

# Coercion and leaking argument structures in Construction Grammar

HANS C. BOAS

## Abstract

*This article investigates the role of coercion and contextual background information in influencing acceptability judgments. Focusing on data from English resultative constructions I propose a usage-based constructional approach that accounts for the factors that allow for a verb's conventionalized argument structure specifications to leak, thereby allowing otherwise unacceptable non-conventionalized utterances such as ??Ed hammered the metal safe to be judged acceptable by means of coercion. By putting less emphasis on independently existing meaningful constructions I argue that frame-semantic information at the level of lexical units (mini-constructions) can be used effectively to link semantic information to syntactic information to arrive at both lower-level and higher-level constructional descriptions for both decoding and encoding purposes.*

## 1. Introduction<sup>1</sup>

The goal of this article is to investigate the factors that influence language users to produce and interpret typically unacceptable sentences as acceptable, given the proper context. For example, most native speakers of English would agree that the resultative construction in (1) is unacceptable. This is so because usually the matrix verb *hammer* does not occur with *safe* as a secondary predicate, but rather with secondary predicates such as *flat* as in (2).

- (1) ??Ed hammered the metal safe.<sup>2</sup>  
(2) Ed hammered the metal flat.

However, if an unacceptable sentence such as (1) is embedded in a particular context, its acceptability ratings clearly improve, as is demonstrated by the example in (3). This shows that the conventionalized specifications of

a language (here, a verb's conventionalized argument structure specifications) may give way to novel nonconventionalized usages given the proper context.

- (3) *The door of Ed's old Dodge had a piece of metal sticking out. When getting out of the car, Ed had cut himself on the metal and had to go to the hospital to get stitches. The next day, Ed hammered the metal safe.*<sup>3</sup>

The question of how to describe and predict the acceptability of resultative constructions of the type in (1) has been the topic of debate over the last two decades.<sup>4</sup> However, little is known about the factors that influence acceptability judgments of the type illustrated in (3), allowing otherwise unacceptable sentences to become acceptable.<sup>5</sup> This article aims to determine the factors which allow for this phenomenon.

By investigating the role of coercion and contextual background information in influencing acceptability judgments, this article also aims to shed some light on the question of whether the rules of language are completely rigid or whether they are completely flexible, as suggested by Hopper (1987: 142, 1991: 18–19). The question of how flexible grammars of languages are, is not a new one. In his well-known monograph *Language*, Edward Sapir (1921: 38) addressed the question of how rigid grammatical rules are and pointed out that “. . . were a language ever completely ‘grammatical’, it would be a perfect engine of conceptual expression. Unfortunately, or luckily, no language is tyrannically consistent. All grammars leak.” Following Sapir's terminology, the term *leakage* is used to refer to instances in which otherwise unacceptable utterances become acceptable in a given context.<sup>6</sup> That is, in cases such as the last sentence in Example (3), the argument structure of the verb *hammer* is said to *leak*, because *hammer* occurs with the nonconventionalized secondary predicate *safe* which is typically unacceptable as the secondary predicate of *hammer* outside of contexts such as in (3).

The article is structured as follows. Section two gives an overview of the theoretical framework employed, namely Construction Grammar (cf. Fillmore and Kay 1993; Goldberg 1995, 2006). It then deals with Goldberg's (1995) analysis of resultative constructions of the type in (1) and raises a number of points that are problematic when it comes to determining the range of contexts in which leakage of the type illustrated in (3) may occur. Sections three and four present an analysis of leakage phenomena which do not need independently existing meaningful constructions à la Goldberg. In particular, the importance of coercion, lexicalized frame-semantic knowledge, and contextual background information in licensing leakage phenomena are discussed. The final section summarizes the proposals presented here.

## 2. The role of argument structure constructions in Construction Grammar

One of the central goals of Construction Grammar (henceforth CxG) is to arrive at an inventory of all of the expressions which actually occur in a language. In order to capture the relevant generalizations over these expressions, the notion of *construction* is employed. Constructions are form-meaning pairings that exist independently of the particular words that instantiate them.<sup>7</sup> For example, Goldberg (1995) suggests that there is an independent resultative construction that bears a patient and a result argument which are added to a verb's semantics to yield sentences such as in (4a).

- (4) a. *He talked himself blue in the face.*  
(Goldberg 1995: 189)
- b. talk <talker>  
(Goldberg 1995: 189)
- c. talk <talker patient result-goal>

In (4a), *himself* and *blue in the face* are not typical arguments of the verb *talk*. Instead, Goldberg argues, the resultative construction adds the patient and result arguments to *talk* whose basic semantics is represented by (4b) in order to yield a resultative semantics such as in (4c). Recognizing the existence of meaningful constructions has the advantage of avoiding the problem of positing implausible verb senses, as Goldberg points out. Moreover, it is possible to “avoid the claim that the syntax and semantics of the clause is projected exclusively from the specifications of the main verb” (Goldberg 1995: 224). Applying Goldberg’s constructional analysis to sentences such as (1), here repeated as (5), we expect to find the independently existing resultative construction to supply the basic argument structure of *hammer* with an additional result-goal argument role as in Figure 1.<sup>8</sup>

- (5) ??*Ed hammered the metal safe.*

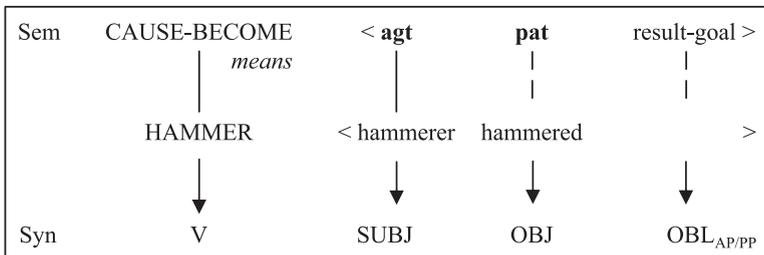


Figure 1. Composite Structure: Resultative + hammer

However, as pointed out above, for most speakers of English *safe* is usually not acceptable as a resultative secondary predicate occurring with *hammer*. The question, then, is how to rule out unacceptable sentences such as (5) in Goldberg's (1995) framework, while at the same time allowing for sentences such as *Ed hammered the metal flat*. To answer this question, we look at Goldberg's constraints regulating interactions between the semantics of verbs and the semantics of the resultative construction.

