An iota of difference

Attitudes to *yod* in lexical and social contexts*

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The factors controlling synizesis and hiatus in Modern Greek have long been debated. Some accounts, e.g., Kazazis (1968, 1992), suggest that a speaker's knowledge of a word's origin (or alternatively, its appropriateness in a formal setting) plays a role. Other accounts, e.g., Nyman (1981), discount this factor. Petrounias (1987) cites word frequency as a factor, claiming that "rarer words follow [the synizesis rule] less frequently" especially if the words seem more formal.

To test the influence of frequency and perceived formality of {-ia} words on their pronunciation, two experiments were conducted, in which ten native speakers of Modern Greek heard 40 words pronounced with hiatus (e.g., σχέδια /*sxeðia*/ "plans") and synizesis (e.g., πόδια /*poðja*/ "feet"). They rated these words on (1) word familiarity, (2) appropriateness of the word in informal conversation, and (3) appropriateness of the word in formal proceedings. In the first experiment, they heard the canonical pronunciations of each word. In the second they also heard non-canonical pronunciations, e.g., [sxe.ðja] and [po.ði.a]. In a third experiment, speakers produced the words in question in a sentence-reading task. The results of these experiments suggest that speakers still have an awareness of the connection between hiatus and formality (*contra* Nyman 1981), and that this awareness may play a role in favoring hiatus not predicted by declensional class for less frequent items, consistent with Petrounias' (1987) predictions.

Keywords: *yod*, hiatus, synizesis, word frequency, syllabification, register

1. Introduction

Kostas Kazazis, in his 1968 discussion of "Sunday Greek," made an observation about a particular hypercorrection he observed during a tape-recorded inter-

view with one of his students. As Kazazis (1968) told it, this young man was quite intimidated both by the tape recorder and by the professor himself, and produced the non-natural pronunciation in (1a):

- (1) a. *['vra.çi.a] a hypercorrect pronunciation for βράχια “rocks”
 b. ['vra.ça] a more typical pronunciation for βράχια “rocks”

Clearly (1a) did *not* represent natural speech for the young man, but Kazazis (1968) saw something deeper in the hypercorrection. Specifically, he used it as a clue to the underlying representation of βράχια. From this viewpoint, the young student's error was evidence that MG orthography closely resembles the underlying phonological representation of MG words in the mind, and that “people often make heavy use of underlying or near-underlying phonological forms when they are under certain conditions of emotional stress... [or] talking to foreigners or to children” (1968). In a sense, they ‘forget’ to apply the phonological realization rules that govern the production of casual, idiomatic speech. The phonological rules involved in example (1) are given in (2); in (1a) Kazazis’ nervous student applies (2a) but not (2b) or (2c):

- (2) a. Palatalize velars before front vowels (/i/ or /e/).
 b. Change an unstressed /i/ to [-syllabic] *ɨ* before another vowel.
 (The Synizesis Rule, also called the Glide Formation Rule — cf. Warburton [1976])
 c. Delete non-syllabic *ɨ* after palatal consonants.¹

The assumption that spelling, formal varieties, or even earlier stages of the language reflect underlying forms is of course somewhat questionable, at least if underlying forms are assumed to be acquired by pre-literate children, and not fundamentally changed by literacy, exposure to other dialects, or other subsequent linguistically broadening experiences. There are, moreover, words where a fully syllabic /i/ is perfectly normal:

- (3) a. μάρτιο, μάρτια “garment(s)”
 b. εμβόλιο, εμβόλια “vaccination(s)”
 c. δωμάτιο, δωμάτια “room(s)”, etc. (Nyman 1981)

How do Kazazis’ rules (or rather, the speakers who unconsciously use them) know which words to change and which to leave alone? Many factors may be at play: etymology, word frequency, current usage of the word, etc. Kazazis (1968) focuses on the first of these, assuming that words in (3) are marked in the lexicon as borrowings of [+learnèd origin], henceforth abbreviated [+l.o.],² and

that (2b,c) are obligatory only in words inherited from the popular (Demotic) form of the language, not those originally from Katharevousa.³

Kazazis was by no means the first to notice or comment on this phenomenon. The vexing question of how to handle MG *yod* had already attracted some attention, and two main proposals had emerged: (1) Modern Greek has a unitary phoneme behind all instances of orthographic {i} (comprising η, ι, υ, ει, ου, and υι) (Newton 1961), but words containing this phoneme may be accompanied by some sort of feature to account for its non-uniform pronunciation in identical contexts (Kazazis 1968), and (2) MG has two different underlying phonemes /i/ and /j/ which directly account for the diversities in pronunciation between (1b) and (3) (Householder et al. 1964, Koutsoudas 1962, and Mirambel 1959). A few points of each of these positions will be given below in Sections 1.1 and 1.2; a useful summary may also be found in Joseph & Philippaki-Warbuton (1987:235–236). More recently a third position has emerged, discussed in Section 1.3. In Section 2, a few aspects of the debate are discussed that can profitably be tested empirically: first, the synchronic relationship between perceived formality for a particular word on its realization with [i] or [j], and second, the effects of the word's frequency on each of these.

1.1 One-phoneme accounts

The one-phoneme (or allophonic, rule-based) approach is taken not only by Kazazis, but also by Malavakis (1984), Nikolopoulos (1985), and Warbuton (1976). It is moreover assumed in Holton et al.'s (1997) reference grammar. Evidence for this view comes from certain synchronic phenomena such as speech errors, sociolinguistic variation and language acquisition. As seen above, Kazazis' (1968) main evidence comes from socially-motivated speech errors such as (1a). This argument depends on the assumption that nervous or hyper-articulated speech results from non-application of phonological rules and is hence closer to underlying forms, which today is perhaps questionable.

For instance, given that βράχια is spelled with an orthographic {i} in Greek, the hypercorrection could be based on 'spelling pronunciation' just as plausibly as an underlying /i/ in the speaker's native lexicon. Kazazis (1969a) responds to this objection of orthographic interference by providing instances of non-application of rule (2c) by a 4-year-old child, producing [xron̩i̯a] and [mal̩i̯a] for χρόνια 'years' and μαλλιά 'hair'. While the child was not strictly pre-literate, Kazazis claims that spelling pronunciation is an unlikely explanation for such productions at so young an age. Thomadaki and Magoula (1998) further substantiate Kazazis' claims, finding that young children acquiring MG show

two patterns of deviation before acquiring [j] and its associated palatal consonants. Some (particularly at earlier stages) delete [j] entirely (and de-palatalize palatal consonants). Other children, particularly at later stages, produce a semi-vocalic or even fully syllabic [i] (following either a palatal or non-palatal consonant). This same effect is also found in previous studies of child-speech (cited in Thomadaki and Magoula 1998).

However, one cannot rule out the possibility that the children are internalizing and reproducing hyper-articulated speech from adults, and that this adult usage *does* in fact stem from orthographically influenced ideas of what constitutes clear Greek! Kazazis himself (1968) notes that child-directed speech is more likely to contain those realizations that he describes as “underlying forms”. The extent to which spelling influences hyper-articulated speech to children and thus indirectly affects children’s phonological acquisition thus deserves further evaluation, including careful consideration of the phonetics of Greek child-directed speech. Tserdanelis (2005) examined differences between child-directed and adult-directed speech, and found that certain types of non-canonical pronunciations, such as consonant deletion and lenition (e.g., realizing a stop as a fricative) occurred less often in the child-directed speech. This indirectly confirms Kazazis’ observation; however, Tserdanelis did not explicitly test synizesis or palatalization, nor did he examine hypercorrect or ‘spelling’ pronunciations. Such an examination is not undertaken here.

1.2 Two-phoneme accounts

The main opposing view is that /j/ is simply a separate phoneme from /i/. This seems to have been the majority view in 1968, and since then it has been argued for by Nyman (1981) and Setatos (1974), and implicitly assumed in the lexical pronunciations given in the *Λεξικό της Κοινής Νεοελληνικής* (1999) (henceforth *ΛΚΝ*).⁴ However, it is by no means universally accepted.

