The Frame Semantics of
‘Communication_Manner’ in English and German

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Abstract
This paper presents an analysis of cross-linguistic frame validity of a small group of English and German verbs, which express manner of communication, in order to address the question whether or not identical semantic frames exist across languages (Boas, 2005). The data for the English and German verbs was drawn from two corpora and manually annotated for the frame-semantic elements in accordance with the methodology utilized by the Berkeley FrameNet project (Johnson et al., 2001). The study’s focus is on the cross-linguistic analysis of the frequency of the semantic elements pertaining to the Communication_Manner frame. The findings suggest that while the same semantic frame applies to the two languages, significant differences in the frequency of certain frame elements exists. As a result, I argue that when adapting semantic frames based on English to another language, it is important consider a more magnified approach to determine more subtle differences in how events are conceptualized across languages. This approach includes the tracking of frame elements and distributional trends for fillers of the semantic element.

1. Introduction
This paper addresses the question of whether or not semantic frames created on the basis of English can be used to describe the semantic structure in other languages. Using the theory of frame semantics (Fillmore, 1982) I conducted a comparative analysis of corpus data for a small group of English and German verbs pertaining to the frame of Communication_Manner. This frame denotes a particular manner of speaking and includes verbs like shout, stammer, mutter etc. This research on communication verbs originates as a response to Boas’ proposal, in which he suggests semantic frames are cross-linguistically valid, and can even be regarded as universal (2001; 2005; 2013a). While Boas notes that frames related to communication and motion often correspond cross-linguistically, others such as Personal_Relationship or Criminal_Process may differ. Semantic frames not only highlight cultural differences in regard to lexical units’ translation equivalents but also point to cultural variation evoked in language. I too assume semantic frames correspond cross-linguistically, but not necessarily in the frequency of frame elements. I argue that the frequency of semantic elements illuminates the more subtle knowledge of how manner of communication events are conceptualized by speakers of English and German. Additionally, the distribution of fillers for semantic elements can point to lexical preferences a given lexical unit may have, and shed light on the German - English translation.

The results of the analysis indicate that the semantic frame of Communication_Manner indeed is applicable cross-linguistically, but that differences exist in how frequently some of the frame elements are encoded. According to the analysis, some of the English and German verbs
notably differ in their preference for encoding the frame elements MESSAGE, TOPIC, ADDRESSEE and MANNER. The analysis shows that German, in contrast to English, more frequently encodes MESSAGE over TOPIC, while the opposite is true for English. This suggests that German manner of communication verbs prefer direct speech in the form of a quote, noun phrase or finite complement clause over topic content. On a similar note, the analysis points to subtle intra-lingual differences among the verbs in each language. Some verbs in this frame appear to be more content specific than others, encoding more conceptual information than attributed to the particular frame. Furthermore, the analysis indicates the German verbs are less likely to require an ADDRESSEE, suggesting German verbs are less communicative than their English equivalents. Likewise, my analysis shows that some German verbs of communication encode MANNER more frequently than their English counterparts, suggesting variability in the verbs’ conceptual information about the concrete verbal manner of communication.

The paper is organized as follows: In section 2, I review relevant literature on the theory of frame semantics and frame semantic research in German; in section 3, I describe my methodology in regard to parameters of data collection and coding; in section 4, I present my data and analysis. Finally, in section 5, I provide a discussion of my findings, their implications and further alleys of research.

2. Background

2.1. Frame Semantics

Frame semantics is a “research program in empirical semantics and a descriptive framework for presenting the results of such research” (Fillmore, 1982, p. 111). It originated in the work of Charles Fillmore in the 1970s and 1980s. The central idea is the notion that lexical units can only be understood in connection to cognitive scenarios, or conceptual frames (Fillmore, 1976). These scenarios can be best described as the “structured background of experience, beliefs, or practices constituting a kind of conceptual prerequisite for understanding the meaning,” where speakers, “… know the word only by first understanding the background frames that motivate the concept the word encodes” (Fillmore & Atkins, 1992; p. 76-77).

Frame semantics underscores the connection between language and our experience. The goal is to illustrate what reasons speech communities have to create specific schematic categories for a lexical unit (henceforth LU), and how these reasons are connected to the understanding of
word meaning (Petruck, 1996). Frame semantics can broaden our understanding of how and why linguistic communities perceive certain concepts differently, how they create meaning, and consequently, how their interpretations are encoded differently in linguistic structure.

To illustrate the notion of frames consider the Theft frame, as described in Boas (2013a). Verbs that evoke the Theft frame are embezzle, pickpocket, shoplift, snatch, steal etc. The core elements of a frame coincide with the broader semantic roles such as Agent, Patient and Instrument, but are represented as more specific to the particular scenario in frame semantics. In the Theft frame they include GOODS (the thing that is taken away), PERPETRATOR (the person or agent who takes the goods), SOURCE (the location of the goods before there are taken), and VICTIM (the person who owns the goods before they are taken). ¹ The semantic frame structures the relationship between the frame elements (henceforth, FEs) as in, ‘The thief stole the wallet from the old lady’s purse,’ where a PERPETRATOR (the thief), takes the GOODS (the wallet) from a VICTIM (the old lady), or LOCATION (the purse). In order to understand the meaning of the verbs in the Theft frame, and to know what takes place in a theft scenario, an understanding of all the FEs is required.

2.1.2. FrameNet

The FrameNet project is an online lexical database that provides “frame semantic descriptions of several thousand lexical items and backing up these descriptions with semantically annotated attestations from contemporary English corpora” (Baker, Fillmore & Lowe, 1998, p. 86).² FrameNet’s goal is to construct frames for all words evoked in English in order to illustrate LUs possible semantic and syntactic realizations, and any conceptual information they share. Within each frame evoked by an LU the FrameNet formalism distinguishes core and non-core FEs. Core elements are the concepts understood as being central to the understanding of the word and its frame, whereas non-core ‘s add peripheral information to a given frame and are not always pivotal to the understanding and interpretation of meaning (Fillmore & Baker, 2009). FrameNet documents all relevant syntactic and lexicographical uses of an LU in the form of annotated examples extracted from the BNC (Baker & Ruppenhofer,

¹ https://framenet.icsi.berkeley.edu/fndrupal/index.php?q=frameIndex
² https://framenet.icsi.berkeley.edu
2002), but only includes limited frequency information. As my research demonstrates, this lack of frequency information may be a shortcoming. The frequency of the FEs and their fillers can aid in discovering potential differences in verb meaning and use, as well as differences in their translations to other languages. The importance of the frequency of frame elements seems to be particularly valuable in the light of the various frame semantic resources currently being constructed for other languages, such as Spanish, Italian, Japanese and Chinese (Subirats, 2009; Johnson & Lenci, 2011; Ohara et al., 2004; You & Liu, 2005), or German (Boas, 2002; Burchardt et al., 2006).

