest', [skilos] 'dog', [sfiri] 'hammer', [s0enos] 'strength, courage', [sxima] 'shape'.
- s does not combine with nasal or liquid except in foreign words where we find sn, e.g. [snob] 'snob', and sl, e.g. [slavos] 'Slav'.
- of the fricatives only 0, x, and - combine with nasal n and only z with m, e.g. [Onitos] 'mortal', [xnarja] 'patterns, traces', [norizo] 'I know'.
- voiceless fricative + voiceless plosive but only in ft, xt, e.g. [ftano] 'I arrive', [xtizo] 'I build'.
- the combinations of two voiced fricatives that occur are vd, v, -d, zv, zm, z, e.g. [vdela] 'leech', [v azo] 'I take out', [dino] 'I undress someone', [zvino] 'erase', [zminos] 'flock', [z uros] 'curly'.

Notice that we have included ts as one of the two consonant initial clusters. However if we adopt the analysis which considers this as a single segment [c]

(phonemically and phonetically) we will have to amend our list of clusters given above to exclude the combination of t+g. Furthermore we would then have to say that the consonant [c] does not combine with other consonants to form clusters. This defective distribution of c is, of course, used to argue against the single segment analysis. Given the rich clustering possibility of Modern Greek and also given the freedom with which g combines with all consonants especially plosives the lack of a ts cluster under the single segment analysis would seem strange. It is also strange to have to say that of all obstruents c cannot combine with other consonants. The problem could be resolved if there was a formal way to say that the affricate c, since it has two aspects in manner of articulation i.e. starting as a stop and finishing as a fricative, is expected (or at least allowed) to behave both as a single element (as in the reduplicative structures mentioned in Householder 1964 and the suffixes) and as a cluster (in that c covers also the distribution of the perfectly possible Modern Greek cluster ts).

As far as [] (dz) is concerned, if it is viewed as a single consonant we must conclude that it does not combine with any other consonant to form clusters. On the other hand we may consider it as being a cluster. In the latter case the cluster may be either dz if d itself is recognized as a distinctive segment or as a sequence of nts, and although the decision between [] and [dz] is both phonematic and phonetic, the analysis as nts will be the underlying phonological representation of phonetic [dz].

To the list of clusters given above we will have to add the possible combinations with b d g if these are taken to be distinctive segments. The possible initial clusters containing b d g are: voiced plosive + liquid except *dl, i.e. bl, br, dr, gl, gr, e.g. [bleko] 'I get entangled', [brosta] 'ahead', [dropi] 'shame', [glitsa] 'shepherd's cane'. Within the analysis which derives b d g from mp nt nk via voicing of the plosive and deletion of the nasal in initial position the list of clusters will include also nasal + stop + liquid as possible combinations.

Another point to be made is that we have not included so far clusters containing [j]. If we were to accept a phonemic analysis which considers this a separate segment and if this [j] were classified as a palatal fricative (Householder et al. 1964) then we have to extend the list of two-consonant clusters to include any consonant + j except of course __, and any two-consonant clusters of those allowed + j, except those whose second member is __. One could also adopt a mixed analysis where only some phonetic [j] belong to phoneme /j/ while others may derive from i or __ if there is morphophonological alternation pointing to underlying /i/ or / /. In this sort of analysis then we may still find v + __ + front vowel as in the paradigm

na v o	'that I go out'
na v is (phonetic [vjis])	'that you go out'
na v i (phonetic [vji])	'that he go out'.

One very general constraint applying to Modern Greek clusters consisting of two obstruents is that they have to agree in voice. They are either both voiced or both voiceless.

The richness of Modern Greek clusters is partly due to the contribution made to the language from two different sources, Katharevousa and Dimotiki (in

addition to foreign words). Katharevousa has not only given large numbers of vocabulary items but also phonological patterns different from those of Dhimotiki. These patterns were not always adjusted to the Dimotiki system but retained their own. In section _____ above we discussed the problem of [j] and we pointed out that if we restrict our description to Dimotiki we could derive [j] from either + front vowel or from unstressed i + vowel. However it was also observed that Katharevousa vocabulary resists this glide formation rule. Another area where Katharevousa and Dimotiki differ is in the clusters of two voiceless consonants. Dimotiki clusters must obey a constraint which requires that the two members of the cluster must be dissimilar in manner of articulation. Only one of them must be a fricative while the other must be a plosive. As far as the order of these is concerned this depends on whether or not the cluster contains an s. If one of the members of the cluster is s then the other member must be the stop irrespective of whether it precedes or follows, e.g. ft, xt, fk. Dimotiki disallows combinations of two fricatives or two stops, i.e. *[_0, x0, pt, kt, fs, sf, etc.]. Katharevousa, on the other hand, allows for these also. Notice that [0t, 0p, 0k] which do not conflict with the Dimotiki constraint do not occur nor do *[fp, xk, xp]. fk occurs only medially but not initially. The common language today includes words of both systems which are no longer felt as belonging to two different language forms, commonly referred to (in the manner we have been employing, for example) as "high" (Katharevousa) vs "low" (Dimotiki), to use Ferguson's (1959) terms. Thus [pteri a] 'wing of building', [f0inoporo] 'autumn', [s0enos] 'courage', are extremely common colloquial expressions, so that the labels Dimotiki and Katharevousa have a mainly historical meaning in this context (see on this Philippaki-Warburton 19__). There is no initial cluster beginning with a liquid.

