Light Verb Constructions and Their Families – A Corpus Study on German *stehen unter*-LVCs

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Abstract

The paper reports on a corpus study of German light verb constructions (LVCs). LVCs come in families which exemplify systematic interpretation patterns. The paper's aim is to account for the properties determining these patterns on the basis of a corpus study on German LVCs of the type '*stehen unter* NP' ('stand under NP').

1 Introduction: LVCs and their families

Light verb constructions (LVC) are a specific type of predicatively used multiword expressions.[1] A LVC consists of a semantically light verb and a phrasal element, e.g., a PP as in the German examples in (1).

(1) a. *unter Beobachtung stehen*
         'be under observation' (lit. under observation stand)
     b. *unter Schutz stehen*
         'be under protection' (lit. under protection stand)

The German LVCs in (1) consist of the light verb *stehen* 'stand' and a prepositional phrase (PP) headed by *unter* 'under'. *Stehen* is, according to Kamber (2008), one of the most frequently occurring light verbs in German.

The English notion 'light verb' goes back to Jespersen (1942) who assumed that light verb are semantically empty. This position has been questioned by a number of authors (e.g. Isoda 1991; Brugman 2001; Butt 1995; Butt and Geuder 2001, 2003; Butt and Lahiri 2013; Fleischhauer and Neisani 2020) who insist that the light verb makes at least a subtle contribution to the LVC's overall meaning. This position also prevails in the

German research tradition. von Polenz (1963) – who introduced the corresponding German notion 'Funktionsverb' (lit. function verb)– recognized that light verbs contribute in terms of aktionsart features as well as causativity. Thus, the light verb is not semantically empty but only semantically reduced compared to its corresponding heavy uses.

In its heavy use (2-a) *stehen* expresses that its subject referent is spatially located in an upright posture; the spatial location is specified by the PP-complement (see Gamerschlag et al. 2013 for a detailed discussion of German posture verbs). As a light verb, *stehen* does not express that its subject referent is being spatially located (2-b). Rather, the verb only contributes to the complex predicate's event structure. LVCs headed by *stehen* always express state predications (e.g. von Polenz, 1963, 1987; Fleischhauer and Gamerschlag, 2019; Fleischhauer et al., 2019).

(2) a. *Der Mann steht   unter dem Dach.*
         the man   stands under the roof
         'The man is standing under the roof.'
     b. *Der Mann steht   unter Schock.*
         the man   stands under shock
         'The man is shocked/stressed.'

The PP-internal noun provides the LVC's main predicational content. The LVC in (2-b) expresses that the subject referent is in a state of shock; substituting the noun by e.g. *Stress* 'stress' results in a different predication. The LVC *unter Stress stehen* 'be stressed' (lit. under stress stand) expresses that the subject referent is in a state of stress.

Like simplex predicates, LVCs can be classified with respect to semantic features like aktionsart and causativity. These features have been systematically related to the light verb's lexical meaning (e.g. von Polenz 1963, 1987). But is has rarely been noticed that systematicity is also found on a semantically deeper level. The LVCs in (1) exem-

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plify a different interpretation pattern from those in (2). Following Nunberg et al. (1994), I use the label 'family' to designate LVCs which conform to the same interpretation pattern. The notion of a LVC-family is defined as follows (following Fleischhauer 2019, 32, Fleischhauer and Turus in press):

(3)   Light verb constructions form a family if (i) they only show variance with respect to their NP element, and (ii) they exemplify the same interpretational pattern.

The LVCs in (1) belong to a family I call 'event passive-family' since they are paraphrased by an event passive construction (so-called *werden* 'become'-passive). *Unter Beobachtung stehen* in (1-a) is paraphrased as 'beobachtet werden' ('be observed' lit. observed become). The two LVCs *unter Schock stehen* 'be shocked' (2-b) and *unter Stress stehen* 'be stressed' superficially look like the LVCs in (1) but resist an event passive paraphrase. Instead, they are paraphrased by a state passive construction (*sein* 'be' + passive participle).[2] *Unter Schock stehen* (2-b), for example, is paraphrased as 'geschockt sein' ('be shocked'; lit. shocked be).

The current paper presents a first systematic case study of LVC-families. The central questions are: Which LVCs are members of these families? And, what are the characteristic properties of the members of the individual families? These questions have been explored on the basis of a corpus study.

2   Corpus study

For the corpus study on German *stehen unter*-LVCs, I used the Tagged-C2 archive of the German reference corpus (DeReKo). The archive basically contains newspaper articles and consists of 1.022.895.699 words organized in 4.491.138 texts. The corpus search has been carried out using the search engine COSMAS II.

