Combining Universal Dependencies and FrameNet to identify constructions in a poetic corpus: syntax and semantics of Latin *felix* and *infelix* in Virgilian poetics

Giulia **Calvi**[1], Riccardo **Ginevra**[1] and Federica **Iurescia**[1]

[1] *Università Cattolica del Sacro Cuore, 20123 Milano, Italy*

Abstract

The paper is a pilot study which argues for a constructionist and computer-based approach to the syntactic and semantic analysis of a poetic corpus in Latin. We focus on the terms *felix* and on its opposite *infelix* and perform manual annotation of their occurrences in Virgil's poems using Universal Dependencies for the syntactic analysis and FrameNet for the semantic one. Integrating the approaches of Dependency Syntax and Construction Grammar, we analyze the linguistic contexts in which the two terms occur and identify the different "constructions" (pairings of form and function) that they instantiate. Our methodology is language-independent and has the potential to aid scholars in the comparative analysis of poetic texts, allowing for the detection of hidden parallels in the style and poetics of different texts and authors.

Keywords

Universal Dependencies, FrameNet, Construction Grammar, Frame Semantics, Latin, Virgil.

1. Introduction

The aim of the present study is to demonstrate the potential of a constructionist and computer-based approach to the analysis of syntax and semantics in a Latin poetic corpus. Our corpus comprises Virgil's (70–19 BCE) literary works, namely (in chronological order of composition) the *Eclogues* (*Ecl.*) or *Bucolics*, the *Georgics* (*Georg.*), and the *Aeneid* (*Aen.*). We focus on two lemmas that have been studied as key terms in Virgil's poetics (e.g. [1]; [2]): *felix* 'productive, auspicious, fortunate, lucky, happy' and its opposite *infelix* 'unproductive, unlucky, ill-fated, miserable'.[1]

Bellincioni [1] analyzed the meanings of the two terms in Virgil's works and detected differences in their poetic uses. On the one hand, *felix* is attested in a variety of contexts, ranging from its (likely original) concrete senses 'productive', 'fruitful' to more figurative senses linked with prosperity and well-being (granted by divine will). When it qualifies humans, *felix* takes the religious nuance of 'favored' by gods and fate. Gagliardi [2] also stressed the polysemy of *felix* in the Virgilian corpus: the lemma may refer to fecundity, propitious benevolence,

or happiness, acquiring new connotations thanks to innovative uses in Virgil's poetics. On the other hand, according to Bellincioni [1] *infelix* is rarely used in the technical sense of 'infertile' or in the senses 'helpless' and 'inauspicious', and in the majority of cases it rather seems to be used to qualify human beings as 'ill-fated'.

In order to identify patterns of the use of these terms in context, we combine a syntactic analysis with a semantic one. Following Osborne and Groß [4] and Osborne, Putnam and Groß [5], we integrate the approaches of Dependency Syntax and Construction Grammar. In doing so, we rely on the Universal Dependencies (UD) framework for the syntactic analysis and on the FrameNet approach for the semantic one, drawing inspiration from previous studies along these lines (e.g. [6]; [7]).

This integrated approach allows us, on the one hand, to identify the linguistic contexts in which *felix* and *infelix* occur in Virgil's corpus and, on the other hand, to analyze correspondences between the syntactic and the semantic levels of the Virgilian passages where these two terms are employed.

0000-0002-6731-6494 (R. Ginevra); 0000-0001-5100-5539 (F.Iurescia);)

[1] We rely on translations provided by [3].

By combining syntactic and semantic analyses, we explore the potential of an approach that integrates Universal Dependencies with FrameNet. In doing so, we aim at demonstrating that ours is a viable methodology to retrieve the contexts in which the two terms occur in Virgil's corpus and to study the correspondences between their syntactic and semantic uses.