- (6) Constraints on resultative constructions
- (a) The two-argument resultative construction must have an (animate) instigator argument.
  - (b) The action denoted by the verb must be interpreted as directly causing the change of state: no intermediary time intervals are possible.
  - (c) The resultative predicate must denote the endpoint of a scale.
  - (d) Resultative phrases cannot be headed by deverbal adjectives.  
(Goldberg 1995: 193)<sup>9</sup>

The first constraint in (6a) does not prevent the resultative construction from providing the semantics of *hammer* with the resultative predicate *safe*, because *Ed* is a person and as such an animate instigator argument. (6b) is meant to "rule out cases in which there is any time delay between the action denoted by the verb and the subsequent change of state." (Goldberg 1995: 194) Note that (5) contains no information which would give rise to a reason to believe that the sentence describes a situation in which the result of *Ed*'s hammering activity materializes only after a significant delay following the cessation of his hammering activity. This means that the constraint in (6b) does not serve to rule out sentence (5). According to constraint (6c), resultative predicates must denote the endpoint of a scale. Note that *safe* is not only able to denote the lower and upper bounds of a "safeness" scale such as in *This car is not safe* or *This car is safe*. Moreover, *safe* may also be modified to denote intermediate points on a "safeness" scale as the following attested corpus examples from the COBUILD Bank of English illustrate.

- (7) a. *Tamoxifen is a relatively safe drug.*  
 b. *We're taking relatively safe chemicals.*  
 (COBUILD)

The examples in (7) show that *safe* is a relative term that can be measured along a scale which has an upper as well as a lower bound. This means that constraint (6c) does not serve to restrict the resultative construction to supply the semantics of *hammer* with *safe* as an additional resultative predicate. Constraint (6d) covers cases in which adjectives are derived from present or past

participles such as *\*She painted the house blackened*. Since *safe* is not a derived deverbal adjective, constraint (6d) does not keep the resultative construction from adding the resultative predicate *safe* to the semantics of *hammer* in Figure 1 in order to prevent the unacceptable sentence in (5).

Our discussion of Goldberg's constraints in (6) shows that they do not rule out unacceptable sentences (e.g., (5)) meaning that her approach leads to overgeneration.<sup>10</sup> Furthermore, her constructional account does not give a clear explanation for why *flat* is acceptable as the resultative predicate of *hammer*, whereas *safe* is typically not. A further problem is that Goldberg does not provide satisfactory mechanisms capable of dealing with the influence of contextual background information. These are needed to explain what factors are involved in rendering an otherwise unacceptable sentence (5) acceptable (8). The remainder of the article presents an alternative proposal that seeks to overcome these problems.

- (8) *The door of Ed's old Dodge had a piece of metal sticking out. When getting out of the car, Ed had cut himself on the metal and had to go to the hospital to get stitches. The next day, Ed hammered the metal safe.*

### 3. Multiple syntactic frames in a usage-based approach to Construction Grammar

In contrast to Goldberg's (1995, 2006) proposal that independently existing meaningful constructions are capable of supplying verbs with additional arguments, we adopt in this article the main assumptions of a usage-based approach to CxG as laid out in Boas (2003) and Iwata (2008). In this view, independently existing meaningful constructions have a far less important status in the grammar than assumed in Goldberg's framework. It does not postulate a limited number of "basic" or "prototypical" verb senses in order to arrive at extended senses by applying mechanisms such as independently existing meaningful constructions. Instead, it views the lexicon as an exhaustive collection of conventionalized senses of words including their syntactic and semantic restrictions imposed on their arguments. In other words, the usage-based approach to CxG adopted here regards the lexical entry of a verb as consisting of a bundle of conventionalized senses where each sense of a verb constitutes its own "mini-construction."

The advantage of assigning to each sense of a verb its own form-meaning pairing exhibiting specific semantic and syntactic specifications for each of its arguments lies in the fact that one does not have to postulate abstract constructions whose range of applicability is hard to determine and might thus lead to overgeneration. This approach takes the level of explanation to a more

concrete level than that of abstract meaningful constructions. It makes it also possible to describe and predict the range of arguments occurring with a given verb more precisely as the following sections illustrate (see Boas 2011a and Welke 2011).

We now turn to the conditions that allow the argument structure of *hammer* to leak. First, the distribution of the conventionalized syntactic frames representing the various senses associated with *hammer* is determined. Then, the conventionalized sense of *hammer* licensing the resultative pattern is identified and described in terms of a mini-construction. Finally, the role of analogical association and contextual background information in licensing leakage is discussed.

