ON THE INTRODUCTION OF LINGUISTICS

IN THE SECONDARY SCHOOL CURRICULUM THROUGH LATIN

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0.   Introduction

The value of Linguistics education in the school curriculum has been urged by several authors (see Larson 2010, Oniga, Iovino, and Giusti 2011, and references therein), and there have been various attempts to introduce formal linguistics into primary and secondary school classrooms (Keyser 1970, Honda 1994, Stordahl 1969, Loosen 2014, O'Neil 2007, O'Neil and Kitzhaber 1965, and references therein). However, these efforts have met with limited success and/or have not been widely emulated (O'Neil and Kitzhaber 1965, Honda 1994, Loosen 2014). While much work has been done on using Linguistics to teach languages, classical languages in particular (Cardinale 2011; Cardinaletti 2007, 2008, 2011; Giusti & Oniga 2011; Oniga 1991, 2007, 2008, 2012; Oniga & Cardinale 2012), we propose the opposite: using classical languages (Latin, in particular)[1] as a vehicle for introducing formal linguistics into the secondary school classroom. In this paper, we review the benefits of introducing theoretical linguistic concepts to high school students (§1), as well as the attempts and challenges that such a proposal encounters (§2). We present our novel approach in §3, and conclude in §4.

1.   Benefits of theoretical linguistics in the high school curriculum

Attractions of introducing theoretical linguistics into the high school curriculum include: (i) improving students' understanding of language, and (ii) honing analytical

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[1] More and more people have shown an interest in using Latin for less traditional purposes. Entire online communities exist for Latinists to practice their language abilities, or to otherwise promote the usage of Latin. The r/Latin sub-Reddit (a specialized forum within the mega-site Reddit.com) hosts a weekly *dies loquax* 'discussion day' where users are encouraged to interact only in Latin (The Latin Language /r/latin n.d.). There is a *Lingua Latīna Vicipaedia*, a Latin-language Wikipedia, offering Latin versions of articles from "The Free Encyclopedia", featuring topics ranging from Roman emperors to modern television shows (Vicipaedia n.d.). Beyond textual resources, the Finnish national broadcaster Yle even airs the *Nuntii Latini* (Latin News) weekly, using the reconstructed classical Latin pronunciation, and has done so since 1989 (Nuntii Latini n.d.).

reasoning skills. Regarding the former, Oniga, Iovino, and Giusti (2011: xi) argue that introducing formal linguistics in the teaching of Latin provides students with better tools to learn the language since "they will no longer learn by heart the inexplicable rules of school grammar, but will discover how human languages function and change... In this perspective, the study of an explicit and scientific grammar loses any passive character, to become an activity which enhances linguistic awareness, meta-linguistic competence, and critical thought." Regarding the latter, Larson's (2010) *Grammar As Science* offers syntax as a way to teach rational inquiry. In the text and accompanying software, students are taught to analyze linguistic data using explicit grammar rules that account for all grammatical forms while disallowing ungrammatical ones.

Using linguistics as a means for teaching analytical reasoning skills and the Scientific Method, has been urged by others as well. Honda (1994) presents a small-scale study investigating secondary school student understanding of the Scientific Method, and suggests that natural language offers a better domain through which to teach the Scientific Method than other subjects. In her study, students participated in a 2-week unit introducing the field of linguistics and specific topics such as plural formation, contractions, etc. Similarly, O'Neil (1998) argues that Linguistics is a better discipline through which to study the Scientific Method than, for example, astrophysics is. He provides the following reasons: (a) everyone has a language, and therefore ready access to linguistic data necessary to verify or falsify hypotheses about language; and (b) students are intrinsically interested in language in a way not found with, for example, astronomical phenomena.

Musso et al. (2003), and Moro (2008) show that focusing on metalinguistic knowledge activates the Broca's area of the brain, which is associated with language processing. Therefore, by studying theoretical linguistics, students' biology facilitates the language acquisition process. Furthermore, Cornoldi (1995) suggests that, once made aware of this cognitive system, students would be able to better control their linguistic performance.

2.   How to bring linguistics to schools

2.1.   Previous and current attempts

There have been various attempts to teach school-aged children theoretical linguistics. The New English Project (NEP) was part of a broad, large scale Cold War-era attempt (1962-1968) to make the American education system better than the Soviets'. The program taught Chomskyan generative syntax to over 50,000 students in Oregon and Washington, USA, and required a complete overhaul of teacher education. Ultimately, the initiative was ended because of the high cost and the fact that critics called it "too rigid" and unengaging for students (Francis 1964, Slack 1964, Stordahl 1969, O'Neil 2007).

