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Hans C. Boas, Ryan Dux, and Alexander Ziem Frames and constructions in an online learner's dictionary of German¹

Abstract: What types of lexical and grammatical information should a learner's dictionary cover? How can the architecture of an online language resource take account of these requirements? This paper introduces the so-called German Frame-Based Online Lexicon (G-FOL), a frame- and construction-based language resource for English-speaking learners of German that aims at overcoming the general disconnect between vocabulary and grammar in most pedagogical resources. First, to illustrate the problem, we take grooming verbs as a ‘test case’. They exhibit subtle semantic and grammatical differences, which are rarely obvious to the average foreign language learner. On the basis of these findings, we demonstrate how G-FOL employs the principles of FrameNet to solve major didactic challenges identified in the case study. Finally, the third part shows how G-FOL is also capable of presenting constructional information in the same format.

Keywords: frames; constructions; vocabulary teaching and learning; G-FOL; FrameNet; constructicon

1 Introduction

The goal of this paper is to explore what types of lexical and grammatical information should be contained in an online learner's dictionary of German intended for speakers of English, and what the architecture of such a resource should look like. Even though we focus on language learning issues from a linguistic rather than a didactic perspective and thus address first and foremost linguists interested in the pedagogical potential of Frame Semantics and Construction Grammar, the architecture of the German frame-based online lexicon builds on the idea that language is always embedded in cultural experiences and practices. From a linguistic point of view, there are two main motivations for our study. The first is that foreign language learning requires the acquisition of vocabulary. Without proper knowledge of what words mean and how they are

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used, it is impossible to adequately learn a foreign language. At the same time, however, there are time constraints on the average foreign language syllabus as well as certain cognitive demands for foreign language learning (see Ellis 1997; Nation 2001). Second, there is often a disconnect between the types of information presented by lexical resources such as dictionaries and syntactic resources such as grammars. More importantly, although there is already a plethora of online lexical and grammatical resources available (see, e.g., Heid 2006), very few, if any, provide answers to the demands of foreign language learners.

To illustrate, consider an English speaker trying to learn the German translation equivalent of *to take a shower*, which does not consist of a corresponding support verb construction **eine Dusche nehmen* ('to take a shower'). Instead, German requires the use of a reflexive verb *sich duschen* ('to shower oneself'). Even though a beginning English-speaking learner of German using traditional instructional resources such as textbooks and dictionaries might think that this lexical difference is an isolated exception, it is in fact an instantiation of the more general support verb construction [*to take a(n) N*] that is well attested across different semantic domains in the English lexicon, such as *to take a shower*, *to take a swim*, *to take an exam*, *to take a leave of absence*, and *to take a nap*.

However, not all of these specific support verb constructions have corresponding German counterparts that consist of reflexive verbs. While *to take a shower* has a reflexive verb translation equivalent in German, *sich duschen* (lit. 'to shower oneself'),² the scenario described by *to take a swim* does not, and its German translation equivalent is the non-reflexive verb *schwimmen* (*gehen*) ('to (go) swim(ming)'). In contrast, some of the German translation equivalents of the support verb construction [*to take a(n) N*] are also support verb constructions, but with different support verbs. Compare *ein Nickerchen machen* ('to take a nap', lit. 'to make a nap') and *sich frei nehmen* ('to take a leave of absence', lit. 'to take oneself free'). These examples illustrate that German translation equivalents of specific instantiations of the English support verb construction [*to take a(n) N*] do not follow a coherent pattern that would allow an English-speaking learner of German to learn any specific (or abstract) strategies that would help him/her systematically predict German translation equivalents of such English support verb constructions even in cases where s/he has never heard them before.

At the same time, there appear to be some regularities among German verbs in certain semantic domains. Consider, for example, body grooming verbs such

² However, to make things more complicated, even, for example, in a present or past tense use there is a non-reflexive verb equivalent, namely if it surfaces as a so-called indefinite null instantiation (Ruppenhofer et al. 2010, 24–25; cf. *er duscht* 'he showers').

as *sich waschen* ('to wash oneself'), *sich die Zähne putzen* (lit. 'to brush oneself the teeth'), and *sich die Haare büsteln* (lit. 'to brush oneself the hair'). These examples show that German grooming verbs appear to have a systematic preference for reflexive patterns.

The differences between apparently unsystematic and systematic verbal behavior raises a number of important questions for foreign language learning. (1) How do we capture both the idiosyncrasies and the general grammatical patterns in a way that is easily understandable to the foreign language learner? (2) How do we represent the relationship between form and meaning in such a way that it allows the foreign language learner to easily remember systematic differences between the foreign language and his/her native language? (3) How can we use the foreign language learner's existing knowledge of his/her own language to help him/her learn words and how to use them in a foreign language? (4) How can we use limited time and resources in an effective way to support the acquisition of both vocabulary items and their associated grammatical constructions outside the classroom so that classroom instruction can focus on using the foreign language?

In the remainder of our paper, we aim to provide answers to these questions by showing how an online lexical resource for English-speaking learners of German can support the acquisition of new vocabulary and grammatical constructions. Section 2 first presents the basic concepts of Frame Semantics (Fillmore 1982), a theory of lexical semantics that forms the basis for FrameNet, a lexicographic database for English (Baker, Fillmore, and Lowe 1998; Fillmore and Baker 2010). We then discuss how the concept of semantic frames has been extended to languages other than English. Next, we present the architecture of the German Frame-based Online Lexicon (G-FOL; Boas and Dux 2013) by describing how words pertaining to body grooming are presented to the foreign language learner. In Section 3, we discuss the need to include additional syntactic information about grooming words that goes beyond the scope of grammatical information typically provided by learner dictionaries and grammars. Section 4 summarizes our findings and discusses points to be addressed by future research.