2. Theoretical framework

2.1. Construction Grammar and Frame Semantics

The term "Construction Grammar" encompasses a series of approaches to grammar, which share the premise that all levels of grammatical analysis involve so-called "constructions", i.e. "learned pairings of form and function", including "morphemes or words, idioms, partially lexically filled and fully general phrasal patterns" ([8], p. 5). Within this framework, no rigid division between lexicon and syntax is assumed: constructions are rather arranged along the lexicon-syntax continuum, varying in their degree of internal complexity and schematicity.[2] The different instances of constructions (i.e. their tokens in a type-token distinction) are called "constructs".

Construction Grammar is in turn the formal counterpart of Frame Semantics, originally developed by Fillmore [10], which posits that word meanings are understood through the "semantic frames" they evoke. A semantic frame may be defined as "any system of concepts related in such a way that to understand any of them you have to understand the whole structure in which it fits" ([10], p. 111). The presence in a text of words evoking specific frames reveals different ways in which the speaker conceptualizes the situation.

2.2. Dependency Syntax and Universal Dependencies

In order to identify the constructions instantiated by *felix* and *infelix* within Virgil's corpus, the relevant occurrences were analyzed within the framework of Dependency Syntax. This choice aligns with Osborne and Groß's [4] claim that Dependency Syntax is more compatible with Construction Grammar's theoretical

assumptions and practical goals, compared to Phrase Structure (or Constituency) Syntax.[3]

Osborne, Putnam and Groß ([5], p. 354) introduced the concept of "catena" to refer to "a word or a combination of words that is continuous with respect to dominance", and proposed to regard it as the fundamental unit of syntax. As argued by Osborne and Groß [4], most constructions discussed within the framework of Construction Grammar can be analyzed as catenae, i.e. as chains of words linked together by dependencies.

Given the high compatibility of Dependency Syntax with Construction Grammar, we adopt the UD framework [12] to perform the syntactic annotation of sentences in Virgil's corpus which included occurrences of *felix* and *infelix*. The annotation served as a basis for the identification of catenae and of the corresponding constructions.

3. Data and methods

3.1. Corpus and annotation task

Our corpus of Virgil's texts originates from the *Opera Latina* corpus [13] developed by the LASLA research centre in Liège.[4] The *Opera Latina* corpus is enhanced with sentence-splitting, tokenization, lemmatization, PoS-tagging and the annotation of morphological features according to a format developed by the LASLA team. The texts in the corpus were converted from the LASLA format into the CoNLL-U format, and into the UD formalism [14].[5] This textual resource is included among the linguistic resources for Latin that are made interoperable through their linking to the LiLa Knowledge Base.[6] The interlinking of the *Opera Latina* corpus in the LiLa Knowledge Base allowed us to build upon the existent annotation in order to add a further layer. Thanks to the LiLa Interactive Search Platform (LISP), one of the online services designed to query the Knowledge Base [15],[7] we were able to retrieve all occurrences of *felix* and *infelix* in Virgil's works: 90 tokens distributed across 89 sentences (see Table 1 in the Appendix).

The sentences were collected into a separate CoNLL-U file that was then enriched with syntactic annotation, manually performed according to UD guidelines.[8]

---

[2] A single expression may instantiate both less complex and phonologically specific constructions (e.g. morphemes, words) and more complex and schematic constructions (e.g. syntactic constructions, such as the transitive one), as long as they may all be analyzed as pairings of form and meaning ([9], p. 7).

[3] Constituency Syntax "views the links between the units of sentence structure as indirect" and "mediated by additional groupings that are present as additional nodes in the syntactic structures" ([11], p. 33), in contrast with construction-based approaches, where "no underlying syntactic nor semantic forms are posited" ([8], p. 7).

