The functional structure of the clause: universals and variation

1 How do we study language variation?

In this chapter, I address the question of language variation in the domain of tense, aspect and mood (TAM). Any description of such variation as well as its analysis and the theoretical musings based upon it has to be couched within a general understanding of what it means for languages to vary. How do we detect language variation? How do we go about comparing languages to each other? And how do we go about inferring language universals?

It is a common strategy to determine the *common denominator* of a given category (such as particular instantiations of tense, aspect, or mood) across unrelated languages and conclude that this common denominator is a language universal and hence part of universal grammar (UG). The remaining task is then to identify the sources and limits of variation associated with this category in a descriptively and explanatory adequate way (see Arregui et al., for a recent cross-linguistic analysis of imperfectives along these lines).

In pursuing this strategy, care has to be taken to properly identify the targets of comparison. How do we know that two language-specific categories are indeed two instances of some hypothesized universal category? What are the heuristics linguists use to identify the comparison set?

It is often assumed that the comparison set is defined via meaning. This is the strategy common across various frameworks including the functional typological literature (Haspelmath 2007 the formal semantics literature (von Fintel & Matthewson 2008), as well as some formal typologies, such as for example *cartography* (Cinque 1999 and subsequent work).

For example, according to Haspelmath (2007: 119), "*comparison cannot be category-based, but must be substance-based, because substance (unlike categories) is universal*". As discussed in detail in Wiltschko (in press), substance-based comparison inevitably results in the appearance of vast variation in formal properties. That is, variation is found in the inventories of categories across languages, but also in the morphological, syntactic, semantic, and pragmatic properties associated with a particular meaning. Consequently, many typologists deny the existence of absolute universals; instead they postulate the existence of prototypical categories with "fuzzy boundaries" (Comrie 1989, Croft 2003) or they deny the existence of universal categories altogether (Evans & Levinson 2009).

But denying the existence of language universals leaves us without a means to comparing languages to each other in the first place. That is, languages cannot be compared directly to each other but instead must be compared to a third element – a *tertium comparationis* in the sense of Humboldt – a universal grammar of sorts.

Even linguists who deny the existence of UG are using some such basis, at least in the form of glossing conventions. That is, to present data to the linguistic community they need to be glossed. The standard guidelines for glossing conventions (the Leipzig glossing rules[1]) contain a set of glosses that are meant to encompass ALL of the morphemes we may find in all human languages. Thus, every linguist, no matter of what conviction, compares languages to each other, either explicitly or implicitly.[2]

Within the generative enterprise, language comparison is ultimately a means to an end, namely to find language universals und to identify the range and limits of variation. In what follows I adopt this research agenda in the domain of TAM. The chapter is structured as follows. I start by giving a brief overview of some core assumptions regarding the syntax of TAM categories within the generative tradition (section 2). I then compare the typological space as delineated across generative approaches towards variation (section 3). These frameworks are then applied towards a brief case study of TAM categories in German, comparing Standard German and an Austrian German dialect (section 4). I then show how comparison may proceed across the three frameworks (section 5). We shall see that meaning-based approaches (including formal semantics and cartography) have to be supplemented with a typology that is based on the way form relates to meaning. Section 6 concludes.

2   The History of clausal functional structure

The status quo of research on universals and variation in the domain of TAM is best understood against the backdrop of the history of assumptions regarding their syntactic instantiations. These play a crucial role, not only in the syntactic literature but also in semantic approaches towards TAM categories. Most of the discussion here will evolve around tense, as it is the category with the longest and richest tradition among the TAM categories within the generative tradition.

Syntactic analyses of clause-structure frequently assume a functional category TENSE (T) which hosts morpho-syntactic tense marking.

(1)   THE FUNCTIONAL CATEGORY TENSE

[1] They are available at http://www.eva.mpg.de/lingua/resources/glossing-rules.php).
[2] Given that this is a paper about parametric variation, a notion tied to frameworks
[2] Given that this is a paper about parametric variation, a notion tied to frameworks that endorse the notion of a universal grammar, I will henceforth refrain from further discussing those approaches towards language that deny the usefulness of this endeavour simply noting that they too require some concept of universal meta-categories, if only for the sake of glossing.