2.1.3. Frame Semantics and the German lexicon

Since the early 2000s two frame semantic resources similar to FrameNet have been in development for German. Researchers in Germany have been working on a lexical semantic resource called SALSA. SALSA builds on the English FrameNet inventory for the frames and semantic roles, but is based on a different approach for annotation with their own annotation software (Burchardt et al., 2006). Furthermore, a German version of FrameNet has been established by researchers of the University of Texas, Austin, utilizing FrameNet’s annotation process. The ultimate goal of German FrameNet is to provide parallel lexical entries coinciding with those in English (Boas, 2002; 2005).

Although Boas (2011) suggests that the English frames in general can be transferred when creating frames for German, there are several important aspects of this assertion that need to be evaluated. One is the distinction of “truly universal frames and language-specific frames” (Boas, 2005, p. 472). For instance, the English Personal_Relationship frame wouldn’t be directly applicable to German for reasons of language specificity and lack of certain LUs in German, rather than due to non-universality of the conceptual frame. Similarly, even if LUs appear to be translation equivalents, a single translation may not be applicable to all of its’ possible situational realizations. This would result in subtle differences in meaning between LUs of the same frame. Hence, it is important to take factors such as the words’ context, style, and polysemy into account when choosing a translation equivalent.

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3 The British National Corpus: [http://www.natcorp.ox.ac.uk](http://www.natcorp.ox.ac.uk)
Concerning the domain of communication verbs, earlier studies have shown they can be reused for other languages such as German, but their often idiosyncratic realizations of FEs can make their analysis difficult at times (Boas, 2005).

3. Methodology

The method of data collection and annotation adapted in this study follows FrameNet’s methodology (Johnson et al., 2001; Ruppenhofer et al. 2006) as closely as possible. As a first step, a group of five English verbs was selected from the list of lexical units in the Communication_Manner frame on FrameNet (babble, stammer, mumble, whisper, and rant).4 Next, their German counterparts were selected (plappern, stammeln, murmeln, flüstern, and schimpfen).5 The German verbs were first chosen by my own intuition, and then cross-checked in three online German - English dictionaries.6 In summary, all verbs used in this study were chosen because of their common usage and frequency. They are translation equivalents which carry similar senses and semantic collocations. They have low polysemy, and they are monomorphemic realizations in German.7

4 https://framenet.icsi.berkeley.edu/fndrupal/index.php?q:frameIndex

5 Regarding the verbs’ translation, it needs to be noted that the English verb to babble could be translated into its German cognate babbeln. However, this translation was not selected for the analysis because of its rather infrequent use, which was further supported by the lack of corpus examples. Instead, the closest synonym plappern was chosen as a translation. Furthermore, the English verb to rant is translated as schimpfen. While there are other possible German translations, once again, they are uncommon. Here, schimpfen consequently seemed to be most similar to the English meaning. Instances of schimpfen in which the verb is followed by the preposition mit [with] were excluded, because in conjunction with the preposition the verb receives a different meaning closer to the English to scold.


7 I ruled out verbs with separable prefixes or particles common to many German verbs.
3.1. Corpora and Search Parameters

For each of the English and German verbs 100 sentences were extracted from the corpus resource tool Sketch Engine.\footnote{http://www.sketchengine.co.uk}\footnote{To render the results as representative and comparable as possible, the enTenTen corpus was used for English, and its’ equivalent, the deTenTen corpus for German. The ‘TenTen’ corpora are web-crawled corpora all sharing the same methodological search parameters and structural attributes, each containing around 10 billion words, hence 10\textsuperscript{10} (Jakubiček, 2013). These corpora are constructed to offer a larger diversity of texts representative of a very contemporary use of the English and German language.} Fifty sentences were collected in the third person singular present tense, and fifty in the third person singular simple past tense. In accordance with FrameNet’s methodology both transitive and intransitive uses of the verbs were included in the data collection. Metaphorical uses of the verbs were manually eliminated from the corpus, such as instances of inanimate objects producing an utterance as in example (1), as well as idiomatic uses of the verbs such as in (2):

(1) Das Bächlein [murmelt]
    The little stream [mumbles]

(2) He [ranted and raved] about the neighbor’s car in his driveway.

While it would be interesting to examine metaphorical uses of manner of communication especially in regard to the fillers of the SPEAKER role, it exceeds the scope of this study. In order to replace the eliminated metaphorical uses more data was collected, consequently rendering a total corpus of 1000 example sentences.

3.2. Data Coding

The data was coded according to FrameNet’s methodology (Johnson et al., 2001; Ruppenhofer et al. 2006). Each sentence was manually coded for the core FEs of the English Communication_Manner frame. All frames in the communication domain are concerned with “verbal communication between people and inherit structure and frame elements from the higher-level frame communication” (Johnson et al., 2001; p.108). The core-elements of this frame as outlined by FrameNet are: SPEAKER, MESSAGE, TOPIC, and ADDRESSEE.\footnote{https://framenet.icsi.berkeley.edu/fndrupal/index.php?q=frameIndex}

The following example (3) demonstrates an English sentence coded for the semantic element SPEAKER, the being that produces a MESSAGE, or communicates a TOPIC. The SPEAKER
role is distinct from the other FEs in that all sentences in the communication domain will necessarily fill the position of the speaker. Usually, the filler is human:\textsuperscript{11}

(3) [Peter Speaker] stammered an apology

Moreover, a MESSAGE (the content which is communicated by the SPEAKER), or a TOPIC (the subject matter of a communicated message), are core FEs of the Communication_Manner frame. MESSAGE, which is aligning with the direct object can be syntactically classified into three possible categories adapted from FrameNet and Urban and Ruppenhofer (2001): a direct quote (which can precede, follow or split the quote), a finite complement clause or a direct object NP.\textsuperscript{12} All realizations of the semantic element MESSAGE were coded for these three categories to explore more subtle distinctions across languages. Examples (4)-(6) below, illustrate these different syntactic types:

(4) [“I feel sorry for them,” Message] babbles Hazen.
(5) Ah-jung stammers that [it was all a misunderstanding Message]
(6) He whispers [her name Message] and smiles.

