Paradigm structure and Greek glides

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1. Aims and outline of the talk

- Aims: I will make three main points all of which relate to an understanding of paradigm structure and the interaction with glide formation. In particular:
  - Glide formation in the inflectional paradigm is triggered by paradigmatic identity considerations and not by hiatus avoidance. This is not a widely known possibility.
  - In derivational morphology though, glide formation can be conditioned by hiatus avoidance. More specifically, some suffixes avoid hiatus by selecting among the inflectional stem allomorphs the right one, if there is one
  - Forms with [i]~[J] alternation and not with paradigmatic uniformity, i.e. [i] or [J] throughout the paradigm, help determine root and stem boundaries
- Outline
  - The phonological status of the glide
  - Morphological assumptions
  - i-GLIDE alternations vs. lack thereof in inflectional morphology
  - Extensions to derivational morphology
  - Typological issues

2. A quick review: the phonological status of the GLIDE[1]

- In Standard Modern Greek (SMG), there's just one glide, the palatal one. Orthographically, it corresponds to one of the [i]-sounding graphs, i.e. *ι, η, υ, ει, οι*; usually it is the *ι* one.
- Depending on the environment, the glide can surface as:

(1) a. [j]: an offglide, e.g. majdanós "parsley" – μαϊντανός
b. [ç]: prevocalically after a voiceless C, e.g. mátça "eyes" – μάτια
c. [ʝ]: prevocalically or after a voiced C, e.g. póðʝa "feet" – πόδια
d. [ʎ, ɲ]: after palatalizing the preceding C and merging with it, e.g. paɲá "sails" - πανιά

- I will refer to all these incarnations of the glide as **GLIDE** or **[J]**

- There's evidence for both the phonemic and allophonic status of the GLIDE

(2) */i/ and /J/ as distinct phonemes*
a. ɣájðaros *ɣá.i.ða.ros "donkey" Trisyllabic window

* Parts of this talk are based on collaborative work with **Mary Baltazani** (University of Ioannina). Thanks to Ricardo Bermudez-Otero, Edward Flemming and especially Adam Albright and Donca Steriade for input on various points of this talk. All errors are my own.

[1] For more details, especially on how the introduction of the underlying GLIDE facilitates the analysis of palatals, see Topintzi & Baltazani (2011).

xáj.ðe.ma	*xá.i.ðe.ma	"caressing"	Trisyllabic window
ánθropóz mu	*ánθropoz mu	"my person"	Enclitic stress
nerájða mu	*ne.rá.i.ðá mu	"my fairy"	No enclitic stress
psaroká.i.kó mu	*psarokájko mu	"my fishing boat"	Enclitic stress

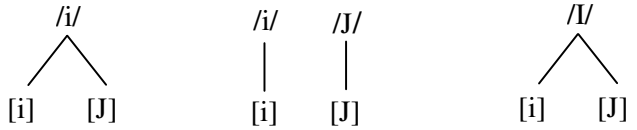
b. á.ð**i**.a	"permission"	á.ð**j̯**a	"empty"
v**i**.á.sti.ce	"was raped"	v**j̯**á.sti.ce	"was in a hurry"
ó.p**i**.o	"opium"	ó.p**ç**o	"whichever"
p**i**.é.ste	"press-2PL-IMP"	p**ç**é.ste	"drink-2PL-IMP"

(3) *[i]~[J] alternations*

SINGULAR	PLURAL	
póði	póð**j̯**a	"foot - feet"
máti	mátça	"eye - eyes"
xalí	xa$\curlywedge$á	"carpet - carpets"
paní	paɲá	"cloth - cloths"

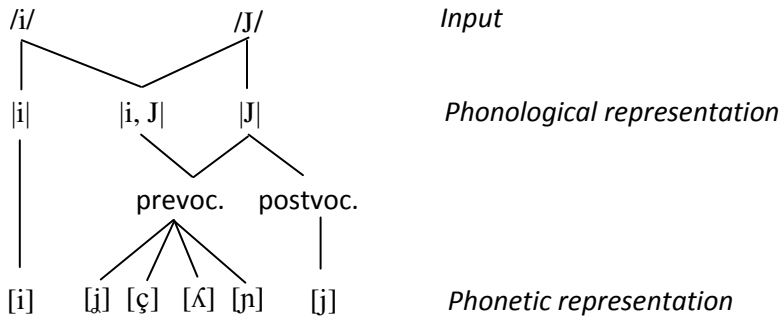
(4) Previous phonological accounts of GLIDE