3.2.2.1.2 Word final clusters

Dimotiki words do not permit consonant clusters in word final position. Katharevousa words on the other hand occasionally permit clusters of voiceless obstruent + s: ks (e.g. [vlaks] 'idiot'), fs (e.g. [vasilefs] 'king'). These have not passed into the everyday common usage. They are restricted to usages where Katharevousa may still be employed and are felt to be learned, pedantic, etc. Other clusters may occur only in words of foreign origin e.g. [parking] 'parking' [DO WE WANT TO FIND A BETTER EXAMPLE????], [mars] 'march' etc. and some onomatopoeic words [mats-muts] 'sounds indicating kissing', etc.

3.2.2.1.3 Word medial consonant clusters

All possible initial consonant clusters occur also medially. However the repertoire of medial clusters is much larger. Thus the following two-consonant clusters which do not occur initially may be found medially: tl, tn, fn, vn, 0m, vm, zn; also, combinations with initial liquid which are excluded in initial position such as rt, rd, rp, rf, rk, rx, rn, rm, r, and lm, lp, lk, lt, l, and combinations of nasal followed by fricative, n0, nx, mj, ns, nd, mv, n (where /n/ is phonetically []), nz, are all found. Also the three-consonant clusters sxr, sxn, s0m, ptr occur. The variety of medial clusters is extended further due to the existence of prefixes ending in k (ek-), f (ef-), s (is-) n (en-, sin-) and r (iper-) [SHOULD WE GLOSS THESE????] which can combine with the various initial consonants and the consonant clusters occurring in the initial position. For example, we find four

consonant combinations such as [efsplaxnia] 'pity', [ekstratia] 'campaign', [ispneo] 'I breathe in', and three-consonant clusters such as [ipertrofia] 'overfeeding', [e glima] 'crime', [si rafeas] 'author', etc.

It is true that not all combinations of r for example, or of f + any initial consonant cluster occur in the language. But it can be argued that in principle all such combinations are possible and that the gaps are accidental. This seems a reasonable position to take although these prefixes belong to Katharevousa and are not very productive. However technical and scientific vocabulary is still extended by Katharevousa roots and Katharevousa derivational patterns. Therefore it is possible, in principle, to combine any of the final consonants of Katharevousa prefixes (en, ek, is, pros, ef, iper) with any of the possible initial clusters. There are some gaps still, but they are systematic in nature. For example even in medial position we cannot find a sequence of two identical consonants. Therefore if such a sequence is created during prefixation the two will be reduced to one. Furthermore we also do not find, in medial position, combinations of obstruents where one is voiced and the other voiceless or vice versa. Thus /is-valo/ ---> [iz-valo] 'invade', /ef-dia0etos/ ---> [evdja0etos] 'well-disposed', etc. However the k of ek seems to resist this constraint: /ek-dromi/ ---> [ekdromi] 'excursion', /ek-dosi/ [ekdosi] 'publication' (though occasionally this k may appear somewhat voiced). Medial clusters, whether derived from prefixation or not, obey another constraint according to which the nasal of a nasal + obstruent combination must have the same point of articulation as the following obstruent. Furthermore in words of Greek origin the stop following the nasal is voiced. Examples of nasal + voiceless stop occur only in foreign items. This constraint, according to which nasal clusters must conform to the pattern homorganic-nasal + voiced-stop is obeyed even by clusters formed during affixation, e.g. /sin-pono/ ---> [simbono] 'I sympathise', /sin-kinono/ ---> [si ginono] 'communicate'. This provides some of the evidence for deriving b d g from nasal + p t k (see our discussion in 3.1.2.1.1. above). Notice however that there are a few instances of nasal + voiceless stop + voiceless consonant where the stops following the nasal are voiceless e.g. [akampt0s] 'inflexible', [kampsi] 'bending', /sin-ptosi/ ---> [simptosi] 'coincidence'.

Other clusters may occur in true Ancient Greek items which surface occasionally but rarely in Modern Greek, such as t0 in [at0is] 'Attica', or in foreign words, such as tsk in [trotskismos] 'Trotskyism', gz in [egzema] [??GLOSS??] etc.

3.2.3.1 Word final vowels

All vowels can occur in final position. In fact the most common final syllable is an open one except for those few cases ending in s and even more rarely n.

3.2.3.2 Word initial vowels

Any of the five vowels may occur in word initial position. Within an analysis which considers phonetic [j] as belonging to phoneme /j/, unstressed i in initial position followed by another vowel would be excluded from Dimotiki words and allowed only for Katharevousa words.

3.2.3.3 Sequence of syllabic vowels

All possible combinations of two syllabic vowels may occur. However within an analysis that views most phonetic [j] as derived from unstressed i next to another vowel (except i) phonological sequences of unstressed i + vowel will give phonetic [j] + vowel at least for the non-Katharevousa vocabulary. On the hand if [j] is considered a separate phoneme then combinations of unstressed i + vowel and the reverse will be excluded in non-Katharevousa and allowed only in Katharevousa vocabulary (See discussion in 3.1.2.1.5 above). Phonological vowel sequences containing u may also appear phonetically with a [w] e.g. /frawla/ [frawla] 'strawberry'. Some sequences of two identical vowels are also possible: [diiko] 'I govern', [a0oos] 'innocent', [nees] 'young'. Sequences of three syllabic vowels may also occur e.g. [neoelinikos] 'neohellenic', [neoanarxikos] 'neoanarchist', and the vowels may even be identical, as in [andiiikos] 'antiviral' (from andi- + stem i- from ios 'virus' + adjectival suffix -ikos).

3.2.4 Structure of lexical morphemes

The initial position of lexical morpheme corresponds with initial position of words. In medial position of lexical morphemes we expect to find only those word medial clusters which are not the result of prefixation. Suffixation does not seem to increase the types of medial clusters. The final position of lexical morphemes is different from final position of words to the extent that root morphemes may end in any consonant i.e. (closed syllables) whereas word finally we find mostly vowels (open syllables). As a consequence the set of syllable types in word final position is very restricted and small while that of lexical morpheme is much larger.