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        TP
       /  \
    Subj    T
           /  \
          T    VP
       [present]  /\
       [past]    /__\
```
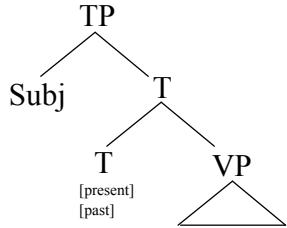
The initial rationale for postulating such a category was the fact that the semantic content of the morphology hosted by this syntactic head is temporal. This follows a more general strategy according to which functional categories are projected from the morpho-syntactic contrasts a language makes use of.

The crucial step that initiated this strategy was taken in Pollock's 1989 seminal paper in which the functional category TENSE was first introduced. In particular, the pre-Pollockian clause-structure featured a functional category labelled as INFL (2), which was assumed to host verbal inflection, including tense and agreement features. What Pollock 1989 found was that word order facts require the postulation of more than one functional category. Thus the split of INFL was motivated by both syntactic and morphological considerations.

(2)   THE FUNCTIONAL CATEGORY INFL

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              IP
            /    \
          NP      I'
          |      /  \
        subject  I    VP
               |     /  \
            [tense]  V'
          [agreement] / \
                     V    NP
                        object
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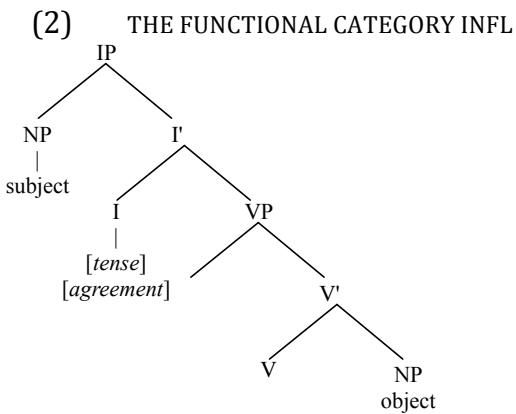
In turn, the rationale for the postulation of the functional category INFL was grounded in general assumptions about phrase-structure. In particular, the pre-dominant theory of phrase-structure at the time when INFL (and TENSE) were introduced as functional heads was X'-theory (Jackendoff 1977). According to X'-theory, all phrases are endocentric. This means that their external syntax is uniquely determined by a single element inside: the *head*. While endocentricity was observed by phrases based on all major categories (NP, VP, AP, and PP) it was not observed by the projection of the sentence itself. As witnessed in the structure in (3), there is no node inside S that would correspond to S in its categorial identity. And conversely,

there is no projection that would correspond to Aux. Thus, S remains without a head, while Aux remains without a corresponding phrase.

(3)   S violates endocentricity

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              S
           ╱  │  ╲
         NP  Aux  VP
                 ╱╲
                ╱  ╲
               ╱____╲
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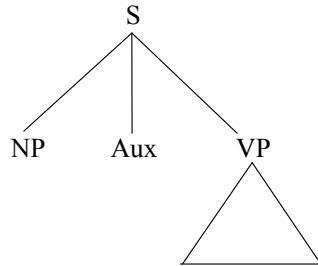
If endocentricity is taken to be a general property of all phrases, then it is predicted that there be a unique and obligatory category that makes a sentence a sentence – since after all a sentence is just a special kind of phrase. And this is precisely the profile associated with inflection in English. All matrix declarative clauses must have one and only one inflected verb. Obligatoriness of the inflectional category is observed based on the fact that a sentence without tense inflection cannot be interpreted as a matrix declarative (4)a and (5)a. Instead, tenseless clauses can only be interpreted if they are embedded and thus dependent (4)b and (5)b.

(4)   a. *Yoshi catch the ball.
        b.   He saw **[**Yoshi catch the ball**]**.

(5)   a. *Yoshi to catch the ball.
        b.   I want **[**Yoshi to catch the ball**]**.

Uniqueness of the inflectional category is observed based on the fact that even if a sentence has two verbs (an auxiliary and a main verb) and thus potentially two hosts for inflection, only one of them – the auxiliary - bears inflection. For example, both present perfect (6)a as well as present progressive (7)a are constructed with an auxiliary verb *have* and *be*, respectively. Crucially, in both cases, only the auxiliary is inflected whereas the main verb is non-finite. It can neither be marked as present (6)b and (7)b nor as past (6)c and (7)c.

(6)   a.   Yoshi has eaten his food
        b. *Yoshi has eats his food.
        c. *Yoshi has ate his food.

(7)   a.   Yoshi is eating his food.
        b. *Yoshi is eats his food.
        c. *Yoshi is ate his food.

Thus, the original motivation for the postulation of the functional category TENSE was twofold: i) to host the morphological realization of tense inflection (as well as

agreement) and ii) to serve as the head of the clause in accord with X'-theory. However, since TENSE has been introduced it has been associated with syntactic and semantic functions that go beyond these two original functions.

One of the syntactic correlates of the presence of TENSE is the association with nominative case assignment, i.e., the licensing of the grammatical subject role. That is, one of the key assumptions of X'-theory is the claim that each head-complement pair introduces another phrasal position (the *specifier).* Hence, it comes as no surprise that TENSE, too, associates with a phrase. In particular, tense marking in TENSE is commonly assumed to be responsible for nominative case-assignment (Rouveret & Vergnaud 1980): it hosts in its specifier position the phrase, which bears the grammatical subject role.

(8)　　The TENSE-NOMINATIVE connection
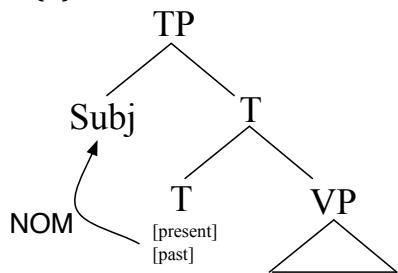
On the semantic side, TENSE has also taken on an important function: it serves to establish a relation between the event time and the utterance time. This assumption is rooted in Reichenbach 1947's insight that temporal interpretation relies on three distinct times as in (9).[3]

(9)　　**Utterance time** (UT): the time at which the sentence is uttered
　　　　Reference time (RT): the time about which a claim is made
　　　　Event time (ET): the time at which the relevant event takes place

While tense establishes a relation between the reference time and the utterance time, (viewpoint) aspect establishes a relation between the event time and the reference time. Thus, the relation between the event time and the utterance time is mediated by the reference time associated with aspect.

Note that there is no necessary connection between the postulation of the functional category TENSE, which was introduced for syntactic reasons as outlined above and the Reichenbachian framework for the interpretation of tense, which concerns itself with the semantics of tense. However, according to many scholars there is a direct mapping between the syntax and semantics of tense. In particular, TENSE is commonly viewed as the host for morphemes that locate the reference time relative to the utterance time (Zagona 1990, 1995; Demirdache & Uribe-Etxbarria 1997, Kratzer 1998, Matthewson 2006, inter alia). As such, TENSE is sometimes

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[3] The reference time is also known as *topic time* (Klein 1994) or *assertion time* (Klein 1995) while the event time is also known as *situation time*.

viewed as an *anchoring category* (Enç 1987): it serves to anchor the event to the utterance.

In sum, there are three correlates of the functional category TENSE.

(10)   Correlates of TENSE
       i) TENSE hosts tense morphology
       ii) TENSE licenses grammatical subjects
       iii) TENSE contributes to the temporal interpretation of the clause in a Reichenbachian way

It is a common assumption in the relevant literature that TENSE is part of UG (e.g., Matthewson 2006). This is partly based on the assumption shared by many researchers that at least one of the properties in i-iii) is universal. Though researchers differ according to how many and which one of these correlates they take to be universal. While all three properties are found in the English instantiation of TENSE, not all of them are universally attested. That is, in some languages, there is no correlation between the presence of tense morphology and the licensing of grammatical subjects. For example, in Romanian grammatical subjects are licensed even in the absence of overt tense morphology, as in (11). [4]

(11)   a.   Ion   vrea   ca   Dan   ša   resolve   problema.
            Ion   wants   that   Dan   PRT   solve   the.problem
            'Ion wants Dan to solve the problem.'
                                                                (Farkas 1985: ex. 2)

This suggests that there is no universal correlation between tense morphology and the licensing of grammatical subjects. Similarly, many languages do not seem to have tense morphology, at least not overtly. For example, in Blackfoot there is no overt marking that would distinguish between sentences that refer to past events and those that refer to ongoing events. This is shown in (12).

(12)   Tenseless language
       Oma   píítaawa   áípaawaniwa.
       om-wa   píítaa-wa   a-ipaawani-wa
       DEM-PROX   eagle-PROX IMPF-fly.AI-PROX
       'That eagle is/was flying up.'
                                         (adapted from Reis Silva & Matthewson 2007: (8))

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[4] According to Varlokosta 1994, in Greek, nominative case is licensed in the presence of semantic tense; without a requirement for morphosyntactic tense. This may be explained on the assumption that the presence of the syntactic head TENSE is conditioned by the presence of semantic tense rather than morphological tense (see Martin 1996 for this view).

Languages such as Blackfoot are sometimes referred to as tenseless languages or *superficially tenseless languages* (Matthewson 2006). The list of such languages is pervasive and includes: Mohawk (Baker and Travis 1997), Chinese (Lee 1999, Lin 2002, 2002, 2006, 2010; Smith and Erbaugh 2005), Inuktitut (Shaer 2003, Bittner 2005), Navajo (Smith 1991), Halkomelem (Wiltschko 2003), St'at'imcets (Matthewson 2006). For a recent overview of tenselessness see Lin 2012.

In the absence of (overt) tense morphology, there can by definition not be a correlation between tense morphology and other properties, such as the licensing of grammatical subjects. It is however still possible that there be zero morphemes responsible for the temporal interpretation (see section 3).

Given that the correlates of TENSE listed in (10) are not universally attested, it follows that they cannot be universal properties of TENSE. It is for this reason that the syntactic category TENSE that is responsible for these correlates must be viewed as a construct: it may be constructed in a way that brings about the correlates in (10) but it may also be constructed in other ways.[5] Assuming that the functional category TENSE is a construct makes three predictions, as outlined in (13).

(13)   What the deconstruction of TENSE predicts
   i) the expression of temporal relations can be constructed in different ways
   ii) TENSE can be constructed in different ways, with different language-specific correlates
   iii) the same ingredients used to construct TENSE can be used to construct other categories as well

In the course of this chapter, we will see that each of these predictions is indeed borne out.

Let us now turn our attention to the history of ASPECT. Splitting the head of the clause into two functional categories paved the way for the exploration of the functional structure that makes up the clause. (In a similar fashion the functional architecture of nominal constituents has been explored and several functional categories are assumed in this domain as well; see Cinque 2002). For example, a functional category ASPECT has been introduced below TENSE (Travis 2010, inter alia). Like TENSE it is assumed to fulfill several morpho-syntactic and semantic functions. It hosts in its head position aspectual morphology (such as perfective and imperfective). Associated with the head of ASPECT is a phrasal position, which is sometimes assumed to license grammatical objects (by virtue of assigning accusative case (see Borer 1994, 2005, Megerdoomian 2000)). The empirical generalization that supports this view is the fact that in many languages, case-assignment to object correlates with aspectual morphology.

(14)   The ASPECT-ACCUSATIVE connection

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[5] See Wiltschko 2014 for the view that this is true of all language specific categories.

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                    AspP
                   /    \