2 Introducing the German Frame-based Online Lexicon (G-FOL)

2.1 Frame Semantics and FrameNet

Frame Semantics (Fillmore 1982, 1985) is based on the idea that "a word's meaning can be understood only with reference to a structured background of experience, beliefs, or practices, constituting a kind of conceptual prerequisite for

understanding the meaning” (Fillmore and Atkins 1992: 76–77).³ In this view, word meanings are understood in terms of semantic background frames that motivate the concept encoded by a word. Since the late 1990s, Frame Semantics has been applied to the construction of a corpus-based lexical database of English, FrameNet, which is built around the concept of semantic frames that can be evoked by lexical units (a lexical unit is a word in one of its senses) (Baker, Fillmore, and Lowe 1998; Fillmore and Baker 2010). Semantic frames are taken as structuring devices to model the types of knowledge necessary for interpreting utterances in the language (see Petruck 1996; Boas 2005a; Ziem 2014a). The FrameNet database consists of lexical entries for several thousand words taken from a variety of semantic domains. Based on corpus data, FrameNet identifies and describes semantic frames and analyzes the meanings of words by appealing directly to the frames that underlie their meanings. In addition, it documents the syntactic properties of words by asking how their semantic properties are given syntactic form (Fillmore, Johnson, and Petruck 2003a: 235). Since 1997, FrameNet has defined 12,777 lexical units (LUs) in 1,180 frames (status as of July 7, 2014).

FrameNet describes LUs in terms of the semantic frames they evoke and presents for each LU a lexical entry that lists different types of interconnected information (see Ruppenhofer et al. 2010 for details). Consider the verb *load*, which has multiple senses, and is thus represented in terms of multiple LUs in FrameNet. One such LU evokes the *Filling* frame,⁴ which is also evoked by other verbal LUs such as *fill*, *glaze*, *smear*, *spatter*, *spray*, and *tile*, among many others. The lexical entry of the LU *load* in the *Filling* frame consists of three parts: (1) the frame description, (2) an exhaustive inventory of how frame elements are realized syntactically, and (3) annotated example sentences from the British National Corpus (BNC). Each frame description consists of frame elements (FEs) that are essential for a full understanding of the associated situation type. For example, the frame description of the *Filling* frame is defined as

words relating to filling CONTAINERS and covering AREAS with some thing, things or substance, the *THEME*. The *AREA* or *CONTAINER* can appear as the direct object with all these verbs, and is designated *GOAL* because it is the goal of motion of the *THEME*. Corresponding to its nuclear argument status, it is also affected in some crucial way, unlike goals in other frames. The *AGENT* is the actor who instigates the filling. (FrameNet; Ruppenhofer et al. 2010)

³ This section is based on Boas (2009a, 2011). The FrameNet data can be accessed online at <http://framenet.icsi.berkeley.edu> (last accessed on August 4, 2014).

⁴ Names of semantic frames are in Courier New font. Names of frame elements are in small caps. Frame Elements differ from traditional universal semantic (or thematic) roles such as *Agent* or *Patient* in that they are specific to the frame in which they are used to describe participants in certain types of scenarios.

The frame description also contains detailed definitions of all FEs as well as a list of all LUs that evoke the frame (see Ruppenhofer et al. 2010). For each LU, FrameNet provides a Lexical Entry Report, which provides a definition for that LU (cf. *to load*: fill a container-like entity with something, often in abundance), a list of FEs and their syntactic realizations, and the valency patterns (see Figure 1), illustrating how frame element configurations are realized syntactically by that LU.

| Number Annotated | Patterns | | | | |
|------------------|----------|------|----------|----------|--|
| | Agent | Goal | Manner | Theme | |
| 1 TOTAL | NP | NP | AVP | PP[with] | |
| (1) | Ext | Obj | Dep | Dep | |
| 13 TOTAL | Agent | Goal | Theme | | |
| (4) | CNI | NP | PP[with] | | |
| | -- | Ext | Dep | | |
| (1) | CNI | NP | PP[with] | | |
| | -- | Obj | Dep | | |
| (1) | NP | DNI | INI | | |
| | Ext | -- | -- | | |
| (1) | NP | DNI | PP[with] | | |
| | Ext | -- | Dep | | |
| (2) | NP | NP | INI | | |
| | Ext | Obj | -- | | |
| (6) | NP | NP | PP[with] | | |
| | Ext | Obj | Dep | | |

Figure 1: Valency information for *load* in the *Filling* frame⁵

Each lexical entry also contains the Annotation Report, which provides annotated corpus sentences from the BNC exemplifying how the FEs are realized in context. Compare, for example, the following sentences illustrating how the FEs of the *Filling* frame are realized syntactically:

- (1) a. [Two girls]_{AGENT} are loading_{VER} [the donkeys]_{GOAL} [with water containers and sacks]_{THEME}.
- b. Did you know that [Cecil Beaton]_{AGENT} couldn't even load_{VER} [his own camera]_{GOAL}?
- c. We'd have [our packs]_{GOAL} loaded_{VER} [with various weights]_{THEME} ...

⁵ Cf. the *Filling* frame retrievable through the “Frame Index” in the FrameNet data (<https://framenet.icsi.berkeley.edu/frndrupal/>, last accessed on August 4, 2014).

The examples in (1) illustrate how semantic frames are structuring devices that help linguists to identify verb classes based on their ability to describe similar types of scenes or situations. While identifying frames and contrasting them with others may raise a number of problems (for details see Petruck et al. 2004; Ruppenhofer et al. 2010), frame-semantic definitions are nevertheless advantageous because they are intuitive and can be checked against corpus evidence.