3.2. Syntactic analysis and extraction of catenae

In order to detect the main catenae involving *felix* and *infelix* (see Section 2.2), we exploited TüNDRA, a web application for querying treebanks that allows users to upload their own CoNLL-U files.[9]

Table 2 and Table 3 in the Appendix provide an overview of the tokens' distributions according to their dependency relation[10] (deprel) to their heads. Tokens sharing the same deprel were then systematically analyzed to identify recurrent catenae with varying degrees of extension and abstraction. The analysis took into account the relations between each token of *felix* or *infelix* and both the upper and the lower nodes of the trees, starting from the deprel of the token to its head.

In what follows, the identified catenae are conventionally represented using square brackets (as per [11], pp. 60–61), which indicate the degree of dependency between words:

$$\text{DEPREL}_1\ [\text{DEPREL}_2\ [\text{DEPREL}_3]]$$

According to this notation system, dependents are enclosed in more brackets than their head, thus 0 brackets for the root, 1 for its dependents, 2 for their own dependents, and so forth, as in the following example:[11]

(1) *Arma virumque cano* 'Arms and the man I sing' (*Aen.* I, 1)

$$[\text{OBJ}_{arma}\ [\text{CONJ}_{virum}\ [\text{CC}_{que}]]]\ \text{ROOT}_{cano}$$

3.3. Semantic analysis and identification of constructions

The instances of the recurrent catenae were then analyzed with respect to their semantic structure. Due to the lack of a resource specifically developed for Latin, the semantic analysis was based on FrameNet,[12] a lexical database of English grounded on Frame Semantics. Within this resource, each frame (e.g. APPLY_HEAT) describes a type of event, relationship or entity, along with the participants involved in it, referred to as "frame elements" (e.g. COOK, HEATING_INSTRUMENT, and FOOD), while the words that evoke a given frame are called "lexical units" (e.g. *cook*, *grill*, and *roast*). For the semantic analysis, an expert manually assigned Latin lemmas to the same frames as their corresponding English translations.

For each instance of a recurrent catena in the corpus, we identified the semantic frames evoked by the tokens that occur with the same deprel within the catena. In what follows, the correspondences between the syntactic and semantic levels of analysis are illustrated by enhancing the notation of the catenae (as per [6], p. 132 and passim) in order to represent them as constructions, i.e. as form-meaning pairings, where frames are represented by superscripts preceding the lexical units that evoke them:

$$^{\text{FRAME.A}}\text{DEPREL}_1\ [^{\text{FRAME.B}}\text{DEPREL}_2\ [^{\text{FRAME.C}}\text{DEPREL}_3]]$$

For instance, the semantic analysis of (1) would be:

$$[^{\text{WEAPON}}\text{OBJ}_{arma}\ [^{\text{PEOPLE}}\text{CONJ}_{virum}\ [\text{CC}_{que}]]]$$
$$^{\text{COMMUNICATION\_MANNER}}\text{ROOT}_{cano}$$

4. Results

4.1. Different constructions, different uses

The most recurrent constructions in which *felix* and *infelix* occur allow for the identification of different usages of these two terms in Virgilian poetics. As shown in Table 4 in the Appendix, both *felix* and *infelix* often occur as adjectival modifiers (amod) of a noun, but significant differences exist in their respective uses.

Felix is attested only once as amod of a subject (nsubj).[13] In 5 out of 17 attestations as amod,[14] *felix* rather occurs as amod of an oblique nominal (obl), i.e. of a non-core argument or adjunct of the verb, in a construction that may denote various entities (winds, tree branches, marriage, death, auspices) and thus evoke various semantic frames:

$$[^{\text{WHEATER | PLANTS | FORMING\_RELATIONSHIPS | DEATH |}}_{\text{EXPECTATION}}\text{OBL}\ [\text{AMOD}_{felix}]]$$

In contrast, *infelix* predominantly occurs as amod of a nsubj, i.e. in 22 out of 40 instances. In 12 occurrences the nsubj refers to human characters,[15] but it may also denote other entities.[16] This use can be represented by the construction:

[PEOPLE | PLANTS | ARTIFACT | ENTITY | ANIMALS | POLITICAL_LOCALES NSUBJ [AMOD $_{infelix}$]]

All in all, *infelix* is significantly more frequent than *felix* in our corpus (see Table 1). The distribution of the lemmas in terms of their most frequent dependency relations shows that *felix* tends to modify adjuncts, while *infelix* tends to modify subjects (see Table 4).[17] *Infelix* even occurs with the nsubj deprel in 5 occurrences,[18] whereas *felix* never does so.