               Obj       Asp
                ↑       /    \
          ACC (       Asp     VP
                     [perf]   /\
                             /__\
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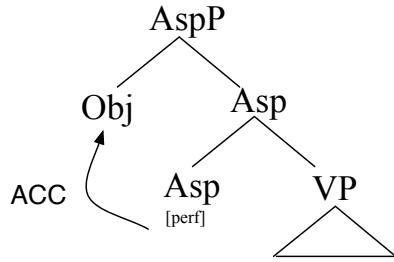
For example, in Finnish predicates in the perfective aspect assign accusative case to the internal argument, whereas predicates in the imperfective aspect assign dative case. This is shown in (15). (Note that, just like with TENSE there need not be an overt morphological exponent of ASPECT).

(15) a. *hän luki kirjan.*
          he   read book-ACC
          'He read the book.'
      b. *hän luki kirjaa.*
          he   read book-DAT
          'He was reading the book.'

<div align="right">Comrie 1976: 8</div>

In terms of its semantics, ASPECT is similar to TENSE in that it is amenable to a Reichenbachian analysis such that it may be viewed as relating the event time to the reference time (Demirdache & Uribe-Etxebarria 1997, among others).

In sum, there are three correlates of the functional category ASPECT.

(16) Correlates of ASPECT
      i) ASPECT hosts aspectual morphology
      ii) ASPECT licenses grammatical objects
      iii)ASPECT contributes to the aspectual interpretation of the clause in a Reichenbachian way

As for mood, significantly less research has been dedicated to this category within the generative tradition. Though there are attempts to treat the expression of mood in a similar fashion as TENSE and ASPECT (e.g., Mezhevich 2008). In particular, in many languages, mood is associated with a dedicated verbal (inflectional) paradigm (see the German subjunctive inflection discussed in section 4). For example, a contrast between indicative and subjunctive mood is common in Romance and Balkan languages (Landau 2004, Quer 2006; 2009) while a contrast between realis and irrealis is common in the languages of the Americas Palmer 2001). Again, following the logic that lead to the postulation of TENSE, the existence of verbal inflection expressing contrasts in mood, lead to the postulation of the functional category MOOD (for a recent discussion on MOODP see Amritavalli 2014). Unlike TENSE and ASPECT, MOOD does not appear to be licensing a grammatical role in its specifier position. This is however not too surprising, given the fact that MOOD is sometimes

assumed to be above the domain where case is licensed, namely in the domain known as the A'-domain (cf. Cinque 1999).

In terms of its semantics, Mezhevich 2008 shows that it is amenable to an analysis similar to that of TENSE and ASPECT. In particular, she suggests that MOOD serves to relate the utterance time to the evaluation time, i.e., the time relative to which the utterance is evaluated. In particular, she argues that MOOD compares the world of the utterance to the actual world by comparing two time lines. If the evaluation world is the same as the utterance world, the result is a realis interpretation; if the evaluation world is asserted to be different from the utterance time, the result is an irrealis interpretation. On this view then, there are two correlates of the functional category MOOD.

(17)   Correlates of MOOD
       i) MOOD hosts mood morphology
       ii) MOOD contributes to the interpretation of the clause by relating the proposition to the evaluation world

The fact that TENSE as well as other functional categories, at least in their language-specific instantiations, must be viewed as constructs leads to a methodological problem, however. If categories such as TENSE, ASPECT, and MOOD have different properties across languages, then we need to have a method of identifying them across languages. This is not a trivial question. If the correlates of a given functional category are language specific, then it follows that the criteria for determining categorial identities are language-specific as well. But then how do we determine whether language-specific categories can be analyzed as instantiating the same category, such as TENSE, or any other functional category for that matter? This question is approached in different ways across different frameworks. This is the topic of the next section.

3   Variation across frameworks

As we have seen above, the postulation of functional categories, such as TENSE, ASPECT, and MOOD may have morphological, syntactic, as well as semantic correlates. Though languages differ according to which of these correlates they display overt evidence for.

The question regarding what is universal and what varies relative to a given linguistic category will have to be approached in different ways depending on which of these correlates (if any) is taken to be at the core. It comes as no surprise that different frameworks pursue this question in different ways, in accordance with their major tenets. In what follows, I outline the goals, assumptions, and methods within three different frameworks: cross-linguistic formal semantics (3.1), cartography (3.2) and the universal spine hypothesis (3.3). For each of these frameworks, I briefly outline the core assumptions regarding the universality and variability of functional categories in general and relative to TAM categories more specifically. In Section 3.4 I conclude.

3.1 Cross-linguistic formal semantics

While the main focus of this chapter is the exploration of variation in the **syntax** of TAM categories it is nevertheless pertinent to discuss some aspects of its **semantics**. There are two main reasons for this. First, as we saw above, it is often assumed that there is a straightforward semantic correlate of the functional category TENSE. In particular, TENSE is assumed to play a crucial role in anchoring the event time to the utterance time. Second, the TAM categories belong to the set of morphemes that formal semanticists take to be the "semantic glue" which is critical in the composition of meaningful sentences (von Fintel & Matthewson 2008). It thus appears that cross-linguistic formal semantics shares at least some aspects of its empirical domain with cross-linguistic syntax, namely the exploration of functional categories. From a semantic perspective, this exploration concerns itself with the question as to how natural languages express meanings. It is a widely assumed that the meanings of complex expressions arise compositionally from the meanings of their parts and the way these parts are combined (this is known as Frege's Principle of compositionality). Hence, it follows that cross-linguistic semantics will have to explore the range and limits of variation as it pertains to the parts (the smallest meaningful elements) as well as the combinatorial principles (the rules of composition).[6]

The question as to what may count as a semantic universal is a relatively recent question (see von Fintel & Matthewson 2008 for an overview). The search for such universals is grounded in some version of the principle of *effability* (Katz 1976) according to which every thought can be expressed in every natural language and that everything that can be expressed in one language can also be expressed in another. While this principle may not hold true in its strongest form (Keenan 1974), some version of it has to be assumed for cross-linguistic comparison of meaning to even be possible. Von Fintel & Matthewson (2008:144) suggest that "*what language X expresses simply is also expressible in language Y but at the price of some complexity*". For example, if a language lacks a simplex form to express a particular meaning, it is (usually) the case that the same meaning can be expressed by means of a more complex expression. Thus, in exploring cross-linguistic semantics the comparison set is strictly defined by meaning. It follows, that claims about semantic universals and variation are not to be equated with claims about structure. In von Fintel & Matthewson's 2008 own words:

"*...cross-linguistic uniformity of meaning* **cannot be found at any kind of structural leve**l *(logical form), since what corresponds to a quantificational determiner like most in one language might be a rather complex expression in another language. So, it's crucial that by "proposition" we mean not any kind of representation that reflects the syntactic structure of the expression used to convey the proposition; instead, we are*

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[6] Von Fintel & Matthewson 2008 suggest that a third way in which languages may differ in the way they construct meanings pertains to the mechanisms of pragmatic interpretation.

*assuming **a purely denotational view of proposition** as in possible worlds semantics."* [emphasis MEW] (vonFintel & Matthewson 2008: 145).

Applying this approach to the investigation of TAM, one has to proceed as follows. First, a meaning has to be identified to be the target of cross-linguistic comparison. I am not aware of a principled way to decide what counts as a meaning that should be explored cross-linguistically. In practice comparison is mostly guided in one of two ways: either by taking the meaning of a language-specific morpheme (e.g., past or present tense) or else by taking the meaning of a traditional grammatical category (such as imperfective, subjunctive, etc.) as the starting point. An example of the former approach is found in Matthewson's work on temporal systems of superficially tenseless languages. In particular, Matthewson 2006 proposes that the temporal system of St'at'imcets differs from its English counterpart in the form and meaning of the available tense morpheme. While in English there is an overt morphological contrast for present (Ø) and past (-*ed* and its allomorphs) St'at'imcets is analyzed as having a single zero morpheme (Ø) which is underspecified for present or past, but cannot be used for claims about the future. This is summarized in Table 1.

	English	St'at'imcets
Form	Ø :: –*ed* (and allomorphs)	Ø
Meaning	present :: past	non-future

Table 1: Tense marking in English vs. St'at'imcets

According to Matthewson (2006:706) this analysis *"fits in with a restrictive view of parameterization and cross-linguistic variation. We can maintain the claim that St'át'imcets parallels English **in the basic structures** involved in temporal interpretation. Differences between the two tense systems reduce to the lexical entries of specific tense morphemes."* [emphasis MEW]

As is clear from this quote, despite the general tenet of cross-linguistic semantics to compare meanings rather than structures, in practice, it is often assumed that when those compared meanings are similar, then they map onto the same structure. In the case at hand this boils down to mapping the same meaning onto the same functional projection (i.e., TENSE). Morphological differences of the type summarized in Table 1 are taken to be purely superficial. This is justified if the identity of a given functional category is defined by its meaning (but see section 3.3 for a different view). This points towards the need for a principled way that allows us to determine the mapping from meaning to the functional architecture, which in turn serves to model the relation between the form, meaning, and distribution of lexical items.

A second way in which a comprehensive formal typology needs to be supplemented is by means of a restrictive theory pertaining to lexical entries (cf. Boeckx 2012: 6): i) what counts as a possible lexical entry; ii) what are the sources and limits of variation in this domain; and iii) how do lexical entries relate to the functional architecture?

Given the assumption that the functional architecture that comprises the

clause is determined based on morphological, syntactic, and semantic properties, heuristics for the identification of variation and universality of functional categories will have to take into consideration all of these properties. Thus, in addition to variation in patterns of meanings, we also need to explore the range and limits of variation in the form-meaning mappings.

3.2   Cartography