3.2.5.1 Syllable structure

A polysyllabic word which does not contain medial clusters is divided into CV-CV-CV since the preferred syllable pattern is CV. Syllabification of a word which contains medial clusters is sensitive to both phonological and morphological criteria. Thus if the cluster is not the result of affixation it is divided so that the second part begins with an acceptable word initial cluster. For example, [elpizo] divides into [el-pi-zo] because lp is not acceptable initially, while [ex0ros] divides into [ex-0ros] 'enemy' etc. If a medial cluster is the result of affixation then the syllabic analysis may follow the morphemic break. Thus [ek0eto] 'expose' is analysed [ek-0e-to]. This analysis is supported by both the phonology since k0 is not an acceptable initial cluster and by the morphology since ek is a prefix. There are cases where the two criteria will give different results. Thus [ektonosi] 'extension' [?????] may be either [ek-to-no-si] by the morphology or [e-kto-no-si] since kt is a possible initial cluster. In such cases, the morphological criterion seems to be stronger and [ek-to-no-si] is the better analysis. In some cases however the morphological analysis is overlooked and other factors such as analogy with other related forms may decide. Setatos (1974) gives as examples of this [efxaristo] 'thanks, thank you' which is syllabified not as the morphology would suggest (i.e. [ef-xa-ri-sto], with prefix ef- 'good, well') but instead as [e-fxa-ri-sto] because this word may also occur in fast speech without the initial e (i.e. [fxaristo]).

There are also cases where the criterion of possible initial cluster does not operate although the cluster is not derived by affixation. For example [va0mos] 'degree' is not syllabified as [va0-mos] but as [va-0mos] in spite of the fact that 0m is not an initial cluster; similarly one finds [de-rma] 'skin', [a-lma] 'jump', etc., violating the initial cluster consideration (these examples are also given in Setatos (1974)). We must also note that there are no underlying diphthongs but only combination of syllabic vowels. However unstressed i and unstressed u under certain conditions reduce to [j] or [w] respectively. This means that in some cases there will be fewer syllables on the phonetic level than those on the phonological level.

3.2.5.2 Canonical syllable type

The variety of canonical syllable types may be given in the schema:

(C)(C)(C) V (C)(C)(C).

The maximal initial sequence is exemplified by the word [skliros] 'hard' and the maximal final sequence by an (admittedly foreign) word such as [tanks] 'tank'. If j is considered as a separate phoneme glide then we must add:

(C)(C)(C) j V or

(C)(C)(C) Vj (C)

3.2.6.6-7 Restrictions between adjacent units

There are no restrictions between adjacent or nonadjacent vowels in a word, and there are no restrictions between nonadjacent consonants. The phonotactic restrictions which exist between adjacent consonants have already been mentioned in the sections on initial and medial clusters. These may be summarized as follows: Nasals have the same point of articulation as following consonants. Stops following a nasal are voiced except in some words of foreign origin and in cases where nasal belongs to a prefix and is followed by two voiceless consonants. In Dimotiki, two voiceless obstruent clusters must disagree in manner of articulation and if one of the obstruents is an s the other must be a stop; if there is no s in the cluster the first of the two obstruents is the stop and the second is the fricative. This constraint does not apply to Katharevousa vocabulary and consequently it does not apply across Katharevousa prefix boundaries. In clusters, obstruents must agree in voicing; they are either all voiced or all voiceless. This constraint may not operate in some cases where a prefix final k combines with a voiced fricative. Combinations of identical consonants which may arise across morpheme boundaries are simplified to one.

All word classes obey the same phonotactic constraints.

3.3. Suprasegmentals

3.3.1 Length

There are no distinctive degrees of length in any of the phonological units.

3.3.2.1 Stress

Stress is distinctive: [fili] 'friends' / [fili] 'kiss', [jeros] 'old man' / [jeros] 'strong'. Phonetically it is a combination of mainly loudness with some degree of high pitch. Phonologically and on the level of grammatical (not phonological) word we distinguish only between stressed and unstressed syllables. Each word may carry only one stress (but see below) and its position is restricted by the so-called 'antepenultimate rule' or 'rule of limitation'. According to this, a polysyllabic word may be stressed on one of the last three syllables i.e. the ultimate (last), the penultimate (second to last) or antepenultimate (third from last). This constraint amounts to the requirement that the stressed syllable of a word cannot be followed by more than two unstressed syllables within that word. Not all words have stress. Some weak (mostly) monosyllabic items known as clitics attach themselves either to a preceding word (enclitics) or to a following one (proclitics). Whether the clitic is joined to the word that precedes or the one that follows is determined by the syntax. Thus articles which precede the noun (or one of its adjectives) which they modify are proclitics whereas possessive pronouns which follow the noun or one of its adjectives are enclitic. Object pronouns are either enclitic when they follow their verb form or proclitic when they precede it. The constraint, mentioned earlier, which stipulates that only two unstressed syllables may follow a stressed one operates both within the grammatical word and also within the phonological word which includes the clitics. In grammatical words when an inflectional ending increases the number of syllables after the basic stress to more than two the stress is moved to the right so that this condition is satisfied, e.g. [máθima] 'lesson' Nom. Sg. but [maθímata] 'lessons'. Within the phonological word, however, when one or more enclitics increase the distance between the stressed syllable and the end of the phonological word, another stress is assigned to the penultimate syllable of the whole unit. Thus the phrase /o an0ropos mas/ 'our man' constitutes one phonological word and is realised phonetically as [oán0ropózmas]. Also /diavase to/ 'read it' gives [djavaseto], and /dose mu to/ 'give me it' surfaces as [dosemuto]; if the final *e* of /dose/ is deleted (as is possible in such a singular imperative) we get [dozmuto] with only one stress. Of the two stresses the last one is stronger, thus primary, while the original one is weakened to secondary. There are occasionally two stresses on a single grammatical word. This however is optional and it applies only to long words where the stressed syllable is preceded by several unstressed syllables, e.g. [pro ramatikos] with the only basic stress on the ultima or [pro rammatikos] with the basic stress remaining primary and another (secondary) on the first syllable. The basic stress does not remain constant. Within inflectional and derivational paradigms there are stress movements (in addition to those motivated by the antepenultimate rule and mentioned above) which will be discussed in section 3.5 below.