I will start a brief discussion of the search criterion used for the corpus study and then proceed by discussing the individual annotation steps. The annotation has been independently done by two annotators, in case of disagreement a third annotator has been consulted.

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[2]For a discussion of formal as well as semantic differences of the two mentioned German passive constructions, see Maienborn (2007).

2.1   Search criterion

LVCs cannot directly be identified within the German reference corpus. The reasons for this are twofold. First, LVCs cannot be distinguished from regular predicate-argument constructions on the basis of morphosyntactic criteria. The two sentences in (2) look superficially similar even though the second one contains a LVC. Some authors propose that LVCs can be distinguished from regular predicate-argument constructions on the basis of the semantic type of the PP-internal noun. LVCs require an eventive noun in PP-internal position, whereas regular predicate-argument constructions do not (e.g. von Polenz, 1963, 1987; Engelen, 1968; Persson, 1994; Helbig, 1984, 2006; Langer, 2004, 2005; Ježek, 2016; Savary et al., 2018). This criterion is refuted by some authors like, for example, Klein (1968); Herrlitz (1973); Schwall (1991); Rostila (2001); Hanks et al. (2006). In addition, the language data discussed in section 3 indicate that LVCs are not restricted to eventive nouns in PP-internal position but license, for example, artefact nouns as well.

Second, the individual components of a LVC can be separated by lexical material which does not belong to the MWE. In the interrogative sentence in (4), the subject NP intervenes between the light verb and the *unter*-PP. Nagy T. et al. (2020, 326) mention that a discontinuous realization of LVCs is particularly frequent in German (compared to e.g. English, Spanish and Hungarian); this is probably due to general constraints on German word order. Discontinuity is a challenging property for the identification of MWEs in general (e.g. Constant et al., 2017).

(4)   *Steht der Verdächtige unter Beobachtung?*
        'Is the suspect under observation?'

Given the mentioned difficulties in identifying LVCs, I searched for all occurrences of inflected *stehen* and the preposition *unter* realized within the same sentence (search string '&stehen \s0 unter'). This search criterion yielded 80255 hits of which 8023 sentences (approx. 10% of all hits) have been randomly collected for manual annotation. 55 sentences have been excluded from the annotation procedure since they were incomplete.

Although there exists substantive literature on the annotation of MWEs in general and of LVCs in particular (e.g. Krenn 2008; Tu and Roth 2011; Rácz et al. 2014; Savary et al. 2018; Nagy T. et al. 2020), these studies differ in scope from the present

one. The present study is not concerned with LVCs in general or LVCs headed by a specific type of light verb but is directed at a specific combination of light verb and preposition. This allowed using more specific annotation criteria which were directly tailored for this type of construction.

LVC-families have not been the subject of corpus studies so far.

2.2 First annotation step

The *unter*-PP is a syntactic complement of *stehen*, both in the verb's light as well as heavy uses. In a first annotation step, we singled out those sentences in which the *unter*-PP is not realized as the verb's complement. The relevant test criterion is whether the PP can be left out without affecting the acceptability of the resulting sentence. If not, the PP is classified as being a complement of *stehen*. The results of the first annotation step are summarized in Table 1.

PP complement	PP not complement
5822	2146

Table 1: Results of the first annotation step.

The sentences in which the PP is not a complement of *stehen* were excluded from further analysis.

2.3 Second annotation step

The second annotation step consisted in distinguishing heavy from non-heavy uses of *stehen*. Non-heavy uses comprise light uses as well as what Fazly and Stevenson (2007, 10) term 'abstract uses'. As a heavy verb *stehen* can be substituted by other posture verbs (e.g. *sitzen* 'sit' or *liegen* 'lie') or by purely locational predicates like *positioniert sein* 'be positioned' or *lokalisiert sein* 'be localized'. In (5-a), *stehen* can be substituted by, for example *sitzen* or *liegen* and therefore is classified as a 'heavy' verb.

The substitution of *stehen* by a different posture verb is unacceptable in (5-b). Accordingly, this use of *stehen* is classified as 'non-heavy'.

(5)   a.   *Der Mann steht/liegt/sitzt unter dem*
        the man stands/lies/sits under the
        Dach.
        roof
        'The man is standing/sitting/lying under the roof.'

    b.   *Der Mann steht/*liegt/*sitzt unter*
        the man stands/sits/lies under
        Schock.
        shock
        'The man is in a state of shock/is shocked.'