One of the most influential formal typologies in the investigation of cross-linguistic syntax is the research agenda initiated by Guglielmo Cinque and colleagues known as *cartography* (Cinque 1999 and subsequent work; see Cinque & Rizzi 2010 for a recent state of the art overview). Its goal is very much grounded in the syntactic view of functional categories in that it seeks to explore the correlations that hold between meanings, their morpho-syntactic expressions as well as their structural positions. What is of relevance is the fact that functional categories are associated with a head position and a phrasal position (the specifier). The head position may host inflectional morphology, auxiliaries, and particles while the specifier position is assumed to host adverbial modifiers (as well as floating quantifiers). One of the core working assumptions within the cartographic research agenda is the assumption that each morpho-syntactic feature corresponds to its own head. This heuristic – to my knowledge the first generative heuristic for discovery since the abandonment of the discovery procedures (Chomsky 1957) - lead to a finer splitting of the functional structure dominating VP. Several heads associated with tense, mood, modal, aspectual, and voice distinctions were added. Thus, just for the TAM categories, Cinque 1999 postulates the following thirty positions:

(18)   Cinque's hierarchy of functional categories: the TAM categories
[[Mood$_{speech\text{-}act}$ [Mood$_{evaluative}$ [Mood$_{evidential}$ [Mod$_{epistemic}$ [T$_{past}$ [T$_{future}$ [Mod$_{irrealis}$ [Mod$_{necessity}$ [Mod$_{possibility}$ [Asp$_{habitual}$ [Asp$_{repetetive}$ [Asp$_{frequentative(I)}$ [Mod$_{volitional}$ [Asp$_{celerative(I)}$ [T$_{anterior}$ [Asp$_{terminative}$ [Asp$_{continuative}$ [Asp$_{perfect(?)}$ [Asp$_{retrospective}$ [Asp$_{proximative}$ [Asp$_{durative}$ [Asp$_{generic/progressive}$ [Asp$_{prospective}$ [Asp$_{sg.completive(I)}$ [Asp$_{pl.completive}$ [Voice [Asp$_{celerative(II)}$ [Asp$_{repetetive(II)}$ [Asp$_{frequentative(II)}$ [Asp$_{sg.completive(II)}$]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]
                                                                    Cinque 1999: 106

In its strongest form, cartography postulates the universality of all of these functional categories (their heads and specifiers) and their hierarchical organization. What varies are the types of movement languages admit, and whether they overtly realize this position (Rizzi 1997, Cinque 1999). Note that on this assumption the child during the acquisition process will not have to encounter overt evidence for the presence of a functional category: its presence is assumed to come for free (i.e., via UG). In this respect, cartography sides with Matthewson's 2006 view within the formal semantic approach reviewed above.
        According to a weaker position, language variation may also be a matter of selecting from the set of categories provided by UG (Wiltschko 2003) or bundling more than one feature into a single head (cf. Giorgi and Pianesi (1997), Bobaljik and

Thráinsson (1998)).

Like the pre-cartographic approach towards functional categories, cartography is a research agenda that emphasizes the correlation of several properties across different domains (morphological, semantic, and syntactic). But it also differs from previous approaches in the types of correlates that are predicted. For example, in the cartography of Cinque 1999 the functional category TENSE, is split into three different categories: TENSE$_{past}$, TENSE$_{future}$, and TENSE$_{anterior}$. Here, each instantiation of TENSE is associated with its own position. This contrasts with the earlier proposal according to which the values of a morphological contrast are (paradigmatically) associated with the same functional category. The empirical advantage of the latter view is that it automatically predicts the complementary distribution of such paradigmatic features. Complementarity is the hallmark of identity suggesting that both *present* and *past* are instances of the same category, namely TENSE. Different values of TENSE are not associated with the same hierarchical position according to the cartography in (18) hence they are not treated as syntactically identical. This gives rise to the question as to what it means for a particular category to bear the same label. Given that different values of TENSE differ in their syntactic distribution, there is no reason to treat them as the same syntactic category. So on this approach we don't expect there to be the same correlates of TENSE as in (10).

In (18) there is no unique category TENSE: instead each value of TENSE is associated with its own position. But if there is no unique category TENSE, and if instead this category is split into three subcategories, then it is not immediately clear which category, if any, is the one that correlates with the licensing of grammatical subjects. Thus, the typological space predicted by the cartographic enterprise is quite different from the earlier non-cartographic approach according to which there is a single TENSE position with morphological, syntactic, and semantic correlates. In particular, the cluster of properties predicted to correlate from the cartographic view is as follows:

(19)   Correlates of F according to cartography
  a.   the morpho-syntactic expression of F associates with F
  b.   the lexical V (or an auxiliary) may move to F
  c.   an adverbial modifier with a corresponding interpretation may be realized in the specifier of F

So if there are morphological, syntactic, or semantic correlates of the meta-category TENSE (including all of its values) then this would count as evidence against the view that that each of its features is associated with it own functional category.

If all functional categories are part of every language then something has to be said about their realization within individual sentences. In particular, not all values of TENSE can co-occur within a single clause. This means that there must be a distinction between those functional categories that are interpreted but not overtly realized (i.e., silent categories) and those that are neither interpreted nor overtly realized (for example in the context of terminative aspect, durative aspect cannot be realized). On the cartographic approach it is unclear how to model this distinction.

In sum, cartography is an approach towards language variation, which takes

into consideration not only the meanings but also the different morpho-syntactic architectures within which they can be assembled. It allows for a fine-grained mapping of morpho-syntactic structures associated with syntactic and semantic correlates. But it misses the paradigmatic character of certain features: it cannot model generalizations that hold across different occurrences of a TENSE feature for example.

What both approaches thus far discussed have in common is the fact that the comparison set is defined in terms of meaning. This is most explicit in the investigation of cross-linguistic semantics where the task is to explore the similarities and differences in patterns of meaning. However, cartography is also mostly meaning based. To see this, consider a simple question: when confronted with a newly studied language, how do we analyse the words and morphemes of this language? How do we determine how this particular language composes its functional architecture? The cartographic heuristic is meaning-based: the mapping of morphemes to the functional architecture depends on the meaning of that morpheme. For example, a past tense morpheme is mapped onto TENSE$_{past}$, a morpheme used to express continuative aspect is mapped onto Asp$_{continuative}$, a morpheme used to express irrealis mood, is mapped onto Mod$_{irrealis}$ and so forth.

While this meaning-based heuristic is simple and useful, it is not without problems. Consider for example the fact that in some languages past tense morphemes are not restricted to attach to verbal categories, and thus are not restricted to the clausal functional architecture. A case in point is Halkomelem Salish, where the same morpheme –*lh* can attach to auxiliaries, but also to nouns (Galloway 1993, Burton 1997).

(20)   The distribution of past tense morphemes in Halkomelem Salish
   a.   *í-lh*   *qw'eyílex tú-tl'ò.*
          AUX-PST dance   DET-PRN
          'He was dancing.'
   b.   *te-l*   *má:l-elh*
          DET-1SG.POSS father-**PST**
          'my late father'

Unless we assume a TENSE$_{past}$ in the nominal domain (Lecarme 1996), we cannot simply assume that the mapping of a morpheme to the functional architecture is uniquely determined by its meaning. Furthermore, the past marker of Halkomelem, even if attached to a verbal category as in (20), has a different distribution than for example its English counterpart. In particular, in Halkomelem past marking is optional and its absence does not trigger a present tense interpretation.

(21)   Past marking is not obligatory
   a.   *í-lh*   *qw'eyílex tú-tl'ò.*
          AUX-PST dance   DET-PRN
          'He was dancing.'
   b.   *í*   *qw'eyílex tú-tl'ò.*
   AUX dance   DET-PRN

'He is/was dancing.'

In this way, cartography allows us to define a typology that maps out the hierarchical organization of morpho-syntactic features, which are in turn defined by their meaning. But it does not capture the formal differences between morpho-syntactic features that have the same meaning. This is the task of a typology that has as its goal the exploration of how form, meaning, and distributional properties relate to each other. To develop a comprehensive formal typology of natural languages, both the cross-linguistic semantics as well as cartography have to be supplemented in this way. If we base typological investigations on meaning alone, we may come to the conclusion that categories are not in fact universal since forms that form a natural class based on their meaning do not necessarily form a natural class based on their formal and distributional properties. The Universal Spine Hypothesis (Wiltschko 2014) to which I turn next seeks to fill this gap.

3.3 The Universal Spine Hypothesis

The core goal of Wiltschko 2014 is to develop a formal typology for functional categories that does not define the comparison set for cross-linguistic investigation based on meaning. It does so by drawing on generative insights of the last few decades. There are two core departures from previous generative typologies, including the ones we have discussed here. First, adopting the work of Ritter & Wiltschko (2009, to appear), Wiltschko 2014 assumes that substantive content (like the temporal content that defines tense) is not an intrinsic part of functional categories. Instead language-specific categories are constructed on the basis of a core set of abstract universal categories (κ) and language-specific units that add form and meaning as illustrated in (22).

(22)   Constructing language specific categories
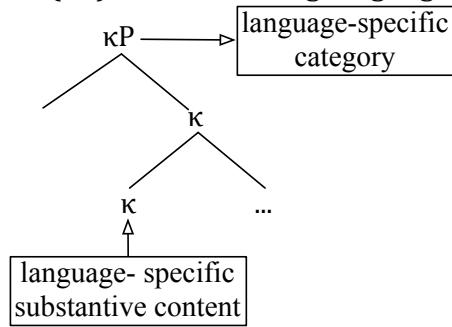
While the core universal categories are not defined based on meaning, their function is universally determined. The functional architecture assumed in Wiltschko is given in (23). It is comprised of four distinct domains, each associated with a particular

function, which is independent of the lexical category it will house.[7] This derives the well-known fact that there is a systematic parallelism between nominal and verbal functional architectures. The lowest domain is responsible for classification, such as Aktionsart for example (κ:*classification*). Next comes an area where a point of view can be introduced, such as viewpoint aspect (κ:*point-of-view*). The domain where TENSE is located is the anchoring domain (κ:*anchoring*) which serves to anchor the event to the utterance (via the point of view introduced below). Finally, the topmost layer in the spine is dedicated to linking the utterance to the larger discourse (κ:*linking*). This is the category traditionally labelled as C (for complementizer).

(23) The universal spine
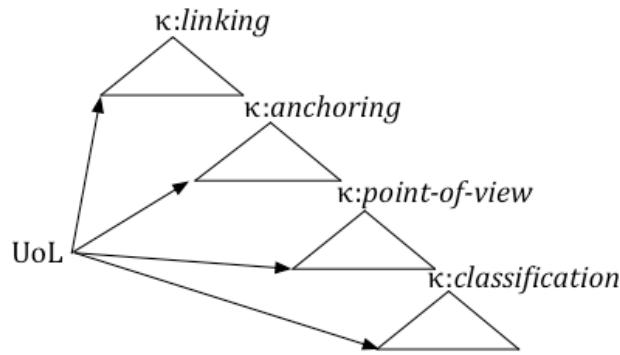
These domains largely echo three domains that define clausal architecture in terms of the roles nominal arguments play within them. Within the lowest domain (κ:*classification*) nominal arguments are introduced as event-participants; in the next domain arguments are assigned purely grammatical roles (subjects and objects): κ:*point-of-view* hosts grammatical object while κ:*anchoring* hosts grammatical subjects; and finally in the highest domain (κ:*linking*), arguments are marked for discourse roles (such as topic or focus). Thus, the correlation between functional heads and the roles that nominal constituents play within the domain of this head serves as a heuristic in the discovery and comparison of categories (just like adverbial interpretations serve as a diagnostic within cartographic typologies).