3.3.3.1 Pitch

Modern Greek does not make a distinctive use of pitch.

3.3.4.1 Intonation

Studies of MG mention intonation only very briefly (e.g. Householder et al. (1964: 8). A very detailed description of a variety of intonational patterns is given in Setatos 1974 and 1982. Our summary, below, is based on Waring 1982, a report of his own extensive and systematic study. Waring's general conclusions are "(a) there is no one-to-one relationship between a basic intonation pattern and a specific meaning and (b) there are, however, certain general relationships which may even have a claim to universality" (p. 23).

The strongest correlation found by Waring between intonational pattern and syntactic is the so-called (by him) "raised-falling" intonation and yes-no questions (see also section _____, above). This pattern, which is more accurately described as "fall to mid pitch" occurs only finally and is almost exclusively restricted to yes-no questions. However, Waring points out that this strong (almost 100%) relationship is only one-way. That is, when this intonational pattern occurs, we have a yes-no question, but in his data, only 32.5% of yes-no questions are accompanied by this pattern, while the remaining yes-no questions may exhibit rising (31%), rising-falling (20%), etc.

The broad correlations between intonation and meaning are summarized by Waring (p. 25). We give them below in an abbreviated form:

rising: 'incompletion' and 'continuation' (many questions, encouraging remarks, invitations)

falling-rising: as with rising, or to express 'doubt', 'uncertainty' or 'qualification'

rising-falling: 'contrast' or rhetorical question 'is that so then?'

falling: no special implications but if marked (e.g. by reaching very low) then 'conclusion', 'finality', 'definitiveness'.

3.3.4.2: In normal (noncontrastive, nonemphatic) intonation, the intonation peak appears on the last main stress of the string. For example:

2 2 1
o janis efere ena filo tu (falling intonation)
John brought a friend of-his

3 2 1
pote Oa pate stin elada (raised-fall)
when will go-you to Greece
'When will you go to Greece?'

3 2 1
pare mazi su to pedi (rising)
take with you the child
'Take the child with you!'

2 3 1
 Oa figis toso noris (rising-falling)
 will leave-you so early
 'Are you going to leave so early?'

3.3.4.3: Emphatic intonation involves raising the intonation peak above its neutral level (as is indicated in 3.3.4.2) and above the level of the other elements in the string. For example:

3 2 1+
 o janis efere ena filo tu.

The center of intonation here remains in the last primary stress but it is raised higher (as the 1+ indicates). This expresses surprise and emphasis. Such emphasis may be placed on other elements in the string. For example:

2 1+ 3
 o janis efere to filo tu.

This indicates that the surprise and the emphasis is on the fact that John did bring his friend. Emphatic intonation therefore may change the position of the intonation peak and accordingly reduce the level of the other elements in the string.

3.3.4.4: Contrastive stress may be placed on any item within the string whether this is one of the stressed words or not. Contrastive stress may in fact be placed even on such elements as clitic pronouns, articles, or even prefixes. For example:

1+ 3 2
 o janis mudose ta lefta
 John gave-me the-money
 'It was John (rather than anybody else) who gave me the money'

3 1+ 2 2 1+ 2
 ine i fili mu oxi o filos mu
 is the(FEM) friend my not the(MASC) friend my
 'She is my girlfriend not my boyfirend'.

In the above the speaker wants to contrast the sex of the friend in question and to point out that the friend is female not male. Since gender/sex is indicated by the article i for feminine and o for masculine, the contrastive stress is placed on those elements in spite of the fact that articles are usually unstressed proclitic items.

Extra high stress may also be placed on the article to indicate not contrast but uniqueness. For example:

2 1+ 3
 aftos ine o kaOigitis
 he is the teacher

The implication here is that as a teacher he is unique, i.e. a real teacher. The following is an example of a stressed prefix--compare:

adjective, and across object clitic pronouns and following verbs, where the phonological conditions may obtain. For example: /ton patera/ ---> [tombatera] 'the father (ACC)', /ton kalesame/ ---> [to galesame] 'we invited him'. In these nasal-plus-voiced plosive sequences, the nasal may even be reduced to nasalization or it may even be deleted (see section 3.1.2.1.1).

(Rule) 3. Obstruents (consonants other than nasals or liquids) assimilate in voice with the following consonant including nasal or liquid. This process is also very productive. It applies across morpheme boundaries within a word in both derivation and inflection but also across word boundaries within the phrase as was the case with rules (1) and (2). For example:

derivation: /is-xoro/ ---> [isxoro] 'I penetrate' but /is-valo/ ---> [izvalo] 'I attack', /ev-anagnostos/ ---> [evanagnostos] 'easy to read' but /ev-Oimos/ ---> [efOimos] 'cheerful'

inflection: /rav-o/ ---> [ravo] 'I sew, stitch', but /rav-t-o/ ---> [rafto] 'I have clothes made (MIDDLE.VOICE)'

within the phrase: /tus nomus/ ---> [tuznomus] 'the laws (ACC)', /mas lipate/ ---> [mazlipate] 'he pities us'

Voicing assimilation, especially affecting s followed by a voiced consonant may even apply across phrase boundaries in faster speech, e.g. (o anOropos) (mas ide) ---> [oanOropozmaside] 'the man saw us'.