The most compelling evidence for this position is the existence of minimal pairs between /i/ and /j/, which force a phonemic analysis. Quite often these minimal pairs are homographs and indeed historical doublets with semantically related meanings, but for a synchronic account of the grammar, these connections are irrelevant. Perhaps the most frequently encountered (and frequently cited: e.g., Holton et al. 1997:8) *strict* example of a /i/~j/ minimal pair is (4):

(4)	a.	άδεια	/ˈa.ði.a/	[ˈa.ði.a]	“license”
	b.	άδεια	/ˈa.ðja/	[ˈa.ðja]	“empty.N.PL/F.SG”

Moreover, if one allows for a phonological rule that merges an underlying /j/ and the preceding consonant into a new palatal consonant (cf. Newton 1971, Holton et al. 1997:6), then the repertoire of ‘abstract’ minimal pairs expands somewhat, as shown in (5). These are not minimal pairs in the strictest sense, but may be said to contrast minimally at an underlying level, if the assumptions Newton (1971) and others make about that level are correct:

(5) a.	Syllabic /i./	δόλιος	/ˈðo.li.os/	[ˈðo.li.os]	‘devious’
	Non-syllabic /j/		/ˈðo.ljos/	[ˈðo.ɭos]	‘poor ...!’
	Syllabic /i./	σκιάζω	/ski.ˈa.zo/	[sci.ˈa.zo]	‘I shade’
	Non-syllabic /j/		/ˈskja.zo/	[ˈsca.zo]	‘I scare’
b.	Syllabic /i./	κάλιο	/ˈka.li.o/	[ˈka.li.o]	‘potassium’
	Non-syllabic /j/	κάλλιο	/ˈka.ljo/	[ˈka.ɭo]	‘better’
	Syllabic /i./	φυλάκια	/fi.ˈla.ki.a/	[fi.ˈla.ci.a]	‘guardposts’
	Non-syllabic /j/	φιλάκια	/fi.ˈla.kja/	[fi.ˈla.ca]	‘little kisses’

Warburton (1976) might argue that these words are in separate sociolinguistic registers, as marked by a [Kath] feature, and follow different rules. Nyman replies: “[Glide Formation] is scarcely such a watershed between Katharevousa and Demotike as is, say, the manner dissimilation: ptoxós [+Kath] / ftoxós [+Dem] ...” (1981:242). Reacting specifically against Warburton’s (1976) [+Kath] notation but implicating other scholars, Nyman further argues that there are many words (e.g., στάδιο “stadium”) now perfectly acceptable in Demotic Greek, and that it would be “more to the point to mark στάδιο as [-Glide Formation].” This ignores Kazazis’ more careful name [learnèd origin] for his feature, which may apply to words “irrespective of whether or not they are still considered as learnèd” (1969b). However, Kazazis’ claim here is itself problematic with regard to its specific empirical implications. These problems are discussed further in Section 2.

1.3 A third viewpoint

More recently, Deligiorgis (1987) and Malikouti-Drachman and Drachman (1990) have proposed an alternative solution, which maintains a distinction between the two types of /i/ without needing to posit the glide /j/ as a separate phoneme. In this analysis, high front vowels that surface as non-syllabic before another vowel (either as glides, fricatives, or as input to palatalization rules such as those shown in (5)) are marked as unspecified for the [consonantal] feature ([0cons]). This underspecified archiphoneme may also be symbolized

as /I/. Vowels that do not so alternate, as in the /i/ vowels found in (3), are fully specified [-cons]. The “Maximal Syllabification Principle” (cf. e.g., Kiparsky 1979:432–433, as quoted in Deligiorgis 1987) forces the realization of /I/ as non-syllabic before another vowel, but must maintain a syllable boundary before fully specified [-cons] /i/.

By allowing underspecified /I/ to surface as either a consonant or vowel as needed, this solution greatly simplifies accounts of morphological alternations. Conversely, by allowing for fully specified /i/ in certain words, it avoids Nyman’s complaints against arbitrary features — the feature [consonantal] is needed by the phonology in any case. This analysis does not appear to make any specific predictions as to the sociolinguistic affects of /i/ and /I/ (but see below). Like Nyman’s (1981) representation, it posits an underlying distinction between two phonological entities, as opposed to Kazazis (1968), whose [l.o.] feature more logically applies to the entire word in question, not to the word’s /i/ phoneme.

2. Sociolinguistic implications of syllabification

2.1 What’s in a name? Implications of the [learnèd origin] feature

Nyman’s critique of Warburton’s (1976) [+Kath] feature highlight a certain difficulty with the one-phoneme account, insofar as it depends on sociolinguistic registers to maintain the distinction between syllabic and non-syllabic /i/. If certain words are no longer felt to be learnèd, then how can they still be marked with any special features, without assuming an unreasonable level of historical or etymological awareness in the minds of native speakers? What empirical claims does a label like [+Kath] or [+learnèd origin] make about the words it marks? This question may turn out to be the crux of the whole debate. Joseph and Philippaki-Warburton, in their detailed review of the issue (1987:233–236), sum it up thus: “The treatment of this problem then would seem to depend on whether one wishes to propose a single, homogenous system for the standard [language] ... or instead present the phonology of the standard (the mixed) as a network of subsystems (at least two, Katharevousa and Demotiki) which coexist.” The former demands a sociolinguistically neutral feature (whether a phoneme /j/ or a distinction in [consonantal] specification); the latter would allow for some sort of stylistic feature attached to the *word* in question rather than the /i/ segment itself.

In this light, Fliatouras and Anastasiadi-Symeonidi's (2004) recent survey of current sociolinguistic and stylistic markers of MG is highly relevant. While Nyman (1981) cites the distinction between ['a.ði.a] and ['a.ðja] as a minimal pair now largely divorced from stylistic or sociolinguistic considerations (whatever the historical connections), Fliatouras and Anastasiadi-Symeonidi (2004) use this same pair of forms to demonstrate current differences in register in Greek, citing *η άδειά μου* (the stress pattern resulting from a fully specified [-cons] /i/) as [+λόγιο] (as well as the 'unmarked' default) and *η άδεια μου* (which could arise from /j/ or underspecified /I/) as [-λόγιο].

2.2 Register and frequency

If Joseph and Philippaki-Warburton's (1987) analysis of the situation is correct, further debate on the proper phonemicization for Modern Greek is pointless without further evidence on how best to represent the system(s) of MG phonology. One such approach is to measure empirically native speakers' current attitudes to certain words. Without such insight (and perhaps even with it), direct, unequivocal evidence for either the one- or two-phoneme position is a tall order indeed.

This paper, accordingly, does not attempt to address the phonemicization issue directly. Rather, it deals with the socially contextualized intuitions of native speakers, an issue more directly related to the evidence presented in Kazazis (1968, 1992). There are essentially two positions one can take on the stylistic significance of words with *yod*. Nyman's (1981) is that the stylistic feeling that a word evokes is not significant enough to be part of its representation in the mental lexicon. Kazazis (1968, 1992) and Nikolopoulos (1985), who accord this feeling sufficient salience to warrant a place (through the [l.o.] or [λόγιο] feature) in the native speaker's grammar, represent the other viewpoint.

According to this latter view, the sociolinguistic register feature [l.o.] already encodes the distinction between syllabic and non-syllabic (or [0cons] and [-cons]) /i/ and predicts (by controlling application of the Glide Formation Rule) the correct surface realizations. An extreme form of this hypothesis would claim that it is not that Katharevousa words just happen to have /i/ marked as [-cons] (as noted by Deligiorgis 1987), but that in the formal situations that these words evoke minimizing the number of syllables pronounced (whether through a rule of Glide Formation or a principle of Maximal Syllabification) is of lesser importance than 'clear enunciation' of /i/. It may well be that the Maximal Syllabification Principle itself is only appropriate in certain sociolinguistic contexts.

Naturally, there is middle ground between these viewpoints; one can posit a phonemic distinction between /i/ and /j/ (or between /I/ and /i/[-cons]), while acknowledging that speakers feel an ‘interlectal awareness’ of their divergent sociolinguistic history, just as speakers are aware of the special status of /ts/ and /dz/ (see Joseph 1992). The question of interlectal awareness in this instance is an empirical one, and one worth revisiting in its own right, given the changing state of the language. If it has disappeared from the language, then an account based on a [l.o.] or [λόγιο] feature is unmotivated and unlikely at best. If it is still present, however, then the role it plays in maintaining the distinction between /i/ and /j/ (or /I/ and /i/[-cons]) is open to further exploration.

Given that [+l.o.] words generally — and words with [i.a] in hiatus particularly (see Petrounias 1987) — are associated historically with Katharevousa, one may predict these words to be more appropriate in formal situations, and perhaps less appropriate in informal situations. In order to operationalize this, we focus then on formal and informal contexts, and see if our difference lies there. However, in making this determination, we need to control for frequency and familiarity: more frequent or familiar words (barring obvious exceptions like curse words) are expected to be correspondingly more appropriate in any circumstance, formal or informal.

Indeed, the role that word frequency plays in the /i~/j/ distinction may turn out to be interesting in its own right. First, highly frequent words might, through their general usage in many different contexts, come to lose any special distinction as [+l.o.]. Secondly, several scholars (e.g., Hooper 1976, Phillips 2001) have noted sound changes involving reduction (including erosion of syllable boundaries) typically affect the most frequent words first, but sound changes involving some type of analysis (in this case, reference to spelling, morphology, and social factors) affect the least frequent words first. In other words, items that the speakers have only rarely encountered are more vulnerable to the effects of analytic processes.