### 3.1. *Multiple syntactic frames relating to a verb's single prototypical sense*

The data employed here to determine the distribution of *hammer* comes from the British National Corpus (BNC). In order to arrive at a somewhat quantifiable basis for the analysis of the distribution of verb senses and their associated syntactic frames, the BNC is taken as the basis for determining the range of verb senses associated with *hammer*. The method of data extraction is as follows. Using the Corpus Workbench developed at the University of Stuttgart, the BNC was searched for sentences containing the verb *hammer*. Of the 674 sentences containing the verb *hammer* in the BNC, 18 instances of *hammer* were mis-tagged, which left a total of 656 sentences.<sup>11</sup> Table 1 lists the total number of corpus attested usages of *hammer* and their associated syntactic frames in order of frequency as they occur in the BNC.

Table 1. *Distribution of syntactic frames associated with hammer in the BNC<sup>12</sup> (total: 656)*

Syntactic frames	Number of occurrences
a. NP hammer NP (transitive) <sup>13</sup>	143
b. NP hammer (intransitive) <sup>14</sup>	106
c. NP hammer NP PP (caused-motion) <sup>15</sup>	104
d. NP hammer out NP <sup>16</sup>	81
e. NP hammer on NP <sup>17</sup>	64
f. NP hammer at NP <sup>18</sup>	42
g. NP hammer home NP <sup>19</sup>	40
h. NP hammer NP {PP/AP} (resultative) <sup>20</sup>	32
i. NP hammer (in) <sup>14</sup> sports NP <sup>21</sup>	18
j. NP hammer PP (motion) <sup>22</sup>	11
k. NP hammer away at <sup>23</sup>	8
l. NP hammer a nail in the coffin <sup>24</sup>	5
m. NP hammer NP out (of) <sup>25</sup>	2

Table 1 shows that *hammer* exhibits a rich variety of syntactic frames expressing different conventionalized meanings, including both “regular” transitive and intransitive usages (cf. (a), (b)) as well as caused-motion and resultative usages (cf. (c), (h)). Moreover, *hammer* is part of a number of idiomatic expressions such as *hammer a nail in the coffin* (cf. (l)) and occurs frequently with specific types of collocates, especially in the domain of sports, such as *hammer a {penalty, kick, goal}* in (i). Instead of splitting up the corpus attested senses of *hammer* into their own distinct meaning categories, senses have been grouped according to the syntactic frames with which they occur.<sup>26</sup> For the purpose of the present discussion, it is not necessary to give a full account of the entire polysemy network of senses and sense extensions (including their related syntactic frames) associated with *hammer*.<sup>27</sup> Instead, we concentrate only on a few syntactic frames representing senses of *hammer* that are relevant to our analysis of sentences such as in (1) and (2) above. In Table 1, these syntactic frames include the intransitive (b), transitive (a), caused-motion (c), and resultative (h) frames when they are used to express situations in which an agent strikes a patient repeatedly with a hammer or other instrument used to strike blows (usually to change the shape or location of the patient (prototypical physical impact sense of *hammer*)) as in the following sentences:<sup>28</sup>

- (9) Intransitive frame
- a. *Someone was hammering in the cellar.*
  - b. *To open the walnuts we placed them on one stone and hammered with another.*
  - c. *But if workmen are hammering outside your door, if the noise is intermittent and/or high-pitched.*  
(BNC)
- (10) Transitive frame
- a. *Shaw observed that the pieces made from copper had been manufactured by smithing techniques alone — by twisting, hammering and chasing the metal.*
  - b. *The *Ammophila* seals it with a plug of sand made firm and smooth by hammering it with a grain of gravel held in her jaws.*
  - c. *Don't hammer your thumb.*  
(BNC)
- (11) Caused-motion frame
- a. *They can tell us what tool to use to hammer upholstery nails into a chair.*
  - b. *Non-impact printers obtain their name from the fact that they don't hammer needles or shaped pieces of metal through a ribbon in order to leave their mark on a piece of paper.*

- c. *William took a tack from between his teeth and hammered it into the leather and then picked up a file.*  
(BNC)
- (12) Resultative frame
- a. *It can be melted and poured into a mould of almost any shape, hammered, into thin sheets, drawn into fine wires and extruded as rods and pipes.*
- b. *And it's malleable, you can hammer it, you can hammer it into shapes and panel beat it*
- c. *I cut out a straight section of wire coat hanger, heated one end until it was cherry red, hammered it flat, then, when it cooled . . .*  
(BNC)

Note that although *hammer* occurs with different syntactic frames in (9)–(12), it is always used to denote similar types of situations in these examples. That is, in each of the examples the respective syntactic frames are used to express a similar type of action of an agent, i.e., the activity of striking repeated blows with an instrument. The only way in which the transitive, caused-motion, and resultative frames differ from the intransitive frame is in the number of post-verbal arguments realized with the verb. This suggests that both the transitive, the caused-motion, and the resultative frames are employed as “extensions” to the semantics represented by the intransitive frame, thereby supplying more specific information about the situation and rendering the circumstances of the situation in which the hammering activity takes place more specific. The following set of sentences illustrates this point more clearly.

- (13) a. *Kim hammered.*  
b. *Kim hammered the metal.*  
c. *Kim hammered the meal into the wall.*  
d. *Kim hammered the metal flat.*

In (13a), only the agent of the hammering activity, *Kim*, is realized with the verb. Notice, however, that although (13a) does not include any other syntactic constituents besides the subject NP and the verb, it is part of world knowledge that hammering in its prototypical sense is typically done with an instrument and that there is usually some kind of object that is the patient of the hammering activity (e.g., *the metal* in (13c)). Moreover, it is part of world knowledge that the patient of a prototypical hammering activity ends up in a specific result location (e.g., *the wall* in (13c)) or state (e.g., *flat* in (13d)). The fact that this information is implicitly understood in sentences such as (13a) illustrates that speakers of a language understand the meanings of words with reference to a structured background of knowledge.