The function heuristic can be used to locate the absolute position of a given grammatical category while traditional tests for structure allow us to diagnose relative position. If we find a linguistic element that marks or encodes event-roles, we can conclude that it is located in κ:*classification;* if it marks or encodes grammatical roles, it is located in either κ:*point-of-view* or κ:*anchoring*; and if it marks or encodes discourse roles it is located in κ:*linking.*

On this assumption then, language specific categories are always constructed based on the categories of the universal spine in interaction with language specific meaningful units. Note that Wiltschko 2014 uses the term Unit of language (UoL) instead of morpheme to reflect the fact that there are different types of 'smallest

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[7] The functional architecture is likely rooted in general cognition or reflects the organization of a specific mode of thought (Hinzen 2013). For a similar view see Ramchand & Svenonius (2013).

meaningful units'. This is because language specific units may associate with the spine in different ways and hence may associate with meaning in different ways. In particular, there are three ways in which the association between a Unit of Language and the spine may differ: In terms of the manner of association (as a head or as a modifier), in terms of the place of association (in which area of the spine), and in terms of the timing association (before or after the syntactic computation).[8] The traditional notion of a morpheme subsumes sound, meaning, as well as categorial identity. But the meaning of a unit that spells out a given syntactic constellation is created in different ways than a unit that associates with the spine before the syntactic computation.

Recognizing the complexity of the relation between sound, meaning and categorial identity allows for a typology that encompasses the way these ingredients (linguistic atoms; Wiltschko & Déchaine 2010) relate to each other. It will thus serve to supplement meaning-based typologies. This echoes Longobardi's (2001: 367) conjecture that semantic parametrization cannot be independent of syntactic parametrization.

To explore cross-linguistic variation in the realm of categories, such as the TAM categories for example, there are two ways to proceed. First, one can identify a particular meaning and explore how it is constructed in different languages. For example, one may explore how temporal systems are constructed in a given language (Tonhauser 2014; Bittner 2014). Are there limits to the variation? Are there implicational relations that are universally observed?

Alternatively, one may investigate the range of variation that arises based on differences in what type of UoLs associate with a given domain. Thus, another way to develop a typology is to ask whether there are other language-specific categories besides TENSE that may be constructed based on κ:*anchoring.* For example Ritter and Wiltschko (2009, in press) argue that the same abstract category INFL (κ:*anchoring*) may be realized as TENSE, LOCATION, and PERSON. This is illustrated in (24).

(24)   Constructing anchoring categories
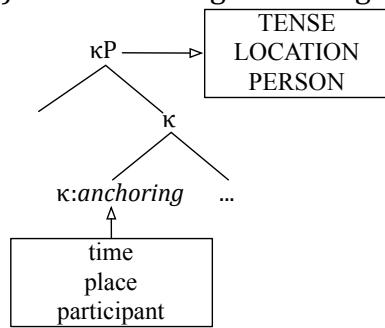
Diagnosing instantiations of κ:*anchoring* involves diagnosing relative position (via c-command, linear ordering, and scope effects) on the one hand and

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[8] This corresponds to the distinction between early and late insertion in the framework of Distributed Morphology (Halle & Marantz 1993).

absolute position (via the function heuristic) on the other hand. The former involves showing that a particular category is higher than categories that instantiate κ:*point-of-view* on the one hand and lower than κ:*linking* on the other hand. The latter involves showing that a particular category fulfills the same function as TENSE, namely anchoring the event-situation to the utterance-situation (possibly via a mediating reference-situation). There is no a priori reason that anchoring proceed via times and *temporal* relations. Instead, the same function can also be achieved by places and *locational* relations. Thus, instead of anchoring the event by asserting when relative to the utterance the event took place, in a location-based system, anchoring proceeds by asserting where relative to the utterance the event took place. Finally, Ritter & Wiltschko (in press) also argue that participant marking (i.e., PERSON) may serve the anchoring function: in such a system anchoring proceeds by asserting who relative to the utterance participants (the speaker or addressee) took part in the event. Similarly, Amritavalli & Jayaseelan 2005 and Amritavalli 2013 argue that anchoring may arise via TENSE or via MOOD.

An immediate prediction of the assumption that the same abstract category (κ:*anchoring*) can be realized in different ways predicts that the different instantiations of this function are in complementary distribution; and that the clausal architecture within a single language is comprised of categories that can be related to each other. Thus, in a PERSON based system where relations among participants are established both κ:*anchoring* and κ:*point-of-view* have to be person-based (see Bliss et al. 2010, Wiltschko 2014 for evidence that this is indeed so).

3.4   Conclusion

We have now reviewed several ways in which the question as to how languages vary may be approached: i) for cross-linguistic semantics, the comparison set is defined based on meaning alone; ii) for cartographic approaches, comparison is also based on meaning but it also takes into consideration morpho-syntactic and syntactic considerations; iii) for approaches based on the universal spine, meaning-based comparisons are supplemented with investigations of the form-meaning relation. And in addition to meaning-based comparisons the assumption of a universal spine with hierarchically organized functions makes it possible to also undertake function-based comparisons.

Accordingly, we can define the notion of *parametric* variation relative to a particular category such as for example TENSE in two different ways. According to the narrow definition we can explore whether there are different ways in which languages may instantiate the functional category TENSE. If, however, Ritter and Wiltschko 2009 and Wiltschko 2014 are correct then TENSE is always constructed and thus cannot be universal. Thus, this approach is necessarily limited in its empirical scope as not all languages are expected to construct TENSE; rather languages are expected to differ in the inventories of they categories they make use of. What is universal on this view is the ingredients that are used to construct TENSE: namely temporal content and the universal spine. Approaching variation from this end makes for a broader definition of parametric variation and it can be tackled in

two different ways: based on meaning or based on function. According to the former approach we would, for example, explore the way temporal interpretations are construed across the languages of the world. This approach may or may not be accompanied by explorations of the form-meaning correspondence. In contrast, according to the latter approach – one that defines the comparison set based on spinal functions – comparative investigations explore how languages manifest the domains identified in (23): how they associate with meaning and sound?

4 A case study of TAM in Standard and Austrian German: the data

In this section I conduct a brief comparative case study: we compare the TAM categories of Standard German (SG) with those of Upper Austrian German (UAG). The key differences between the two dialects concern the simple past and the subjunctive. In particular, while the verbal paradigm in SG includes a form for the simple past (preterite), UAG has no such form. Instead, present perfect morphology is used for past contexts. The second difference concerns subjunctive marking. SG has two types of subjunctive: present and past subjunctive (traditionally known as Konjunktiv I and Konjunktiv II) but they are no longer productively used (as indicated by ! in Table 2), especially in spoken language. This contrasts with UAG, which, unsurprisingly, does not distinguish between a present and past subjunctive, but has only one form. Interestingly, this form is productively used.

	INDICATIVE				SUBJUNCTIVE			
	PRESENT		PAST		PRESENT		PAST	
	IMPERF	PERF	IMPERF	PERF	IMPERF	PERF	IMPERF	PERF
SG	✓	✓	✓	✓	✓!	✓	✓!	✓
UAG	✓	✓	✗	✗	✓	✓	✗	✗

Table 2: Comparing morpho-syntactic TAM categories in SG and UAG

If we investigate the difference between SG and UAG within a meaning-based system we are lead to the conclusion that the present perfect form has taken over the simple past because it is used in past contexts. This leaves unaccounted for the fact that UAG does not have a present/past contrast in the subjunctive. I will show in section 5 that an analysis within the USH allows for an interesting way to understand the distribution of the subjunctive. In particular, Wiltschko 2014 argues that the UAG subjunctive is a different instantiation of the anchoring category. In other words, UAG SUBJUNCTIVE replaces SG PAST. I start by introducing the TAM system of SG in section 4.1 and then introduce the TAM system found in UAG in section 4.2.

4.1 Standard German

German has a rich system of verbal inflection including several TAM categories.[9] For the purpose of the present discussion, the following categories will be relevant. In terms of the morphological contrasts that are expressed TENSE includes two values: a present and a past. Present tense is morphologically unmarked, while past is formed in two distinct ways. For so called weak verbs, past is marked with the suffix (-*te*). This suffix immediately follows the verbal root and precedes person agreement (*koch-te_{past}-st_{2sg}*); for so called strong verbs, past is marked by means of Ablaut. This is summarized in Table 3.

	STRONG VERBS *komm* ('come')		WEAK VERBS *koch* ('cook')	
	PRESENT	PAST	PRESENT	PAST
1SG	*ich komm-e*	*ich k**a**m*	*ich koch-e*	*ich koch-**te***
2SG	*du komm-st*	*du k**a**m-st*	*du koch-st*	*du koch-**te**-st*
3SG	*er komm-t*	*er k**a**m*	*er koch-t*	*er koch-**te***
1PL	*wir komm-en*	*wir k**a**m-en*	*wir koch-en*	*wir koch-**te**-n*
2PL	*ihr komm-t*	*ihr k**a**m-t*	*ihr koch-t*	*ihr koch-**te**-t*
3PL	*sie komm-en*	*sie k**a**m-en*	*sie koch-en*	*sie koch-**te**-n*

Table 3: Present and past tense in Standard German

In addition to the simple past, SG also has another way of expressing past events, namely the perfect, which itself comes in two forms, a present and a past perfect. It is formed by means of an auxiliary (a form of *haben* 'have' or *sein* 'be') and the participial form of the verb. It is the tense inflection on the auxiliary verb that determines whether the complex form is present perfect or past perfect.

	STRONG VERBS *komm* ('come')		WEAK VERBS *koch* ('cook')	
	PRESENT PERFECT	PAST PERFECT	PRESENT PERFECT	PAST PERFECT
1SG	*ich bin gekommen*	*ich war gekommen*	*ich hab-e gekocht*	*ich ha-tt-e gekocht*
2SG	*du bi-st gekommen*	*du war-st gekommen*	*du ha-st gekocht*	*du ha-tt-est gekocht*
3SG	*er ist gekommen*	*er war gekommen*	*er ha-t gekocht*	*er ha-tt-e gekocht*
1PL	*wir sind gekommen*	*wir war-en gekommen*	*wir hab-en gekocht*	*wir ha-tt-en gekocht*
2PL	*ihr seid gekommen*	*ihr war-t gekommen*	*ihr hab-t gekocht*	*ihr ha-tt-et gekocht*
3PL	*sie sind gekommen*	*sie war-en gekommen*	*sie hab-en gekocht*	*sie ha-tt-en gekocht*

Table 4 Standard German present and present perfect

In terms of mood distinctions, SG has 3 values: indicative, present subjunctive and past subjunctive. The latter two are known in the traditional German literature as Konjunktiv 1 and Konjunktiv 2. The examples we have seen thus far are all in the indicative mood, which is the morphologically unmarked form. The present subjunctive is formed on the basis of the simple present, which is in turn suffixed by –*e.* This suffix has the same distribution as the past suffix: it follows the verbal root and it precedes person agreement (*koch-**e**-st*).