2.2 Multilingual FrameNets

The concept of semantic frame has also been applied to the analysis of languages other than English (Lambrecht 1984; Petruck 1986; Matsumoto 1989; Baker 1999). Over the past decade, several studies have investigated how semantic frames developed on the basis of English data such as Commitment (Subirats 2009), Communication (Subirats and Petruck 2003; Boas 2005b), Revenge (Petruck 2009), Risk (Fillmore and Atkins 1992; Ohara 2009), and *Self_motion* (Fillmore and Atkins 2000; Boas 2001; Iwata 2002) can be applied to the analysis of other languages such as Spanish, German, Japanese, French, and Hebrew. The consensus emerging from these studies is that frame-semantic information allows us to characterize semantically coherent classes, both within a single language and cross-linguistically (see Boas 2009a and 2009b for details). At the same time, however, these studies also point out that the range of syntactic frames occurring with a given LU is to a certain degree idiosyncratic and cannot always be automatically deduced from semantic information.

In addition, several research teams started constructing FrameNets for a variety of other languages. Following proposals by Heid (1996) and Boas (2002), the basic idea is to reuse semantic frames from the original Berkeley FrameNet for English and apply them to the analysis of other languages to see whether the semantic frames can also be used to describe the lexicons of these other languages. While these multilingual FrameNets all aim to reuse English FrameNet frames, they differ from each other in their goals, workflow, corpora, and tools. Projects such as the German 'Saarbrücken Lexical Semantics Acquisition Project' (SALSA; see Burchardt et al. 2009) are interested in full-text annotation of an entire corpus instead of finding isolated corpus sentences to identify lexically graphically relevant information as is the case with the Berkeley project, Spanish FrameNet (see Subirats 2009), or Swedish FrameNet (Borin et al. 2009). In addition, these FrameNets use different types of resources as data pools. That is, besides exploiting a monolingual corpus, as is the case with Japanese FrameNet (see Ohara 2009), projects such as French FrameNet (Pitel 2009) also employ multilingual corpora and other existing lexical resources (see Fontenelle 2009).

FrameNets for other languages also differ in the tools for corpus searches and annotation. While the Japanese and Spanish FrameNets choose to adopt the Berkeley FrameNet software (Baker, Fillmore, and Cronin 2003) with slight modifications, others such as SALSA develop their own to conduct semi-automatic annotation on top of existing syntactic annotations, or they integrate off-the-shelf software packages as is the case with French FrameNet or Hebrew FrameNet (see Pitel 2009; Petruck 2009). Different FrameNets also focus on different semantic domains. While the majority of non-English FrameNets aim to create databases with broad coverage, other projects focus on specific lexical domains such as soccer language (see *Kicktionary*; Schmidt 2009) or terminology from bio-technology (see Dobey, Ellsworth, and Scheffczyk 2006). Finally, to produce parallel lexicon fragments for other languages, projects utilize different methodologies. While German FrameNet (Boas 2001, 2002) and Japanese FrameNet (Ohara 2009) rely on manual annotations, French FrameNet and BiFrameNet (Fung and Chen 2004) use semi-automatic and automatic approaches to create parallel lexicon fragments for French and Chinese, respectively.

English FrameNet and the FrameNets for other languages are rich lexical resources constructed primarily for professional linguists interested in conducting research particularly in the realm of (computational) lexicography and semantics. While the frame descriptions and the information contained in the lexical entries are extremely detailed and useful for both linguistic research and natural language processing applications, they are not helpful for foreign language learners because (1) they contain too much information, (2) they are too detailed, (3) the linguistic concepts are too difficult to understand for non-linguists, and (4) learners of foreign languages often have limited pre-existing knowledge of the language they are learning (cf. also Atzler 2011).

2.3 The German Frame-based Online Lexicon

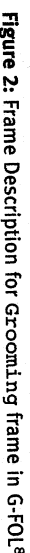
Insights of the FrameNet project led to the development of a prototype frame-based online lexical resource for learners of German at the University of Texas at Austin (UT Austin): the German Frame-based Online Lexicon (G-FOL; Borat and Dux 2013; <http://www.coerll.utexas.edu/frames/>), a project headed by Hai Boas. Currently, G-FOL is designed for English-speaking learners of German in the first or second year of college-level German courses.⁶ However, as the database is continuously extended and refined, we aim to provide frames at constructions for more advanced learners as well.

⁶ The first phase of the G-FOL project focuses on vocabulary in the semantic domains typically taught in first- and second-year university German courses. The next phases will cover the vocabulary and grammar, and will also provide information about different registers (as well as language variation more broadly).

Next, a team of Germanic linguists at UT Austin examined the vocabulary lists of the textbook used for the first year of German instruction at UT Austin in order to identify sets of relevant words evoking the same semantic frame. Using a variety of online corpora, the team of linguists extracted simple German example sentences and annotated them with frame-semantic information. The team created user-friendly lexical entries to be stored in the stripped FrameNet database on local servers. The result is a set of easy-to-use contrastive German-English entries with notes on contrastive differences between German and English, culture-specific information, collocational information, and information about basic grammar usage. Finally, a team of web-designers created an easy to use website to present the resulting information to learners of German. The following sections provide more details on the individual steps underlying this process.