3.4.1.2 Dissimilatory Processes

As mentioned in the section on phonotactics, Dimotiki clusters of two obstruents must contain one continuant (fricative) and one stop. This constraint therefore disallows clusters consisting of either two stops or two fricatives. If the cluster contains an s the other consonant is the stop. If the cluster does not contain s then the first of the two consonants must be the continuant while the second must be the plosive. This Dimotiki phonotactic constraint must also be obeyed across morpheme boundaries and especially in the verb inflectional endings. In order to get the right kind of Dimotiki clusters in verb endings, including verbal derivatives produced by suffixation, we must recognize the following dissimilatory processes:

1. Obstruent (nonnasal, nonliquid) becomes plosive if accompanied (preceded or followed) by a s (or z). For example: /graf-s-o/ ---> [grapso] 'I write (PERFECTIVE.NONPAST)', /diavaz-Oike/ ---> [djavastike] 'it has been read'

2. Nonstrident obstruent becomes plosive if it follows another nonstrident obstruent. For example: /graf-Oike/ ---> [graftike] 'it has been written'

3. Nonstrident obstruent becomes fricative before another nonstrident obstruent. For example: /plek-Oike/ ---> [plextike] 'it has been knitted'.

These dissimilatory processes do not apply to Katharevousa origin words. They do not apply to katharevousa prefixation, e.g. /ek-tiposi/ ---> [ektiposi] 'printing', etc. They also do not apply even to verb inflection if the verbs themselves are of recent Katharevousa origin, e.g. /ekpedev-s-o/ ---> [ekpedefso] 'I instruct (PERFECTIVE.NONPAST)', where we see two clusters that do not follow the Dimotiki phonotactic

constraint, one consisting of two plosives ([pk]) and the second of two fricatives ([fs]). It is important to note that, as so often the case with Greek, Dimotiki patterns can be relaxed and the Katharevousa clusters may be used for certain socio-stylistic effects (e.g. to appear educated).

3.4.2. Metathesis is an extremely limited and sporadic phenomenon as far as the standard language is concerned, affecting only a few vocabulary items such as [fuxta] <---> [xufta] 'handful', [kamilafki] <---> [kalimafki] 'priest's hat'.

3.4.3. Coalescence.

Under coalescence we may include diphthongization, which involves the reduction of i or u to a nonsyllabic vowel in the environment of another vowel. For example: /milai/ ---> [milaj] 'he speaks', /teliono/ ---> [teljono] 'I finish', /aitos/ ---> [ajtos] 'eagle', /frawla/ ---> [frawla] 'strawberry', etc. Diphthongization involving reduction of i to j presupposes, of course, that one accepts the analysis that some instances of [j] derive from [i] via the glide-formation rules discussed in section 3.1.2.1.5 above. Diphthongization may not be considered a morphophonemic rule (or may be given a much more marginal status) within an analysis in which all instances of [j] belong to a separate /j/ phoneme.

Under coalescence we may also include the reduction of two identical consonants into one. For example: /ton nomo/ ---> [to nomo] 'the law (ACC)', etc. On the other hand, this phenomenon may be listed under deletion (section 3.4.4.1, below).

3.4.4.1. Deletion.

1. One of two identical consonants in a sequence is deleted (see above, section 3.4.3). For example: /tis skepsis/ ---> [tiskepsis] 'the thoughts (ACC)' or 'of the thought (GEN)'.

2. A nasal is generally deleted before a strident consonant and before a liquid. For example: /sin-sorevo/ ---> [simorevo] 'I gather', /sin-lipume/ ---> [silipume] 'I commiserate'. However, the final n of the prefix /en-/ remains before the strident consonants. For example: /en-somatono/ ---> [ensomatono] 'I incorporate', /en-zimo/ ---> [enzimo] 'enzyme'. The nasal deletion before stridents is fairly productive in that it also applies across the an article and a following noun or adjective. However, in this environment it applies optionally: /ton sinadelfo/ ---> [tonsinadelfo] or [tosinadelfo] 'the colleague (ACC)', /ton logariazmo/ ---> [tonlogariazmo] or [tologariazmo] 'the account (ACC)'. The nasal, however, resists deletion in the object clitic pronoun ton 'him', even when the right phonological conditions obtain: [ton sinandisa] 'I met him', [ton simbaOo] 'I like him'. The failure of the nasal of ton 'him' to be deleted here is probably due to the fact that such a deletion would create a homophony between to meaning 'him' as the result of nasal deletion and the clitic object pronoun to meaning 'it'. Thus if nasal deletion were to operate, [toskeftome] would be ambiguous between 'I am thinking of him' and 'I am thinking of it'. We see therefore that the phonological rule of nasal deletion does not apply in this syntactic context in order to avoid such ambiguity. It is important to note that nasal deletion applies more freely with the

feminine object clitic pronoun tin in the appropriate phonological context, e.g. [tinskeftome] or [tiskeftome] 'I am thinking of her'; here the nasal loss creates no ambiguity.

Final n in verb stems is deleted before the active voice perfective aspect marker s, following the above general rule, as in /lin-s-o/ ---> [liso] 'I untie (PERFECTIVE.NONPAST)', and also before the o of the passive perfective marker, as in /lin-o-o/ ---> [liOo] 'I am untied (PERFECTIVE.NONPAST)'.