i. One phoneme ii. Distinct Phonemes iii. Archiphoneme



- (i) cf. Kazazis 1968; Malavakis 1984; Nikolopoulos 1985; Warburton 1976
- (ii) cf. Householder et al. 1964; Koutsoudas 1962; Mirambel 1959; Nyman 1981; Setatos 1974; Holton et al. 1997
- (iii) cf. Deligiorgis 1987; Malikouti-Drachman & Drachman 1990
- Note that most of these accounts made crucial reference to the *katharevousa* vs. *dhimotiki* distinction. The role this plays is not denied, but we believe that a much larger set of data than previously assumed can be captured through phonological means only

(5) Current proposal (after Levi 2011; similar analyses for glides in Pulaar, Karuk, Sundanese, Pashto)



- This suggests that /i/ and /J/ will surface faithfully, unless the phonology of the language forces them to neutralize (cf. §4.2).

3. Assumptions about Greek nominal morphology

- I follow Ralli (2005) in assuming that there are 8 declensions of Greek nouns, although on occasion I diverge on the exact details of their analysis
- For current purposes, the only important assumption is that I analyse nouns ending in *-i* as follows:
  e.g. [máti] "eye"
  where **i** is a thematic vowel

  Nom.Sg. /mát-**i**-∅/ → [máti] (Stem = mát-**i**-, Root = mát) Gen.Sg. /mat-**i**-*ú*/ → [matçú]

4. Predicting i-GLIDE alternations in inflectional morphology

4.1. Data

- Recall from (3) that in a class of neuter nouns [i]~[J] may alternate (also here as (6a)). But, in a different set of neutral nouns (6b), they do not.

(6) a. Alternations (nouns contain theme vowel)

SINGULAR	PLURAL	
máti	mátça	"eye"
peði	peðjá	"child"
xoráfi	xoráfça	"field"

b. No alternation (nouns do not contain theme vowel)

SINGULAR	PLURAL	
ðomátio	ðomátia	"room"
sçéðio	sçéðia	"sketch, plan"
peðío	peðía	"field, plain"
psóɲo	psóɲa	"shopping"
órɲo	órɲa	"vulture"
sápço	sápça	"rotten"

(7) *Paradigms for (a) and (b)*

	SINGULAR	PLURAL	SINGULAR	PLURAL
NOM.	mát-i-∅	mát-ç-a	ðomáti-o	ðomáti-a
GEN.	mat-ç-ú	mat-ç-ón	ðomatí-u	ðomatí-on
ACC.	mát-i-∅	mát-ç-a	ðomáti-o	ðomáti-a
VOC.	mát-i-∅	mát-ç-a	ðomáti-o	ðomáti-a

- Generalization
  - Stem+∅ (Nom. Sg) present glide formation in Plural and Gen. Sg.
  - Stem+o (Nom. Sg) present hiatus or glide formation throughout

- Assuming a Rich Base, we should consider all combinations of stems with underlying i/J with either of the two categories above:

(I)	/koti+∅/	/koti+a/
(II)	/koti+o/	/koti+a/
(III)	/kotJ+∅/	/kotJ+a/
(IV)	/kotJ+o/	/kotJ+a/

Of those, only two surface faithfully: (II) cf. sçéðio - sçéðia and (IV) cf. psóɲo -psóɲa. Patterns (I) & (III) converge to the surface pattern […i+∅] – […J+a], i.e. the one that presents alternation.

4.2. Analysis

- Use of O(ptimal) P(aradigms) Faithfulness after McCarthy (2005)
- OP-FAITH constraints evaluate candidates that consist of entire inflectional paradigms, where an inflectional paradigm contains all and only the words based on a single lexeme (2005: 174)
- When an OP constraint dominates the relevant IO-constraint, then paradigm uniformity emerges at the cost of faithfulness to the input. This is the situation here.
- (8) OP-FAITH-σ# >> IDENT-IO[±syll] >> *VV
  OP-FAITH-σ#: Words in a paradigm have an identical number of syllables (adapted from Bat-El 2008)
- Glide formation is thus triggered by paradigm uniformity: OP-FAITH-σ# >> IDENT-IO[±syll]. Avoidance of hiatus is otherwise unimportant due to: IDENT-IO[±syll] >> *VV

(9) Pattern II: [i-i]