Contemporary efforts continue. Loosen (2014), a high school English teacher in Wisconsin, documents an attempt to offer a semester-long elective comparable to a college-level introductory linguistics course. Her anecdotal experience showed high student enthusiasm, and resulted in student improvement in their English classes as well. Other anecdotal reports exist of teachers offering linguistics electives to high school students, although there are no data on these experiences.

The recent success of NACLO (North American Computational Linguistics Olympiad: http://www.nacloweb.org), a high school competition where students analyze language-based problem sets, may yet prove to be the most successful means to date of introducing school-aged students to the field of Linguistics. Students participate as individuals in the open round and the invitational round, and then as a national team in the international competition. Started in 2006, over 1000 students now participate annually, and the number of student and institutional participants continues to grow.

Due in part to the success of NACLO, the LSA (Linguistic Society of America) has recently created a committee to develop an AP ("advanced placement") Linguistics course and examination for high school students. The success of such a program could have a profound impact on the role of linguistics in American high school.

2.2. Problems fitting in

The challenges of introducing Linguistics into the American school system are varied. The school system in America typically understands "science" as referring to a small set of specific subjects: Biology, Earth Science, Chemistry, and Physics. Linguistics, were it considered at all, would doubtless be associated with English or

Foreign Language departments. But the latter are not a natural home for the subject matter. English teachers focus primarily on academic writing and literary analysis, with little interest or training in grammar or linguistics. Foreign Language programs are overwhelmingly conversation-driven, dedicating little time to grammar and structure and no time to linguistic analysis.

Interestingly, Latin instruction has largely resisted the conversational approaches prevalent in the modern foreign languages.[2] Latin teachers typically spend significant time on grammar, including identifying patterns in paradigms, discussing grammatical concepts such as case, syllable weight, syntax and focus, etc. Linguists also study these things. This suggests Latin as a potential subject area in which to introduce concepts from linguistics.

3.   The Latin classroom

In the United States, the instructors in traditional Latin classrooms largely focus on rote memorization of paradigms and the study of grammatical constructions, in order to read and translate classical Latin texts. For example, the introduction to each noun class generally consists of presenting pupils with a single paradigm, followed by a dozen or so novel nouns. Latin as it is taught is purely an exercise in memorization. However, if students look at the language data from an analytical perspective informed by theoretical linguistics, they can better understand the underlying linguistic processes of the language to become better Latinists.

We conducted a study to see if Latin learning improved when students were introduced to linguistic principles (DeSalvo 2015). The lesson plans injected basic linguistic concepts into the traditional Latin curriculum. For example, rather than recite a list of forms, students were trained to look for patterns in the nominal and verbal paradigms. The exercises highlighted the internal morphological makeup of Latin words, not just additional vocabulary acquisition. As evidenced by post-testing, participants readily understood morphological analysis, which helped them with nominal case inflection and verbal person-number agreement—foreign concepts to most English speakers.

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[2] There are some exceptions. For example, the Great Hearts charter schools in the southwestern United States place more emphasis on spoken Latin. Their after-school Latin club takes trips to museums and endeavor to discuss their day exclusively in *lingua latīna*.

3.1. Lesson plans

We developed five lesson plans that teach Latin students to explore theoretical linguistics using Latin data they are familiar with. Each lesson typically consisted of three components: a pretest, a lesson, and a posttest.[3] Below we discuss in depth two of those classes and their respective teaching approaches. The Appendix provides additional sample exercises from each of the five lessons.

3.1.1. Verbal morphology

In the Verbal Morphology lesson, the teacher worked with the class to analyze the morphological structure of a Latin verbal paradigm. Just as in a traditional Latin class, the teacher started by showcasing, for example, the present active indicative paradigm of the verb 'love'. The difference between the traditional and the new approach is the explicit explanation of morphological structure and the meaning of the individual morphemes. The teacher discussed how the different parts of words contribute different meanings, in contrast to the traditional approach of translating the word *amas* as 'you love' (*amat* 'he/she/it loves', *amāmus* 'we love', etc.). Thus students discovered that the root *am-*, common in all these forms, means 'love', while *-as* indicates a 'second person singular' subject or 'you(sg)', etc.[4]

Students were then presented with the similar present active indicative paradigm of a new verb from a different conjugation class, such as the verb 'teach': they were given various forms of the verb 'teach' (1), and they were asked to provide the Latin morphemes corresponding to the given meaning (2).