TOPIC is expressed as a PP-Complement headed by the preposition about, and is frequently preceded by a quantificational noun (i.e. something). After preliminary observation of the data I added the prepositions against and of, and their German counterparts respectively.\textsuperscript{13} Examples (7)-(9) displays sentences coded for TOPIC:

(7) The politicians babbled about [DARE’s laudable intent Topic]
(8) Moreno ranted against [the town and its inhabitants Topic]
(9) A boy in the marketplace whispered of [the corridor of death Topic]

The semantic role of the ADDRESSSEE, the person to whom a SPEAKER is communicating, doesn’t need to be expressed in a sentence. When it is expressed, it occurs as an indirect object in the form of a PP-complement. ADDRESSSEE can be introduced by ‘to-type’ prepositions including to, into, in (Urban & Ruppenhofer, 2001), as well as at. Accordingly the closest German

\textsuperscript{11} In metaphorical and fictive usages of the verbs the SPEAKER role could be filled by any kind of agent, (in)animate and (non)human.

\textsuperscript{12} In German MESSAGE can also be expressed through the subjunctive mood.

\textsuperscript{13} The German prepositions used to code TOPIC are: über/auf [about], gegen [against] and von [of]
equivalents of these prepositions were used for coding ADDRESSEE. Example (10)-(12) illustrates English sentences coded for ADDRESSEE:

(10) The Unicorn whispered to [the little woodland creatures Addressee]
(11) Tatiana babbles at [the camera Addressee] in a fake Spanish accent.
(12) She leaned down and whispered in [my ear Addressee]

According to Urban and Ruppenhofer (2001), the distinction between ‘to-type’ preposition and at, is that to introduces a “voluntary participant in the speech situation,” while the preposition at indicates non-reciprocity and the “direction of speech” (p. 84). The presence of to, indicating an indirect object, evokes a communicative interpretation, while verbs using the preposition at, may be interpreted non-communicatively (Zwicky, 1971). ‘Communicativeness’ here, indicates the verbs’ range from merely describing the auditory manner of articulation to the explicit transfer of a message. Verbs that are highly communicative always encode an explicit transfer of message. Hence, ‘communicativeness’ is correlated with the presence of the ADDRESSEE role, and correlated with the preposition to.

Verbs were coded for MANNER, a non-core frame element. The coding seemed necessary after preliminary observation of the data indicated a greater instantiation of MANNER, in the German data. Urban and Ruppenhofer (2001) note that, “manner expressions can elaborate on the manner of some action, even if the verb denoting the action itself describes the manner, or introduce a component of manner not found in the verb” (p.84). For this FE, fine-grained distinctions were coded. MANNER, was classified into two categories: affective and articulatory manner. Affective manner includes adverbs of emotion, for example: happily, excitedly, angrily. Articulatory manner includes adverbs connected to how an utterance is produced in regard to volume, duration, tone and so forth (e.g. quietly, loudly, hoarsely).

Example (13)-(14) shows how MANNER was coded for these two categories:

(13) Wu Kong babbled on [happily Manner] about the fight.
(14) Mr. Clarey ranted [loudly Manner]

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14 The German prepositions used to indicate ADDRESSEE are: in/ ins [in/into], mit [with/to], zu [to/at].

15 Generally the sentence structure to indicate ADDRESSEE is very similar in English and German. In both languages the preposition precedes the indirect object denoting the addressee. The exception here is the German verb flüstern [whisper], which uses the separable prefix verb zuflüstern [whisper to]. For separable prefix verbs the preposition is attached to the verb in the infinitive, but in the finite form the preposition is separated from the stem, moving to the very end of the sentence.
4. Data Presentation and Analysis

4.1. Verbs of Communication_Manner

This section provides the results of the comparative analysis of the German and English corpus data. Table 1 illustrates the results of the coded FEs, SPEAKER, MESSAGE, TOPIC, ADDRESSEE and MANNER, and their total frequencies for all the English and German verbs. Table 1 shows both languages always fill the SPEAKER role. German sentences fill the MESSAGE and MANNER role more frequently than English sentences do. Contrastingly, the English verbs fill the TOPIC and ADDRESSEE role more frequently than German.16

Table 1: Total number of Frame Elements in English and German with percentages (N=1000)

<table>
<thead>
<tr>
<th>Frame Element</th>
<th>English Verbs</th>
<th>German Verbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPEAKER</td>
<td>n=500 100%</td>
<td>n=500 100%</td>
</tr>
<tr>
<td>MESSAGE</td>
<td>n=274 59%</td>
<td>n=366 72%</td>
</tr>
<tr>
<td>TOPIC</td>
<td>n=97 21%</td>
<td>n=31 6%</td>
</tr>
<tr>
<td>ADDRESSEE</td>
<td>n=51 11%</td>
<td>n=34 7%</td>
</tr>
<tr>
<td>MANNER</td>
<td>n=43 9%</td>
<td>n=76 15%</td>
</tr>
<tr>
<td>Total</td>
<td>n=465 100%</td>
<td>n=506 100%</td>
</tr>
</tbody>
</table>

Since the analysis is focusing on the frequency of MESSAGE, TOPIC, ADDRESSEE and MANNER, I will present my examples in conjunction to each of these frame elements.

4.1.1. MESSAGE

Table 2 illustrates the frequency of MESSAGE in English and German.17 Both English and German encode MESSAGE frequently, but German sentences show a significantly higher percentage than English. The discrepancy suggests German verbs of communication manner lexically co-occur more with message content.