	/sçéði+o/$_{NOM.SG}$ /sçéði+a/$_{NOM.PL.}$	OP-FAITH-σ#	IDENT-IO[±syll]	*VV
☞a.	sçé.ði.o sçé.ði.a			**
b.	sçé.ði.o sçé.ðja	*!	*	*
c.	sçé.ðjo sçé.ði.a	*!	*	*
d.	sçé.ðjo sçé.ðja		*!*	

N.B: comparison of (a)-(d) establishes that IDENT- IO[±syll] >> *VV. If *VV >> IDENT, then (d) would wrongly win

(10) Pattern IV: [J-J]

	/psónJ+o/$_{NOM.SG}$ /psónJ+a/$_{NOM.PL.}$	OP-FAITH-σ#	IDENT-IO[±syll]
☞ a.	psó.ɲo psó.ɲa		
b.	psó.ɲo psó.ni.a	*!	*
c.	psó.ni.o psó.ɲa	*!	*
d.	psó.ni.o psó.ni.a		*!*

(11) Pattern I goes to [i-J]

	/peðí+∅/$_{NOM.SG}$ /peðí+a/$_{NOM.PL.}$	OP-FAITH-σ#	IDENT-IO[±syll]
a.	pe.ðí pe.ði.á	*!	
b.	péðʝ pe.ðʝá	*!	**
c.	péðʝ pe.ði.á	*!	*
☞d.	pe.ðí pe.ðʝá		*

(12) Pattern III goes to [i-J]

	/peðʝ+∅/$_{NOM.SG}$ /peðʝ+a/$_{NOM.PL.}$	OP-FAITH-σ#	IDENT-IO[±syll]
a.	pe.ðí pe.ði.á	*!*	**
b.	péðʝ pe.ðʝá	*!	
c.	péðʝ pe.ði.á	*!	*
☞d.	pe.ðí pe.ðʝá		*

- Upshot: 3 surfacing patterns, i.e. (i) hiatus throughout, (ii) glide throughout, (iii) i-J alternation, predictable from:
    - (a) UR /J/ vs. /i/
    - (b) declension class (whether there are zero affixed forms or not)

- Excursus: How highly-ranked should OP-FAITH-σ# be? Below DEP and MAX, because we want to allow for e.g. imparisyllabic nouns like *máθima – maθímata* "lesson-s"

(13) Relative low ranking of OP-FAITH-σ#

	/maθimat+∅/$_{NOM.SG}$ /maθimat+a/$_{NOM.PL.}$	*BAD CODA	DEP-SEG	MAX-SEG	OP-FAITH-σ#
a.	máθimat maθímata	*!			*
b.	maθímato maθímata		*!		
c.	máθima máθima			**!	
☞d.	máθima maθímata			*	*

5. Glides as probes for base identification

- Up to now, we saw that in inflection the distribution of glides was not conditioned by hiatus avoidance. In derivation however, hiatus is a consideration in the following sense: given a choice among inflectional stem allomorphs, some suffixes select the hiatus-avoiding one
- Two basic patterns in derivational suffixation:
  - ❶ Suffixes that select for surface allomorph bases
  - ❷ Suffixes that select for roots
- Crucially, the distinction between the two types of suffixes is made evident by the behaviour of words whose inflectional paradigm presents i-J alternation.
- Thus, the behaviour of glides can provide insights as to what the base is in Greek derivational morphology

5.1. The data

- Examination of V-initial derivational suffixes as mentioned in Ralli (2005: 147-153) including:
  - verbal suffixes: -ιέμαι, -άρω, -αίνω, -ώνω, -(ι)άζω, -εύω
  - nominal and adjectival suffixes: -ότητα, -άκι, -οσύνη, -ώνας, -είο, -ακός, -άδα, -ώτης, -αρός, -ώδης, -άτικος
- Construction of corpus of words based on the online Triantafyllides dictionary (*Λεξικό Κοινής Νεοελληνικής*, 1998, Ινστιτούτο Νεοελληνικών Σπουδών, ΑΠΘ): http://www.komvos.edu.gr/dictionaries/dictonline/DictOnLineTri.htm

5.2. Suffixes of Type ❶

- Case study: the verbal suffix -(ι)άζω surfaces as [-Jázo, -iázo, -ázo]
- N=467 words:
  - [-Jazo] N=263; [-iazo] N=57; [-azo] N=147
- Focusing on [-Jazo] & [-iazo]