(1) a. *doces*   'you(sg) teach'

    b. *docet*   'he/she/it teaches'

    c. *docemus*   'we teach'

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[3] In some cases the pretest was skipped due to time constraints.
[4] As this is an introductory exercise, the first person singular form is excluded, vowel length is ignored, and we did not discuss the theme vowel, although these topics are included in subsequent lessons.

(2) a. 'teach' _____

b. 'you(sg)' _____

c 'he/she/it' _____

d. 'we' _____

Students were then asked to extend their analyses to a different verb of the same conjugation class as 'teach'. In this exercise, they were given one form from the verb 'have' (3), and asked to predict several other forms based on their earlier morphological analysis of 'teach' (4).

(3) *habet* 'he/she/it has'

(4) a. 'you(sg) have' _____

b. 'we have' _____

(See the Appendix for more exercises.)

3.1.2. Historical linguistics

In the Historical Linguistics lesson, the instructor introduced students to the concept of diachronic phonological change, in particular degemination and sonorization. In the lesson on degemination, the teacher discussed the Latin and Romance forms in (5), focusing on the intervocalic consonants.

(5) Lat. VACCA(M) 'cow'

a. [vakka] (Italian)

b.   [vakə]   (Portuguese)

The students were then presented with other Romance words (6) and attempted to reconstruct the Latin forms.

(6)   Lat. _____ 'beautiful (f.)'

a.   [bɛlla]   (Italian)

b.   [bɛlə]   (Portuguese)

Subsequently, based on Latin forms, they predicted modern Romance forms (7).

(7)   Lat. CAPPA(M) 'cape'

a. _____   (Italian)

b. _____   (Portuguese)

In the lesson on sonorization, the teacher discussed the Latin and Romance forms in (8), focusing on the intervocalic consonants.

(8)   Lat. FATU(M) 'fate'

a.   [fato]   (Italian)

b.   [fadu]   (Portuguese)

As with the degemination lesson presented above, students were given two tasks based on analysis of new data: the reconstruction of the Latin form from Romance words (9) and the prediction of the Romance forms from the Latin etymon (10).[5]

(9)   Lat. _____ '(past participle suffix)'

       a.   [ato]   (Italian)

       b.   [adu]   (Portuguese)

(10)   Lat. MARITU(M) 'husband'

       a. _____   (Italian)

       b. _____   (Portuguese)

(See the Appendix for more exercises.)

3.2.   Lesson results

The lessons were offered to six different classes of students aged 11-15, from two different schools in New York. All of the classes had approximately the same degree of exposure to Latin, i.e., some basic introductory lessons, but not even a full year of a traditional Latin curriculum.

Pre-tests were administered to gauge students' understanding of both the Latin forms and the Linguistic topic involved with each lesson. For example, the nominal morphology pre-test asked students to analyze morphemes, and to produce Latin nouns of the same declension class. After each experimental lesson, students took a post-test to measure how well they understood each concept. The post-tests incorporated the same sort of linguistic analysis that the lessons introduced, using novel Latin vocabulary. Out

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[5] The quality of the final vowels was also discussed, as were the innovative and conservative characteristics of both languages. However, in this lesson, we did not discuss the fact that the data could be analyzed differently, i. e., that Portuguese could be analyzed as deriving from Italian by the same rules. This historical lesson was presented in the context of the spread of Latin during Roman domination of Europe. We thank a reviewer for pointing this out to us.

of the 58 students involved in post-testing, 50 passed the post-test that assessed both their ability to perform linguistic analysis and their Latin competence.[6]

Two classes participated in the verbal morphology lesson. In the verbal morphology Group 1 (consisting of 8 students), 25% students passed the pre-test; 75% passed the post-test (62.5% with perfect or near-perfect scores). All students showed individual improvement and comprehended the concept of morphological analysis. 62.5% of the students accurately extended their analyses to the novel verbs. With Group 2 (13 students) participating in the Verbal Morphology lesson, the students did not have sufficient time to take a pre-test. However, 84.6% passed the post-test and understood how to perform morphological analysis. The two students who did not consistently analyze the morphological data on the post-test had simply copied their answers from the lesson's practice problems. All of the students in the second group accurately extended their analyses to the novel Latin vocabulary (including the two students mentioned above).