Petrounias (1987) predicted for MG specifically: “Στα άτονα ‘-ia παρατηρείται τάση για εφαρμογή του κανόνα της συνίζησης, με πρώτο στάδιο την τροπή του [i] σε ημίφωνο. Η εφαρμογή ή η μη εφαρμογή του κανόνα εξαρτάται από πολλούς παράγοντες. [...] Φυσικά, σπανιότερες λέξεις προσαρμόζονται λιγότερο ή καθόλου. [...] Τέλος, είναι πιθανό η δυνατότητα ολοκληρωμένης μορφολογικής ανάλυσης, δηλαδή η ύπαρξη αναγνωρίσιμου λόγιου επιθήματος και όχι μόνο κάποιας γενικής ‘κατάληξης’, να δυσχεραίνει την προσαρμογή”. (*For unstressed /'-ia/ a tendency is observed for application of the synizesis rule, with the first stage [being] the realization of [i] as a semivowel. The application or non-application of the rule depends upon many factors. [...] Naturally, rarer*

words apply [the rule] less, if at all. [...] Finally, it is possible that the possibility of integrated morphological analysis, in other words the existence of a recognizable learned inflection and not just some general ending, will disfavor application.)

To my knowledge, the specific claim that less-frequent words apply syni-
 zesis (or Glide Formation) less has not been formally tested. The effect of fre-
 quency on the realization of /i/ is distinct from the sociolinguistic variables
 mentioned above, but the two may interact.

3. Experiment 1

3.1 Purpose and predictions

The purpose of the Experiments 1 and 2 below is to investigate the effect of *frequency*, *familiarity* and *S/H-class* on the perceived *register* of a word — formal or informal. For the purposes of these experiments, *frequency* is defined as the frequency reported for that word-form in the Hellenic National Corpus (HNC) (Hatzigeorgiu et al. 2000) as of May 2003. Since the HNC is a written corpus (and to this author's knowledge, no available corpora of spoken Greek are sufficiently large to give accurate frequency counts), these written frequencies may not correlate perfectly with the actual spoken frequencies for these words. Therefore, Experiment 1 measures *familiarity* with each word, as will be explained below. It is anticipated that written frequency will correlate highly, though not perfectly, with reported familiarity ratings. It is an empirical matter which of the two factors will have a more direct effect on register, though familiarity seems likely to be more relevant than written frequency.

S/H-class is defined as the expected syllabification pattern of each word. Two classes will be considered here: the *S-words*, which have an underlying /j/ (in Nyman's terms) or /I/ [0cons] (in Malikouti-Drachman's and Deligiorgis' terms); and the *H-words*, which have an underlying /i/ (Nyman), /i/ [-cons] (Malikouti-Drachman, Deligiorgis), or [+l.o.] (Kazazis). Regardless of the exact representation, all theories discussed above predict that S-words will undergo syni-
 zesis, and the H-words will remain in hiatus.

The S/H-class for a particular word was operationalized as follows. Neuter plural nouns (which make up the majority of the words used in these experiments) were classified as S-words if their singular nominative-accusative form ends in {i} (iota), and as H-words if their singular nominative-accusative form ends in {io} (iota-omicron). For the adjectives and feminine singular nouns, the S/H-class was determined by the pronunciation listed in the *AKN* dictionary.

This dictionary is the largest and most complete monolingual Modern Greek dictionary of which the author is aware with pronunciations explicitly given. Words that can be realized either with synizesis or hiatus (e.g., ἅγιος “saint”, according to Deligiorgis 1987) and words that have two pronunciations listed in the AKN are excluded from this study.

The dependent variable *register* was split into two separate variables for the purposes of these experiments: *informal appropriateness* and *formal appropriateness*. Like frequency, these were determined experimentally as explained in the methods section below. If Kazazis’ (1968) [l.o.] feature is accurately named, and H-class words are still stylistically marked, then the following predictions follow:

1. S-class words will receive a high informal appropriateness rating and a low formal appropriateness rating.
2. H-class words will receive a low informal appropriateness rating and a high formal appropriateness rating.

If Nyman (1981) is correct, then there will be no significant difference between S-words and H-words with regard to either formal or informal appropriateness. Neither Kazazis nor Nyman makes a definite prediction for the effect of frequency or familiarity.

3.2 Materials

In order to examine these factors, ten quadruplets (pairs of pairs) of words ending in {-ia} were compiled. Each quadruplet consisted of a high-frequency S-word, a high-frequency H-word, a low-frequency S-word, and a low-frequency H-word. Within each quadruplet, part of speech was held constant: 8 quadruplets were neuter plural nouns, one consisted of feminine singular nouns, and one of adjectives ending in {-ia} (ambiguous between neuter plural and feminine singular). The consonant preceding the {-ia} ending was also held constant, with one exception (/s/ vs. /θ/).

The high- and low-frequency pairs were further controlled for wordform frequency. Each of the high-frequency words occurred more than 170 times in the nearly 34-million-word corpus,⁵ with an average frequency of 551 for S-words and 693 for H-words. The low-frequency words each occurred fewer than 60 times in the corpus, and had average frequencies of 20.1 (S-words) and 20.6 (H-words). The difference between the frequencies of the high- and low-frequency groups was significant ($p < .05$). The slightly greater frequency for the /i/ items in both lists is intentional: it prevents effects of S/H-class and

frequency from being confounded (as they would be if the inequality went the other direction). However, a matched-pair t-test did not find this slight bias to be significant ($p > .2$). Both the high- and low-frequency lists are given in Appendix 1.

The 40 test words were combined with 104 filler items for a total of 144 items. Each participant listened to each of the 40 items, as well as all the fillers. However, the items were presented in four counterbalanced orderings, so that each word in a given quadruplet would be heard before its three matched items by a (roughly) equal number of subjects.

3.3 Participants and method

Ten native speakers of MG (6 male, 4 female) participated in the experiment. With the exception of one 50-year-old female, the participants' ages ranged from 20 to 35 in 2003. Six were interviewed in Columbus, Ohio, and four in the area around Athens, Greece. All of those interviewed in Columbus had or were pursuing advanced degrees; those in Athens had at least finished the *lyceum*. None reported a history of hearing or speech impairment.

The stimuli were presented from recordings stored on a laptop computer using the E-Prime experiment design studio (Schneider et al. 2002). The participants listened over headphones to a series of words being pronounced by a phonetically trained native speaker of Greek. They were asked to rate each word according to three 7-point scales: one scale of general familiarity, and two of stylistic appropriateness. In each of these scales, 7 means "very familiar/appropriate" and 1 means "very unfamiliar/inappropriate". An English synopsis is below:

1. *Familiarity*: How familiar are you with this word generally?
2. *Informal Appropriateness*: How natural would it be to use/hear this word among close friends in a bar or coffeehouse (assuming the topic of conversation made it relevant)?
3. *Formal Appropriateness*: How natural would it be to use/hear this word in court, with a priest, or in church (again assuming the topic of conversation made it relevant)?

3.4 Analysis

Scale-based ratings, such as the 7-point scales used in these experiments, have different properties than many other types of experimental measurements.

Common parametric statistical tests do not properly apply to these types of scales. However, one assumption that can be safely made about scales such as these is that the participants' responses can be meaningfully ranked from highest to lowest. The statistical tests used in this analysis use these rankings to compare certain variables and conditions, as do the graphs in Figures 1–4 below (note here that the *highest* ratings receive the *lowest* ordinal rank and vice versa). Specifically, Spearman's rho compares the correlation between the rankings of two separate variables (e.g., frequency and familiarity) to see if these are significantly correlated (that is, more closely related than would be expected simply by chance). The Wilcoxon Signed Rank Test is used for seeing if two groups of items differ significantly with respect to their ranked scores.

3.4.1 *Frequency and familiarity*

As predicted, familiarity ratings are very strongly correlated with the HNC word frequency (Spearman's rho = .832, $p < .001$). On average, high-frequency words were 1.2 points higher on the familiarity scale than low-frequency words. Nevertheless, there is an effect of S/H-class on familiarity: the average familiarity rating for S-words was found to be 0.6 points higher than for H-words (Wilcoxon Signed Rank Test $Z = -2.13$, $p = .03$). If familiarity is a good approximation for perceived frequency of everyday spoken Greek, this suggests that the HNC is a biased sample, in that H-words show up more frequently, and S-words less frequently, than they ought for spoken Greek. While this is by no means a surprising finding (given that the HNC is mostly derived from news-text, textbooks, and the like), it is worth bearing in mind when interpreting the results that follow. Fortunately, the bias appears to be small compared to other effects, as shown below.

3.4.2 *Informal appropriateness*

The scale for informal appropriateness showed a moderate effect of S/H-class, in the predicted direction: S-words were rated 1.3 points higher than H-words (Wilcoxon $Z = -3.36$, $p = .001$). Still, there is still some overlap between the two categories, as can be seen in Figure 1, below. Three H-words show higher scores for informal appropriateness than their S-word counterpart (ιμάτια 3.9 > δεμάτια 3.4; εμβόλια 6.7 > αμπέλια 6.4; σχέδια 6.6 > πόδια 6.5).