- Basic generalization: no verb in [-Jazo] with a neuter base in -io nor a verb in [-iazo] with a neuter base in -J

(14) *a. Verbs in [-Jazo] from a noun with [J] throughout*
sinefçázo < sinefçá$_{\text{NOMSG}}$; sinefçás$_{\text{GENSG}}$ "cloud over - cloud"
melaɲázo < melaɲá$_{\text{NOMSG}}$; melaɲás$_{\text{GENSG}}$ "bruise$_V$ - bruise$_N$"

b. Verbs in [-iazo] from a noun with [i] thoughout
sçeðiázo < sçéðio$_{\text{NOMSG}}$; sçeðíu$_{\text{GENSG}}$ "plan, sketch$_V$ - sketch$_N$"
apusiázo < apusía$_{\text{NOMSG}}$; apusías$_{\text{GENSG}}$ "being absent - absence"

c. Verbs in [-Jazo] from a noun with [i-J] alternation
vraðʝázo < vráði$_{\text{NOMSG}}$; vraðʝú$_{\text{GENSG}}$ "becomes evening - evening"
paramiθçázo < paramíθi$_{\text{NOMSG}}$; paramiθçú$_{\text{GENSG}}$ "lie (as in a fairy-tale) – fairy-tale"

- (14a&b) show that when there's no alternation within the paradigm, then the unique stem will serve as base for derivation; (14c) shows that when stem allomorphs are available, then the one that better satisfies phonological considerations (here, *VV) will get chosen as base for derivation

- Formally, this can be analysed by using Steriade's (2008) FAITH-BD (Base-Derivative) constraints and the assumption that *sets* of winning candidates as those in (9)-(13) above are stored in the derived lexicon which derived forms can fully access. So the base should be understood as the extended lexical entry.
  - cf. Steriade's (2008) Ident [αF] (BD): For any segment s in a subconstituent C of an expression E, if s is [αF] then s has an [αF] correspondent in a listed allomorph of C.
- Effectively this approach allows for selection of the most appropriate among multiple bases

- IDENT[±syll]-BD: For any segment s in the derivative, if s is [αsyll], then s has an [αsyll] correspondent in the base
- Proposed ranking: IDENT[±syll]-BD >> *VV

(15) /sinefJ-á, sinefJ-és/ → [sinefçá, sinefçés] (cf. (14a)) Unique base: {sinefç-}

	{sinefç-} {-ázo}	IDENT[±syll]-BD	*VV
☞a.	sinefçázo		
b.	sinefiázo	*!	*

(16) /sxeði-o, sxéði-a/ → [sçéðio, sçéðia] (cf. (14b)) Unique base: {sçéði-}

	{sçéði-} {-ázo}	IDENT[±syll]-BD	*VV
☞a.	sçeðiázo		*
b.	sçeðʝázo	*!	

(17) /paramíθ-i, paramíθ-i-a/→ [paramíθi, paramíθça] (cf. (14c)) Bases: {paramíθi-}, {paramíθç-}

	{paramíθi-}, {paramíθç-} {-ázo}	IDENT[±syll]-BD	*VV
a.	paramiθiázo		*!
☞b.	paramiθçázo		

- What this analysis predicts:
  - Hiatus or Glide should appear throughout in derived forms if the base presents itself hiatus or glide only (i.e. in I-I, J-J patterns)
  - I-J patterns should have derived forms with glides, since in their case IDENT[±syll]-BD is non-decisive and *VV favors candidates that avoid hiatus[2]
- Other Type ❶ suffixes: -ώτης (-ótis), -άτικος (-átikos), -ακός (-akós)

5.3. Suffixes of Type ❷

- Case study: the verbal suffix -ώνω (-óno) surfaces as [-Jóno, -ióno, -óno]
- N=744 words:
  - [-Jono] N=15; [-ióno] N=49; [-ono] N=680

(18) *a. Verbs in [-Jono] from a noun with [J] throughout*
isçóno < ísços$_{NOMSG}$; ísçu$_{GENSG}$ "straighten-straight"
b. Verbs in [-iono] from a noun with [i] thoughout
θemelióno < θemélio$_{NOMSG}$; θemelíu$_{GENSG}$ "establish - foundation"
c. Verbs in [-óno] with all other types of bases including those with [i-J] alternation
rizóno < ríza$_{NOMSG}$; rízas$_{GENSG}$ "root$_V$ – root$_N$"
kubóno *kubjóno < kubí$_{NOMSG}$; kubjú$_{GENSG}$ "button$_V$" < "button$_N$"

- The [-Jono] and [-iono] cases are compatible with the analysis in §5.2, but the [-ono] cases with i-J alternation are not. To see why consider (19).