The first step in developing the G-FOL involved choosing which frames to include in the resource. We decided to begin with didactically useful frames that deal with topics included in most introductory foreign language textbooks. We especially wanted to begin with frames that may pose problems for English-speaking students of German, either due to one-to-many translations resulting from different word meanings or due to grammatical differences in how the FEs are expressed. We decided to begin with the *Personal_relationships*, *Eating_and_drinking*, *Education*, and *Grooming* frames. The *Grooming* frame, for instance, is particularly suitable for the resource, as it contains common words that are typically taught in introductory language courses and are necessary for describing one's everyday activities. There are some instances of translational difficulties (see also Section 1): for instance, while English uses the same verb, *brush*, for brushing one's hair and one's teeth, German employs different verbs for the different body parts (*bürsten* 'to brush' for hair, and *putzen* 'to clean/scrub' for teeth). The *Grooming* frame is also grammatically interesting from a cross-linguistic perspective, as English sentences realize the possessor

For each frame, we created a “Frame Description” page, which includes the definition of the frame and each of the FEs. For the Grooming frame, these definitions were taken directly from FrameNet. However, for other frames, such as *Personal relationships*, we modified the FrameNet definitions slightly if they involved linguistic jargon which may be too technical for language learners. Figure 2 shows a screenshot of the Frame Description page for Grooming, including the Frame Definition, a picture depicting the frame’s meaning, and the list of core FEs for the frame,⁷ whose definitions can be viewed by dragging the mouse over the FE name.



7 In accordance with FrameNet (e.g. Ruppenhofer et al. 2010: 35), we distinguish between non-core and core FEs whereby the latter, but not the former, are supposed to be conceptually essential elements of the respective frame.

8 Please see <http://coerll.utexas.edu/frames/frames/grooming> (last accessed on August 4, 2014).

LU *biirsten* (“to brush”). Before populating the list, we chose which LUs to include in the G-FOL. We began by searching the English LUs on FrameNet to identify the most important and interesting ones. To simplify the experience for the users, some LUs were excluded if they were particularly infrequent, such as *abulution* and *moisturize* in the Grooming frame.

For the chosen LUs, we identified any German equivalents using bilingual dictionaries and native speaker intuitions. It is important to note that German-English word pairs are rarely true translation equivalents, thus necessitating a cross-listing of English LUs to multiple German LUs, or vice versa, or a further specification of meaning in the entry title. For instance, the second item on the list of LUs on the left of Figure 3 shows not just the verb *bürsten*, but also the common collocation *die Haare bürgsten* ('to brush the hair'), and the English counterpart is also listed with the collocating noun *hair*.

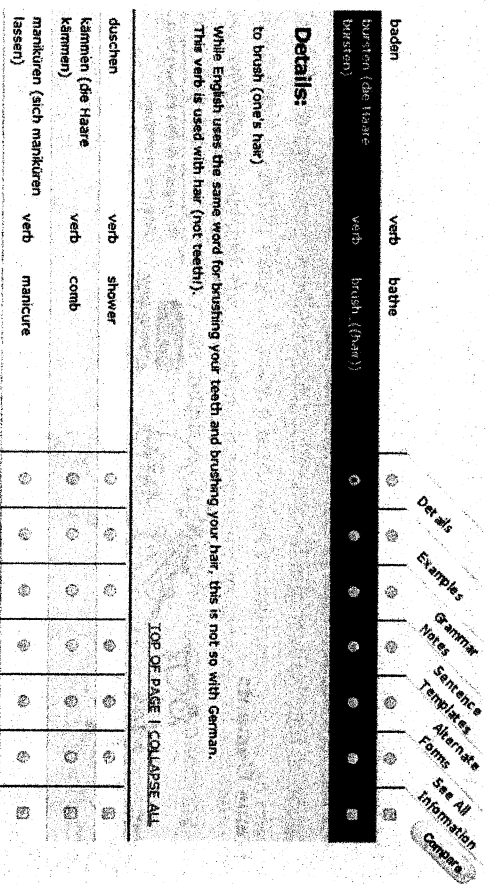


Figure 3: Portion of LU list for Grooming frame and Details for the LU *bursten* ("to brush")⁹

For the Details page, we provide brief instructions in prose about how the LU may differ from English and cause translation difficulties for learners. For this LU, we pointed out that the verb *bürsten* is only used for brushing one's hair and not for brushing one's teeth.

Another useful piece of information provided for LUs in the G-FOL is the “Grammar Notes”, which describe how individual LUs or sets of LUs differ from

9 The “compare” button in the top right corner in Figure 3 allows G-FOL users to check any number of verbs for comparison of their properties in an external pop-up window.

their English counterparts in the grammatical expression of FEs. Figure 4 shows a portion of the “Grammar Notes” relevant for the verb *sich duschen* (‘to take a shower’). In particular, it points out that *sich duschen* is used as a transitive verb (with the direct object frequently appearing as a reflexive pronoun when one showers oneself), whereas English speakers use the noun *shower* in combination with the light verb *take*, as in *take a shower*.¹⁰ In Section 3, we describe how we plan to expand the grammatical coverage of the G-FOL to address the constructional behavior of LUs more systematically.

German vs. English

When it comes to Grooming, English differs from German in two respects. First, instead of using a simple verb like *German duschen*, English often uses a support verb construction, where a meaningful noun (*shower, bath*) combines with a 'light' verb (*take*).

Ich dusche mich mehrmals am Tag

Second, while German expresses the Patient as though it is directly affected by the verb (as a direct or indirect object), English construes the participant more as a possessor of the body part (with a possessive pronoun).

I brush my teeth. – Ich putze mir die Zähne.