An effect is also found with frequency: high-frequency words are rated on average 1.4 points more appropriate in informal situations than low-frequency words. Rank-correlation measures find this significant (Spearman's rho = .564, $p < .001$). However, a stronger mean difference (1.9 points) and rank-correlation (Spearman's rho = .821, $p < .001$) is found with familiarity ratings. This

closer fit lends some credence to the assumption that the familiarity rating is a better measure of 'true' familiarity than the HNC (written) frequency. In any case, the correlations suggest that frequency and especially familiarity are more important factors in determining informal appropriateness than S/H-class. The correlation between familiarity and informal appropriateness is graphed in Figure 1.

3.4.3 Formal appropriateness

The scale for formal appropriateness showed the strongest effect of S/H-class, in the opposite direction from the informal scale, as predicted. The H-words were rated 1.7 points higher than the S-words (Wilcoxon Signed Rank Test $Z = -3.92$, $p < .001$). All H-words were higher-ranked than their S-word counterparts. Unlike the informal appropriateness ranking, neither frequency nor familiarity showed significant correlation with formal appropriateness (Spearman's $\rho = .308$ and $.076$). The strong separation between S- and H-words and the relatively small slopes of the trend lines in Figure 2 reflect these findings.

Figures 1(left) and 2(right). Informal appropriateness shows a strong rank-correlation with familiarity; formal appropriateness shows a large separation between S-words and H-words.

3.5 Discussion

The directions of the effect of word class on informal and formal appropriateness are exactly as predicted, with S-words felt to be more informal and H-words more formal. Since these differences are greater than the effect of word

class on familiarity, it seems unlikely that the bias of familiarity alone accounts for the differences observed.

What is particularly interesting is not only that the direction reverses, but that the relative importance of factors also reverses: familiarity and frequency largely determine informality, with S/H-class as a minor factor, but S/H-class determines formality almost exclusively. This suggests that if there is a special marking of [+l.o.] words, it is more likely defined (for most speakers in the study) in terms of the words' appropriateness in formal situations, not their inappropriateness for informal situations.

However, this reversal of factor importance does not hold for all individuals. A closer inspection of the data by participant suggests caution. For example, half of the males ranked all high-frequency words (S-words and H-words alike) as "very appropriate" in formal situations. (The 50-year female participant displayed the widest gap in formality ratings between S-words and H-words.) In informal contexts, four participants ranked low frequency S-words as more appropriate than high-frequency H-words. This being said, the main trends are robust: *all* participants rated H-words as more formally-appropriate than S-words, and common words as more informally-appropriate than rare words.

4. Experiment 2

Experiment 1 offers some insight into native listeners' sense of the social appropriateness of various H[iatus]- and S[ynizesis]-words, and suggests that the historical relationship between the H-word class and formal situations is still felt. However, it does not clarify whether this relationship is a direct one between sound and social sensibility, or if it is mediated by the meaning of the words. It could be argued that H-words just happen to mean the sorts of things that are appropriate in formal situations, and S-words do not. In the absence of other evidence, this explanation is a plausible alternative to a direct connection between sound and register.

Just as Kazazis (1968, 1992) used hypercorrections and hyperdemoticisms as evidence for the various sociolinguistic pressures on MG speakers, so the perception of these same 'errors' may be relevant for teasing apart these questions. The second experiment was designed with this end in mind: to see the effect of various pronunciations of the same word on its ratings, as a window into the sense of the sound itself.

4.1 Materials

For the purposes of this experiment, it is assumed *a priori* that the classification of words into the H-class or the S-class (described in Section 3.1 above) is correct, though we will revisit this assumption later. From this assumption, a *canonical pronunciation* will be defined as one that matches the expected pronunciation given the class: i.e., with a fully syllabic [i] for H-class words, and [j], [ɟ], [ç], or [ʌ] (depending on the preceding consonant) for S-class words. Conversely, pronunciations that do not match the word's S/H-class will be termed non-canonical or *mismatch pronunciations*. These come in two types: *hypercorrections* ([i] pronunciations for S-class words, e.g. πόδι.α ['po.ði.a]) and *hyperdemoticisms* ([j]-type pronunciations for H-class words, e.g. σχέ.δja ['sçe.ðja]). The same list of 40 words was rerecorded by the same native speaker as in Experiment 1. The speaker read each word with two pronunciations: once with [i] and once with [j] (or its equivalent), regardless of the canonical pronunciation. Hence, the new list contains 40 tokens of canonical tokens, 20 'hypercorrections', and 20 'hyperdemoticisms' (as defined above). No fillers were used for this task.

4.2 Participants and method

Eight listeners (4 male, 4 female, a subset of the original 10) participated in this experiment. It was administered as the last task of three tasks, after Experiment 1 and immediately after a related production task. Four listeners participated in Ohio and four in the Athens, Greece area. The three survey questions were the same as in Experiment 1.

4.3 Analysis

The familiarity portion of Experiment 2 was not used; rather, the values obtained in Experiment 1 were used in all of the following analyses. The new ratings for informal and formal appropriateness of the 80 stimuli were ranked with respect to one another. The term *change in appropriateness* refers to the difference in ranking between a word's non-canonical pronunciation and its corresponding canonical pronunciation, for example, the difference in ranking between ['po.ði.a] and ['po.ðja] for πόδι.α.

4.3.1 *Informal appropriateness*

As before in Experiment 1, the informal appropriateness rating for canonical pronunciations showed a moderate (though smaller) effect of S/H-class, in the predicted direction: S-words were rated 1.1 points higher than H-words (Wilcoxon $Z = -3.08$, $p = .002$). Similarly, canonical pronunciations of high-familiarity words were rated (on average) 1.0 points higher than canonical pronunciations of low-familiarity words. Again, familiarity was rank-correlated with informal appropriateness (Spearman's $\rho = .807$, $p < .001$). This correlation is stronger for H-words ($.898$, $p < .001$) than for S-words ($.691$, $p = .001$).

However, the mismatch pronunciations did not show a main effect for informal appropriateness overall, either for S/H-class or for frequency or familiarity. This is due to a strong interaction between S/H-class and familiarity. The hyperdemotic tokens show the same relationship to familiarity as the canonical pronunciations: the more familiar ones are also felt to be more appropriate (Spearman's $\rho = .613$, $p = .004$), though on average they are 1.3 points less appropriate than canonically pronounced H-words. Nevertheless, three less-frequent words proved exceptions to this trend: for $\delta\epsilon\lambda\tau\acute{\alpha}\rho\iota\alpha$ “cards”, $\nu\eta\mu\acute{\alpha}\tau\iota\alpha$ “filaments” and $\omicron\chi\epsilon\iota\delta\iota\alpha$ “oxides”, the mismatch pronunciations are ranked slightly higher than the canonical ones. This was not general across participants: some ranked the canonical pronunciations higher, and some gave them the same ranking.

The S-class $\rightarrow$ [i] (hypercorrect) mismatch pronunciations, on the other hand, show a (non-significant) negative correlation between familiarity and informal appropriateness (Spearman's $\rho = -.126$, $p = .597$). When change in appropriateness is measured (as defined in 4.3 above), hypercorrections show a larger change than hyperdemoticisms (Wilcoxon's $Z = -3.25$, $p = .001$). This change in appropriateness grows with the (canonical) word's familiarity: the more familiar the S-word, the greater the penalty for using a hypercorrecting [i] for it. This tendency (Spearman's $\rho = .622$, $p = .003$) can be seen from the downward slope of the relevant line in Figure 3 (below to the left). A similar tendency seems also to hold for hyperdemoticisms (shown by the white line in Figure 3; Spearman's $\rho = .619$, $p = .004$), though for hyperdemoticisms it is not so strong as to negate the overall correlation of familiarity and informal appropriateness discussed above.

4.3.2 *Formal appropriateness*

For the canonical pronunciations, formal appropriateness showed the strongest effect of S/H-class, in the opposite direction from the informal scale, just as found in Experiment 1. The H-words were rated 1.4 points higher than the

S-words (Wilcoxon $Z = -3.95$, $p < .001$). Familiarity did not show a significant correlation with formal appropriateness, although frequency did (Spearman's $\rho = .404$, $p = .01$).

For the non-canonical pronunciations, there was no main effect for S/H-class or for frequency. However, the *change* in formal appropriateness is strongly affected by S/H-class: the 'penalty' for hyperdemoticism is nearly three times as large (measured in rank displacement) as that for hypercorrection (Wilcoxon $Z = -4.87$, $p < .001$). Indeed, for three items (καθάρια "clean", δεμάτια "bundles" and κανάτια "pitchers", symbolized by the three squares appearing below the x-axis line in Figure 4), an [i] pronunciation caused a *rise* in the formal appropriateness ranking. Speakers seem to feel either that these are correct or at least alternate pronunciations of these words, or that hypercorrection of certain (low-frequency) lexical items is actually a desirable strategy in formal situations. These trends are shown in Figure 4, below on the right; the three words will be discussed further below.