### 3.2. Event-based frame-semantic representations of verb senses

In order to account for the influence of world knowledge on the interpretation of words and sentences, we adopt the main principles of Frame Semantics as proposed by Fillmore (1982, 1985). Frame Semantics builds on the idea that words are understood with respect to knowledge about how a word is used by speakers of a speech community.<sup>29</sup> Fillmore and Atkins (1992) summarize the core principles of Frame Semantics as follows:

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. Speakers can be said to know the meaning of the word only by first understanding the background frames that motivate the concept that the word encodes. Within such an approach, words or word senses are not related to each other directly, word to word, but only by way of their links to common background frames and indications of the manner in which their meanings highlight particular elements of such frames. (Fillmore and Atkins 1992: 76–77)

Applying frame-semantic principles to the analysis of the sentences in (13), we can define a semantic frame for (prototypical) hammering events that includes information about event participants such as the agent (*Kim*),<sup>30</sup> the patient (*the metal*), the instrument (*the hammer*), and possible end states (e.g., *flat*) or locations (e.g. *into the wall*) of the patient.<sup>31</sup> Words that participate in the “hammering frame” include verbs such as *hammer* and *pound*, nouns such as *hammer*, *hammer smith*, *hammering*, *hammerer*, *pounder*, and adjectives such as *hammered*, *hammer-wrought*, and *pounded*. The use of each of these words evokes the entire “hammering frame,” i.e., even though a specific event participant may not be overtly mentioned, it is implicitly understood. For example, in a sentence such as *The hammer is on the table* the noun *hammer* evokes the “hammering frame” and its respective event participants. This includes knowledge about the fact that a hammer is an instrument typically used to strike repeated blows to a patient, that there is an agent that utilizes the hammer to engage in the activity of hammering, and finally, that the patient typically changes its state or location as a result of the agent's activity.

To distinguish between overtly mentioned event participants and implicitly understood event participants, we follow terminology proposed by Boas (2003) by differentiating between “on-stage” information and “off-stage” information. The former type of information is conceptually relevant information about an event that is linguistically relevant for the interpretation of the meaning denoted by an event frame. The latter type of information is not immediately relevant for the present construal of an utterance because it is part of world knowledge. In this view, only the agent *Kim* in (13) is conceptually relevant on-stage information required by the physical impact sense of *hammer* to be overtly realized to evoke the “hammering frame” (cf. the unacceptability of

utterances such as *\*Hammered.* or *\*Hammered the metal.*) Other event participants such as the patient, the instrument or the end result state or location are off-stage information and are implicitly understood since they are event participants which belong to the “hammering frame.”

Our discussion of the sentences in (13) shows that the intransitive, transitive, caused-motion, and resultative frames are employed to express different degrees of informational specificity of a prototypical hammering event in which an agent utilizes a hammer to strike repeated blows to a patient, which, as a result, ends up in a final location or result state. In other words, different syntactic frames may be used in (13) to refer to the same prototypical hammering event. Depending on how specifically a speaker wishes to describe the event, he may choose to include more precise information about the event by employing a syntactic frame that allows him to specify this information. For example, when the intransitive frame is used to describe a prototypical hammering event as in (13a), only the agent is overtly mentioned. However, because of frame semantic knowledge associated with the prototypical sense of *hammer* it is implicitly understood that the hammering activity also involves a patient, an instrument, and knowledge that the patient ends up in an end location or result state.

In order to represent the fact that the intransitive, transitive, caused-motion, and resultative frames in (13) may all refer to the same prototypical hammering event, we adopt Boas’ (2003) proposals to indicate frame-semantic knowledge in terms of event-based frame semantic representations. In this approach, each sense of a verb represents its own form-meaning pairing in the form of a mini-construction containing on-stage and off-stage information about the event participants and their relations to each other, temporal sequences, force dynamics, and prototypical result states or end locations.<sup>32</sup> The mini-construction is formalized in terms of an event-based frame semantic representation as in Figure 2 which shows the semantic specifications of the prototypical sense of *hammer*.

SOURCE	Path	Path	Path	GOAL
↓ Ag	↓ Ag	↓ Ag	↓ Ag	Ag
↓ Pt	↓ Pt	↓ Pt	↓ Pt	(Pt (p3))

- Ag: Entity striking (repeatedly) with a hammer
- Pt: Physical object
- p3: SYN: AP/PP
- SEM: denoting a location or a state that can be construed as being directly caused by the energy emitted by the agent

Figure 2. Event-based frame semantic representation of the prototypical sense of *hammer*<sup>33</sup>

The event-based frame semantic representation (short: event frame) in Figure 2 contains different types of information about the prototypical sense of *hammer*. First, it contains information about the temporal sequences of an event. That is, the five temporal slots represent an event from its beginning (SOURCE) to its end (GOAL) including intervening time intervals (Path). Second, there are specifications for the event participants such as agent (Ag) and patient (Pt) present in each of the temporal slots. The presence of agent and patient in all five temporal slots indicates that both event participants are present throughout the entire event from beginning to end. The semantic specifications for agent and patient listed below the temporal frame capture the type of encyclopedic knowledge that members of a speech community share about the characteristics of the agent and the patient of a prototypical hammering event.<sup>34</sup> The third type of information specifies the properties of possible end result states and locations. That is, “p3” captures the fact that patients of prototypical hammering events may end up in particular types of end locations or result states. The parentheses surrounding “Pt” and “p3” indicate that the patient and the result state or end location are optional semantic event specifications (in contrast to the agent participant role which is an obligatory event specification).<sup>35</sup> Furthermore, the double parentheses surrounding “p3” indicate that the result specification is only relevant when the patient of the prototypical hammering activity is conceptually relevant. Finally, the arrows leading from the agent down to the patient specifications in Figure 2 represent the force dynamics that hold between the event participants (cf. Talmy 1988) during a prototypical hammering event. The arrows indicate that from the beginning of a prototypical hammering event on, the agent exerts force (by hammering) that affects the patient. At the end of a prototypical hammering event, the agent has stopped exerting force and the patient is in a (typically different) result state or end location. Note that the formalization of frame-semantic knowledge in Figure 2 contains primarily semantic information, yet there is no mention of how the event participants are realized at the syntactic level. It is this point to which we now turn.