I brush his teeth. – Ich putze ihm die Zähne

Figure 4: Portion of “Grammar Notes” for *sich duschen* (‘to take a shower’)

To show users how a given LU is used in context, G-FOL provides for each LU a list of three to six example sentences along with English translations. Most of the examples were hand-selected from online corpora, such as the DWI corpus (*Digitales Wörterbuch der deutschen Sprache*; www.dwds.de), with the criteria that the sentence should be brief and clear and exemplify a common use of the LU in question. In some cases, examples were made up by a native speaker to more clearly demonstrate the meaning and grammar of the LU. These example sentences are also annotated for FEs using color-coding in order to show users how individual participants are realized grammatically and po-

10 Note that individual verbs may differ with respect to their occurrence in reflexive vale patterns. This is likely the case with *duschen* ('to shower') and *baden* ('to bathe'). Specific one reviewer points out that (s)he prefers verbs such as *baden* without a reflexive object over reflexive counterpart *sich baden*. This might be due to regional variation. It could also reflect the fact that some native speakers associate the non-reflexive *baden* more with an activity interpretation, whereas the reflexive *sich baden* evokes more directly the actual Grooming interpretation, whereas the reflexive *sich baden* evokes more directly the actual Grooming interpretation, whereas the reflexive *sich baden* evokes more directly the actual Grooming interpretation, whereas the reflexive *sich baden* evokes more directly the actual Grooming interpretation, because the PATIENT FE is explicitly mentioned. To account for this variation, the G-FOL indexes such IUs with a Grammar Note stating that the reflexive object may be omitted in certain contexts in modern colloquial German.

out differences between the two languages. Figure 5 shows the example sentences for the verb *baden* ('to bathe') in the Grooming frame, with the German on the left side and the English translations, provided by the UT Austin linguists developing the G-FOL, on the right. The AGENT FE is colored purple (here, dark gray), the PATIENT FE is pink (here, light gray), and the BODY_PART FE is green (here, normal gray).

| baden | verb | bathe |
|--|---|-------|
| Example Sentences: | | |
| 1. Anne badete und ging ins Bett. | 1. Anne took a bath and went to bed. | |
| 2. Die Mutter badet ihr Baby jeden Abend. | 2. The mother bathes her baby every evening. | |
| 3. Mein Bruder hat sich bei uns gebadet, als er uns besucht hat. | 3. My brother bathed himself at our place when he visited us. | |
| 4. Am Abend badet Sabine ihre Füße. | 4. In the evening Sabine bathes her feet. | |

Figure 5: Example sentences for *baden* ('to bathe')

In addition to "Details", "Grammar Notes", and "Example Sentences", G-FOL also provides a list of "Alternate Forms" for each LU, which lists various tense forms for verbs (preterite, participle, etc.) or plural forms for nouns. Finally, G-FOL provides "Sentence Templates" which are simple sentence "skeletons" that show how a verb combines with various configurations of its FEs. For example, the templates for *baden* include "AGENT *badet*", "AGENT *badet* PATIENT", and "AGENT *badet* BODYPART".¹¹ The German sentence templates also appear with English translation equivalents on the right side.

This section has described the development and layout of the G-FOL, which provides detailed information about German LUs for English-speaking learners. While the G-FOL also provides grammatical information as it is relevant for the documented vocabulary items, a more systematic and comprehensive treatment

¹¹ As the sentence templates serve to show what FEs a given verb may appear with, they only include the simple FE name but not any grammatical information on how the FE is realized (e.g. PATIENT as a reflexive object).

of how constructions are related across German and English is desired. The following section sketches how constructional information can be integrated into the G-FOL.

3 From frames to constructions

3.1 Completing the learner's dictionary: why constructions matter

What does a language learner need to know in order to correctly use and understand LUs in a given language, such as German? To what extent can, or should, the design of an online dictionary adjust to the learners' linguistic competence? The answer we offered so far is: s/he needs to know the frame an LU evokes, including its FEs, and their syntactic realization patterns. Note, however, that an approach solely built on frames runs into serious problems if it deals with grammatical structures that are not fully transparent (Fillmore 2008; Fillmore, Lee-Goldman, and Rhodes 2012; Ziem, Boas, and Ruppenhofer 2014; with reference to didactic issues: Ziem 2015a). Such grammatical structures include, for example, grammatical idiosyncrasies that cannot be explained by valency reduction or augmentation, that is, the addition or omission of valents, alone. Hence, opaque grammatical and semantic structures are true challenges for language learners. To illustrate, consider (2):

- (2) a. In the afternoon we organized a small bridal shower for Lydia who is getting married soon.¹²
- b. ?In the afternoon we organized a cold shower for Lydia who is getting married soon.

(2a) only differs from (2b) with respect to the direct object's adjectival attributes, with *small bridal* specifying the noun *shower* in (2a) and *cold* specifying it in (2b). However in (2b), but not in (2a), the LU *shower* (noun) evokes the Grooming frame. This is because in (2a) *shower* is part of an [Adj N] construction displaying regular syntax while exhibiting semantic idiosyncrasies, in that its meaning is not compositional, but rather meaningful as a whole. In other words, *bridal shower*, but not *cold shower*, is semantically intransparent, since it is not produced through regular adjective-noun modification as specified in a

¹² <http://www.danielhaase.com/usa/february/english.html> (last accessed on August 4, 2014).

grammar. In line with Berkeley Construction Grammar (Fillmore 2013), we refer to such complex linguistic units as constructions, defined as linguistic signs licensed on the basis of other linguistic signs.