Figures 3 (left) and 4 (right). Change in informal appropriateness shows a slight negative rank-correlation with familiarity; change in formal appropriateness is much greater for hyperdemotisms than for hypercorrections (especially for rarer words). The symbols 'i' and 'j' are used for hiatus and synizesis here respectively.

4.4 Discussion

We have seen that, as far as the canonical pronunciations are concerned, Experiment 2 essentially replicates the findings of Experiment 1. As for the mismatch pronunciations, we see fairly clear differences between hypercorrections and hyperdemotisms, in both formal and informal contexts. Hyperdemotisms in general do not pattern very differently from actual words, as far as

frequency and familiarity are concerned. Hypercorrections, on the other hand, behave in an almost opposite manner, in that the least frequent items are most acceptable when hypercorrected. If one extends Petrounias' (1987) predictions for speakers to include listeners' expectations, then these results are consistent with his claims.

When the change in rank-appropriateness is considered, hypercorrect and hyperdemotic items display more similar patterns (as shown in Figures 3 and 4). A few very infrequent words in both the hypercorrect and hyperdemotic classes seem more acceptable with the 'wrong' pronunciation than with the pronunciation indicated in the Δ KN. This is an interesting effect, but hard to interpret. It may suggest that the Δ KN does not match these speakers' intuitions with regards to those items.⁶ However, it is just as likely that speakers' intuitions are less firmly grounded with infrequent items, and that there is more idiolectal variation of the 'analysis' type, as Hooper (1976) and Phillips (2001) would predict.

Finally, the reaction against hyperdemoticism in formal situations appeared to be the strongest effect of any in Experiment 2. This effect is strengthened by extreme ratings given by the oldest participant, who clearly associates synzinesis with informal settings.

However, when her data is excluded from the analysis, the change-in-rank 'penalty' for hyperdemoticism is still about twice as large as that for hypercorrection. This suggests that even for younger speakers, the pressure against hyperdemoticism in formal situations is stronger than the pressure against hypercorrection in informal situations.

5. Experiment 3

A full-scale production study for observing these phenomena in conditions that mirror everyday, informal context of language would be a difficult undertaking, since any study with a sufficiently casual context (short of a very large spoken corpus) is unlikely to yield a wide enough array of types of the relevant words. This is particularly true for the low-frequency items, which in view of Petrounias' (1987) predictions are among the most interesting. Therefore, a production study was designed using a sentence-reading task.

While such a study may be too formal to give a true picture of day-to-day production of these words, it may well reflect the participants' careful speech.

5.1 Materials, participants and method

This sentence-reading task used the same 40 words as the previous two experiments. Each word was placed in a carrier sentence, such as the example given in (6):

- (6) Τη φράση ‘τα τιμάρια’ την ξέχασε. “He forgot the phrase ‘the fiefs.’”

The sentences were designed such that each target word is immediately followed by a consonant. These 40 sentences were intermixed with 168 fillers, for a total 208 sentences. Four lists of these sentences in counter-balanced orders were prepared, so that the four words in each quadruplet appear in different orders for different speakers. Nine of the ten participants were recorded, but due to poor recording quality, three recordings were not used. Of the six speakers that were used (three male, three female), three were recorded in Ohio, and three in the vicinity of Athens, Greece.

Each of the 240 instances determined to be usable (6 speakers $\times$ 40 words) was digitized at 22050 Hz and excised from its sentential context using Praat (Boersma 2001). Continuant-initial words were windowed using Cool Edit to prevent the perception of an extraneous initial stop-burst. Each recorded instance of each word was then rated by six native listeners of Modern Greek: two trained phoneticians (both male), and four naïve listeners (three female, one male). The six raters were instructed to rate each word instance that they heard on a 7-point scale. When they heard a word pronounced with a definite [i] in hiatus with the following vowel, they were to rate that instance as a ‘1’. Conversely, when they heard a definite example of synizesis (e.g., iota realized like a gamma, chi, or completely absent), they were to rate that instance as a ‘7’. Items that were somewhere in between these two extremes were rated with intermediate numbers: for example, those that were midway in between clear hiatus and clear synizesis would receive a ‘4’, those that sounded slightly more like synizesis than hiatus would receive a ‘5’, etc. Items where the rater could not accurately hear intended word itself were rated as ‘0’ and treated as missing items.

Each rater rated each of the six speakers’ productions of each word (all 240 items). The word list was blocked by speaker (that is, all productions by a single speaker appeared together) and randomized within each block. Each rater heard each item twice, separated by one second of silence, before rating the item.

5.2 Analysis

Although the 7-point scales used here mean something different than those used in Experiments 1 and 2, as discussed above, their basic statistical properties will be the same. Therefore, the same rank-based statistical tests used in Experiments 1 and 2 (Wilcoxon Signed Rank Test, Spearman's rho) are used here as well.

For the purposes of this discussion, the average rank assigned by the raters was taken as the (perceived) pronunciation for each instance. An item with an average ranking less than 4 will be considered to have been pronounced with hiatus; conversely, an item with an average ranking greater than 4 will be taken as having been pronounced with synizesis.

5.2.1 *Effect of S/H-class*

When the whole set of forty words is considered, both raters and speakers showed strong correlations amongst each other. All rank-correlations are significant at the $p < .001$ level. As may be expected, the strongest effect across all speakers is S/H-class (as determined by the dictionary entry or declensional class, described above). With only three exceptions (discussed below), each of the words was pronounced as expected by a majority of speakers. Three other words were pronounced contrary to expectation by one speaker only, and one word by two speakers. One speaker produced the 40 words precisely as predicted, with no exceptions. The average difference in rating for all words, speakers, and raters was 3.84 points. This difference between the S-class and the H-class was significant overall and for each speaker at the $p < .001$ level.

5.2.2 *Effects of formal and informal appropriateness*

Across the 40 words, there was a strong correlation between both formal and informal appropriateness (as rated in Experiment 1) and rated pronunciation (whether rated by phoneticians, naïve listeners, or overall). All three pronunciation ratings were significantly rank-correlated with formal appropriateness at the $p < .001$ level (Spearman's rho = $-.762$ for phoneticians' average, $-.664$ for naïve average, and $-.665$ for total average). The negative correlations indicated that (as expected), the more formal the word, the more likely its pronunciation to be judged close to [i]. Conversely, positive correlations were found between informal appropriateness and pronunciation rating: Spearman's rho = $.388$ for phoneticians' average ($p = .013$), $.464$ for naïve average ($p = .003$), and $.455$ for total average ($p = .003$). These results are hardly surprising, as they follow di-

rectly from the observations made above about S/H-class, and the correlations between S/H-class and appropriateness ratings found in Experiments 1 and 2.

When S/H-class is controlled for, no strong trend is manifest. Among the 20 H-words, correlations between pronunciation ratings and formal appropriateness were in the expected direction (that is, with more formal words receiving lower rankings), but none approached significance. Informal appropriateness showed even weaker trends, and not in the expected direction. Among the 20 S-words, there was a significant correlation between the two phoneticians' ratings and formal-appropriateness ratings (Spearman's $\rho = -.564$, $p = .01$), but not for the naïve or total ratings. No significant correlations were found between informal appropriateness and pronunciation. It is worth noting that the interrater correlations, while strong overall, fail to obtain significance for S-words. Hence, all results here must be interpreted with caution.

5.2.3 *Effects of frequency and familiarity*

For H-words, no significant correlations between pronunciation ratings and either frequency or familiarity (as measured in Experiment 1) were found. For the 20 S-words, correlations with both frequency and familiarity were found for the naïve average pronunciation ratings (Frequency: Spearman's $\rho = .565$, $p = .009$; Familiarity: Spearman's $\rho = .503$, $p = .024$). Similar correlations obtained for the overall average pronunciation ratings, but not for the phoneticians' ratings ($p = .009$). Even the naïve ratings are the result of specific outlying lexical items, and not general effects, however; when the two very-infrequent outliers καθάρια "clean", δεμάτια "bundles" are removed, no significant correlations are found for the remaining eighteen S-words. The importance of these two outliers in understanding the relationship between intuition and production is discussed further, below.

5.3 Discussion

5.3.1 *Three lexical outliers*

The aforementioned S-words καθάρια "clean", δεμάτια "bundles" along with ψιμύθια "rouges" are three of the least frequent (and least familiar) among the 40 experimental items. In addition to being rated 34th, 36th and dead last in Experiment 1's familiarity rating, each of these shows irregularities in the responses for Experiment 2: the formal appropriateness scores for καθάρια and δεμάτια are 1 and 0.75 points (respectively) *higher* for the [i] pronunciation than for the canonical [j] form; conversely, for ψιμύθια the [j] form was rated slightly more familiar than the 'canonical' [i] form. Likewise in Experiment 3,

five of the six speakers pronounced καθάρια and δεμάτια with hiatus ([i]), and four speakers pronounced ψιμύθια with synizesis, according to both the average rating of all six raters, and the phoneticians' average rating. (By the naïve average ratings, only three speakers pronounced ψιμύθια with synizesis.) Each of these words, then, shows exceptionality in all three experiments, but possibly for slightly different reasons.