In what follows we provide two case studies of particularly interesting constructions in which *felix* and *infelix* occur.

4.2. Case study 1: vocative

When *infelix* and *felix* occur as amod of a vocative noun or as vocative themselves, they instantiate constructions with different functions, which point to different meanings for the two terms.

As for *infelix*, 4 occurrences attest the following catena:

[X$_{verb}$[19] [VOCATIVE$_{infelix}$ |[20] VOCATIVE [AMOD$_{infelix}$]] [OBJ] [NSUBJ | OBL [DET]]]

(2) *a, virgo infelix, quae te dementia cepit!*. 'Ah, **unhappy girl, what a madness has gripped you!**' (*Ecl.* VI, 47)

(3) *quid loquor? aut ubi sum? quae mentem insania mutat? / infelix Dido, nunc te facta impia tangunt?*. 'What say I? Where am I? **What madness turns my brain? Unhappy Dido,** do only now your sinful deeds come home to you?' (*Aen.* IV, 595-596)

(4) *"infelix, quae tanta animum dementia cepit? / non vires alias conversaque numina sentis? / cede deo".* '**Unhappy man! How could such frenzy seize your mind?** Do you not see the strength is another's and the gods are changed? Yield to heaven!' (*Aen.* V, 465-467)

(5) *ut stetit et frustra absentem respexit amicum:/ "Euryale infelix, qua te regione reliqui?".* 'when he halted and looked back in vain for his lost friend. "**Unhappy Euryalus, where have I left you?**" ' (*Aen.* IX, 389-390)

All these passages feature a rhetorical interrogative that conveys emotional turmoil (due either to despair or frenzy) experienced by the character addressed with the vocative. In (2), (3), and (4), the verb evokes the frames MANIPULATION or CAUSE_CHANGE, which describe the effect of madness on the state of mind of the vocative's referent. The corresponding construction may be represented as follows:

[MANIPULATION | CAUSE_CHANGE X$_{verb}$ [VOCATIVE$_{infelix}$ | VOCATIVE [AMOD$_{infelix}$]] [PEOPLE | FEELING OBJ] [MENTAL_PROPERTY NSUBJ[DET]]]

As for *felix*, it occurs as amod of a vocative in two passages:

(6) *dicite, felices animae, tuque, optime vates,/ quae regio Anchisen, quis habet locus? illius ergo/ venimus et magnos Erebi tranavimus amnis.* '**Say, happy souls,** and you, **best of bards**, what land, what place holds Anchises? For his sake are we come, and have sailed across the great rivers of Erebus.' (*Aen.* VI, 669-671)

(7) *ite meae, felix quondam pecus, ite capellae.* '**Away, my goats! Away,** once **happy flock**!' (*Ecl.* I, 74)

Both passages attest a verb (*dicite* and *ite*, evoking the frames STATEMENT and MOTION, respectively) in the 2pl of the imperative present. The command is first addressed to a larger group (PEOPLE and AGGREGATE), evoked by a vocative (*animae* and *pecus*) and described as *felix*. Then, it is addressed to a specific entity within that group (PEOPLE_BY_VOCATION and ANIMALS), also evoked by a vocative (*vates* and *capellae*):

[STATEMENT | MOTION X$_{verb.2pl.imp.}$[21] [PEOPLE | AGGREGATE VOCATIVE [AMOD$_{felix}$] [PEOPLE_BY_VOCATION CONJ$_{vocative}$] | [MOTION CONJ$_{verb.2pl.imp.}$ [ANIMALS VOCATIVE]]]]

This construction is in turn a subtype of a more general construction that also underlies the only instance of *felix* as vocative (8), whose head is a MOTION verb (*vade*) in the 2sg imperative:

---

[17] With regard to the sentence depth, *infelix* tends to modify subjects with a sentence depth equal to one (ROOT [NSUBJ [AMOD $_{infelix}$]]) in 15 out of 22 tokens), whereas *felix* tends to occur at lower levels of the syntactic tree.