Two groups participated in the nominal morphology lesson. The first group (8 students) also lacked the time during their class to take a pre-test, but 75% passed the post-test. All of the students were able to analyze the morphological structure of the noun; however, they struggled with the concept of noun cases, and thus only 37.5% correctly predicted the forms of novel nouns. The second group completing the nominal morphology exercise (15 students) seemed to understand grammatical case better; 93.3% passed the post-test, while consistently performing morphological analysis and predicting inflected forms of novel Latin vocabulary.

All 11 students participating in the Historical Linguistics lesson displayed ability on the post-tests to accurately identify the two types of diachronic phonological change described in the lesson (degemination and sonorization). Additionally, 8 of the 11 consistently reconstructed the Latin/Proto-Romance forms based on the modern Romance words given.

The group participating in the syntax lesson (15 students) created tree diagrams for various Latin sentences which had English glosses and identified parts of speech based on syntactic context. The smallest lesson group (3 students) participated in the Prosody lesson. Prior to the lesson, all students were able to count syllables, but not

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[6] "Passing" was fixed as 66% of the questions answered correctly.

analyze syllable structure or assess syllable weight. After the lesson, all of the participants consistently syllabified novel Latin words and identified onsets, nuclei and codas. Furthermore, they correctly calculated moraic weight and assigned lexical stress.

For every lesson, all students showed individual improvement in their understanding of the Latin and Linguistic concepts discussed in each lesson, as evidenced by the post-testing. This pilot study strongly suggests that engaging in a linguistic analysis of the Latin language, students improve their ability in Latin. To further test the efficacy of these lessons, an additional study might more explicitly investigate the difference in Latin competency between a control group following the traditional Latin curriculum and a test group using the sort of approach described above.

4.   Conclusions and further study

The lessons used in the study not only introduced students to certain linguistic concepts, but tested the same knowledge found in traditional Latin courses. While the traditional Latin curriculum emphasizes rote memorization, these experimental lessons encourage students to explore and conjecture language patterns. Students formulate their own hypotheses by looking at Latin data and apply their analyses to novel forms. Not only does this further reinforce their knowledge of the Latin language, it also invites students to approach language using analytical reasoning.

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Appendix

The following five exercises are taken from the experimental lessons. They consist of problem sets that students worked on with the instructor during the lesson.

Latin Nominal Morphology Exercise

Observe all of these nouns which have to do with 'crabs'. Which segments correspond to the following meanings?

cancros	'the crabs' (ACC.PL)	*cancris*	'from the crabs' (ABL.PL)
cancri	'of the crab' (GEN.SG)	*cancrorum*	'of the crabs' (GEN.PL)
cancro	'to the crab' (DAT.SG)	*cancrum*	'the crab' (ACC.SG)

'crab' _____   ACC.PL _____

GEN.PL _____   DAT.SG_____

ABL.PL _____   GEN.SG _____

ACC.SG _____

The word *puero* means 'to the boy' (DAT.SG). It follows the same patterns as the noun above. How would you say the following in Latin?

'from the boys' (ABL.PL) _____

'of the boy' (GEN.PL) _____

'the boy' (ACC.SG) _____

Latin Historical Linguistics Exercise

In the table below, observe the changes that happen as Proto-Romance evolved into the modern Romance languages. In the first example, the Proto-Romance [vakka] 'cow' undergoes *degemination* to produce the Portuguese, [vakə]. In the second example, [amiku] 'friend' becomes Portuguese [amigu], undergoing *sonorization*. For the examples where no Proto-Romance form is listed, what do you think the Latin/Proto-Romance word might have sounded like? For the examples where no modern Romance form is listed, how do you think those words are pronounced?