While ψιμύθια seems to be simply an unknown word to most of the speakers (or at least sufficiently rare for them to have doubts of how to pronounce it), and καθάρια may have different representations in different dialects (and indeed it is a dialect word, the more usual word for “clean” being καθαρά), δεμάτια shows some sign of having a representation that is sensitive to (social) context. While none of the eight raters in Experiment 2 rated the [i] (hiatus) pronunciation more appropriate in informal contexts, and only one rated it more familiar, three rated it more appropriate in formal settings, and three others as equally appropriate. This is of course the same trend seen generally in Experiment 2, but with δεμάτια it is strong enough to override the representation predicted by the morphological class (see also note 6). The pronunciations in Experiment 3 are consistent with this if they in fact represent self-conscious speech found in formal situations; one would expect more pronunciations of δεμάτια with synizesis in casual situations. In any case, the fact that this word is often pronounced with hiatus, despite its classification (by its morphological class) as an S-word, is further confirming evidence for Petrounias' (1987) prediction.

However, not all speakers show divergence from the classes predicted from the ΔKN. It is worth noting that the one speaker who pronounced all 40 of the words as predicted in the sentence-reading task also rated all canonical pronunciations higher than mismatch pronunciations on Experiment 2. It seems that this one speaker at least agrees completely with the ΔKN (for these items, anyway) both in his (careful) speech and in his socio-stylistic intuitions.

6. Conclusion

6.1 General findings

6.1.1 *Experiments 1 and 2*

Experiments 1 and 2 have shown that the presence of hiatus or synizesis in a word is associated with particular socio-stylistic judgments on that word,

particularly with high or low appropriateness in formal contexts. Experiment 1 shows this effect for the words themselves, in their canonical pronunciations; Experiment 2 replicates this finding, and also suggests that, while most words have a single canonical or ‘correct’ pronunciation, not all non-canonical pronunciations are treated equally. On the one hand, by and large (though not always) the canonical pronunciations of the words tested in Experiment 2, as predicted from the listed pronunciations or declensional classes in the Δ KN, are felt to be more appropriate in both formal and informal contexts than the alternative (mismatch) pronunciation. This finding is consistent with the two-phoneme and underspecified /I/ accounts. On the other hand, ‘hypercorrect’ hiatus for S-words carries more stigma in informal contexts, and less stigma in formal contexts, than ‘hyperdemotic’ synizesis for H-words. This suggests that the association between sound and socio-stylistic judgments is not mediated through other factors (such as meaning) of the S-words or the H-words, but that native Greek listeners make direct associations between hiatus and formality, and between synizesis and informality. While this does not provide direct evidence for a [l.o.] feature, it does suggest a strong degree of ‘interlectal awareness’ about synizesis and hiatus, which must inform a fully explanatory account of Greek *yod*.

6.1.2 *Experiment 3*

Experiment 3 has shown that with a few exceptions as discussed above, the predictions of hiatus and synizesis by the Δ KN and declensional classes are borne out in these six speakers’ productions. Furthermore, comparisons between the experiments show that these exceptional words also display divergent ratings in Experiment 2. However, outside the expected effect of the two word classes and these exceptions, Experiment 3 failed to demonstrate a clear and robust link between stylistic ratings and any perceived place on a hiatus-synizesis continuum. In other words, H-words as a group are more formal than S-words, but the most formal H-words are not pronounced with the strongest degree of hiatus. However, this non-finding may be an artifact of how the continuum of pronunciations was measured (see Section 6.2 for further discussion).

6.1.3 *Effects of word frequency*

In Experiments 1 and 2, more frequent words were rated as more highly appropriate in both settings, but this correlation was particularly strong for informal settings. In Experiment 2, non-canonical pronunciations for more frequent words displayed a greater change in appropriateness rating than less frequent words. This suggests that the participants have a more definite sense about how

the more frequent words ought to be pronounced, and violations of this expectation are more salient. For certain of the least-frequent words, this sense of a single correct pronunciation seemed to be weak or missing for some speakers, who rated the two pronunciations the same, or reversed the expected order. Although the exact reasons for these exceptional ratings cannot be determined definitively by these experiments, it may be that the general association of hiatus with formality overrode any word-specific sense of correct pronunciation for some of these items (e.g., *δεμάτια*).

Similarly, in Experiment 3 certain low-frequency words can and apparently do change their (perceived) pronunciation in accordance to the degree of formality they are accorded. Whether this is the result of a process applicable in principle to *any* low-frequency word, or just a fact about specific, exceptional words — or simply noise in these experimental results — cannot be determined with certainty from a small sample such as this. But it seems quite plausible that hypercorrection could affect a wide variety of low-frequency words as Petrounias (1987) implies.

6.2 Directions for further research

This present study cannot and does not claim to address all the variables relevant in investigating the lexical and stylistic associations of hiatus and synizesis in Modern Greek, either synchronically or in the recent history of the language. There are a number of factors that may play a role, some controlled for, and some not well-controlled. While it is not anticipated that these other factors will overturn the more robust findings here, they may well shed a different light on the larger picture. Each of them may be expected to provide possible avenues for further work on the issue of hiatus and synizesis in its various aspects.

One factor that was controlled for, but not adequately explored in these experiments was the role of surrounding phonological context. A number of rules such as that in (2c) describe the effect of the preceding consonant on the phonetic realization of non-syllabic /l/ (or /j/), whether as [j], [j̥], [ç], or a palatalization of the preceding consonant (see note 1). These were all lumped together in this study as part of the same general phenomenon, but this grouping was assumed rather than tested. It may be that different realizations of synizesis (and even different examples of hiatus before various preceding consonants) evoke different socio-stylistic affects, and follow different tendencies in production. These issues are not addressed here.

A more serious limitation, and more interesting for the historical as well as sociolinguistic implications of this study, is the small size of the sample involved, and the lack of control of crucial variables such as gender, age, education level, regional affinities, and length of time spent outside of Greece. Age, education level, and particularly timing of education relative to the switch from Katharevousa to Dimotiki as the principal medium of instruction and targeted standard of educated speech surely play large roles in this. This study found evidence of these differences: the 50-year-old informant now living and working in Ohio responded very differently from the younger informants who had lived and studied in Greece more recently. She gave much more weight to general associations of hiatus and synizesis with formal and informal speech (respectively) and gave much more categorical judgments. This suggests (not surprisingly) that the general associations with speech style were stronger a generation ago than they are today. Similar effects of age have been shown for other sociolinguistic factors (see e.g., Arvaniti & Joseph, 2000), and it stands to reason that a larger study controlling for age and education factors would reveal much more detail about the direction and speed of change in the hiatus-synizesis distinction. However, inasmuch as the effects described here were still found when this informant's data was excluded (as discussed in the text above), the validity of these results is not jeopardized.

Finally, no acoustic measurements were made of the production data elicited from the participants. Rather, a perceptual task was used to evaluate the productions indirectly. However, this may have obscured or distorted patterns observable in the acoustic productions themselves. For example, it was noted that Experiment 3 failed to find any relationship between the hiatus-synizesis continuum and any of the other variables tested. It may be that a careful acoustic study would find a pattern between formality or familiarity and an acoustic variable, such as duration of the glide/vowel, or degree of frication. It may also reveal other reduction phenomena, such as undershoot of the following /a/ vowel (see e.g., Baltazani (2002) on patterns of vowel coalescence), not commonly discussed in conjunction with the /i/~j/ representation issue.

6.3 Final thoughts

While the hiatus-synizesis distinction may not be a watershed of stylistic difference today, it is still robust enough to be observable. Hence the statements in Nyman (1981) should not be taken too strongly. However, this stylistic distinction is best observed and measured by focusing on the degree of appropriateness in formal contexts, not in informal contexts. It may not be sufficiently

strong to predict completely the distribution of hiatus and synizesis, but it certainly plays a role, as evidenced by exceptional items such as *δεμάτια*. Under-specification accounts such as Deligiorgis (1987) and Malikouti-Drachman & Drachman (1990) similarly may benefit from acknowledging these socio-stylistic factors — not just as historical explanations for current synchronic patterns, but as a factor still influencing how words (and particularly less-frequent words) are perceived and realized.

This being said, the differences between the oldest participant and the others does strongly suggest that, while interlectal awareness of historical patterns of register remains in force, the force of these social implications is growing weaker with time. Most words, particularly frequent ones, continue to have a strong sense of a single pronunciation acceptable in all contexts. Nothing in this study rules out the possibility that, given the right context, any S-word succumb to a hypercorrect hiatus, as Kazazis (1968) observed a generation ago. However, these findings suggest that for younger speakers and more frequent words, it is becoming increasingly unlikely.