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16 A chi-square test was run for the frame element frequencies across languages. German and English show a significant difference in encoding MESSAGE ($\chi^2=19.39 < .05$), TOPIC ($\chi^2=45.96, p< .05$), ADDRESSEE ($\chi^2=5.48, p< .05$) and MANNER ($\chi^2=7.51, p< .05$).

17 See appendix for additional tables of the frame element frequency between verb counterparts.
Table 2: MESSAGE presence numbers given with percentages in parentheses (N=1000); ($\chi^2=19.39$, p< .05)

<table>
<thead>
<tr>
<th>MESSAGE</th>
<th>No MESSAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>English</strong></td>
<td></td>
</tr>
<tr>
<td>274 (59%)</td>
<td>191 (41%)</td>
</tr>
<tr>
<td><strong>German</strong></td>
<td></td>
</tr>
<tr>
<td>366 (72%)</td>
<td>140 (28%)</td>
</tr>
</tbody>
</table>

### 4.1.1.1. Analyzing message-types

The data was analyzed for the most common message-type in the languages.\(^{18}\) The surface realization of the sentences shows the verbs correlate with different message-types. Examples (15)-(16) illustrate canonical fillers of how MESSAGE is expressed in English and German respectively:

(15) “Ist es vorbei?” [**MESSAGE**] flüsterte Freddy.  
[“Is it over?” [**MESSAGE**]] whispered Freddy.

(16) He babbles [a few other words **MESSAGE**] and is trying so hard to stand.

According to the data the most frequent pattern to encode the MESSAGE in both languages is in the form of a direct quote, as in examples (15). Less frequently the message is encoded as a noun phrase, as *a few other words* in example (16). Finite complement clauses are rare. The exception here proved to be the pair *to rant/*schimpfen*, which contrary to all the other verbs in the group never expresses MESSAGE as an NP:

(17) *He rants [a rant **MESSAGE**]*

(18) *Er schimpft [eine Beschwerde/eine Entschuldigung/eine Frage **MESSAGE**]*  
*He rants [a complaint/an apology/a question **MESSAGE**]*

Sentences like the ones of the counterexamples (17) and (18) appear to be impossible for *to rant/ schimpfen*. Examples (19) and (20) illustrate the only possible realizations of MESSAGE common for the pair; a finite complement clause or quote:

(19) Er schimpft dass, [die Beleuchtung immer noch nicht stimmt **MESSAGE**]  
*He rants that [the lighting still isn’t right **MESSAGE**]*

(20) [“When I get back, I am so quitting the Agency,”**MESSAGE**] Ulyssa ranted under her breath smacking the communicator harder in her frustration

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\(^{18}\) See appendix table VI, for the message-type distribution.
The absence of messages realized as NPs differentiates the pair from all other verbs of the Communication_Manner frame under investigation here. I argue that the lack of expressing message as an NP, as well as the verbs’ preference for articulating something negative, render to rant/schimpfen more similar to complain verbs. This assumption is further supported by observations of Levin (1993), who demonstrates that verbs in the complain domain can only express messages as “finite sentential complements” or direct speech (p. 211). The notion that this pair of verbs should at least be cross-listed in FrameNet’s Complaining frame is further supported by observations of how TOPIC is encoded for this verb (see section 4.1.2.).

4.1.1.1. Analyzing NP filler distribution

Besides analyzing MESSAGE frequency and message-type distribution across languages, I also looked at nouns appearing as fillers when MESSAGE is realized as a noun phrase. These fillers can aid in describing and predicting any lexical preferences the verbs may have when it comes to filling the semantic roles (Johnson & Lenci, 2011). I found that when MESSAGE is expressed the NP-fillers always appear to mirror the semantics characteristics of the verb:

(21) Ah-jung stammers that it was all [a misunderstanding Message]
(22) Jakob flüstert [die geheimen Neuigkeiten Message] seinem Freund zu.
    Jakob whispers [the secret news Message] to his friend.

For instance, the cognates to stammer/stammlen indicate similar fillers such as excuses, apologies, justifications or misunderstandings (example 21). The fillers suggest an unnerved mental state, perhaps causing the halted rhythm of ‘stammering.’ Similarly nouns for to whisper/ flüstern coincide with the inherent manner of the verb indicating a low volume of the produced speech. Frequent fillers such as asides or secret in English, and Worte [words], Dinge [things], or geheime Neuigkeiten [secret news] in German (example 22), all imply messages that are somewhat concealed to overhearing participants.

Commonly observed fillers for to mumble/murmeln in English are, something incoherent/ incomprehensible, a few words, half-words, nonsense words, denoting unintelligible or unfinished speech. Contrastingly, German fillers are nouns that suggest a sort of iterative manner of what is uttered (e.g. Zauberspruch [magic spell], Formeln [formulas], Gebete [prayers], Litanei [litany], Lied [song]). The difference in noun fillers used to fill the semantic role may be a sign of subtle distinctions in the verbs’ characteristics across languages. Likewise, in sentences
with *babble/plappern* the object position in English is often filled with the noun *nonsense*, while in German nouns are similarly non-descriptive (e.g. *viele verschiedene Laute* *(many different sounds)*, *verwirrendes Kauderwelsch* *(confusing gibberish)*, *zusammengstückeltes Zeug* *(pieced together stuff)*). Once again, they are implying a certain unintelligibility of the message. As in (23)-(24):

(23) Noch im Sterben murmelte sie [die polnischen Gebete Message]
    Even as she was dying she mumbled [the polish prayers Message]

(24) George babbles [nonsense Message]

### 4.1.2. **TOPIC**

Table 3 illustrates the frequency of **TOPIC** in English and German.\(^\text{19}\) The English examples encode **TOPIC** more frequently than German. This suggests the English use of communication verbs is paired more with topic content than the German verbs.