### 3.3. *Linking event-based frame-semantic information to the syntactic level*

To ensure the proper linking of the semantic information to the syntactic level, we adopt the set of linking rules in (14) regulating the linking of event participants to the syntactic level for regular declarative clauses.<sup>36</sup> Figure 3 illustrates how the linking rules link the event participants of Figure 2 to intransitive, transitive, and resultative/caused-motion (syntactic) frames.

## (14) Linking Rules

- (1) Prototypical agents are mapped as NPs to the subject position.
  - (2) Prototypical patients are mapped as NPs to the postverbal position.
  - (3) Resultative phrases specifying the prototypical end result state of the prototypical agent are linked to immediate post-verbal position.
  - (4) Resultative phrases specifying the prototypical end result state of the patient are linked to immediate post-patient position.
- (Boas 2003: 190)

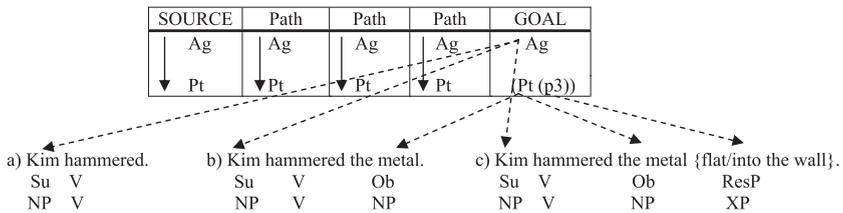


Figure 3. *Linking to intransitive, transitive, and caused-motion (syntactic) frames based on event frame of prototypical sense of hammer*

The interaction of the linking rules in (14) with the event frame in Figure 2 yields the three different types of declarative sentences in Figure 3, (a)–(c). The broken arrows leading away from the event participant specifications represent the “linking” of frame-semantic information to the syntactic level. That is, the agent of the prototypical hammering event is automatically linked as an NP to subject position in Figure 3 (a), (b), and (c), as a result of the linking rule in (14.1). In Figure 3, (a), the linking rules license an intransitive syntactic frame because the event-frame specifications only mark the agent as conceptually relevant to the understanding of the prototypical sense of *hammer* (both “Pt” and “p3” are surrounded by parentheses indicating their optional status) and thus require its overt realization at the syntactic level. In Figure 3, (b), the event frame allows optional realization of the patient, which is linked by (14.2) as a postverbal NP to object position, thereby yielding a transitive syntactic frame (in combination with (14.1) linking the agent to sentence initial position). Finally, the semantic event-frame specifications allow for the realization of a result phrase denoting the end location or result state of the patient argument.<sup>37</sup> Linking rule (14.4) is responsible for linking the resultative phrase to a position immediately following the patient, thereby yielding a resultative (syntactic) frame (in combination with (14.1) and (14.2) linking the agent to sentence-initial and the patient to postverbal position, respectively).

While the interaction of semantic event-frame specifications in Figure 2 with the linking rules in (14) license the attested syntactic intransitive, transitive, and resultative/caused-motion frames expressing different degrees of descriptivity of prototypical hammering events in Figure 3, they also serve to rule out unattested sentences such as those in (15).

- (15) a. \**Hammered*.  
 b. \**Hammered the metal*.  
 c. \**Hammered {flat|into the wall}*.  
 d. \**The metal hammered*.<sup>38</sup>  
 e. \**{Flat|into the wall} hammered*.  
 f. \**The metal {flat|into the wall} hammered*.  
 g. ??*Ed hammered the metal safe*.

Examples (15a)–(15c) and (15e) are ruled out by the event-frame specifications in Figure 2 which require overt syntactic realization of the agent. Moreover, (15c) is ruled out by the requirement in Figure 2 that the patient argument be realized at the syntactic level whenever the resultative phrase is realized to express some property of the patient. (15d) and (15f) violate the event-frame specifications that the agent argument be an entity which repeatedly strikes with a hammer. In this particular case, *the metal* cannot be construed as such an entity. Finally, (15g) is typically judged unacceptable because the semantic specifications for the resultative phrase are violated. That is, in the context of (15g) *safe* can usually not be construed as denoting an end state directly caused by the energy emitted by the agent of the hammering activity.<sup>39</sup>

This section has argued that in a usage-based approach to CxG, a lexical entry of a verb consists of a bundle of conventionalized form-meaning pairings (mini-constructions, or event frames) exhibiting precise semantic and syntactic specifications for each of its arguments. In the case of *hammer*, we have seen that the mini-construction (i.e., event frame) representing its prototypical sense licenses conventionalized utterances (UC), as in Figure 3 while simultaneously ruling out nonconventionalized utterances (UN), as in (15). By modeling the prototypical sense of *hammer* in terms of a mini-construction, we have thus identified a specific instance of the grammar that forms the basis for licensing resultative patterns with *hammer*.

The lexico-grammatical approach to argument structure presented here only captures the distribution of conventionalized utterances that are licensed by conventionalized mini-constructions (i.e., event frames) (see Nemoto [2005], Iwata [2008], and Boas [2011b] for a similar analysis of the English locative alternation). It does not in its current form address cases in which an unacceptable nonconventionalized utterances, as in (15g), becomes acceptable when embedded in the proper context. The following section addresses this question

by identifying the individual factors that allow a verb's argument structure to leak.