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[9] For reasons of space I cannot do justice to the entire system. In particular, I will not discuss the future (which is expressed periphrastically with the auxiliary *werden*).

As for the past subjunctive, for weak verbs it is formed by suffixing *–te* to the unmarked verbal form. Thus, it is identical with the simple past. For strong verbs, it is formed by suffixing *–e* and the verbal stem is modified by means of Ablaut. For some verbs, subjunctive is associated with a dedicated Ablaut pattern, while for other verbs the ablaut associated with the subjunctive is identical to the ablaut associated with past tense. This is summarized in Table 5.

	STRONG VERBS *komm* ('come')		STRONG VERBS *geh-* ('go')		WEAK VERBS *koch* ('cook')	
	PRESENT SUBUNCIVE	PAST SUBJUNCTIVE	PRESENT SUBUNCIVE	PAST SUBJUNCTIVE	PRESENT SUBJUNCTIVE	PAST SUBJUNCTIVE
1SG	*ich komm-e*	*ich käm-e*	*ich gehe*	*ich ging-e*	*ich koch-e*	*ich koch-**te***
2SG	*du komm-e-st*	*du käm-e-st*	*du geh-e-st*	*du ging-e-st*	*du koch-st*	*du koch-**te**-st*
3SG	*er komm-e-t*	*er käm-e-t*	*er geh-e-t*	*er ging-et*	*er koch-t*	*er koch-**te***
1PL	*?wir komm-en*	*wir käm-en*	*?wir geh-en*	*wir ging-en*	*wir koch-en*	*wir koch-**te**-n*
2PL	*ihr komm-e-t*	*ihr käm-e-t*	*ihr geh-et*	*ihr ging-et*	*ihr koch-t*	*ihr koch-**te**-t*
3PL	*?sie komm-en*	*sie käm-en*	*?sie gehen*	*sie ging-en*	*sie koch-en*	*sie koch-**te**-n*

Table 5: Standard German mood distinctions

It turns out that for many verbal forms, there is no formal distinction between past and subjunctive. [10] Thus, while some forms in the paradigm show that the subjunctive has to be recognized as a dedicated verbal inflection, in many actual forms of the paradigm the distinction is blurred (Fabricius-Hansen and Sæbø 2004). In many descriptions of German, the frequent homophony between past and subjunctive is taken to be the reason for the rare use of this verbal inflection. That is, especially in spoken German, the synthetic subjunctive described above is replaced with a construction involving an auxiliary. There are two strategies: one is based on the present or past perfect such that the auxiliaries are marked as subjunctive. This is illustrated in Table 6.

	STRONG VERBS *komm* ('come')		WEAK VERBS *koch* ('cook')	
	PRESENT SUBUNCIVE	PAST SUBJUNCTIVE	PRESENT SUBJUNCTIVE	PAST SUBJUNCTIVE
1SG	*ich sei gekommen*	*ich wär-e gekommen*	*ich hab-e gekocht*	*ich hät-te gekocht*
2SG	*du sei-st gekommen*	*du wär-e-st gekommen*	*du hab-e-st gekocht*	*du hät-te-st gekocht*
3SG	*er sei gekommen*	*er wär-e gekommen*	*er hab-e-t gekocht*	*er hät-te gekocht*
1PL	*wir sei-en gekommen*	*wir wär-en gekommen*	*wir hab-e-en gekocht*	*wir hät-te-n gekocht*
2PL	*ihr sei-d gekommen*	*ihr wär-e-t gekommen*	*ihr hab-e-t gekocht*	*ihr hät-te-t gekocht*

[10] This contrasts with English past subjunctive which is always identical to the past. For the present subjunctive, the only difference between indicative and subjunctive is in the 3rd person where the former is inflected for singular (*walk-s*) while the subjunctive is not (*walk*). That is, the present subjunctive is identical to the present indicative (except in the 3rd singular where only the indicative is inflected for singular).

| 3PL | *sie sei-en gekommen* | *sie wär-en gekommen* | *sie hab-e-en gekocht* | *sie hät-te-n gekocht* |

Table 6 The analytic subjunctive based on the perfect

The second strategy is a complex form involving the past subjunctive form of the auxiliary *werden,* namely *würde.* This is illustrated in Table 7. To express a present interpretation of this subjunctive the auxiliary co-occurs with the infinitive and to express a past interpretation the verb is in its participial form and accompanied by a infinitival auxiliary.

	PRESENT SUBUNCTIVE	PAST SUBJUNCTIVE
1SG	*ich würd-e kommen*	*ich würd-e gekommen sein*
2SG	*du würd-e-st kommen*	*du würd-e-st gekommen sein*
3SG	*er würd-e kommen*	*er würd -e gekommen sein*
1PL	*wir würd-en kommen*	*wir würd -en gekommen sein*
2PL	*ihr würd-e-t kommen*	*ihr würd -e-t gekommen sein*
3PL	*sie würd-en kommen*	*sie würd -en gekommen sein*

Table 7 The analytic subjunctive based on *werden*

In sum, SG has a complex system of verbal inflection for the TAM categories: in terms of mood it distinguishes between an indicative and a subjunctive. Each of the mood categories is in turn associated with a present and a past form. And within each of the resulting forms a basic distinction can be made between an imperfective form, which is always based on the simple verb, and a perfective form, which is always formed with an auxiliary and a participial form. This is summarized in Figure 1.
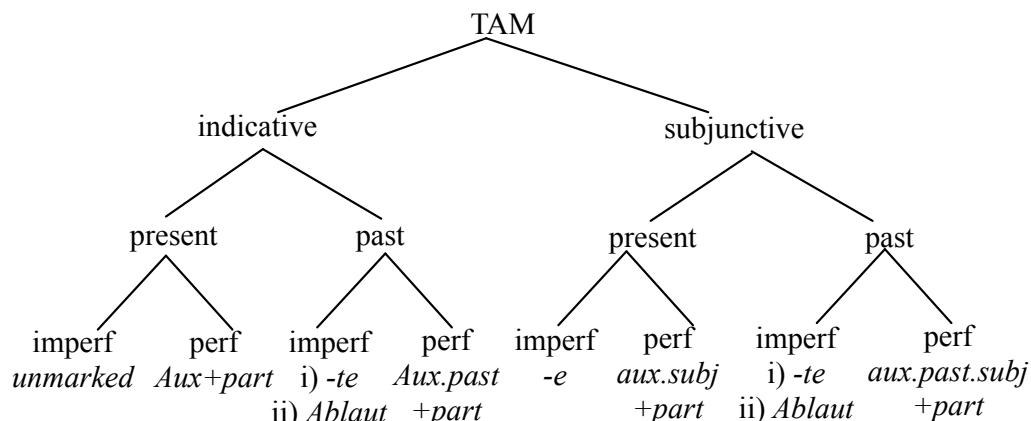

Figure 1 The Standard German TAM system

4.2   Upper Austrian German

In this subsection, we turn our attention to the TAM system of Upper Austrian German (UAG). We observe a system similar to the SG but with two crucial differences. First, no morphological difference is made between present and past, neither in the indicative nor in the subjunctive. There is only one verb that has a

present/past contrast, namely the auxiliary *sein* ('be') that has a past and a present perfect form.

	sei ('come')		
	PRESET	PAST	PRESENT PERFECT
1SG	*i bin*	*i woa*	*i bin gwe(s)n*
2SG	*du bi-st*	*du woast*	*du bist gwe(s)n*
3SG	*ea is*	*ea woa*	*ea is gwen(s)n*
1PL	*mia san*	*mia woan*	*mia san gwe(s)n*
2PL	*ia sats*	*ia woats*	*ia sats gwe(s)n*
3PL	*si san*	*si woan*	*si san gwe(s)n*

For all other verbs, the semantic difference between present and past is expressed by means of the morpho-syntactic contrast between imperfective (unmarked) and perfect (auxiliary + participle forms) – a contrast we have already seen in SG where it co-exists with the contrast between present (unmarked) and past. Interestingly, the absence of the present/past contrast extends to the perfect. While in SG the perfect comes in two forms, a present perfect and a past perfect, UAG has a present perfect only. This is even the case for verbs that form the present perfect with *be,* which – as we saw above – does have a past form. This is summarized in Table 8.

	STRONG VERBS *kum* ('come')		
	IMPERFECT	PRESENT PERFECT	*PAST PERFECT
1SG	*i kum*	*i bin kuma*	**i woa kuma*
2SG	*du kum-st*	*du bin kuma*	**du woast kuma*
3SG	*ea kum-t*	*ea is kuma*	**ea woa kuma*
1PL	*mia kum-en*	*mia san kuma*	**mia woan kuma*
2PL	*ia kum-ts*	*ia sats kuma*	**ia woats kuma*
3PL	*si kum-en*	*si san kuma*	**si woan kuma*

Table 8 The absence of past perfect in UAG

This establishes that UAG lacks a contrast between present and past tense, both with simple verbs forms as well as with the perfect, which is in turn constructed with an auxiliary.

The second difference between SG and UAG has to do with the subjunctive, which is completely productive in UAG. This contrasts with SG where it is almost leaving the language, at least in colloquial speech.

In addition to the difference in productivity, we also observe a morphological difference. First, given that there is no present/past contrast, we may expect that in the subjunctive too, the contrast between present and past will be absent. This is indeed the case. Instead there is only one subjunctive. For weak verbs, it is formed by suffixing the verb with *–at.* This suffix is in the same position as the past tense

marker we observed in SG: it follows the verbal base and precedes subject agreement morphology.

	WEAK VERB: *koch* 'cook'	
	UNMARKED	SUBJUNCTIVE
1SG	*i koch*	*i koch-**at***
2SG	*du koch-st*	*du koch-**at**-st*
3SG	*ea koch-t*	*ea koch-**at**-t*
1PL	*mia koch-n*	*mia koch-**at**-n*
2PL	*ia koch-ts*	*ia koch-**at**-ts*
3PL	*si koch-n*	*si koch-**at**-n*

Table 9 Subjunctive marking in Upper Austrian German weak verbs

Note that with weak verbs, the form of the subjunctive has three allomorphs. It can be formed by ablaut alone, or by means of suffixation of –*at* or by a combination of Ablaut and –*at* suffixation. All three forms are interpreted in the same way with no detectable difference.

	STRONG VERB: *kum* 'come'			
	UNMARKED	SUBJUNCTIVE: ABLAUT	SUBJUNCTIVE: UNMARKED -AT	SUBJUNCTIVE: ABLAUT -AT
1SG	*i kum*	*i kam*	*i kum-**at***	*i kam-**at***
2SG	*du kum-st*	*du kam-st*	*du kum-**at**-st*	*du kam-**at**-st*
3SG	*ea kum-t*	*ea kam*	*ea kum-**at**-t*	*ea kam-**at***
1PL	*mia kum-en*	*?mia kam-en*	*mia kum-**at**-n*	*mia kam-**at**-n*
2PL	*ia kum-ts*	*ia kam-ts*	*ia kum-**at**-ts*	*ia kam-**at**-ts*
3PL	*si kum-en*	*?si kam-en*	*si kum-**at**-en*	*si kam-**at**-n*

Table 10 Subjunctive marking in Upper Austrian German strong verbs

In sum, the UAG TAM system has two morpho-syntactic contrasts only: one between indicative and subjunctive and one between imperfective and perfective. This is summarized in Figure 2.
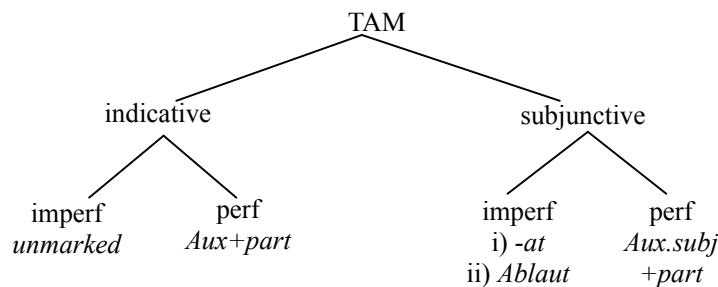
Figure 2 The UAG TAM system

Thus, relative to the SG system, UAG differs in the number of forms it makes available. It lacks a morphologically simple past tense. At the same time however,

the UAG subjunctive is productive while the simplex subjunctive in SG is no longer productively used. This is summarized in Table 2 repeated from above.

	INDICATIVE				SUBJUNCTIVE			
	PRESENT		PAST		PRESENT		PAST	
	IMPERF	PERF	IMPERF	PERF	IMPERF	PERF	IMPERF	PERF
SG	✓	✓	✓	✓	✓!	✓	✓!	✓
UAG	✓	✓	✗	✗	✓	✓	✗	✗

Table 2: Comparing morpho-syntactic TAM categories in SG and UAG

Given the lack of a simple past, one way of understanding the difference between UAG and SG is to say that that they differ in the availability of the morpho-syntactic category TENSE. This is summarized in Table 11.

	Perfect/imperfect	Present/past	Indicative/subjunctive
SG	✓	✓	✓
UAG	✓	✗	✓

Table 11: The difference between SG and UAG TAM system

In what follows I show how this morpho-syntactic difference may be analysed within the different frameworks introduced in section 3.

5 TAM categories in Standard and Austrian German: comparative analyses across frameworks

5.1 A meaning-based comparison of Standard German and Upper Austrian German

As we have seen, one way of investigating TENSE in a cross-linguistic setting is to explore the question as to how temporal reference is construed. While under this meaning-based approach TENSE and the morpho-syntactic means that express it typically play an important role, the main focus is on the way such temporal relations are construed even in languages that lack dedicated morpho-syntactic expressions for present, past, or future.

From this perspective, the absence of a present/past contrast in UAG does not tell us much about the role TENSE plays in this language, or how it differs from its SG counterpart. That is, it is possible that the only difference between the two dialects is that SG has an overt past marker whereas in UAG it is silent. Consequently, the complementarity of past and subjunctive is insignificant on this view. Since the encode different meanings, the two categories are not to be compared.

The crucial empirical questions we need to ask is how temporal relations, such as past, present, and future are construed. What we observe in SG is that the past can be expressed by means of the simple past (25)a or the present perfect (25)b, with no difference in interpretation (Willhelm 2007). The present is expressed with

the (unmarked) simple present as in (26).[11] Finally, a future interpretation is expressed either by means of the auxiliary (*werden*) with the infinitival form of the verb (27)a or by means of the unmarked form, which is typically classified as the simple present (27)b.

(25) Past
    a.   *Ich koch-te (gestern).*
        I   cook-PAST (yesterday)
        'I cooked yesterday.'
    b.   *Ich habe (gestern) gekocht.*
        I   have (yesterday) cooked.PART
        'I cooked yesterday.'

(26) Present
        Ich koch-e   (gerade).
        I   cook-1SG now
        'I'm cooking right now.'

(27) Future
    a.   *Ich werde (morgen)   koch-en.*
        I   will   (tomorrow) cook.INF
    b.   *Ich koch-e   (morgen).*
        I   cook-1SG (tomorrow)
        'I will cook tomorrow.'

As shown in (28)-(30), the temporal system of UAG is similar to that of SG the only exception being the absence of a simple past tense to express the past.