3. Dental fricatives (i.e. θ, ð) are deleted before s and before o. This applies to verb-stem-final dentals before the perfective markers because this is where such clusters occur, but it can be seen as a reflex of a constraint that does not allow combinations of two dental [????IS THIS RIGHT???) consonants. The only possible combination of these is sθ and zð where the strident precedes the nonstrident, but even this is permitted only with Katharevousa items.

4. Vowel deletion: when hiatus (sequence of two vowels) occurs within a root, if one of the two vowels is either unstressed i or unstressed u, it is reduced to a glide (see section 3.4.3 on coalescence, above). When the two vowel sequence does not contain i or u, the hiatus remains, within the root.

When two vowels come together across morpheme or word boundaries, there is a tendency for one of them to be deleted. The choice of which one of the two vowels is deleted is determined to a large extent by its position on the sonority hierarchy, whose order is a o u i e. The more low and open the vowel, the higher it is on this scale and the stronger it is said to be. Deletion will affect the weaker of the two vowels in hiatus. (The exact relationship of o to u and of e to i is not completely clear.) Although the sonority scale seems to apply to a number of cases, other factors also operate and often override it. These factors may be morphological, syntactic, or idiosyncratic. We summarise below the more general rules of vowel loss in hiatus:

a. Prepositional prefixes (obligatorily) and prepositions in phrases (optionally) lose their final vowel before an initial vowel of the element that follows. Deletion in this context does not follow the sonority hierarchy. For example: /apo-elpizo/ ---> [apelpizo] 'I make someone despair', /kata-erxome/ ---> [katerxome] 'I come down', /apo ekso/ ---> [apekso] 'from the outside'. Idiosyncratically, though, the final vowel of the prepositional prefix /pro-/ 'pre-' does not delete. Similarly, some recent, Dimotiki, prefixes tend not to lose their final vowel before another vowel, as in /para-ipie/ ---> [paraipje] 'he drank to excess', or /kata-idromenos/ ---> [kataidromenos] 'completely sweaty'. With the Dimotiki prefixes /para-/ and /kata-/, we may find some cases where deletion applies, as in /para-efaga/ 'I overate' ---> [paraefaga] or [parafaga].

b. In inflectional endings the situation is rather complex because it often depends on the morphological analysis one proposes and the degree of abstraction one allows. Thus, if the verb forms for the so-called 'contracted' verbs /agapo/ 'I love', /agapume/ 'we love', /diarkun/ 'they suffice', etc. are analysed as /agapa-o/, /agapa-ume/, /djarke-un/, etc. we must include the deletion of a root- (or stem-)final a or e before o and u. This goes against the sonority hierarchy but is motivated by morphological considerations (i.e. uniform underlying form for the stem, unity of form for the endings, etc.).

c. Within the noun phrase, hiatus is generally created between articles and following nouns or adjectives or other specifiers. Here deletion seems to apply only sporadically. When it applies, it follows the sonority hierarchy, though. Deletion in a noun-phrase cannot apply if the definite article is one of those consisting only of a single vowel, such as the nominative singular masculine o, the nominative singular feminine i, and the nominative plural nonneuter i. In such cases, hiatus will remain. For example: /o anOropos/ ---> [oanOropos] 'the man', /i aniksi/ ---> [ianiksi] 'the spring', /i anOropi/ ---> [ianOropi] 'the men'. The neuter articles to (singular) and ta (plural) also resist deletion: /ta onira/ ---> [taonira] 'the dreams'. Only very occasionally do we find optional deletion, as in /to alogo/ ---> [talogo] 'the horse'. However, the articles to, ta, and the indefinite singular ena do lose their final vowel optionally before the lexical item alos 'other', as in /to alo pedi/ ---> [talopedi] 'the other child'. In conclusion, the hiatus created within the noun phrase between proclitic elements with final vowel and vowel-initial following words tends to remain.

d. The situation is different with vowel-final proclitics attached to a verb when the verb begins with a vowel. Here the deletion of one of the two vowels, although optional, is preferred, and it follows the sonority hierarchy. The relevant proclitics include the direct object pronouns to (neuter singular) and ta (neuter plural), the indirect object pronoun tu (masculine and neuter singular), and the verbal particles Oa and na. For example: /to akusa/ ---> [takusa] 'I heard it', /Oa erOo/ ---> [OarOo] 'I will come'. Notice, however, that if the sequence is a + o deletion usually does not take place, as in [OaorisO] 'I will order'.

e. In composition, if hiatus occurs, it usually remains. Sometimes one of the two vowels may be deleted but this depends on the individual items. For example: /kako-anaOremenos/ ---> [kakanaOremenos] 'badly brought up', but [neolinas] 'neohellene'.

f. The unstressed initial of deictic elements such as the personal pronouns ego 'I', esi 'you (SINGULAR)', emis 'we', etc, and the words edo 'here' and eki 'there', if preceded by a word ending in a vowel is deleted, as in [ela si] 'come (you)!' as opposed to [irOes esi] 'you came'.