(19) /kub-í, kub-i-ú/ → [kubí, kubjú] Bases: {kubí-}, {kubj-}

	{kubí-}, {kubj-} {-óno}	IDENT[±syll]-BD	*VV
a.	kubióno		*!
💣b.	kubjóno		
☞ c.	kubóno		

- A way-out: Propose that this set of suffixes identifies as its base the *root* and not the extended lexical entry

[2] A residue of derived words with Type ❶ suffixes present [J] or [i] (much less frequently) even though their bases lack [J] or [i], e.g. vðomaðjátikos < vðomáða "weekly - week", muxʌázo < múxla "mould$_V$ – mould$_N$".

- Analysis: Add low-ranked STEM=ROOT and high-ranking MAX-BD in the ranking. All forms are subject to STEM=ROOT, but a subset of them (i.e. those with suffixes of Type ❶) are also subject to high-ranked MAX-BD and IDENT-BD. The relevant suffixes and constraints are marked as ❶.
- MAX-BD: For any segment s in the base, there is a correspondent in the derivative
- STEM=ROOT: The stem and root boundaries coincide
- MAX-BD❶, IDENT[±syll]-BD ❶ >> *VV >> STEM=ROOT
- Representative examples of Type ❶ and ❷ suffixes in this analysis

(20) Type ❶: base is extended lexical entry

	/paramíθ-i, paramíθ-i-a/ {paramíθi-}, {paramíθç-} {-ázo}❶	MAX-BD❶	IDENT[±syll]-BD ❶	*VV	STEM=ROOT
a.	paramiθázo	*!			
b.	paramiθiázo			*!	*
☞ c.	paramiθçázo				*

(21) Type ❷: base is root

	/kub-í, kub-i-a/ {kubí-}, {kubj̯-} {-óno}	MAX-BD❶	IDENT[±syll]-BD ❶	*VV	STEM=ROOT
a.	kubióno			*!	*
b.	kubj̯óno				*!
☞ c.	kubóno				

- Other Type ❷ suffixes: -άδα (-áða), -άκι (-áci), -εύω (-évo)

5.4. Other remarks

- Of the remaining suffixes, we observe that either:
  - no clear picture can be established because only few examples with [i] or [J] appear before the suffix, e.g. -αίνω (-éno) or -ώνας (-ónas)
  - examples with [i] and/or [J] appear before the suffix, but their potential bases do not involve the [i/J] alternation that crucially distinguishes between ❶ and ❷, so they are compatible with either analysis, e.g. -οσύνη (-osíni), -ώδης (-óðis)
    - experimental testing with nonce words would help clarify the status of those suffixes

6. What's the base for derivation?

A few typological remarks on the base of derivation

- A single base: oblique case in Latin (Albright 2005), plural in Yiddish (Albright 2008)
- Multiple bases and choice of the most well-formed phonologically: Romanian (Steriade 2008), Ukrainian and Russian (Steriade and Yanovich 2011)

- Stem-based [presumably with access to input only] affixation, e.g. Italian (Peperkamp 1995)
- Greek cannot be accommodated to any of the above:
    - As shown, the multiple-bases account works but only for a subset of the derivational affixes, i.e. Type ❶ ones. Root-based affixation is required for Type ❷ suffixes.
    - The single base account is not sufficient either; while a portion of the data can be accounted by assuming that Gen.Sg. is the base, it predicts that for a word like Nom.Sg. [máti], Gen.Sg. [matçú], the latter should be used as the base for affixation. That's correct for [matç-ázo] but incorrect for [mat-áci] *[matç-áci]
- Greek thus emerges as a mixed system where individual suffixes impose different requirements to their bases, either attaching to roots or surface stem-allomorphs

7. Conclusion

- Starting from the claim that both /i/ and /J/ have phonemic status in Greek, an account has been offered that explains their allophonic relationship in inflectional paradigms as a result of paradigmatic identity
- Hiatus, while not an issue in inflectional morphology, is avoided in derivational morphology given the chance, i.e. whenever there are multiple bases available and FAITH-BD being non-decisive, passes the decision to markedness *VV
- The pattern of [i-J] alternation helps determine whether a derivational suffix attaches to a root or a stem

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