Notes

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1. Rule (2c), along with a number of other rules dependent on the type of consonant preceding the non-syllabic *i*, yield a variety of surface forms such as [j], [ç], [ɲ], and a number of palatalization effects. For a full account of all the possible changes triggered by the preceding consonant across a wide variety of dialects, see Newton (1971). Since the appropriate realization of *i* is determined from context, this paper follows Koutsoudas (1962) in abstracting over those details, treating the entire class together in one category (labeled /j/ by Koutsoudas), compared and contrasted with /i/.

2. The term [learnèd origin] is Kazazis' term, with the grave accent distinguishing the adjective "learnèd" from the past participle of 'learn'. It seems likely that Kazazis meant it to be roughly equivalent to the Greek term [λόγιος] (cf. e.g., Fliatouras and Anastasiadi-Simeonidi 2004) and no crucial difference between the two will be maintained here, except to note that Kazazis is highlighting the word's (actual or perceived) *origin*, not its current status *per se*.

3. For definitions and history of Demotic and Katharevousa Greek, see e.g., Horrocks (1997).
4. In fact, the ΔΚΝ, attempting to give as detailed phonetic information as possible, goes further than Koutsoudas' (1962) two-phoneme account in two ways: (1) it represents the end results of all of the various palatalization/consonantalization rules triggered by /j/ (e.g., [ʎ], [ɲ], [ç]) as well as the devoiced palatal fricative [ç̥], and (2) it occasionally posits an intermediate degree of synizesis without concomitant fricativization or palatalization: e.g., *ἴο* in [ʔḱṵ.lu] (one pronunciation for *διόλου* "(not) at all"). This second point seems to indicate the possibility of a continuum between hiatus and complete Glide Formation; however, instances of words marked with this intermediate symbol were relatively rare, making it somewhat impractical to test this possibility rigorously.
5. The Hellenic National Corpus (HNC) is a continually updated and expanding corpus of Modern Greek. In July 2003, the time when these stimuli were chosen, it contained 33,865,969 words. Since that time its size has increased to over 34 million words.
6. This is not implausible *a priori*, given that its editors admit to feeling some uncertainty on certain words' pronunciations in the dictionary's front matter. Alternate morphological forms missing from the dictionary may also have an effect. For example, while ΔΚΝ (1999) lists only *δεμάτι* as a possible singular for *δεμάτια*, another dictionary lists *δεμάτιον* "fasciculus" as well. If speakers are aware of this other form, it could explain the exception discussed above. However, informal inquiries to my participants — including the oldest one — suggest that they prefer *δεμάτι* to *δεμάτιο(v)*, so this explanation is not favored. Alternatively, one might claim that for some individuals, the association between declensional class ({-ι} vs. {-ιο}) and S/H-class does not hold for all words. This would be unproblematic in the case of fully-specified /i/[-cons] on {-ι} words, but /I/[0cons] for {-ιο} words would either break the paradigm or predict singular forms like *[ðel.'ta.rjo]. Explanations along the lines of Hooper (1976), Petrunias (1987), and Phillips (2001) seem more likely.

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Appendix 1: Tables of the Forty Stimulus Words

Table for High Frequency Items

Word	Expected pronunciation (AKN)	Frequency Counts (HNC)		# of Pretonic Syll.s	Preceding Segment	S/H-class	POS
		Wordform	Lemma				
μιζέρια	[mi.'ze.rja]	199	251	1	/r/	S	f.sg.
απόρροια	[a.'po.ri.a]	213	215			H	
δοκάρια	[ðo.'ka.rja]	349	1297	1	/r/	S	n.pl.
τεκμήρια	[tek.'mi.ri.a]	255	937			H	
καινούρια	[ce.'nu.rja]	418	1158	1	/r/	S	adj.
εγχώρια	[e.'ɣxo.ri.a]	404	1270			H	
ζευγάρια	[ze.'vɣa.rja]	342	1231	1	/r/	S	n.pl.
σενάρια	[se.'na.ri.a]	1134	3521			H	
γέλια	[ˈje.ɬa]	973	1313	0	/l/	S	n.pl.
σχόλια	[ˈsxo.li.a]	1022	2084			H	
καλάθια	[ka.'la.θɕa]	301	952	1	/θ/	S	n.pl.
γυμνάσια	[ji.'mna.si.a]	299	1300			H	
σκουπίδια	[sku.'pi.ðja]	459	715	1	/ð/	S	n.pl.
γονίδια	[ɣo.'ni.ði.a]	365	1099			H	
μονοπάτια	[mo.no.'pa.tɕa]	247	728	2	/t/	S	n.pl.
ψηφοδέλτια	[psi.fo.'ðel.ti.a]	220	764			H	
κρεβάτια	[kre.'va.tɕa]	174	983	1	/t/	S	n.pl.
γραμμάτια	[ɣra.'ma.ti.a]	208	496			H	
πόδια	[ˈpo.ðja]	2047	3498	0	/ð/	S	n.pl.
σχέδια	[ˈsɕe.ði.a]	2805	9121			H	

Table for Low Frequency Items

Word	Expected pronunciation (ΔKN)	Frequency counts (HNC)		# of Pretonic Syll.s	Preceding Segment	S/H-class	POS
		Wordform	Lemma				
φούρια	[¹ fu.rja]	30	48	0	/r/	S	f.sg.
διάρροια	[ði.'a.ri.a]	25	38	1		H	
βλαστάρια	[vla.'sta.rja]	16	28	1	/r/	S	n.pl.
δελτάρια	[ðel.'ta.ri.a]	25	34			H	
καθάρια	[ka.'θa.rja]	5	21	1	/r/	S	adj.
χειμέρια	[çi.'me.ri.a]	6	34			H	
σκαθάρια	[ska.'θa.rja]	10	15	1	/r/	S	n.pl.
τιμάρια	[ti.'ma.ri.a]	10	25			H	
αμπέλια	[a.'mbe.ʎa]	56	137	1	/l/	S	n.pl.
εμβόλια	[e.'ɲvo.li.a]	52	227			H	
κολοκύθια	[ko.lo.'ki.θɕa]	7	7	2	/θ/	S	n.pl.
ψιμύθια	[psi.'mi.θi.a]	7	10	1		H	
απίδια	[a.'pi.ðja]	9	10	1	/ð/	S	n.pl.
πλακίδια	[pla.'ki.ði.a]	11	23			H	
κανάτια	[ka.'na.tɕa]	18	22	1	/t/	S	n.pl.
νημάτια	[ni.'ma.ti.a]	14	23			H	
δεμάτια	[ðe.'ma.tɕa]	5	11	1	/t/	S	n.pl.
ιμάτια	[i.'ma.ti.a]	5	8			H	
στολίδια	[sto.'li.ðja]	45	92	1	/ð/	S	n.pl.
οξειδία	[o.'ksi.ði.a]	51	117			H	

Appendix 2: Instructions Given to the Participants

Experiments 1 and 2

Introductory Summary

Θα ακούσετε μία σειρά λέξεις με ακουστικά, όπως τις διάβασε ένας φυσικός ομιλητής της ελληνικής. Καθώς ακούτε κάθε λέξη, να σκέφτεστε ποιά είναι η έννοια της λέξης και σε ποιές καταστάσεις μπορεί να τις λέτε ή να τις ακούτε. Θα ακούσετε κάθε λέξη δυο φορές, και θα σας ρωτήσουμε να εκτιμήσετε την λέξη που ακούσατε σύμφωνα με τρία κριτήρια.

- (1) Πόσο γνωστή σας είναι η λέξη (γενικά).
- (2) Πόσο φυσιολογικό θα σας φαινόταν να ακούσετε ή να πείτε την λέξη ανάμεσα σε φίλους σε ένα καφενείο, μπαρ, ή παρόμοιο τόπο ανεπίσημης κουβέντας (υποθέτοντας ότι είναι σχετική με το θέμα συζήτησης).
- (3) Πόσο φυσιολογικό θα σας φαινόταν να ακούσετε ή να πείτε την λέξη σε έναν παπά, ένα δικηγόρο ή ένα δικαστή, στην εκκλησία, στο δικαστήριο ή παρόμοιο τόπο επίσημων διαδικασιών (πάλι υποθέτοντας ότι είναι σχετική με το θέμα συζήτησης).

Detailed Instructions

Θα ακούσετε μια λέξη, και κατόπιν θα χτυπήσετε τον αριθμό που περιγράφει το βαθμό στο οποίο αυτή η λέξη σας είναι γνωστή.

1. Η λέξη μου είναι τελείως άγνωστη.
2. Η λέξη μου είναι κάπως γνωστή, αλλά δεν ξέρω ακριβώς τί σημαίνει.
3. Η λέξη μου είναι γνωστή, και ξέρω περίπου τί σημαίνει.
4. Η λέξη μου είναι γνωστή, και ξέρω τί σημαίνει, αλλά δεν την χρησιμοποιώ.
5. Η λέξη μου είναι γνωστή, αλλά την χρησιμοποιώ μόνο σπάνια.
6. Η λέξη μου είναι γνωστή, και την χρησιμοποιώ πότε-πότε.
7. Η λέξη μου είναι γνωστή, και την χρησιμοποιώ αρκετά συχνά.