How, then, does a language learner know that the NP *bridal shower* in (2a) is interpreted in such a way that the whole unit evokes a frame? And why is it, on the other hand, that in (2b) both lexical constituents of the NP *cold shower* evoke a frame of their own in such a way that the *Temperature* frame tied to the LU *cold* specifies the *Grooming* frame evoked by the noun *shower*? Even worse, how does a language learner know that the linguistic unit *bridal shower* evokes the *Social_event* frame instead? Obviously, *bridal shower* is an instance of a lexically specified [Adj N] construction that requires its own entry in a dictionary for language learners. Due to the non-compositional nature of such idiomatic expressions, their syntactic and/or semantic properties cannot be captured in a purely lexical approach relying on valency alone, such as the Berkeley FrameNet project, although the project accounts for many multi-word units acting as frame-evoking units, including, for example, [Adj N] constructions like *given name*, compound adjectives such as *light-fingered*, and particle verbs like *take off* (Ruppenhofer et al. 2010: 7, 53).

One of the key insights of Construction Grammar, the sister theory of Frame Semantics (cf. Ziem 2014b), is that constructions (pairings of form and meaning) are the basic building blocks of language (see the contributions in Hoffmann and Trousdale 2013). As such, constructions also concern the very foundations of a learner's dictionary (Holme 2010; Ziem under review). However, despite their prevalence, constructions are often quite elusive and difficult to address for language learners. Consider even more complex constructions subsuming *shower* as its lexical constituent:

- (3) a. Finally, simply shower off the remaining salt residues with cold or warm water.¹³
- b. These power brokers regularly dine with their congressman, accompany him on vacations and shower him with gifts.¹⁴

Compare (3a) with (3b). The meaning of the prepositional verb *shower off* in (3a) is structured by the *Grooming* frame. However, if the lemma *to shower* (verb) enters the construction [subject + VERB + direct object + prepositional

¹³ <http://goo.gl/xkxzg9> (last accessed on August 4, 2014).

¹⁴ http://www.washingtonpost.com/wp-dyn/content/article/2006/02/07/AR2006020701736_Technotati.html (last accessed on August 4, 2014).

object with *with*], as exemplified in (3b), then it evokes a different frame, namely *Giving*. Here, it is the construction, and not the meanings of the sentence's LUs compositionally combined with the sentence's meaning, that defines the meaning. More precisely, once *shower* enters into the construction exemplified in (3b), it undergoes a semantic shift yielding a metaphoric reading. Also, in this case, learning frames evoked by LUs does not suffice; a language learner must also know in which constructions LUs form a lexical constituent. In other words, lexical meanings may vary depending on the constructions in which they are embedded. Bearing the examples given above in mind, there is no way constructional information can be kept out of a learner's dictionary. In (3b) it is the construction that gives rise to a metaphoric interpretation of *shower*. Metaphors of this kind also need to be covered by a learner's dictionary (cf. Ziem 2015b for integrating metaphors in G-FOL).

Fortunately, constructional information can easily be incorporated into the infrastructure of G-FOL. Note that LUs and constructions share basic properties. Most importantly, both are linguistic signs, that is, conventionalized pairings of form and meaning. Hence, rather than forming distinctive entities, there is a continuum between lexicon and grammar (Boas 2010; Broccias 2012; Fillmore Lee-Goldman, and Rhodes 2012; for an overview see Ziem and Lasch 2013: 90–95). Just like words, constructions are learned by associating forms with meanings. Goldberg (2006: 5) thus argues that words are also constructions; lexical constructions only differ from grammatical ones in that they are neither schematic nor abstract. As a result, the same mechanisms should apply to the presentation of both words and constructions, including idioms and grammatical patterns, i.e. a learner's dictionary. Furthermore, not only do the structural similarities of words and constructions allow for unified empirical descriptions, including homogenous annotations; they also call for integrating constructional information in G-FOL, as we demonstrate in the following sections.

3.2 Annotating and analyzing constructions in FrameNet

Over the past two decades, the Berkeley FrameNet community has become increasingly aware of the necessity to extend the lexical resource of frames to FrameNet construction. As a natural extension of the lexical FrameNet resource the FrameNet construction is designed to be a repository of grammatical structures peculiar to a language (Fillmore 2008; Fillmore, Lee-Goldman, and Rhodes 2012; Ziem 2014b). As Fillmore notes, a sophisticated valency dictionary such as FrameNet provides the following advantages to aid in sentence interpretation:

a set of articulated lexical descriptions of each (frame-bearing) word, awaiting compositional principles based on simple patterns of grammatical organization to integrate the meanings provided by each word into reasonable formulation of the meaning of the sentence. (Fillmore 2013: 1)

He adds, however, that a full account of the syntactic and semantic structures a sentence instantiates also requires the inclusion of grammatical constructions that have meanings and functions on their own (Fillmore 2013: 17). Similar to examples such as *bridal shower*, *meteor shower*, and *to shower somebody with something*, many syntactic and semantic structures “cannot be fully explained in terms of the kind of structures recognized in FN’s [= FrameNet’s] annotation database, or simple conjunctings or embeddings of these” (Fillmore, Lee-Goldman, and Rhodes 2012: 312). Nevertheless, the FrameNet database already contains a good deal of constructional information including, most importantly, so-called realization constructions, or valency patterns in which an LU could be realized (Ziem 2014b: 279–280). Realization constructions provide constraints on the combinatory potential of an LU by defining patterns in which FEs can be syntactically combined.

By using the same formalisms and annotation criteria for both frame-bearing words and grammatical constructions, Fillmore demonstrates how to integrate the latter into the FrameNet database (Fillmore 2008; Fillmore, Lee-Goldman, and Rhodes 2012). Table 1 summarizes similarities of the annotation work yielding detailed descriptions of frames and constructions.