Table 3: **TOPIC** presence numbers given with percentages in parentheses (N=1000); (\(\chi^2=45.96\) p< .05)

<table>
<thead>
<tr>
<th></th>
<th><strong>TOPIC</strong></th>
<th>No <strong>TOPIC</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>97 (21%)</td>
<td>368 (79%)</td>
</tr>
<tr>
<td>German</td>
<td>29 (6%)</td>
<td>475 (94%)</td>
</tr>
</tbody>
</table>

4.1.2.1. **Analyzing TOPIC introducing prepositions and PP-complements**

The data was analyzed for **TOPIC** introducing prepositions and PP-complements.\(^\text{20}\) Again, the verbs systematically pattern with certain prepositions and complements. In English and German, **TOPIC** is generally introduced by the prepositions *about* and its German counterpart *über*:

(25) Carmen mumbles something about [the American Dream Topic]

(26) Thomas plappert munter über [das kommende Spiel Topic]
    Thomas babbles cheerfully about [the upcoming game Topic]

As the examples illustrate both English and German introduce **TOPIC** similarly. In examples (25)-(26) **TOPIC**, here *the American Dream*, or *das kommende Spiel* [the upcoming game], is introduced as a PP-complement headed by *about/über*. For *to mumble*, **TOPIC** showed to be

\(^{19}\) See appendix for additional tables of the frame element frequency between verb counterparts.

\(^{20}\) See appendix table VII, for the distribution of preposition-types.
exclusively expressed when preceded by the quantificational pronoun *something*, as in example (25).

Some English and German verbs introduce TOPIC with and *of*, and its’ German translation *von*, as exemplified for *stammeln* and *to whisper*:

(27) Der Mann stammelt etwas von [einem Missverständnis _Topic_]
    The man stammers something of [a misunderstanding _Topic_]

(28) A boy whispered of [the corridor of death _Topic_]

In examples (27) and (28) the TOPIC of the sentence such as *eine Missverständnis* [a misunderstanding] or, *the corridor of death*, is introduced by the preposition *of/von*. The preposition *von* in German is interesting in regard to the duration of the utterance. It implies that the TOPIC communicated by the speaker is subject to a briefer exchange of communication, one less comprehensive than implied by *über* [about]. This suggests that inherent duration may be one characteristic of the German verb.

In addition, the data indicate that TOPIC can be biased in regard to content. While no trend towards a specific TOPIC content could be discerned for most verbs, *to rant/schimpfen* proved to be the exception, showing a preference for content that is almost exclusively negative:

(29) He ranted about [how kids bring guns to school _Topic_]

(30) Ein Bürgerrechtler schimpfte gegen [die Beugung des Völkerrechts _Topic_]
    A civil rights campaigner ranted against [the diffraction of international law _Topic_]

Examples (29)-(30) illustrate that the subject matter is introduced by the prepositions *about* and *against* respectively. They show how the content of the subject matter is predominantly negative, such as *how kids bring guns to school* in example (29), or *die Beugung des Völkerrechts* [the diffraction of international law], (example 30).

The analysis shows 82% of the content pertaining to TOPIC has to do with something undesirable or negative, while in German it is entirely negative. The verbs’ focus on negative subject matter suggests again that *to rant/schimpfen* belong to *complain* verbs, and raises the questions if they should be cross-listed in FrameNet’s *Complaining* frame (see section 4.2.).

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21 *von*
4.1.3. ADDRESSEE

Table 4 below demonstrates the frequency of ADDRESSEE in English and German.\textsuperscript{22} Altogether, ADDRESSEE is the least frequently filled role in both languages. Nevertheless, English sentences show a higher frequency of ADDRESSEE than German. This suggests English communication manner verbs are interpreted more communicatively than German.

Table 4: ADDRESSEE presence numbers given with percentages in parentheses (N=1000); ($\chi^2=5.48$, p< .05)

<table>
<thead>
<tr>
<th></th>
<th>ADDRESSEE</th>
<th>No ADDRESSEE</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>51 (11%)</td>
<td>414 (89%)</td>
</tr>
<tr>
<td>German</td>
<td>34 (7%)</td>
<td>472 (93%)</td>
</tr>
</tbody>
</table>

4.1.3.1. Analyzing ADDRESSEE introducing prepositions and PP-complements

Moreover, ADDRESSEE introducing prepositions and PP-complements were examined.\textsuperscript{23} The verbs typically pattern with certain preposition-types. This can illuminate lexical preferences of the verbs, and point to subtle differences between verbs in regard to a communicative interpretation.

Examples (31)-(33) illustrate the most prototypical English and German examples of encoding ADDRESSEE, usually indicated as the complement of the preposition:

(31) Wilson ranted to [the American people \textit{Addressee}]

(32) Eine Frau flüsterte zu [ihrer Nachbarin \textit{Addressee}]

A woman whispered to [her neighbor \textit{Addressee}]

(33) Rambo mumbles to [no one in particular, \textit{Addressee}]

Example (31) and (33) illustrate how ADDRESSEE is generally introduced with the preposition \textit{to/zu}, here the \textit{American people}, or \textit{ihre Nachbarin} [her neighbor], both evoking a communicative interpretation. In contrast, example sentence (33) also introduces ADDRESSEE with the preposition \textit{to}, but the addressee \textit{no one in particular} purports a non-communicative interpretation.

The cognates to \textit{whisper/flüstern} exhibit the highest frequency for encoding ADDRESSEE of all verbs in the group. The pair introduces ADDRESSEE as in the following examples:

\textsuperscript{22} See appendix for additional tables of the frame element frequency between verbs across languages.

\textsuperscript{23} See appendix table VIII, for distribution of preposition-types.
(34) The Sergeant pulled Jimmy aside and whispered to [him Addresssee]
(35) Miriam flüstert ein Wort der Aufmunterung ins [Ohr einer Mutter Addresssee]
   Miriam whispers a word of encouragement into [the ear of a mother Addresssee]

The prepositions *to* and *ins* [into], as in examples (34) and (35), were the only preposition used for the verbs. The salience of *ADDRESSSEE* and the exclusive use of *to/zu* and *into/in* suggests the verb is more likely interpreted communicatively, as an explicit transfer of a message, rather than just an auditory articulation.