The results of the second annotation step are summarized in Table 2. There is a clear preference for *stehen* in combination with the preposition *unter* to be used as a non-heavy verb.

heavy use	non-heavy use
562	5260

Table 2: Results of the second annotation step.

The third annotation step has only been done with respect to the sentences classified as containing a non-heavy use of *stehen*.

2.4 Third annotation step

The final annotation step consisted in identifying LVC-families. Since the focus is on the two LVC-families introduced above, it was only checked whether the combination of light *stehen* and its PP-complement is paraphrased by using a sentence containing an event passive or state passive construction. The two types of paraphrases have already been introduced in Section 1. As summarized in Table 3, 1335 occurrences require an event passive paraphrase and 1524 sentences are paraphrased by use of a state passive construction. The two LVC-families represent 49.23% of all non-heavy uses of *stehen* within the analyzed sample.

event-passive paraphrase	state-passive paraphrase
1335	1524

Table 3: Results of the third annotation step.

An example of a non-heavy use of *stehen* rejecting an event passive or state passive paraphrase is shown in (6). The construction *unter dem Motto stehen* (lit. under the motto stand) is paraphrased as 'have as its motto' which is not a passive paraphrase but a paraphrase expressing abstract (predicative) possession.

Based on the data of the third annotation step, the individual members of the two LVC-families have been identified. The event passive-family

is represented by 33 different LVCs; for the the state passive-family 19 different members have been found. The full list of nouns occurring PP-internally in the two families is given in the appendix. With respect to the third annotation step, the two annotators have been in total agreement.

(6) *Das Kinderturnen   stand unter dem*
     the children.gymnastic stands under the
     Motto "Max und Moritz".
     motto Max and Moritz
     'The children's gymnastics has as its motto 'Max and Moritz'.' (A98/JAN.01801 St. Galler Tagblatt, 12.01.1998, Ressort: RT-ORT (Abk.); Dorffeststimmung auf die Bühne gezaubert)

3 The semantic type of the PP-internal nouns

In a final step, all nouns occurring PP-internally were classified with respect to the type of object they are denoting. It was first checked whether the PP-internal nouns denote an eventuality. The notion 'eventuality' is used as a cover term for states and events (Bach, 1986). Eventuality-denoting nouns accept temporal (e.g. *gestern* 'yesterday') and aspectual modifiers (e.g. *andauernd* 'continuous') (Fábregas and Marín, 2012; Fleischhauer and Neisani, 2020). Only five nouns (7-a) – all belonging to the state passive-family – reject temporal/aspectual modification. An example of a LVC containing the artefact noun *Drogen* 'drugs' is shown in (7-b). The example expresses that the subject referent is in a state induced by drugs (i.e. is influenced by drugs).

(7) a. *Alkohol* 'alcohol', *Beruhigungsmittel* 'sedative', *Drogen* 'drugs', *Medikamente* 'medicine', *Suchtmittel* 'addictive substances'
     b. *Der Fahrer stand unter Drogen.*
         the driver stood under drugs
         'The driver was under the influence of drugs.'

With respect to the eventuality-denoting nouns, the two LVC-families show clear differences. The PP-internal nouns occurring in the event-passive family denote events, those occurring in the state-passive family are state-denoting. There exist a number of criteria which allow distinguishing event-denoting nouns from state-denoting ones (cf. Fábregas and Marín 2012; Fábregas et al. 2012). Only event-

denoting nouns can be realized as the subject of predicates like *geschehen/passieren* 'happen', *beenden* 'stop/finish' and *unterbrochen sein* 'be interrupted'. For details concerning the criteria, the reader is referred to the mentioned literature.

In Section 1, I introduced the LVC *unter Beobachtung stehen* 'be under observation' as a representative member of the event passive-family. The example in (8) demonstrates that the noun *Beobachtung* 'observation' can be realized as the subject of *geschehen* 'happen'. The noun is also licensed as the subject argument of the other mentioned predicates (not illustrated for reasons of space) and qualifies as being event-denoting.

(8) *Vermutlich geschah die Beobachtung* [...]
     probably   happened the observation
     mit Hilfe eines nicht allzu schlechtes
     with help a   not all.too bay
     Fernrohrs [...]
     telescope
     'Probably, the observation happened with the help of a not too bad telescope" (http://www.vm2000.net/category/ausgabe-80/; 28.04.2021)

The noun *Schock* 'shock' which occurs in the LVC *unter Schock stehen* 'be shocked' – a representative member of the state passive-family – shows a somewhat more variable behavior. Although *Schock* can be realized as the subject of *geschehen*, as shown in (9), it can neither be realized as the subject argument of *beenden* 'stop/finish' nor of *unterbrochen sein* 'be interrupted'. The cumulative evidence speaks in favor of classifying *Schock* as a state-denoting noun.