Table 1: Annotation of Lexical and Grammatical Units (cf. Fillmore 2008: Chapter 5.1)

| Lexical Units (in FrameNet) | Grammatical Units (in the FrameNet-Construction) |
|---|--|
| Identification of frame-evoking LUs | Identification of construction-evoking elements (CEE) |
| Description and annotation of frames, FEs, frame-to-frame relations | Description and annotation of constructions, their constructional elements (CEs), construction-to-construction relations |
| Naming of FEs according to their function in a frame | Naming of CEs according to their function in a construction |
| Annotation of FEs according to their grammatical function and phrase type | Annotation of CEs according to their phrase type, annotation of lexical head of the construction (if applicable) according to its grammatical function |
| Providing sample sentences for illustrating a frame | Providing sample sentences for illustrating a construction |
| Identifying and illustrating valency patterns | Identifying and illustrating realization patterns of constructions |

Similar to frame-evoking LUs, the linguistic unit evoking a construction is called a ‘Construction Evoking Element’ (CEE). To illustrate, consider the construction [subject + *shower* + direct object + prepositional object with *with*] exemplified in (3b). For convenience, we shall call this the *shower-sb-with-sth* construction. In this construction, *shower* acts as the CEE, and the actually realized expression, the so-called construct, licensed by the construction comprises (a) the subject instantiating the FE DONOR, (b) the direct object *him* instantiating the FE Recipient, and (c) the prepositional object *with gifts* instantiating Theme. Since the meaning of the construction is determined by the Giving frame, its Constructional Elements (CEs) can be annotated with recourse to the FEs inherent to the Giving frame. CEs are those constituents of sentences that instantiate parts of a construction. Consequently, the definition of the *shower-sb-with-sth* construction is very similar to that of the Giving frame in FrameNet:¹⁵

A DONOR transfers a THEME from a DONOR to a RECIPIENT. Just like the Giving frame, this construction includes only actions that are initiated by the DONOR (the one that starts out owning the THEME). Sentences (even metaphorical ones) must meet the entailment that the DONOR first has possession of the THEME. Following the transfer, the DONOR no longer has the THEME and the RECIPIENT does. (FrameNet, Ruppenhofer et al. 2010)

Constructional annotations help describe and define a construction appropriately. First, the CEE is identified. Note that in contrast to frame annotation, many grammatical constructions are not associated with an explicit target LU that provides a link to the construction. We then name those parts of sentences that form the constituents of the constructs licensed by the construction. Finally, these components are labeled as elements of the construction. Following this procedure, (4) exemplifies the annotation of (3b) with regard to (i) the CEE, (ii) the CEs and their functions within the construction, and (iii) the construct that is licensed by the construction. Sticking to FrameNet conventions, we tag CEs with square brackets and constructs with curly brackets, while labeling the meanings or functions of these elements with the help of subscripts.

- (4) [DONOR These power brokers] regularly dine with their congressman,
accompany him on vacations and [SHOWER-WITH-STH [CEE <shower>]
[RECIPIENT him] [THEME with gifts]].

(4) does not include annotations of the grammatical function and phrase structure of each of the CEs. In line with the descriptions of the respective FEs in the Giving frame, the CEs realized in (4) can be defined as follows:

¹⁵ <https://framenet.icsi.berkeley.edu/fndrupal/index.php?q=luindex> (last accessed on August 4, 2014).

- DONOR is the person that begins in possession of the THEME and causes it to be in the possession of the RECIPIENT.
- RECIPIENT is the person that receives the THEME from the DONOR.
- THEME is the object that changes ownership.

All of this information is relevant for designing a proper constructional entry in a learner's dictionary. The following section shows how this information can be neatly integrated into the G-FOL database.

3.3 Integrating constructional information into G-FOL

We now demonstrate how to integrate constructional information into G-FOL on the basis of the *shower-sb-with-sth* construction introduced above. Currently, G-FOL is limited to words that evoke a frame; it does not yet contain constructions. However, just as FrameNet may be extended to a FrameNet construction (cf. Ziem 2014b: 283–285), we may expand the G-FOL database to a repository of grammatical constructions relevant for language learners' needs when consulting a dictionary.

The most basic information to include in the database concerns the "Construction Description" subsuming definitions of the CEs. With respect to the *shower-sb-with-sth* construction, the data are similar to the descriptions and definitions given in the prior section. Analogous to the "Frame Description", which provides a list of all frame-evoking LUs (cf. details in Section 2.3), the "Construction Description" will comprise a list of CEEs. The list will encompass verbs such as *overwhelm* or *flood*, which also serve as CEEs once they enter into the construction.

Regarding the information provided for each CEE and the respective constructions, we will also stick to the data structure developed for each frame-evoking LU wherever possible. To be precise, the following categories will be adopted, which are illustrated by the German equivalent of the *shower-sb-with-sth* construction (see previous sections above).

- *Details*: If a German construction differs from its English equivalent, it is elaborated to what extent this is the case. Even though the German *jdn. mit etwas überschütten* ('to shower-sb-with-sth') construction does not exhibit grammatical properties peculiar to this unit, there are constraints concerning the realization of the CEs: first, in a declarative active sentence DONOR must be realized in subject position; second, RECIPIENT is required to be realized as a direct object; third, THEME must take the form of a PP whose nominal constituent might well be abstract (*joy, love*); finally, all three CEs

must be realized. Furthermore, it is worth mentioning that in the standard translation *shower-sb-with-sth*, the verb *shower* undergoes a metaphorical shift, just like *überschütten* ('to shower-sb-with-sth' or 'to shower-sth-on-sb') in the German equivalent. Since this metaphorical meaning is conventionalized, it should also show up in the "Details" portion of the entries for *shower* and *überschütten* respectively.