Some of the English verbs introduce the *ADDRESSSEE* role with *at*:

(36) The woman waves her hand and babbles something at [us Addresssee]
(37) Minerva stammered at [her aunt Addresssee]

Examples (36)-(37) show how *ADDRESSSEE* is introduced by *at*, a preposition that indicates the direction of speech, which may evoke non-communicative interpretation. In German, there is no translation equivalent similar to *at* in this context, but a similar interpretation to the English examples is evoked by the following sentence:

(38) Nico plappert munter während der Messe mit [dem Pfarrer Addresssee]
    During mass Nico babbles happily at [the priest Addresssee]

In example (38) *ADDRESSSEE* is expressed by the preposition *mit* [with], usually denoting a voluntary interlocutor, evoking a communicative interpretation. However, I would argue that German speakers would understand the sentence non-communicatively, due to the contextual information.

### 4.1.4. MANNER

Table 5 illustrates the frequency of *MANNER* in English and German. English and German sentences encode *MANNER* relatively infrequently. However, the German examples show a higher percentage of filling the *MANNER* role than English.

<table>
<thead>
<tr>
<th></th>
<th>MANNER</th>
<th>No MANNER</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>43 (9%)</td>
<td>418 (91%)</td>
</tr>
<tr>
<td>German</td>
<td>76 (15%)</td>
<td>428 (85%)</td>
</tr>
</tbody>
</table>

24 German preposition *ins-in das* [into the]

25 See appendix for additional tables of the frame element frequency between verbs across languages.
4.1.4.1. Analyzing MANNER and filler distribution

Lastly, MANNER is expressed with adverbs. The MANNER role can be encoded with affective or articulatory fillers.26 Examples (39) and (40) show sentences coded for MANNER in English and German:

(39) “No,” she mumbles [tinily, Manner] and then silence again
(40) “Hi Tina” stammelte er [verlegen Manner] 
  “Hi Tina” he stammered [awkwardly Manner]

Example (39) illustrates how the semantic role is filled by an articulatory adverb, such as *tinily*. The German data reveals that *stammeln* more frequently co-occurs with affective fillers such as *verlegen* [awkwardly] in example (40), or adverbs like *verwirrt* [confusedly], *ängstlich* [fearfully], *verzweifelt* [desperately]. All fillers, I would argue, point to a certain unnerved cognitive state (as already noted prior in section 4.1.1.1.).

Of all verbs in the group, the German verb *plappern* shows the highest frequency in filling the MANNER role. The verb indicates a trend towards affective manner:

(41) Das Mädchen in der U-Bahn plappert [unbekümmert Manner] mit ihrer Mutter
    The girl on the tram babbles [unconcernedly Manner] with her mother
(42) “Er bringt noch zwei Freunde mit,” plapperte er [heiter Manner]
    “He is bringing two friends,” he babbled [cheerfully Manner]

The examples demonstrate that MANNER can be filled with adverbs such as *unbekümmert* [unconcernedly] in example (41). Other frequent pairings in the data are adverbs such as *heiter* [happily] in example (42), or synonyms thereof, for example *fröhlich* [cheerfully], and *munter* [jauntily].

Once more, the English verb *to rant* is the exception in the group, showing a higher frequency of encoding MANNER in English than in German:

(43) He ranted [loudly Manner] for at least a full three minutes
(44) Colin rants [extensively Manner] on the issue.

The verb *to rant* shows a trend towards articulatory fillers. The fillers often concern aspects of volume such as *loudly* in example (43), or the duration of speech such as *extensively*, in example (44). The trend towards articulatory fillers may be explained due to the verb itself already

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26 See appendix table IX, for the distribution of affective and articulatory manner.
entailing information connected to emotion, denoting a more negative and aggravated mental state of the speaker. This would render affective fillers either contradictory or redundant.

4.2. The Communication_Manner Frame

The results of the frame semantic analysis indicate that the English and German Communication_Manner frame is composed of the same frame elements, as predicted by Boas (2001; 2005; 2013a). While some verbs, especially cognates, are very similar in their frequency of instantiations with certain frame elements, others differ. Altogether, the frequency of frame elements across languages show a significantly higher encoding of MESSAGE and MANNER in German. English verbs reveal a higher frequency of the TOPIC and ADDRESSEE role. The qualitative analysis of frame-element fillers reveals intra-language differences of verbs in the same frame, e.g. the verbs to rant/schimpfen, which seems to belong to a different frame.27

Moreover, the frequency of the ADDRESSEE role in English and German indicates that the verbs differ in their ‘communicativeness.’ The level of ‘communicativeness’ is correlated to the amount a verb encodes an addressee with the preposition to. Figure 1 shows the English and German verbs from least to most communicative. Verbs to the left of the spectrum are more frequently used to describe an auditory manner, while verbs to the right show a high degree of message transfer.

27 Based on the results of the analysis, I propose to cross-list the verbs to rant/schimpfen in the Complaining frame in FrameNet and a German version thereof. The Complaining frame is defined by FrameNet as follows: A COMPLAINER communicates their negative emotional reaction to some state of affairs in a COMPLAINT. As an alternative to the specific COMPLAINT, the TOPIC of the speaker’s complaint may be specified. The core FEs of the frame are: COMPLAINER, COMPLAINT, MEDIUM and TOPIC. Due to the content specificity of to rant/schimpfen focusing on something negative, the relative absence of encoding the ADDRESSEE role, and the lack of noun phrases as a possible message-type, the pair appears to be a good match for this frame.
5. Discussion

While this study altogether confirms Boas’ (2005) assumption that the same semantic frames, such as the Communication_Manner frame, exist cross-linguistically, the classification of language-specific and truly universal frames appears to be fuzzy (Boas, 2011). The analysis shows the frame elements of FrameNet were transferable to German, but there are differences in the frequency of frame elements that seem to be language specific. The differences in frequency of frame elements in English and German suggest that speakers highlight certain frame elements over others. In the case of German, MESSAGE and MANNER were encoded significantly more frequent, whereas TOPIC and ADDRESSEE were more salient in English. This suggests that German speakers prefer a message (i.e. a quote, noun phrase or a finite complement clause) when using communication manner verbs, as well as additional information elaborating on the affective or articulatory manner of an utterance.