(28) Past
        I hob (gestan)   kocht.
        I have (yesterday) cook.PART
        'I cooked yesterday.'

---

[11] There is another way in which an ongoing reading can be expressed in both SG and UAG, namely by means of a prepositional phrase where the determiner is incorporated into the preposition and the verb appears in its infinitival (nominal) form. This construction can be used in the present and in the past (recall that the auxiliary *be* is the only one that has a past form).
    i)   *Ich bin am   kochen.*
        I   am at.DET   cook
    ii)   *Ich war am   kochen.*
        I   was at.DET   cook
Note that both the simple present and this complex imperfective construction differ in that while both allow for an ongoing present interpretation, only the simple present allows for a habitual and a future interpretation as well.

(29)   Present
          I koch (grod).
          I cook (now)
          'I'm cooking just now.'
(30)   Future
   a.   *I wead (moagn)   koch-n.*
          I will (tomorrow) cook.INF
          'I will cook tomorrow.'
   b.   *I koch (moagn).*
          I cook (tomorrow)
          'I will cook tomorrow.'

Figure 3 summarizes the construal of temporal relations in SG and UAG. Temporal relations are indicated on the timeline. The morpho-syntactic categories used to express these temporal relations are represented in square brackets.

	past	present	future
SG	[past] [present perfect]	[present]	[future] [present]
UAG	[present perfect]	[present]	[future] [present]

Figure 3: temporal construals in SG and UAG

A formal semantic analysis of this pattern involves the association of lexical entries with the morphological forms that express these temporal relations. It is a common assumption that semantic tenses are associated with the denotations in (31) (see von Stechow 2002).

(31)   SEMANTIC TENSES are symbols of type i which bear time variables as indices. Let c be the context of the utterance with t_c the speech time. g is a variable assignment.
   a. $||NOW||^{g,c}$ is the speech time conceived as a point.
   b. $||PAST_j||^{g,c}$ is defined only if g(j) precedes the speech time t_c. If defined, $||PAST_j||^{g,c} = g(j)$.
   c. $||FUTR_j||^{g,c}$ is defined only if g(j) follows the speech time t_c. If defined, $||FUTR_j||^{g,c} = g(j)$.

                                              von Stechow 2002: 402 (19)

From a comparative perspective, we may ask whether all languages express past, present, and future in the same way. That is, languages may differ in the number of temporal contrasts that may be expressed and in the restrictions that may be placed on any particular semantic tense.

For example, we find languages with an explicit *past/non-past* contrast (such as German) while other languages have a *future/non-future* contrast (Comrie 1985:

49). Furthermore, as already noted, some languages have been described as fully tenseless where temporal contrasts are not grammaticized (see Lin 2012 for a recent overview) while others are described as mixed tensed language with merely optional tense marking (Smith et al. 2003, 2007; see also Baker & Travis (1997) on Mohawk). In addition, there are also languages, which express temporal relations that go beyond the three-way contrast in (31). That is some languages have graded tense systems that distinguish how far back into the past or forward into the future a given event is to be located (see Cable 2013 for recent discussion based on Gĩkũyũ, Bantu). Accordingly, one might classify languages in terms of the number of temporal contrasts they encode as illustrated in Figure 4.

No tense	Tenseless				
2 way contrast	past		non-past		
	non-future			Future	
3 way contrast	past		present	Future	
graded tense	Remote past	Recent past	present	Immediate future	Distant future
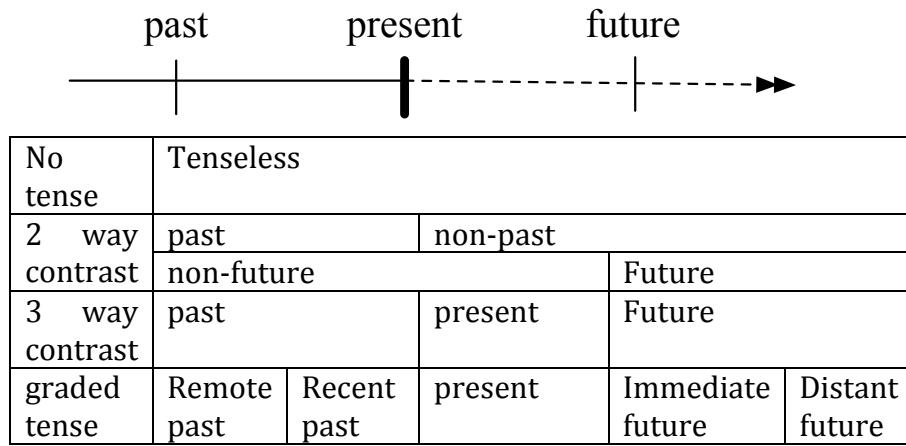
Figure 4: Classifying tense systems

This type of classification is based on the implicit assumption that only a certain type of temporal expression counts. Typically this includes morphemes belonging to the verbal paradigm, auxiliaries and dedicated particles. For example, SG is typically described as either a past-non/past system (if one determines the number of semantic tenses based on the verbal paradigm alone) or as a three way tense system (if one counts periphrastic expressions including auxiliaries). Note, however that SG has the means to express graded tenses, just like the system found in Gĩkũyũ. But whereas in Gĩkũyũ graded tenses are expressed based on verb-internal modification involving a form of Ablaut and/or infixation (32), in SG it is expressed by means of verb-external modification by means of adverbial modifiers (33).

(32) Graded tenses in Gĩkũyũ
  a. 'Current Past': *Mwangi nĩekũinaga.*
     'Mwangi was dancing (within the day).'
  b. 'Near Past': *Mwangi nĩarainaga.*
     'Mwangi was dancing (within last few days).'
  c. 'Remote Past': *Mwangi n¯ĩāinaga.*
     'Mwangi was dancing (prior to 'Near Past').'
  d. 'Current Future': *Mwangi nĩekũina.*
     'Mwangi will dance (within the day).'
  e. 'Remote Future': *Mwangi nĩakaina.*

'Mwangi will dance (tomorrow or later).'

(33) Graded "tenses" in SG
    a. 'Current Past':   *Ich tanzte   gerade.*
                            I dance-past   just
                            'I just danced.'
    b. 'Near Past':   *Ich tanzte vor kurzem/vor ein paar Tagen.*
                            I dance-past P short/P indef pair day-pl.'
                            'I danced not too long ago/a few days ago.'
    c. 'Remote Past':   *Ich tanzte vor langer Zeit.*
                            I dance-past P long time
                            'I danced a long time ago.'
    d. 'Current Future':   *Ich werde bald tanzen.*
                            I will soon dance
                            'I will dance soon.'
    e. 'Remote Future':   *Ich werde morgen/später tanzen.*
                            I will tomorrow/later dance
                            I will dance tomorrow/later.

Similarly, languages that are classified as tenseless have means to express temporal relations such as aspectual markers, temporal adverbials and the like. The difference between morphemes that are analyzed as instantiating semantic tenses of the type shown in (31) and other forms that establish temporal relations is that the denotation of the former is restricted to being a semantic tense whereas the latter have additional meaning components as well. For this reason, Tonhauser (2014:22) argues that *"an empirically adequate description of temporal reference must consider not just the contribution to temporal reference by tense but also that of the other linguistic and contextual means"*.

This means that a typology that is based on semantic criteria does not automatically generate a formal typology that would allow us to compare the overt realizations of the functional category TENSE. What is missing is an explicit criterion that establishes whether or not a given morpheme is realizing TENSE. Temporal content is neither a necessary nor a sufficient condition to unambiguously establish this. Thus, within this approach the fact that UAG lacks an explicit contrast between present and past does not tell us anything about the properties of semantic tense. And consequently it doesn't tell us much about the parametric difference in the realization of TENSE in SG vs. UAG. This is because there is no explicit way to determine how a given lexical entry relates to the postulated functional categories that make up the clausal architecture. Most telling is von Stechow's (2002: 402) explicit warning against *"fall[ing] into the trap to believe that the Slavic imperfective morphology necessarily expresses IMPERFECTIVE. This morphology may very well be a concomitant with PERFECT or PERFECTIVE in particular contexts."* But how else should we explore parametric variation in the functional architecture of clauses?

5.2 The cartography of TAM in Standard German and Upper Austrian German

Cartography is a framework that has as its goal to draw maps of syntactic configurations. But even though it's empirical focus is syntactic, its ingredients – the functional categories – are semantically defined. Recall Cinque's hierarchy of TAM categories repeated below as (34).

(34) Cinque's hierarchy of functional categories: the TAM categories

$[[\text{Mood}_{\text{speech-act}}$ $[\text{Mood}_{\text{evaluative}}$ $[\text{Mood}_{\text{evidential}}$ $[\text{Mod}_{\text{epistemic}}$ $[\text{T}_{\text{past}}$ $[\text{T}_{\text{future}}$ $[\text{Mod}_{\text{irrealis}}$ $[\text{Mod}_{\text{necessity}}$ $[\text{Mod}_{\text{possibility}}$ $[\text{Asp}_{\text{habitual}}$ $[\text{Asp}_{\text{repetetive}}$ $[\text{Asp}_{\text{frequentative(I)}}$ $[\text{Mod}_{\text{volitional}}$ $[\text{Asp}_{\text{celerative(I)}}$ $[\text{T}_{\text{anterior}}$ $[\text{Asp}_{\text{terminative}}$ $[\text{Asp}_{\text{continuative}}$ $[\text{Asp}_{\text{perfect(?)}}$ $[\text{Asp}_{\text{retrospective}}$ $[\text{Asp}_{\text{proximative}}$ $[\text{Asp}_{\text{durative}}$ $[\text{Asp}_{\text{generic/progressive}}$ $[\text{Asp}_{\text{prospective}}$ $[\text{Asp}_{\text{sg.completive(I)}}$ $[\text{Asp}_{\text{pl.completive}}$ $[\text{Voice}$ $[\text{Asp}_{\text{celerative(II)}}$ $[\text{Asp}_{\text{repetetive(II)}}$ $[\text{Asp}_{\text{frequentative(II)}}$ $[\text{Asp}_{\text{sg.completive(II)}}$ $]]]]]]]]]]]]]]]]]]]]]]]]]]]]]$

Cinque 1999: 106

Each functional category is identified by its general label, which roughly corresponds to traditional grammatical categories (Aspect, Tense, Modality, or Mood) and a subscript, which identifies the value of that category (such as past, future, perfect, habitual etc). On this view, the strategy is to map the morphemes that express the values of these categories onto their respective syntactic position. For our case study, we expect that SG past morphology maps onto T_{past} and the future auxiliary *werden* maps onto T_{future}. Note that in (34) there is no functional category that would host present tense, which is consistent with the fact that present tense is the unmarked form in both SG and UAG.

Thus, the mapping of morphemes that directly correspond to these functional categories is straightforward and makes clear predictions. In particular, it is predicted that past tense is structurally higher than future tense and irrealis mode. But how can we tell? The standard way of mapping within the cartographic approach combines the syntactic makeup of inflectional morphology via head-movement, and the study of the order of arguments and adjuncts with respect to different verbal forms (Cinque & Rizzi 2010: 53). In German head-movement is not telling as it always targets a domain higher than the domain where TENSE is located. This is because German is a Verb second language with the inflected verb moving to C (den Besten 1983). Thus, the position of the finite verb cannot serve as a heuristic to determine which of the categories in (34) are active in the language.

An immediate question arises in light of the fact that in SG a past interpretation may be achieved by means of either the simple past tense or the present perfect, while in UAG present perfect is the only form available for a past interpretation. Under a cartographic approach it is not immediately clear how to analyse this pattern. The meaning-based heuristic would lead us to map the SG past onto T_{past}. Since the present perfect has the same meaning the meaning-based heuristic would lead us to also map it onto T_{past} as in (35)a. The morpho-syntactic complexity of this periphrastic tense form may be accommodated by assuming that the auxiliary maps onto T_{past} while the participle maps onto $\text{Asp}_{\text{perfect}}$ as in (35)b.

(35) a. … $[\text{T}_{\text{past}}$ **tanzte** …]

b.　… [T$_{past}$ **hat** [Asp$_{perfect}$ **getanzt** …]]

The fact that in many varieties of German the simplex (preterite) form is replaced with the periphrastic form up to the point where the preterite no longer exists means that the association in (35)a is no longer available in the language.

There are several problems with this view. First, it is unclear how to analyse the difference between present and past perfect in SG. That is, the Cinque hierarchy has no dedicated position for present tense. If the present auxiliary maps onto T$_{past}$ to reflect the fact that this form has the same meaning as the simplex past, then how do we analyse the past perfect?