Κατόπιν θα χτυπήσετε τον αριθμό που περιγράφει πόσο φυσιολογικό θα σας φαινόταν να ακούσετε ή να πείτε την λέξη ανάμεσα σε φίλους στο καφενείο, μπαρ, ή παρόμοιο τόπο ανεπίσημης κουβέντας (υποθέτοντας ότι είναι σχετική με το θέμα συζήτησης).

Όχι φυσιολογικό 1 2 3 4 5 6 7 τελείως φυσιολογικό

1. Η λέξη δεν είναι καθόλου φυσιολογική σε τόπο ανεπίσημης κουβέντας.
[...]
4. Κάποιοι λένε την λέξη σε τόπο ανεπίσημης κουβέντας, αλλά δεν θα την έλεγα
εγώ.
[...]
7. Η λέξη είναι τελείως φυσιολογική σε τόπο ανεπίσημης κουβέντας.

Κατόπιν θα χτυπήσετε τον αριθμό που περιγράφει πόσο φυσιολογικό θα σας φαινόταν να ακούσετε ή να πείτε την λέξη σε έναν παπά, ένα δικηγόρο, ή ένα δικαστή, στην εκκλησία, στο δικαστήριο ή παρόμοιο τόπο επίσημων διαδικασιών (πάλι υποθέτοντας ότι είναι σχετική με το θέμα συζήτησης).

Όχι φυσιολογικό 1 2 3 4 5 6 7 τελείως φυσιολογικό

1. Η λέξη δεν είναι καθόλου φυσιολογική σε τόπο επίσημων διαδικασιών.
[...]
4. Κάποιοι λένε την λέξη σε τόπο επίσημων διαδικασιών, αλλά δεν θα την έλεγα εγώ.
[...]
7. Η λέξη είναι τελείως φυσιολογική σε τόπο επίσημων διαδικασιών.

Experiment 3

Instructions for Speakers

Θα διαβάσετε φωναχτά μία σειρά από φράσεις σε ένα μικρόφωνο. Διαβάστε τις φράσεις με φυσικότητα, καθώς θα τις λέγατε ανάμεσα σε φίλους. Διαβάστε κάθε φράση μία φορά από μέσα σας προσεκτικά, για να είστε σίγουρος ότι καταλαβαίνετε τί σημαίνει, πριν να την διαβάσετε φωναχτά.

Instructions for Raters

Θα ακούσετε στα ακουστικά μία σειρά λέξεις προφερομένες από διάφορα άτομα. Κάθε λέξη περιέχει ένα φθόγγο που γράφεται «υ» (ή «η», «υ», «ει», «ου», «νυ»), δίπλα σε άλλο φωνήεν (συνήθως «α»). Αυτός ο φθόγγος μπορεί να προφερθεί σε χασμωδία με το επόμενο φωνήεν (δηλαδή ξεχωριστά από αυτό, σε άλλη συλλαβή), ή μπορεί να προφερθεί σε συνίζηση με το επόμενο φωνήεν (δηλαδή μαζί του, στην ίδια συλλαβή). Αν το «υ» ακούγεται σαν «γ» ή «χ», ή δεν ακούγεται καθόλου, να το χαρακτηρίζετε ως συνίζηση.

Για κάθε λέξη, να αφουγκράζεστε προσεκτικά για να δείτε αν την πρόφερε ο ομιλητής με χασμωδία ή συνίζηση. Πρέπει να γράφετε πως προφέρθηκε η λέξη ΑΠΟ ΕΚΕΙΝΟ ΤΟΝ ΟΜΙΛΗΤΗ. Να χτυπήσετε έναν αριθμό από 1 μέχρι 7 όπως γράφεται πιο κάτω. Αν δεν καταλάβατε ποιά λέξη προφέρθηκε, να χτυπήσετε τον αριθμό 0.

1. σημαίνει ότι είστε απόλυτα βέβαιος/-η ότι το ιώτα προφέρθηκε σε χασμωδία.
2. σημαίνει ότι είστε κάπως βέβαιος/-η ότι το ιώτα προφέρθηκε σε χασμωδία.
3. σημαίνει ότι δεν είστε βέβαιος/-η, αλλά το ιώτα ακούγεται πιο πολύ σαν την χασμωδία από την συνίζηση.
4. σημαίνει ότι το (γ)ιώτα ακούγεται τόσο σαν την χασμωδία όσο σαν την συνίζηση.
5. σημαίνει ότι δεν είστε βέβαιος/-η, αλλά το γιώτα ακούγεται πιο πολύ σαν την συνίζηση (ή σαν το γάμμα, το χί, ή έναν άλλο σύμφωνο) από την χασμωδία.
6. σημαίνει ότι είστε κάπως βέβαιος/-η ότι το γιώτα προφέρθηκε σε συνίζηση (ή σαν το γάμμα, το χί, ή άλλα).
7. σημαίνει ότι είστε απόλυτα βέβαιος/-η ότι το γιώτα προφέρθηκε σε συνίζηση (ή σαν το γάμμα, το χί, ή άλλα).
0. σημαίνει ότι δεν καταλάβατε ποια λέξη προφέρθηκε.

Experiments 1 and 2

Introductory Summary

You will listen over headphones to a series of words being pronounced by a native speaker of Greek. As you hear each word, think about the word's meaning and in what situations you might use it or hear it. You will hear each word twice, and we will ask you to rate the word that you heard according to three aspects:

- (1) Your familiarity with that word (generally).
- (2) The naturalness of hearing or using this word among friends in a coffeeshop, bar, or other place of informal conversation (assuming the conversation has turned to a subject where the word would be reasonably relevant).
- (3) The naturalness of hearing or using this word with a priest, lawyer or judge, in a church, court of law, or a similar place of formal proceedings (again assuming the proceedings are such that the word would be relevant).

Detailed Instructions

You will hear a word, and then type the number which describes the degree to which this word is known to you.

1. This word is completely unfamiliar to me.
2. This word is somewhat familiar to me, but I don't know exactly what it means.
3. This word is familiar to me, and I know pretty much what it means.
4. This word is familiar to me, and I know what it means, but I don't use it.
5. This word is familiar to me, but I use it only rarely.
6. This word is familiar to me, and I use it from time to time.
7. This word is familiar to me, and I use it fairly frequently.

Afterwards type the number that describes the naturalness of hearing or using this word among friends in a coffeeshop, bar, or a similar place of informal conversation (assuming the conversation has turned to a subject where the word would be reasonably relevant).

Not natural 1 2 3 4 5 6 7 completely natural

1. The word is not at all natural in a place for informal conversation.
[...]
4. Some people use this word in places of informal conversation, but I would not.
[...]
7. The word is completely natural in a place for informal conversation.

Afterwards type the number that describes the naturalness of hearing or using this word with a priest, lawyer or judge, in a church, court of law, or a similar place of formal proceedings (again assuming the proceedings are such that the word would be relevant).

Not natural 1 2 3 4 5 6 7 completely natural

1. The word is not at all natural in a place for formal conversation.
[...]

4. Some people use this word in places of formal conversation, but I would not.
[...]
7. The word is completely natural in a place for formal conversation.

Experiment 3

Instructions for Speakers:

You will read a series of phrases aloud into a microphone. Please read the phrases naturally, as you might say them among friends. Read carefully each phrase once to yourself, to make sure you understand what it means, before you read it aloud.

Instructions for Raters:

You will listen over headphones to a series of Greek words being pronounced by various people. Each word will contain a sound spelled ι (or η, υ, ει, οι, υι), next to another vowel (usually α). This sound may be pronounced in hiatus with the vowel after it (that is, separate from it, in another syllable), or it may be pronounced in synizesis with that vowel (together with it in the same syllable). If the ι sounds like γ or χ, or is not heard at all, characterize that as synizesis.

For each word, you should listen carefully to see whether the speaker pronounced it with hiatus or synizesis. You should mark how the word was pronounced BY THAT SPEAKER. Type a number from 1 to 7 as described below. If you are not able to understand which word was said, mark it as a zero (0).

1. means that you are completely sure that the iota (ι) was pronounced with hiatus.
2. means that you are somewhat certain that the iota was pronounced with hiatus.
3. means that you are not sure, but the iota sounds more like hiatus than synizesis.
4. means that the iota sounds just as much like hiatus as like synizesis.
5. means that you are not sure, but the iota sounds more like synizesis (or like γ or χ, or some other consonant) than hiatus.
6. means that you are somewhat certain that the iota was pronounced with synizesis (or like γ, χ, etc.).
7. means that you are completely sure that the iota was pronounced with synizesis (or like γ, χ, etc.).
0. means you are not able to tell what word was said.