Likewise, the qualitative analysis pointed to subtle distinctions within frame elements. The analysis indicated variability in message-type, NP and manner fillers, and preposition-types paired with verbs. The distribution of these fillers and preposition-types can not only point to more common fillers paired with the verbs, but also to the semantic characteristics of the verbs. The qualitative analysis of topic complements revealed a greater topic specificity of the verbs to rant/schimpfen. Their focus on negative content suggests they should be cross-listed under the Complaining frame in FrameNet.
Lastly, the verbs’ frequency of filling the ADDRESSSEE role hints at subtle differences of the verbs’ communicative interpretations. The more frequent pairings of English verbs with the ADDRESSSEE role may suggest that they are understood by speakers as more communicative than their German translations.

The notion of utilizing a magnified approach, including frequency of frame elements and the distribution of fillers, is especially valuable for researchers currently building FrameNet in other languages (Boas, 2002; Ohara et al., 2004; You & Liu, 2005; Burchardt et al., 2006; Subirats, 2009; Johnson & Lenci, 2011). This approach illuminates which frame elements are highlighted by speakers of a given language, and exposes a lexical units’ preference for fillers of each semantic role. This preference can point to subtle intra-lingual distinctions between verbs within the same frame. It would also be useful to integrate information about filler frequency in the frame representation in FrameNet.

Consistent with the above mentioned notion of a more fine-grained analysis of frame elements, researchers of German have started to construct a lexicographic resource for educational purposes the G-FOL (German Frame-semantic Online Lexicon). The G-FOL attempts to include more explicit descriptions of all aspects of meaning for a given LU to provide language learners with more representative examples of semantic frames in German (Boas & Dux, 2013). These fine-grained descriptions try to solve issues that language learners may encounter when consulting a dictionary. Dictionaries provide a vast array of translation equivalents, often raising the question which word is most fitting. Here, a magnified frame semantic approach can provide more information on verb use.

Furthermore, this study suggests that possible cultural differences within frames may be left unexplored when only frame elements and syntactic patterns of lexical units’ are considered. The frame elements for English and German are the same overall, but the significantly higher frequency of MESSAGE over TOPIC in the German verbs suggests that German speakers prefer a message with verbs indicating manner of communication, which may be culture specific. This difference evokes the Whorfian hypothesis, denoting that language affects the way that concepts are understood. Slobin (2002) for instance, has noted “each language provides its users with preferred perspectives for encoding dimensions of human experience. For any given domain,

28 http://coerll.utexas.edu/frames/taxonomy/term/73
languages can be grouped into typological categories on the basis of the grammatical and lexical means used to establish preferred perspectives in that domain” (p. 13). This raises the question whether or not notions of linguistic relativism are supported by my findings. Research in the field of cross-cultural pragmatics has proposed that German interactional style is shaped by a greater content orientation and displays a preference for greater directness and explicitness (House, 2006).

6. Conclusion

I have shown a cross-linguistic analysis of English and German verbs pertaining to the semantic frame of Communication_Manner to examine whether or not semantic frames can be transferred across languages. The analysis showed the frame upholds cross-linguistically, but the languages differ in how frequently they fill certain frame elements. The findings indicated significant differences in filling the semantic roles: MESSAGE, TOPIC, MANNER and ADDRESSEE. The German verbs reveal a higher pairing with MESSAGE and MANNER than in English, whereas English verbs showed a higher frequency of filling the TOPIC and ADDRESSEE roles than in German. Based on these findings I conclude that research of the cross-linguistic applicability of existing English frames needs to consider a magnified approach of frame elements, including the frequency of frame elements and fillers.
Sources


Appendix

Table I: Total frame element distribution for *to stammer* and *stammeln* \((n=100)\)

<table>
<thead>
<tr>
<th></th>
<th>MESSAGE</th>
<th>TOPIC</th>
<th>ADDRESSEE</th>
<th>MANNER</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>to stammer</em></td>
<td>81%</td>
<td>0%</td>
<td>1%</td>
<td>11%</td>
</tr>
<tr>
<td><em>stammeln</em></td>
<td>82%</td>
<td>7%</td>
<td>0%</td>
<td>2%</td>
</tr>
</tbody>
</table>

Fisher's exact two-tailed test yields a significant difference across languages for TOPIC \((p= .014)\) and MANNER \((p= .018)\).

Table II: Total frame element distribution for *to whisper* and *flüstern* \((n=100)\)

<table>
<thead>
<tr>
<th></th>
<th>MESSAGE</th>
<th>TOPIC</th>
<th>ADDRESSEE</th>
<th>MANNER</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>to whisper</em></td>
<td>66%</td>
<td>1%</td>
<td>29%</td>
<td>3%</td>
</tr>
<tr>
<td><em>flüstern</em></td>
<td>86%</td>
<td>0%</td>
<td>30%</td>
<td>12%</td>
</tr>
</tbody>
</table>

Chi-square test result indicates a significant difference across languages for MESSAGE \((\chi^2=10.96, p< .05)\); Fisher’s exact two-tailed test yields a significant difference across languages for MANNER \((p= .0287)\).

Table III: Total frame element distribution for *to mumble* and *murmeln* \((n=100)\)

<table>
<thead>
<tr>
<th></th>
<th>MESSAGE</th>
<th>TOPIC</th>
<th>ADDRESSEE</th>
<th>MANNER</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>to mumble</em></td>
<td>75%</td>
<td>9%</td>
<td>3%</td>
<td>13%</td>
</tr>
<tr>
<td><em>murmeln</em></td>
<td>94%</td>
<td>0%</td>
<td>0%</td>
<td>13%</td>
</tr>
</tbody>
</table>

Chi-square test result indicates a significant difference across languages for MESSAGE \((\chi^2=13.87, p< .05)\); Fisher's exact two-tailed test yields a significant difference across languages for TOPIC \((p= .0032)\).

Table IV: Total frame element distribution for *to babble* and *plappern* \((n=100)\)

<table>
<thead>
<tr>
<th></th>
<th>MESSAGE</th>
<th>TOPIC</th>
<th>ADDRESSEE</th>
<th>MANNER</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>to babble</em></td>
<td>36%</td>
<td>30%</td>
<td>7%</td>
<td>14%</td>
</tr>
<tr>
<td><em>plappern</em></td>
<td>42%</td>
<td>4%</td>
<td>4%</td>
<td>39%</td>
</tr>
</tbody>
</table>

Chi-square test result indicates a significant difference across languages for MANNER \((\chi^2= 16.04, p< .05)\); Fisher's exact two-tailed test yields a significant difference across languages for TOPIC \((p= <.0001)\).