A second problem with the analysis in (35) has to do with the fact that in UAG the simple past form has completely vanished but at the same time the subjunctive is a productive category – unlike in Standard German. And interestingly, the UAG subjunctive is morphologically similar to the SG preterite: Ablaut with strong verbs and a suffix containing *t* for weak verbs (SG –*te* and UAG –*at*). It is thus tempting to view the loss of past and rise of subjunctive as related (see Nübling 1997 for a extensive discussion). The cartographic structure in (34) has nothing to say about this relation, however. Since all mapping heuristics are based on meaning, purely formal similarities between categories remain insignificant.

In light of these questions we need to amend the cartographic typology with one that takes into consideration language-specific restrictions on the relation between form and meaning.

5.3　A comparison based on the universal spine

How do we compare TAM systems within a framework that denies the existence of prefabricated categories, such as the Universal Spine Hypothesis (henceforth USH). One of the immediate predictions of the USH is that meaning is not an intrinsic property of functional categories. Thus, purely meaning based-comparison is not likely to yield a natural class in terms of formal properties. This is because the same substantive content may associate with the spine in different ways, in different positions, and at different times. Within this approach, the difference between SG and UAG may be understood as an instance of different content associating with the same head position, namely the anchoring category: while in SG the morphological contrast between present and past realizes the anchoring category, in UAG it is the morphological contrast between indicative and subjunctive. This is illustrated in (36).

(36)　Constructing past or subjunctive
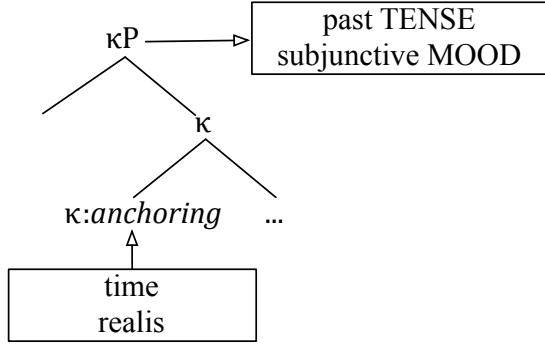
Thus, in UAG mood anchors the event to the utterance (Wiltschko 2014) (see Amritavelli 2013 for a similar claim based on Dravidian). Accordingly, the subjunctive in UAG is predicted to display properties that differ from the subjunctive of the more familiar type. In particular, in Balkan languages, the subjunctive associates with the C-domain and consequently can co-occur with TENSE. The distribution of subjunctive morphology in UAG supports the view that it associates with a position lower than C (Wiltschko 2014). For example, as shown in (37), in UAG agreement associated with the anchoring category is realized on verbs, while agreement that associates with the C-system is realized on complementizers.

(37) a. *Wonn-**st** nua   du   kumm-**st**…*
          if-2SG   only you   come-2SG
          'if only you would come…'
      b. *Wonn-**ts** nua   es   kumm-**ts**…*
          if-2PL   only you.2PL   come-2PL
          'if only you guys would come…'

Crucially, subjunctive marking in UAG always attaches to verbs (38)a, and never to the complementizer (38)b,c, suggesting that it associates with the anchoring category rather than with C.

(38) a. *Wonn-st nua du kumm-**at**-st…*
          if-2SG   only you come- SUBJ-2SG
          'If only you would come...'
      b. **Wonn-**at**-st nua   es   kumm-**at**-ts…*
          if- SUBJ-2SG only   you.PL   come-SUBJ-2SG
          'If only you guys would come...'
      c. **Wonn-**at**-st   nua   es   kumm-ts…*
          if- SUBJ-2SG only   you.PL come.SUBJ-2SG
          'If only you guys would come...'

Evidence that the UAG subjunctive is indeed formally and functionally similar to other anchoring categories is discussed in Wiltschko, 2013, 2014. Among the most striking differences between the commonly discussed subjunctive in Balkan and

Romance languages on the one hand and the UAG subjunctive on the other hand is the fact that the latter is possible in independent clauses and in contexts where the event is indeed ongoing (see Wiltschko 2014 for detailed discussion and analysis).

(39) a. *Du, ea koch-at   eh.*
          You, he cook-subj prt
          'He is cooking.'

      b. *Du, ea dat   eh koch-n.*
          You, he do.SUBJ PRT cook-INF
          'He's cooking.'

Thus, unlike the Romance and Balkan subjunctives, the UAG is neither dependent nor does it necessarily express an unreal situation.

This much establishes that what we call a subjunctive has different semantic properties as well as different formal properties. A typology that is based on meaning alone will miss an important facet of language variation in that it will not make any predictions about the nature of the subjunctive in a language that lacks TENSE. In this way, the formal approach towards variation adds an additional facet to the comparative analysis of categories (including the TAM categories) that is missing from those that are purely based on meaning.

6 Coming to terms with language variation within a universalist setting

The core goal of this chapter was to explore the parametric space available with respect to a core set of functional categories that define the clause: tense, aspect, and mood (TAM). Any such exploration must be embedded within a general framework that provides protocols for cross-linguistic comparison. Traditionally, this type of comparative work is the domain of linguistic typology, which concerns itself with the *"classification of structural types across languages"* (Croft 2003:1). There are two principal goals:

i)   to explore linguistic **diversity** by classifying categories and structures
ii)   to explore language **universals** by seeking patterns that occur systematically across related and unrelated languages

Within the generative tradition the exploration of universal grammar was not always tied to the exploration of diversity. That is, it was Chomsky's 1957 conviction that UG must be inferable from a single language (such as English). However, with the advent of the principles and parameters framework, the focus of study was broadened to explore the parameters UG makes available.

In the early days, these parameters were thought of as *yes/no* switches which when turned on or off will be responsible for a cluster of seemingly unrelated

properties. The most famous of these parameters was the *pro-drop* parameter (a.k.a. *null subject parameter*; Chomsky 1981, Rizzi 1982). It was proposed in order to account for differences among the Romance languages in the availability of an unpronounced subject: *yes* for Italian and *no* for French. Within the confinement of the Romance languages such clustering of properties is indeed observed (see Jaeggli and Safir 1989 for relevant discussion). However, the empirical coverage of this parameter does not really go beyond the Romance languages. As Baker 2008 notes, neither the comparison of dialects within a single language, nor comparison of languages across language families yields the predicted results (Gilligan 1987). Consequently, the conceptualization of parameters in the original sense has been called into question. Instead, many assume, following Borer (1984:3) "*the availability of variation [is restricted] to the possibilities which are offered by one single component: the inflectional component.*" What does it mean to be part of the "inflectional component", especially given that inflection is a language-specific morphological type? Accordingly, isolating languages for example would by hypothesis fall outside of this source of language variation. The relevant insight of Borer's claim is that parametrization is a matter of lexical entries of functional items. Hence her proposal is sometimes referred to as the *lexical parametrization hypothesis.* And the way it is often viewed is summarized in Baker (2008) under the label "the Borer Chomsky conjecture": "*all parameters of variation are attributable to differences in the features of particular items (e.g., the functional heads) in the lexicon*" (Baker 2008: 354).

This view paved the way for a more fine-grained approach towards variation known as the micro-parametric view (e.g. Kayne 2005). It is characterized by a difference in the empirical domain under investigation as well as a difference in the way cross-linguistic variation is conceptualized. As for the former, it took into consideration the differences across dialects of the same language; as for the latter, the differences are thought to be small (hence the term *micro*-parameter*)*, but still affecting the grammatical system of a particular language. If two languages (including dialects) appear to be vastly different, then, so the argument goes, we are observing the result of a series of micro-parameters.

In contrast to the micro-parametric approach towards variation, the macro-parametric approach, in the sense of Baker 1996, 2008, has it that "*there are some parameters within the statements of the general principles that shape natural language syntax*" (Baker 2008: 354). The empirical domain over which a macro-parameter is usually formulated involves generalizations across different language families (such as Indo-European, Iroquoian, Bantu).

Where is the type of variation discussed in the present chapter situated relative to the division between micro- and macro-parameters?

The first thing to note is that the question regarding variation in the TAM categories is a question about the categorial inventory of a given language. And as we saw throughout this chapter, in this area cross-linguistic comparison is typically substance based. Exploring universals and variation in the domain of TAM typically means to explore the way tense, aspect, and mood are realized in any given language. It is for this reason that typological claims about categorial inventories are pre-dominantly associated with a functionalist perspective. While formal typologies

have been developed within generative traditions, they investigate differences in structural terms such as syntactic relations. After all, formal typologies are concerned with formal properties independent of their substance (Baker 2010, Baker & McCloskey 2007). But if so, how do we compare categories across languages in a formal setting? This is precisely what the universal spine hypothesis aims at (Wiltschko 2014).

As we have seen throughout this chapter, if the comparison of categories across languages is purely based on meaning we are missing important formal generalizations. Thus, the typical meaning-based comparisons (such as cross-linguistic semantics and cartography) should go hand in hand with a formal exploration of categories. In other words, it is not enough to compare meanings across languages, but we also want to compare the relation between form and meaning. A formal typology of categorial inventories asks whether there are any systematic correlations between the meanings we find and the way they relate to form (including sound and distribution).

To show the significance of such an enterprise was one of the key goals of this chapter. And along the way we have seen that at least within the universal spine hypothesis, variation across languages can be small or big no matter whether the languages are dialects of the same language or from different language families. On the one hand, the functional inventory of Standard German is essentially as different from Blackfoot (Algonquian), Halkomelem (Salish) as it is from Upper Austrian German. That is, while Standard German associates temporal substantive content with the anchoring category, Blackfoot associates participant marking, Halkomelem associates locative marking, and Upper Austrian associates realis marking. According to Baker's 2008 definition this would count as a micro-parametric difference, given that it doesn't concern the *statements of the general principles that shape natural language syntax* but instead it concerns the *differences in the features of particular items (e.g., the functional heads) in the lexicon.* Nevertheless, the surface effects of such variation are rather drastic. In Jakobson's 1959 terms: " . . . *the true difference between languages is not in what may or may not be expressed but in what must or must not be conveyed by the speakers*".

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