[18] *Ecl.* VI, 74-81; *Aen.* VII, 373-377; *Aen.* IX, 477-481;*Aen.* X, 424-425; *Aen.* X, 781-782.

[19] In what follows, we use X to notate an element of the catena that may have any deprel, e.g. *cepit* has the root deprel in (2), *mutat* has conj in (3), whereas *cepit* and *reliqui* have ccomp:reported in (4) and (5), respectively.

[20] The pipe symbol within the notation is used to represent the two possible alternatives: *infelix* occurs either as an adjectival modifier of a vocative noun or as vocative itself.

[21] The verb *dicite* has the ccomp:reported deprel in (6)(7) and *ite* has root in (7).

$$[^{\text{STATEMENT | MOTION}}\text{X}_{\text{verb.2sg/pl.imp.}} [\text{VOCATIVE} [\text{AMOD}_{felix}] \mid \text{VOCATIVE}_{felix}]]$$

(8) *'vade,' ait, 'o felix nati pietate'.* '**Go forth**,' he cries, '**blest** in your son's love' (*Aen.* III, 480)

As shown by these examples, different constructions are instantiated by *felix* and *infelix* when they occur as attributes of a `vocative` or as `vocative` themselves. Each construction has a specific function:

- the construction with *infelix* is employed to address the vocative's referent in a rhetorical interrogative that emphasizes the pathos of the discourse;
- the construction with *felix* is employed to qualify the addressee of a command expressed in the imperative present.

4.3. Case study 2: *infelix Dido*

Infelix is used as epithet of Dido, queen of Carthage, in 8 occurrences within the *Aeneid*.[22] In two of these, it instantiates the same complex catena:

$$\text{ROOT}_{\text{verb.3sg.pres.}} [\text{NSUBJ}_{Phoenissa \mid Dido} [\text{AMOD}_{infelix}] [\text{ACL} [\text{OBL} \mid \text{OBL:AGENT}]]] [\text{CONJ}_{\text{verb.3sg.pres.}}]$$

(9) *praecipue **infelix pesti deuota** futurae/ expleri mentem **nequit ardescit**que tuendo **Phoenissa*** "Above all, **the unhappy Phoenician, doomed to** impending **ruin, cannot** satiate her soul, but **takes fire** as she gazes" (*Aen.* I, 712-714)

(10) *Tum vero **infelix fatis exterrita Dido**/ mortem **orat**; **taedet** caeli convexa tueri* "Then, indeed, **awed by her doom**, **luckless Dido prays** for death; **she is weary** of gazing on the arch of heaven." (*Aen.* IV, 450-451)

These two examples also attest common semantic features: they introduce the character of Dido, conveying the idea of her predestination to a fate of death and destruction. The passages correspond to critical points in the plot: in (9) Dido falls in love with Aeneas, whereas (10) describes her death. The corresponding construction may be represented as follows:

$$\text{ROOT} [\text{NSUBJ}_{Phoenissa \mid Dido} [\text{AMOD}_{infelix}] [^{\text{DESTINY | FEAR}}\text{ACL} [^{\text{DESTROYING}}\text{OBL} \mid ^{\text{DESTINY}}\text{OBL:AGENT}]]] [^{\text{EMOTION\_HEAT | EXPERIENCER\_FOCUSED\_EMOTION}}\text{CONJ}]$$

In both (9) and (10), Dido is the subject, modified not only by the attribute *infelix*, but also by a perfect participle (`acl`) that emphasizes her impending doom. More precisely, in (9), *devota* 'doomed' evokes the frame DESTINY, specified by the oblique nominal (`obl`) *pesti* 'to ruin'; in (10) *exterrita* 'awed' evokes the frame FEAR, whereas DESTINY is evoked by the agent (`obl:agent`) *fatis* 'by her doom' causing the terror.