Vowels may also be deleted in environments other than hiatus, as in the following cases:

g. The final e of the preposition se 'in, at, to, on', if followed by the definite article (or the indefinite ena, though this is a case of hiatus) is deleted, as in /se to spiti/ ---> [sto spiti] 'to the house'.

h. The final a of the preposition mesa 'within, between' is deleted if followed by the preposition se with the definite article, as in /mesa se to spiti/ ---> [mestospiti] 'inside the house' (with "coalescence" of s + s to s as well).

i. The final o of the preposition apo 'from' is deleted, if followed by the definite article, as in /apo to spiti/ ---> [aptospiti] 'from the house'.

j. Optionally the final e of the singular imperative and the penultimate e of the plural imperative forms may be deleted, as in [fere to] or [fer to] '(you (singular)) bring it!', [ferete to] or [ferte to] '(you (plural)) bring it!'. [WE SHOULD ADD HERE THAT THE SYNCOPATED FORM IS THE MORE COMMON ONE IN THE PLURAL FOR MOST VERBS, EXCEPTING ONES LIKE

KRINO, PERIMENO, LEGO, ETC., AND THAT THE APOCOPATED FORM OF THE SINGULAR IMPERATIVE IS MOST COMMONLY FOUND WITH VERBS OF HIGH FREQUENCY LIKE FERRO, KANO, ETC.]

k. The unstressed "augment" (initial vowel marking past tense forms) is deleted, as in [grapsame] 'we wrote' versus [egrapsa] 'I wrote'. (Babiniotis (19XX) suggests that the augment e (also i in a limited number of verbs) is only inserted if it is required to provide a syllable in order to accommodate the antepenultimate stress requirement of the past tense; within such an analysis, there will be no need for this deletion rule.)

1. Unstressed i in word-final position often gets devoiced and sometimes deleted. Unstressed i may also get deleted in other positions within a word, as in /sikoti/ ---> [skoti] 'liver' or /peripato/ ---> [perpato] 'I walk'. Unstressed i and u delete more regularly in northern dialects of Greece, while this phenomenon is more sporadic in the standard language.

3.3.3.2. Insertion.

1. e may be inserted after a verb-final n, as in [grafune] 'they write', a variant of [grafun].

2. g is inserted between a verb stem ending in a vowel and a verbal ending beginning with a vowel. This process is more systematic with verb stems ending in a, but only in the active imperfective past, e.g. /agapa-a/ ---> [agapaga] 'I used to love'. Also, the imperfective past [eklega] 'I was crying', from the verb /kleo/ 'I cry' (perfective /klap-s-o/) may be interpreted as having an epenthetic g; similarly [akuga] 'I was listening', from /aku-o/ (perfective /aku-s-o/).

3. If the insertion of the augment is adopted (see section 3.4.4.1.k), then this too represents an insertion.

3.5. Morphophonology (Suprasegmental)

3.5.1.1. Stress assignment in lexical items can change under various morphological processes and compounding, and so is not constant.

3.5.1.2. The types of alterations in stress assignment in words that can happen under various morphological processes, including compounding, are:

- a. loss of stress altogether
- b. retraction of stress to a syllable earlier in the word
- c. shifting of stress to a syllable later in the word
- d. addition of stress (occurring only in certain strings with clitics).

For example, the noun savato 'Saturday', as an independent word, is stressed on the first syllable (antepenultimate here), but in the copulative compound savatokirjako 'Saturday and Sunday, weekend' (cf. kiriaki 'Sunday'), it becomes unstressed altogether. Similarly, mavro- 'black' loses its stress altogether in the compound aspromavro- 'black and white' (cf. aspros 'white'). Also, from the point of view of lexical stems, those which are stressed in basic forms can be said as well to lose their stress in certain inflectional formations; for instance, spiti 'house' has the stress on the first syllable of the stem in the basic (nominative singular) form, while in the genitive singular form, spitju, the stem is unstressed and the ending -u is stressed.

Retraction of stress to an earlier syllable occurs most notably in inflection as part of the formation of a certain class of past tense forms. For example, verbs stressed on the penultimate syllable in the present tense (active), e.g. elpizo 'I hope', form an imperfective past with different endings and with retraction of the accent to the antepenultimate syllable, i.e. elpiza 'I was hoping'; similarly, the simple (aoristic) past shows a retraction of the accent vis-a-vis the present, though with a different stem formative, i.e. elpisa 'I did hope'. In compounding, examples of accent retraction are to be found as well; in comparison with the independent word kiriaki 'Sunday', the second member of the compound savatokirjako 'Saturday and Sunday, weekend' shows a retraction of the accent to the syllable ki- (with a stem change as well to o-stem from independent form i-stem).

The forms spiti 'house' (NOM) and spitju 'house' (GEN), cited above, provide an example of the throwing forward of the accent in a word. In these forms, the accent in the genitive, vis-a-vis the (more basic) nominative has been shifted forward in the word, onto a later syllable. Similarly, the pair plenome 'I wash myself' / plenomaste 'we wash ourselves' shows the same type of accent shift (taking the stress in the singular to be more basic); so also in the past tense: plioika 'I washed myself' versus plioikame 'we washed ourselves'. In compounding, too, one finds instances such as aspromavro- 'black and white', cited above, in which the accent of aspro- 'white' in the compound is thrown forward (aspro-) compared with that in the independent form (Aspro-).

Finally, addition of stress occurs in certain strings involving clitics. In particular, as noted in section 3.3.2.1, when a clitic, either a direct or indirect object form or a possessive pronoun, follows, i.e. attaches as an enclitic to, a verbal form, in the case of the object pronouns attaching to participles and imperatives, or a noun or adjective, in the case of the possessive pronouns, and the "host" of the clitic form has antepenultimate stress, then an extra stress is added to the final syllable of the host, and the antepenultimate stress is weakened to secondary stress. Thus the neuter accusative (direct object) clitic pronoun to, when attached to the imperative singular djavase 'read', yields the form djavaseto, with the addition of a stress on the e, and similarly with the active participle: djavazondas + to ---> djavazondasto. An example with the possessive pronouns is to parapono 'the complaint' + mu 'my' ---> to paraponomu. All of the clitics are monosyllabic, so that generally the encliticization process adds only one syllable to the string. Two clitics can be attached, though, when there are indirect and direct object pronouns, e.g. djavasetuto 'read it to him' (djavase 'read' + tu 'to him' + to 'it'); if two enclitics attach to a host which bears a stress on the penultimate syllable, there is the addition of a stress to the rightmost clitic, e.g. stilte 'send' (IMPV.PL) + mu 'to me' + to 'it' ---> stiltemuto, with a superficially stressed clitic.