(9) *Der erste schwere Schock geschah*
     the first heavy   shock happened
     sofort   am ersten Abend [. . .].
     immediately at the   first   eventing
     'The first heavy shock happened immediately at the first evening [. . .]' (https://www.astrotreff.de/forum/index.php?-thread/172584-out-of-stellaland-oder-das-raunen-der-kleinodien/; 01.06.2021)

The interpretational difference observed between the LVCs of the two families is not arbitrary but results form the specific meaning of the nouns licensed in PP-internal position. Event-denoting nouns allow for an event-passive interpretation, state nouns result in a state passive read-

ing. The artefact nouns *Alkohol* 'alcohol', *Drogen* 'drugs', *Suchtmittel* 'addictive substances', *Beruhigungsmittel* 'sedative' and *Medikamente* 'medicine' are associated with a specific state – the state of being intoxicated by the respective substance – and give rise for a state passive reading as well. This interpretation is not restricted to the use of these nouns within the mentioned LVC since it is also found without the light verb. The nouns *Drogen* 'drugs' and *Alkohol* 'alcohol' are conjoined with a PP headed by *unter* in (10) which is realized as an adjunct PP. Like in (7-b), the PP indicates that the subject referent has been under the influence of drugs and alcohol.

(10)   *25-Jähriger fährt   unter Drogen und*
       25-year_old drives under drugs   and
       Alkohol
       alcohol
       '25-year-old is driving under (the influence of) drugs and alcohol'
       (BRZ08/JUL.09227   Braunschweiger Zeitung, 17.07.2008; 25-Jähriger fährt unter Drogen und Alkohol)

Not only *Drogen* can be realized within an *unter*-PP without light *stehen*; the same is true of the other nouns occurring in the two families. This is a relevant observation as it demonstrated that the passive-like interpretation is only dependent on this specific use of the preposition *unter*[3] but neither on the light verb nor on the light verb construction as such. The basic function of the light verb is embedding the passive-like meaning expressed by the PP within a state predication.

4   Conclusion & Outlook

The paper started from the observation that LVCs instantiated by the same morphosyntactic type – in our case '*stehen + unter*' – are heterogeneous with respect to their interpretation. LVCs of this type exemplify (at least) two different systematic interpretation patterns (which have been termed 'families'). Both families share a passive-like interpretation which has been related to the specific use of the preposition *unter*. The differences between the two families have been related to the semantic type of the PP-internal nouns. The existence of LVC-families has (to the best of my knowledge) so far only been recognized for Persian LVCs (e.g.

Family, 2006, 2008, 2011, 2014) but it has been gone unnoticed for other languages (especially for German). It will be definitely worth investigating whether we come across similar or even the same LVC-families in other languages. A natural candidate to look at might be Dutch which – in difference to other languages as for example Turkish or Persian – shows a light use of a verb meaning 'stand'.

Another question to be investigated in the future is whether we can identify further characteristics with respect to which the mentioned LVC-families differ from each other. A promising feature to look at is causativization since it seems to be the case that the two families show different preferences in the choice of their causative light verb. LVCs of the event passive-family prefer *stehen* 'put' (lit. cause to stand), those of the state passive-family prefer *setzen* 'put' (lit. cause to sit). The results of a limited corpus study on the distribution of the two causative LVCs *stellen* and *setzen* are summarized in Table 4. The first two LVCs belong to the event passive-family, the second two LVCs are of the state passive-family. Each LVC has been individually searched for within the German reference corpus (search strings: '&stellen \s0 unter N' and '&setzen \s0 unter N'; 'N' has been replaced by the individual nouns.

	stellen	*setzen*
unter Beobachtung 'under observation'	201	4
unter Schutz 'under protection'	2179	0
unter Schock 'under shock'	1	7
unter Stress 'under stress'	1	244

Table 4: Preferences in the choice of causative light verbs.

Due to reasons of space, I cannot go into further details (especially with respect to the motivation of the different preferences) but take this as a promising starting point for a continuation study on the different families of *stehen unter*-LVCs.

Concerning further automation, we are planing to train learning algorithms on the basis of the annotated data set for the automatic identification of *stehen*-LVCs.

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[3]For an overview on different meanings realized by *unter*, see Kiss et al. (2016).

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