Moreover, the coordinated verb (`conj`) in both instances relates to Dido's emotional state, which is different in the two examples: in (9) *ardescit* 'takes fire' marks the beginning of Dido's love for Aeneas, whereas in (10) *taedet* 'is weary' evokes her attitude towards life.

The initial and the final moments of Dido's story are thus expressed by means of the same catena, evoking her impending ruin. This construction seems to encapsulate the whole thematic arc of Dido's role in the *Aeneid*, which is framed both at its inception and at its conclusion by a linguistic structure that highlights the inevitability of her fate.

5. Conclusion and future work

With the present study, we show the potential of a constructionist and computer-based approach in the analysis of a poetic corpus in Latin. By integrating syntactic information based on UD with semantic annotation grounded on FrameNet, we were able to identify recurrent constructions involving two key lemmas of Virgilian poetics, *felix* and *infelix*. This enabled us to uncover differences and parallels in the uses of these two terms within Virgil's language.

The present work is a pilot study which may pave the way for future research. Our approach is language-independent, and may thus be applied to different corpora across various languages and historical periods, for instance to explore similarities in the poetics of various authors within different traditions. Our investigation relied on manual annotation for both the syntactic and semantic analyses due to the lack or poor performance of automatic annotation systems for Latin poetry at the time of writing. The feasibility and effectiveness of such systems can vary significantly across different languages, depending on the resources available. Future improvements in automatic annotation for Latin may allow us to scale up this approach to perform analyses of even larger corpora.

Virgil's poems played a crucial role in shaping later poetic traditions for centuries: an interesting application of our integrated approach may thus be to investigate whether the same constructions attested in Virgil's poems also occur in the works of later poets who are

---

[22] *Aen.* I, 712; *Aen.* I, 749; *Aen.* IV, 68; *Aen.* IV, 450; *Aen.* IV, 529; *Aen.* IV, 596; *Aen.* V, 3; *Aen.* VI, 456.

known to have been influenced by him, both in Latin (e.g. Valerius Flaccus's *Argonautica*, Silius Italicus's *Punica*, Publius Papinius Statius's *Thebaid*), as well as in other languages, such as Italian (e.g. Dante Alighieri's *Commedia*).

References

[1] Bellincioni, Maria. 1985. felix/infelix. In: Enciclopedia Virgiliana 2. 486-488. Roma: Istituto dell'Enciclopedia Italiana, Treccani.

[2] Gagliardi, Paola. 2017. *Beatus, felix, fortunatus: il lessico virgiliano della felicità*. Roma: Carocci.

[3] *Oxford Latin Dictionary*. 1968. Oxford, Oxford University Press.

[4] Osborne, Timothy and Groß, Thomas. 2012. Constructions are catenae: Construction Grammar meets Dependency Grammar. Cognitive Linguistics 23(1). 165-216.

[5] Osborne, Timothy, Putnam Michael, Groß Thomas. 2012. Catenae: Introducing a Novel Unit of Syntactic Analysis. Syntax 15 (4). 354-396.

[6] Ginevra, Riccardo, and Francesco Mambrini. "The Old Norse FrameNet (ONoFN): Developing a New Digital Resource for the Study of Semantics and Syntax within a Medieval Germanic Tradition". Filologia Germanica – Germanic Philology 14 (2022), 119-140.