#### 4. Lexicalized prototypical constructions serve as the basis for leakage

In the case of (15g), here repeated as (16), the co-occurrence of the subject *Ed* with the object *the metal* indicates that *hammer* is used in its prototypical (physical impact) sense as characterized by the event frame in Figure 2 above.<sup>40</sup>

(16) ??*Ed hammered the metal safe.*

Adding *safe* to the prototypical sense of *hammer* expresses a specific type of end state which results from Ed's hammering activity. By employing the syntactic frame [NP V NP XP] to express this end state, *safe* is automatically associated with the conventionalized resultative semantics of the event frame in Figure 2 which require the resultative phrase to denote a location or a state that can be construed as being directly caused by the energy emitted by the agent. Since *safe* does not meet these specific conventionalized semantic/pragmatic requirements of the event-frame specifications for the resultative phrase in Figure 2, the sentence is unacceptable without context. An explanation of the circumstances under which an event frame's conventionalized specifications may leak to allow for nonconventionalized constituents is needed.

I suggest that an event frame's conventionalized specifications may leak to give way to nonconventionalized utterances only when it is possible to coerce the utterance as something that the speaker has heard before, according to Michaelis' Override Principle:<sup>41</sup>

**The Override Principle:** If a lexical item is semantically incompatible with its syntactic context, the meaning of the lexical item conforms to the meaning of the structure in which it is embedded. (2004: 51)

In the case of utterances as in (16), this is only possible if two conditions are met. First, there must be an existing conventionalized (and lexicalized) form-meaning pairing (or mini-construction) which serves as an analogical basis for both production and comprehension of the nonconventionalized utterance. Second, contextual background information must be available to allow for the association of the nonconventionalized utterance with the already existing conventionalized utterance (for details, see Boas 2003: 270–277). Based on the association of nonconventionalized utterances with existing conventionalized utterances, it becomes possible for a verb's conventionalized specifications to leak and to give way to novel utterances that may in turn be coerced in analogy to conventionalized utterances. In my view, coercion is understood as

involving the whole utterance and not only a verb within a more abstract construction. As such, the target of coercion may involve verbs as well as other constituents in the utterance, depending on the availability of contextual background information. The following sections outline this proposal in more detail.

#### 4.1. *Frequency and lexical specifications of conventionalized prototypical constructions*

This section discusses the types of event frames that may serve as a basis for analogical extensions. In contrast to verbs such as *hammer*, whose event frames relate to a rather narrow scope of possible situations, there are more general verbs, also known as *light verbs*, such as *get*, *take*, *give*, or *make* which exhibit a much higher frequency of use than other types of verbs. Carroll et al.'s (1971) Word Frequency Book points out that in their 5,000,000-word corpus, light verbs occur with a much higher frequency than other types of verbs. More specifically, *make* occurs 8,333 times, followed by *get* (5,700 times), and *take* (4,089 times). The observation that light verbs exhibit a higher frequency than that of other verbs suggests that they have a privileged status in the grammar. To be specific, they may serve as the basis for analogical extensions, thereby leading to novel utterances. In the case of *make*, I suggest that it represents the lexicalized prototypical instance of what Goldberg refers to as an independent "meaningful" unit "that is itself associated with meaning," (1995: 224, 10), namely, the resultative construction. This proposal relates to Goldberg's observations regarding the relationship between *make* and the independently existing resultative construction. She points out that

... the notion of changing the state of something in general, and making, in particular, is basic to the resultative construction, since by virtue of positing only a single very abstract sense, all instances instantiate the construction equally. *Make*, however, is the most prototypical causative verb because its lexical semantics is identical with what is claimed here to be the construction's semantics. (Goldberg 1995: 35)

According to Goldberg, there is both a prototypical instance of the resultative construction and an independently existing resultative construction with its own construction-specific semantics and the ability to contribute additional arguments to a verb's meaning. In contrast, the alternative view proposed here does not require any independently existing constructions that contribute arguments to a verb's meanings. With respect to *make*, this means that there is no need for an independently existing meaningful resultative construction because *make* already is the prototypical lexicalized instantiation of resultative

semantics. By doing away with the notion of an independently existing meaningful construction as part of a theory of grammar, emphasis is put on specific instances in which the respective constructional meanings attributed to abstract constructions can be independently verified by actual language usage, in this case by attested resultative usages of *make*.<sup>42</sup> The alternative account focuses on concrete lexicalized instances of the prototypical resultative meaning of the light verb *make*.

Observations made above in Section 2 also support the proposal to direct our attention away from independently existing meaningful constructions capable of supplying arguments to verbs and to focus on more concrete lexicalized instances of lexicalized argument. To repeat, Goldberg's constructional account exhibits a number of issues when it comes to determining what types of verbs may occur in the construction. The data illustrate that it is not always clear under what circumstances a construction may supply a given verb with additional arguments, and what types of arguments may be supplied when an utterance is encoded. This observation led to postulating mini-constructions representing each conventionalized sense of a verb in Section 3. Following these proposals, we expect to find data supporting the claim that one of the senses of *make* should be regarded as the prototypical lexicalized instance of resultative semantics (related to what I call meta-constructions) and also that it serves as the basis for analogy leading to leakage of conventionalized event-frame specifications of other verbs.

A corpus investigation of the distribution of *make* in resultative contexts in the British National Corpus shows that it occurs with a broad variety of different resultative phrases such as in the following examples.