- *Examples*: This rubric will include annotated sample sentences instantiating the grammatical construction addressed, such as (3b). To keep the examples for language learners as simple and accessible as possible, the annotations only cover CEs and their functions within a construction. Thus, in (3b) the NP *these power brokers* is labeled as DONOR, the NP *him* as RECIPIENT, and the noun *gifts* within the PP *with gifts* as THEME.

Grammar Notes: As a more specific instance of the abstract construction [VERB + direct object + prepositional object with *with*], *jdn. mit etwas überschütten* ('to shower-sb-with-sth') displays regular syntactic properties and it inherits the prototypical meaning of ditransitive constructions, namely that the "[a]gent successfully causes recipient to receive patient" (Goldberg 1995: 38), and more specific information from the GIVING frame as defined in FrameNet.¹⁶ However, note that in written discourse verbs such as *überfluten* and *überschwemmen* ('to flood') are limited to rather informal registers; as a matter of fact, they are common in spoken discourse but also occur in narrative texts including newspaper articles.

- *Sentence Templates*: Neither the English *shower-sb-with-sth* construction nor its German equivalent *jdn. mit etwas überschütten* varies in terms of the realization and configuration of CEs. The sentence template is thus restricted to 'DONOR shower/s RECIPIENT with THEME'.

Alternative Forms: As mentioned in Section 2.3, the G-FOL database also provides a list of alternate verb forms (preterites, participles, etc.) for each frame-evoking LU. For constructional entries, these pieces of information are equally relevant in that many constructions either comprise irregular verbs or allow for a variety of CE configurations.

In order to make G-FOL as user-friendly as possible, we intend to allow users to access constructional information in two ways. In addition to providing a repository of basic constructions relevant for language learners, or a mini-construction, constructions should also be accessible through the entries of those LUs that act as CEEs.

¹⁶ <https://framenet.icsi.berkeley.edu/Indirupal/index.php?q=frameindex> (last accessed on August 4, 2014).

4 Conclusions and outlook

This paper reported on the conceptual development and implementation of a frame- and construction-based online dictionary for language learners. Specifically, we introduced G-FOL, a bilingual lexical resource developed first and foremost for English-speaking university students in first- and second-year German courses. Given that G-FOL is based on Berkeley FrameNet data revised for pedagogical purposes, we discussed how constructional information could be integrated into the database established so far.

Our aim to build a didactic resource such as G-FOL, designed for supporting foreign language teaching and learning, is motivated by three observations. First, there is a practical need for rich vocabulary instruction within the constraints of an average US college syllabus and in line with our knowledge about the cognitive demands for foreign language learning (Ellis 1997; Nation 2001). Second, there is a general disconnect between vocabulary and grammar in most pedagogical resources, yielding enormous difficulties for language learners. Third, there is typically not enough time in foreign language class periods to also teach the detailed aspects of word meaning and grammar that are necessary for proper usage.

To illustrate these challenges for a modern learner's dictionary, we showed how verbs in the Grooming frame exhibit semantic and grammatical differences, which are rarely obvious to average language learners. Based on findings in this case study, we described the general structure of the G-FOL database, including a "Frame Description" for each frame, "Details" about annotated sentences, grammar notes, sentence templates, and alternative forms for each frame-evoking LU. In this context, it was our goal to demonstrate how G-FOL employs and expands on principles of FrameNet (Fillmore and Baker 2010) and to what extent the methodological framework could be applied to more complex frames and constructions.

To this end, G-FOL is designed to enable language learners to learn the meaning and usage of new words outside of the classroom, using contrastive examples and semantic frames to make vocabulary acquisition more effective. This learning can take place at any time with the help of any device connected to the internet (e.g. computer, tablet, smartphone), thereby allowing learners to individually tailor their learning process.

In the future, we intend to implement grammatical constructions in the G-FOL database systematically. An important part of this endeavor is to set up an even richer pedagogical resource, documenting the entire range of constructions for each LU. Not only does such a "mini-constructor" for language

learners reveal relations between various constructions in German and English but, more importantly, implementing annotated exercise texts (such as cloze and multiple choice tests) into the dictionary also facilitates interactive vocabulary and construction learning. In addition, we plan on developing accompanying pedagogical materials such as online exercises (e.g. fill-in-the-blank, multiple choice, writing tasks) and classroom activities specifically designed for different learner levels. For detailed ideas about what such materials may look like, see Boas and Dux (2013).

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Constructicography meets (second) language education: On constructions in teaching aids and the usefulness of a Swedish constructicon

Abstract: This chapter addresses the need for better coverage of semi-general linguistic patterns in (second) language pedagogy, which is currently biased towards general rules on the one hand and concrete expressions on the other. Arguably, this reflects the descriptive resources available: grammars and dictionaries. Hence, we propose that L2 education should benefit from a constructionist approach, which is less restricted to distinct linguistic levels and therefore better suited to handle, in particular, patterns combining lexical and grammatical properties.

We review some of the leading Swedish L2 textbooks and study aid materials, and illustrate how they tend to neglect semi-general patterns and fail to capture the productivity and variability of constructions. For future L2 education to achieve better coverage in this regard, access to constructionist descriptive resources should be helpful. As an example of such a resource, we present the Swedish constructicon (SweCcn), an electronic database of Swedish construction descriptions, and discuss its usefulness for developing construction-based teaching materials, as a complement to the grammar and dictionary approach.

Keywords: language pedagogy; second language learning; constructicon; constructicography; construction grammar; Swedish

1 Introduction¹

Teaching materials in (second) language pedagogy obviously have to account for concrete expressions as well as general rules. What tends to be overlooked,

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