[7] Brigada Villa, Luca, Erica Biagetti, Riccardo Ginevra, and Chiara Zanchi. 2023. Combining WordNets with Treebanks to study idiomatic language: A pilot study on Rigvedic formulas through the lenses of the Sanskrit WordNet and the Vedic Treebank. In Proceedings of the 12th Global WordNet Conference. Edited by German Rigau, Francis Bond and Alexandre Rademaker. Donostia-San Sebastian: Global Wordnet Association, pp. 133–39.

[8] Goldberg, Adele E. 2006. *Constructions at work: The nature of generalization in language*. Oxford: Oxford University Press.

[9] Goldberg, Adele E. 1995. *Constructions: A Construction Grammar Approach to Argument Structure*. Chicago: University of Chicago Press.

[10] Fillmore, Charles J. 1982. Frame Semantics. In: The Linguistic Society of Korea (edd.), *Linguistics in the morning calm*, 111-137. Seoul: Hanshin Publishing Co.

[11] Osborne, Timothy. 2019. *A Dependency Grammar of English. An Introduction and Beyond*. Amsterdam: John Benjamins.

[12] De Marneffe, Marie-Catherine, Christopher D. Manning, Joakim Nivre, and Daniel Zeman. 2021. Universal Dependencies. Computational Linguistics 47: 255–308.

[13] Denooz, Joseph. 2004. "Opera Latina: Une Base de Données Sur Internet." *Euphrosyne* 32: 79–88.

[14] Margherita Fantoli, Marco Passarotti, Francesco Mambrini, Giovanni Moretti, and Paolo Ruffolo. 2022. Linking the LASLA Corpus in the LiLa Knowledge Base of Interoperable Linguistic Resources for Latin. In *Proceedings of the 8th Workshop on Linked Data in Linguistics within the 13th Language Resources and Evaluation Conference*, pages 26–34, Marseille, France. European Language Resources Association.

[15] Marco Passarotti, Francesco Mambrini, and Giovanni Moretti. 2024. The Services of the LiLa Knowledge Base of Interoperable Linguistic Resources for Latin. In *Proceedings of the 9th Workshop on Linked Data in Linguistics @ LREC-COLING 2024*, pages 75–83, Torino, Italia. ELRA and ICCL.

[16] H. Rushton Fairclough. 1916. *Virgil*. (2 vols.). Cambridge (MA), Harvard University Press.

6. Appendices

Table 1 provides an overview of the tokens' distribution of *felix* and *infelix* across Virgil's works:

Table 1
Occurrences of *felix* and *infelix* in Virgil's works

	Eclogues	Georgics	Aeneid	Total	Relative Frequency
Felix	2	8	21	31	0,00035
Infelix	5	6	48	59	0,00067
Total	7	14	69	90	0,00104

Table 2 and Table 3 provide an overview of the tokens' distributions according to their (deprel) to their heads ("query:edge" in the table) listed in decreasing order:

Table 2
The deprels of *felix*

query:pos	query:edge	query:lemma	occurrences
ADJ	amod	felix	17
ADJ	conj	felix	4
ADJ	root	felix	3
ADJ	advcl:pred	felix	2
ADJ	acl:relcl	felix	1
ADJ	xcomp	felix	1
ADJ	ccomp:reported	felix	1
ADJ	vocative	felix	1
ADJ	parataxis	felix	1

Table 3

The deprels of *infelix*

query:pos	query:edge	query:lemma	occurrences
ADJ	amod	infelix	40
ADJ	advcl:pred	infelix	7
ADJ	nsubj	infelix	4
ADJ	root	infelix	3
ADJ	vocative	infelix	3
ADJ	parataxis	infelix	1
ADJ	nsubj:pass	infelix	1

Table 4 provides an overview of the most frequent *catenae* for *felix* and *infelix*:

Table 4

Felix and *infelix*'s most frequent catenae

	Total	AMOD			NSUBJ
		[NSUBJ [AMOD]]	[OBL [AMOD]]	OTHER	
Felix	31	1	5	11	/
Infelix	59	22	1	17	5