- (17) a. *But then, it was not his good looks that made him famous.*  
 b. *What is done to make tap water safe to drink?*  
 c. *"Bastards like that make me sick," he confided to Thiercelin.*  
 d. *They reduced nausea and prevented vomiting, and many of them made people sleepy.*  
 e. *As ever at Jaguar, the emphasis will be on making the car smooth and quiet.*  
 f. *And it stretches all the tissue on the inside, and that's what makes it sore.*  
 g. *In fact it makes you more stupid.*  
 h. *All I'm saying is that worry can make you thin.*  
 i. *I think it was the wine that made me real tired.*  
 (BNC)

Note that each time *make* occurs with a resultative phrase in (17), it expresses the resultative semantics of "X CAUSES Y to BECOME Z." The question re-

mains, however, whether *make* may in fact be regarded as an instance of the prototypical resultative construction itself. In other words, may it be regarded as a substitute for Goldberg's independently existing meaningful construction? In order to answer this question, let us turn our attention to an interesting fact having to do — again — with *frequency*. A comprehensive investigation into the distribution of adjectives used as resultative phrases appearing with *make* in (17) in the BNC yields the following results.

Table 2. *Distribution of 9 adjectives used resultatively with different verbs in the BNC*<sup>43</sup>

	<b>famous</b> (6344)	<b>safe</b> (8069)	<b>sick</b> (4243)	<b>sleepy</b> (401)	<b>smooth</b> (3045)	<b>sore</b> (852)	<b>stupid</b> (3083)	<b>thin</b> (5081)	<b>tired</b> (3989)
<i>make</i>	37	67	136	19	12	11	5	10	18
<i>other verbs</i>	0	0	worry (8)	0	polish (12)	scratch (1)	drink (3) blow (1) drive (1) fuck (1) laugh (1) scare (1) smack (1) worry (1)	cut (6) wear (5) spread (4)	0

The first line in Table 2 contains the individual adjectives and their total number of occurrences in the BNC. The second line shows the number of occurrences of the respective adjectives as resultative phrases with *make* in the BNC. The third line includes the number of other verbs found with these adjectives in resultative patterns. The corpus data indicate that *make* occurs in combination with the nine resultative phrases more often than with any other verb. This is evidence that the light verb *make* exhibits a very high frequency in general language use and that the use of *make* in resultative sentences is also much higher than that of any other verb. In some cases, *make* is even the only verb exhibiting resultative usage in combination with an adjectival phrase, as the collocational patterns of *make* with *famous*, *safe*, *sleepy*, and *tired* illustrate. Comparing the frequency of *make* to the frequency of other verbs in Table 2 strongly suggests that *make* should be regarded as the prototypical lexicalized instantiation of resultative semantics.<sup>44</sup>

Another interesting point illustrated by Table 2 concerns the status of the adjectives used resultatively, e.g., *safe*. Out of 8069 occurrences in the BNC, *safe* occurs a total of 67 times in resultative contexts. In each case, *safe* occurs with *make* as its head verb, thereby forming a fixed collocational pattern of light verb and resultative phrase. This observation suggests that *make-safe* has the status of a collocation which is lexicalized as such in the lexicon.<sup>45</sup> In other

words, the high frequency of co-occurrence of *make* with *safe* as a secondary predicate has led to the lexicalization of a conventionalized mini-construction with its own semantics and construction-specific requirements. The following BNC-attested examples illustrate this point.

- (18) a. *He made his pistol safe . . .*  
 b. *The German government has offered to spend £82 million over the next seven years to make the plant safe*  
 c. *What is done to make tap water safe to drink?*  
 d. *The first priority would be for the ground crews to make the bombs safe . . .*  
 e. *Good food handling and thorough cooking should make all food safe.*  
 f. *How soon do they make sexual intercourse safe?*  
 g. *Baker also claimed the Government had done all it could to make cars safe.*  
 h. *This demonstrates the need for us to continue to stop and search people, if we are to make the streets safe.*  
 i. *The building work will hopefully start this spring with repainting and making the structure safe.*  
 j. *On 19 June 1984, local residents and landowners formed the Silvermines Pollution Action Group (SPAG) to campaign for the mine to be made safe . . .*  
 (BNC)

The sentences in (18) clearly show that the *make-safe* collocation has a very specific semantics relating to a limited set of events. That is, in each of the ten representative examples, *make-safe* is employed to describe an event in which a (potential) danger or threat is overcome by an agent or an activity in order to prevent something bad from happening. In each case, the (potential) danger or threat comes from an object or activity which — due to its nature — is capable of threatening the security or health of (human) beings: pistols, (industrial) plants, tap water, bombs, food, sexual intercourse, cars, streets, (building) structures, and mines.<sup>46</sup> The fact that the individual objects or activities in (18a)–(18j) pose a (potential) danger is part of conventionalized world knowledge and thus serves as the motivation for speakers to employ the conventionalized *make-safe* collocation to describe (potential) ways of overcoming those dangers and threats. This means that the *make-safe* collocation is a mini-construction that is a pairing of a specific semantics/pragmatics (overcoming the (potential) danger or threat of an object or activity) with a very specific syntactic frame, i.e., [NP V NP *safe*]. Figure 4 is an illustration of the formalized event frame representing this mini-construction:

SOURCE	Path	Path	Path	GOAL
↓ Ag	↓ Ag	↓ Ag	↓ Ag	Ag
↓ Pt	↓ Pt	↓ Pt	↓ Pt	Pt p3

Ag: Entity or activity capable of eliminating the (potential) danger or threat posed by patient