Table V: Total frame element distribution for *to rant* and *schimpfen* \((n=100)\)

<table>
<thead>
<tr>
<th></th>
<th>MESSAGE</th>
<th>TOPIC</th>
<th>ADDRESSEE</th>
<th>MANNER</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>to rant</em></td>
<td>16%</td>
<td>57%</td>
<td>4%</td>
<td>11%</td>
</tr>
<tr>
<td><em>schimpfen</em></td>
<td>62%</td>
<td>20%</td>
<td>0%</td>
<td>1%</td>
</tr>
</tbody>
</table>

Chi-square test result indicates a significant difference across languages for MESSAGE \((\chi^2=44.47, p< .05)\) and TOPIC \((\chi^2= 28.91, p< .05)\); Fisher’s exact two-tailed test yields a significant difference across languages for MANNER \((p= .005)\).
Table VI: Total frequency of Message-types by verb

<table>
<thead>
<tr>
<th>MESSAGE Total (n=100)</th>
<th>n</th>
<th>Quote</th>
<th>n</th>
<th>Finite Compl. Clause</th>
<th>n</th>
<th>NP</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>to stammer</strong></td>
<td>81%</td>
<td>73</td>
<td>90%</td>
<td>5</td>
<td>6%</td>
<td>3</td>
</tr>
<tr>
<td>stammeln</td>
<td>82%</td>
<td>59</td>
<td>72%</td>
<td>6</td>
<td>7%</td>
<td>17</td>
</tr>
<tr>
<td><strong>to whisper</strong></td>
<td>66%</td>
<td>45</td>
<td>72%</td>
<td>2</td>
<td>3%</td>
<td>22</td>
</tr>
<tr>
<td>flüstern</td>
<td>86%</td>
<td>71</td>
<td>83%</td>
<td>2</td>
<td>2%</td>
<td>13</td>
</tr>
<tr>
<td><strong>to mumble</strong></td>
<td>75%</td>
<td>56</td>
<td>74%</td>
<td>0</td>
<td>0%</td>
<td>19</td>
</tr>
<tr>
<td>murmeln</td>
<td>94%</td>
<td>78</td>
<td>83%</td>
<td>2</td>
<td>2%</td>
<td>14</td>
</tr>
<tr>
<td><strong>to babble</strong></td>
<td>36%</td>
<td>23</td>
<td>64%</td>
<td>0</td>
<td>0%</td>
<td>13</td>
</tr>
<tr>
<td>plappern</td>
<td>42%</td>
<td>31</td>
<td>74%</td>
<td>1</td>
<td>2%</td>
<td>10</td>
</tr>
<tr>
<td><strong>to rant</strong></td>
<td>16%</td>
<td>13</td>
<td>81%</td>
<td>3</td>
<td>19%</td>
<td>0</td>
</tr>
<tr>
<td>schimpfen</td>
<td>62%</td>
<td>58</td>
<td>94%</td>
<td>4</td>
<td>6%</td>
<td>0</td>
</tr>
</tbody>
</table>

Table VII: Total n of preposition-types indicating TOPIC in English and German

<table>
<thead>
<tr>
<th>English Verbs</th>
<th>about</th>
<th>of</th>
<th>against</th>
<th>Total n</th>
<th>German Verbs</th>
<th>über</th>
<th>von</th>
<th>gegen</th>
<th>Total n</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>to stammer</strong></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>stammeln</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>to whisper</strong></td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>flüstern</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>to mumble</strong></td>
<td>9</td>
<td>0</td>
<td>0</td>
<td>9</td>
<td>murmeln</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>to babble</strong></td>
<td>28</td>
<td>2</td>
<td>0</td>
<td>4</td>
<td>plappern</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td><strong>to rant</strong></td>
<td>45</td>
<td>12</td>
<td>1</td>
<td>4</td>
<td>schimpfen</td>
<td>17</td>
<td>0</td>
<td>3</td>
<td>20</td>
</tr>
</tbody>
</table>
Table VIII: Total n of preposition-types indicating ADDRESSEE in English and German

<table>
<thead>
<tr>
<th>English Verbs</th>
<th>in/into</th>
<th>to</th>
<th>at</th>
<th>Total n</th>
<th>German Verbs</th>
<th>in/ins</th>
<th>zu</th>
<th>mit</th>
<th>Total n</th>
</tr>
</thead>
<tbody>
<tr>
<td>to stammer</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>stammeln</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>to whisper</td>
<td>17</td>
<td>19</td>
<td>0</td>
<td>36</td>
<td>flüstern</td>
<td>14</td>
<td>16</td>
<td>0</td>
<td>30</td>
</tr>
<tr>
<td>to mumble</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>murmeln</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>to babble</td>
<td>0</td>
<td>3</td>
<td>4</td>
<td>7</td>
<td>plappern</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>to rant</td>
<td>0</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>schimpfen</td>
<td>0</td>
<td>0</td>
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<td>0</td>
</tr>
</tbody>
</table>

Table IX: Total n of affective and articulatory MANNER

<table>
<thead>
<tr>
<th>MANNER</th>
<th>stammer</th>
<th>stammeln</th>
<th>whisper</th>
<th>flüstern</th>
<th>mumble</th>
<th>murmeln</th>
<th>babble</th>
<th>plappern</th>
<th>rant</th>
<th>schimpfen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>2</td>
<td>11</td>
<td>3</td>
<td>12</td>
<td>13</td>
<td>13</td>
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<td>Affective</td>
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<td>8</td>
<td>0</td>
<td>6</td>
<td>6</td>
<td>2</td>
<td>6</td>
<td>21</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Articulatory</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>6</td>
<td>7</td>
<td>11</td>
<td>8</td>
<td>18</td>
<td>8</td>
<td>0</td>
</tr>
</tbody>
</table>