These changes in stress assignment are inspired by two basic principles regarding Greek accentology combined with idiosyncratic facts about the particular morphology involved. The two principles are:

- a. the stress in a word must fall on one of the last three syllables (the modern reflection of the Ancient Greek "Rule of Limitation" or "Dreimorengesetz"; see also section 3.3.2.1)
- b. there can be only one primary stress in a phonological word.

The idiosyncratic morphological facts include unpredictable aspects of Greek word formation such as: copulative compounds have antepenultimate

stress (i.e. they have "recessive" accent--it is placed as far from the end of the word as the rules of the language allow), the genitive singular in -u of neuter nouns in -i is end-stressed, certain past tense forms are recessive in accentuation, etc.

These principles, therefore, explain why aspro- undergoes a forward shift of its accent in the compounding process that yields aspromavro- and why mavro- loses its accent in the same process: in a recessively stressed form like a copulative compound, the stress will be on the antepenultimate, and since a compound is one surface word, there can be only one stress. Thus in relation to the freely occurring forms, aspro- undergoes a forward shift of accent and mavro- loses its accent. In the similar compound savatokirjako, for the same reasons, i.e. the requirement of a single antepenultimate stress in such a compound, the first member loses its stress and the second member undergoes stress retraction vis-a-vis the free forms. Similarly, accent retraction in elpizo versus elpiza is a result of the particular accentual pattern associated with this past tense formation (i.e. recessive) plus the antepenultimate principle ((a) above). The stress shift in plenome versus plenomaste or in plioika versus plioikame is motivated by the length of the plural endings (two syllables, -maste/-ame) coupled with the antepenultimate rule and recessive accentuation in this past tense type.

As is clear from the above discussion of clitic accentuation, the clitic facts constitute counterexamples to these principles; nonetheless, they are wholly explicable in terms of these principles. As noted in section 3.3.2.1, the addition of an enclitic to a word with antepenultimate stress creates a situation in which a phonological word (clitics have no independent phonological stress and depend on finding a "host" to attach to) violates principle (a) above. The addition of a primary stress to the final syllable of the host (the penult of the new phonological word created by the encliticization) removes this violation and, due to principle (b), the weakening of the earlier primary stress to secondary stress gives a phonologically acceptable word.

One final type of factor which plays a role, of a different nature from the other guiding principles but important nonetheless, is social and/or stylistic in nature. As noted in the Introduction, Modern Greek presents a classic case of diglossia between a low style and a high style, which is, in this case, somewhat archaizing. The conditioning for the accentual shifts in Ancient Greek was based largely on the number of morae in the last three syllables of a word (hence the German name for the Rule of Limitation: *Dreimorengesetz*) and the language had distinctive length for vowels and diphthongs. Modern Greek has no such length distinctions (see section 3.XXX), so the conditioning for the stress shifts, as indicated here, is largely morphological in nature and is phonologically opaque. As a result, there is a tendency in the "low style" language to level out some of the stress shifts in paradigms, while the "high style" variety maintains more of the (Ancient Greek) accentual shifts. Thus, one finds in Modern Greek variation between, for example, panepistimiu (low-style) and panepistimlu (high-style), both the genitive singular of the neuter o-stem panepistimio 'university', with stylistic and social factors serving to dictate the appropriateness of a given variant in a particular context.

3.5.1.3. As indicated in section 3.5.1.2, the position of the stress in these morphophonological changes is predictable. The factors which govern the ultimate placement of the stress are:

- a. the phonological factor of the underlying placement of the stress in the word
- b. the phonological factor of the number of syllables in the word
- c. the morphological factor of the idiosyncratic accentual effects associated with a given morphological process
- d. the accentual principles stated in section 3.5.1.2.

Besides the idiosyncratic morphological accentual effects noted in that section, there are many others, including the following:

- i. diminutives in -aki are stressed (underlyingly, as shown by the surface stress in the nominative singular) on the -a-; therefore such a diminutive of a form like agori 'boy' would show a loss of stress from the lexical base form (from stress on the -o- to agoraki 'little boy')
- ii. negative adjectival/participial forms with the prefix a- (an- before a vowel) are recessively accented, e.g. a-dinatos 'impossible' versus dinatos 'possible'
- iii. adjectives in -is (nominative masculine singular) are end-stressed, e.g. eftixis 'lucky', dimofilis 'popular', etc.
- iv. except for forms in (iii), adjectives formed with the prefix ef-/ev- 'good, easy' and dis- 'bad, difficult' are recessively stressed, e.g. efkratos 'temperate (of climate)' (cf. efkratis 'temperate (of temperament)'), with stress as in (iii), disarestos 'disagreeable', evarestos 'agreeable', etc.

and many more, too numerous to list here.

3.5.1.4. See section 3.5.1.3.

3.5.2.1. - 3.5.2.4. These questions are irrelevant since Greek is not a tonal language.

3.5.3. There are no phonological effects associated with the various intonation patterns, though some phonetic effects are noticeable. The peak of sentence-stress is longer and louder than other syllables in the sentence (analogous to the phonetic effects of word-stress). For phonetic effects in hesitation forms, see section 4.2.