Latin/Proto-Romance	English Gloss	Italian	Portuguese	Romanian
[vakka]	'cow'	[vakka]	[vakə]	[vakə]
[amiku]	'friend'	[amiko]	[amigu]	[amik]
	'dried'	[sekko]	[seku]	[sek]
	'cape'	[kappa]	[kapə]	[kapə]
	'step'	[passo]	[pasu]	[pas]
	'(past participle suffix)'	[ato]	[adu]	[at]
[koppa]	'cup'			

[maritu]	'husband'				

Latin Verbal Morphology Exercise

Observe all of these words which have to do with 'teaching'. Which segments correspond to the following meanings?

docere   'to (infinitive) teach'   *docemus*   'we teach'

doces   'you(sg) teach'   *docetis*   'you(pl) teach'

docet   'he/she/it teaches'   *docent*   'they teach'

'teach' _____   you(sg) _____

he/she/it _____   we_____

you(pl) _____   they _____

'to (infinitive)' _____

The word *habet* means he/she/it has. It follows the same patterns as the verb above. How would you say the following in Latin?

'you(sg) have' _____
'we have' _____
'they have' _____

Latin Syntax Exercise
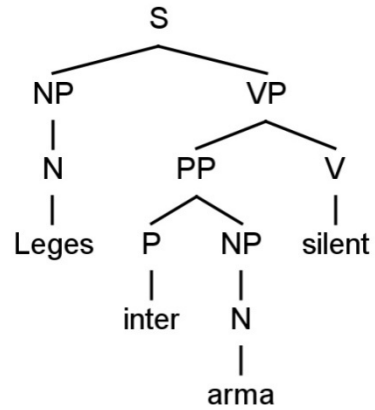
Sentences can be grouped into a hierarchy of phrases and interrelated parts. For example, a sentence must always have a subject and a predicate. Examine the following Latin sentence:

> *Leges inter arma silent.*
> laws among arms become-quiet
> 'During war, laws grow silent.'

The following phrase structure rules allow us to account for this sentence:

> S > NP VP
> NP > N
> VP > PP V

PP > P NP

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                        S
                 _____/ _____
              NP                 VP
              |              ____/ \____
              N            PP           V
              |          _/ \_          |
            Leges       P    NP      silent
                        |     |
                      inter   N
                              |
                            arma
```

Use the above phrase structure rules to draw a tree for a similar sentence:

 Anguis in herba latet.

 snake in grass hides

 'A snake hides in the grass.'

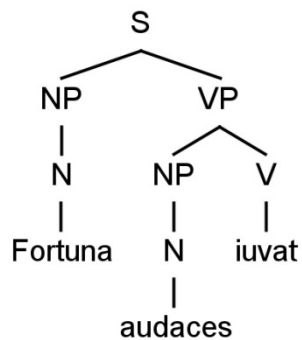Some verbs, called "transitive verbs", take nouns as objects:

 Fortuna audaces iuvat.

 fortune the-bold favors

 'Fortune favors the bold.'

We need a new phrase structure rule for these structures:

 VP > NP V

```
                     S
               _____/ \_____
            NP              VP
            |             _/ \_
            N            NP     V
            |            |      |
         Fortuna         N    iuvat
                         |
                      audaces
```

Try to diagram the following sentence using the phrase structures rules we have discussed:

 Puer calceos habet.

boy shoes   has

'The boy has shoes.'

Finally, since nouns can be modified by adjectives, we need another rule to account for these types of noun phrases:

NP > N Adj

Draw a tree diagram of the following sentence using the phrase structures rules we have discussed:

Puer calceos novos habet

boy shoes   new   has

'The boy has new shoes.'

Latin Prosody Exercise

Latin poetic meters are based on sequences of **heavy** (**H**) and **light** (**L**) syllables. Observe the opening line from *The Aeneid* which is written in *dactylic hexameter*. *Dactylic hexameter* generally consists of six feet (or metra) which can be either **dactyls** (consisting of a sequences of **HLL** syllables) or **spondees** (**HH**). In addition, the last syllable of a line can be light or heavy.

arma virumque canō Troiae quī prīmus ab ōrīs

ar	ma	vi	rum	que	ca	nō	Troi	ae	quï	prī	mu	sa	bō	rīs
H	L	L	H	L	L	H	H	H	H	H	L	L	H	H
(H	L	L)	(H	L	L)	(H	H)	(H	H)	(H	L	L)	(H	H)

This line contains two dactyls, followed by two spondees, a dactyl, and a spondee. Note that syllables do not always correspond with word boundaries.

Question: What makes a syllable heavy or light?

Exercise: Here is another verse of *The Aeneid* written in dactylic hexameter. Try breaking up into heavy and light syllables.

Īnfandum rēgīna iubes renovāre dolōrem