Pt: Entity or activity that poses a (potential) danger or threat to (human) beings or other entities

p3: “safe”; SEM: state which no longer threatens by danger or injury

Figure 4. Event-based frame semantic representation of the make-safe collocation<sup>47</sup>

The specifications in Figure 4 regulate the types of arguments occurring with the *make-safe* collocation. That is, only entities or activities that are capable of eliminating the (potential) danger or threat posed by the patient will be allowed as agent arguments. Moreover, patient arguments have to fulfill the requirement of posing a (potential) danger or threat to (human) beings or other entities. The arrows indicate that the agent exerts energy towards the patient over the duration of the event. At the end of the energy exertion, the final state is reached as indicated by “p3,” *safe*. Finally, the event frame requires that *safe* as well as the patient argument are profiled, i.e., that they be realized at the syntactic level (notice the missing parentheses around “Pt” and “p3”). Due to these event-frame specifications, this specific conventionalized collocation of *make* is automatically associated with a resultative frame [NP V NP *safe*], thereby licensing (in combination with the linking rules in (14)) sentences such as in (18a)–(18j) while disallowing unacceptable sentences such as the following:

- (19) a. \**They made their pistols broken.*  
 b. \**Kim made the book safe.*<sup>48</sup>  
 c. \**The wind made the water safe.*  
 d. \**Pat made the pistol.*

(19a) is unacceptable since the event-frame specifications in Figure 4 require *safe* to be the resultative phrase used to express eliminating a danger or threat in combination with *make*. Similarly, (19b) is ruled out because according to conventionalized world knowledge, typically books do not pose any danger to human beings or other entities. This means that *the book* is incompatible with the event-frame specifications for the patient argument in Figure 4.<sup>49</sup> (19c) is unacceptable because without the proper context, *the wind* cannot be construed as an entity that eliminates a (potential) danger or threat posed by the water. (19d) is ruled out since the obligatory resultative phrase *safe* is not realized

at the syntactic level. All in all, then, the event-frame specifications for *make-safe* in Figure 4 serve not only to license acceptable sentences expressing the semantic/pragmatic relations inherent to the *make-safe* collocation with a special conventionalized syntactic frame, but they also rule out unacceptable examples of the type in (19).

The data in this section clearly suggest three important points. First, *make* is among the most frequently occurring verbs in English and thus has a special status in the grammar. Second, compared to other verbs occurring in combination with a variety of adjectives in resultative usage patterns in the BNC, *make* is the most frequent one. By regarding *make* as the prototypical lexicalized instantiation of resultative semantics, there is no need for postulating an abstract meaningful construction as in Goldberg (1995). Third, *safe* occurs exclusively with *make* when used resultatively and thus forms a collocational pattern that is best captured in terms of a conventionalized event frame (or mini-construction) linking the semantic/pragmatic information of *make-safe* with a specific syntactic frame configuration, i.e., [NP V NP *safe*].

#### 4.2. *Coercion and the role of contextual background information*

This section turns to the question of how conventionalized event frames such as that licensing *make-safe* may serve as the basis for weakening constructional selection restrictions of other event frames such as those of the prototypical sense of *hammer*, thereby ultimately leading to coercion and the leakage of their conventionalized specifications given the proper contextual background information. As pointed out in Section 3, the unacceptability of *Ed hammered the metal safe* is due to the fact that the semantics of *safe* are incompatible with the semantic specifications of the event frame of the prototypical sense of *hammer*. To be more precise, the requirements that the resultative phrase denote a state that can be coerced as being directly caused by the energy emitted by the agent is violated by *safe*, because *safe* is not conventionally construed as such an end result state. Following these observations, this section suggests that it is possible to avoid this semantic incompatibility by allowing *safe* to be construed as a possible end result state caused by hammering. By associating the mini-construction representing the prototypical sense of *hammer* with the *make-safe* construction discussed above, it becomes possible to override the specifications for the resultative phrase of the prototypical sense of *hammer*, thereby leading to coercion. On this view, an override of an event frame's semantic specifications (= leaking of the verb's conventionalized subcategorization requirements) may be licensed under the following conditions, which are to be regarded as a more detailed specification of Michaelis' (2004) Override Principle.

## (20) Conditions on leakage

The conventionalized specifications of an event frame  $E_1$  may leak to yield a new nonconventionalized utterance ( $U_N$ ) iff

- a. There exists another conventionalized event frame  $E_2$ ,
  - (i) that licenses conventionalized utterances ( $U_C$ ) expressing part of the form-meaning pairing of  $U_N$ , and
  - (ii) that is more abstract at some level than  $E_1$ .
- b. By means of analogical association, those parts of the event-frame specifications of  $E_1$  are overridden or augmented by the event-frame specifications of  $E_2$ , which are necessary to license  $U_N$ . Association of  $E_1$  with  $E_2$  in order to license  $U_N$  is only possible if
  - (i) there is a semantic overlap between  $E_1$  and  $E_2$  such that those specifications of  $E_1$  which are not overridden or augmented by  $E_2$  can be construed as an instance of  $E_2$ , and
  - (ii) each form-meaning specification associated with  $E_2$  that overrides or augments any of  $E_1$ 's specifications is construed the same way in  $U_N$  as it is according to its specifications encoded (expressed) by  $E_2$  as a result of the information provided by  $E_1$ ,  $E_2$ , and contextual background information.

In order to demonstrate how the specifications of an event frame may leak to license an  $U_N$  (nonconventionalized utterance), we now turn to a step-by-step discussion of how the individual conditions in (20) have to be satisfied. Figure 5 illustrates how the  $U_N$  *Ed hammered the metal safe* is licensed by augmenting event-frame specifications of a conventionalized event frame  $E_1$  with information from another conventionalized event frame  $E_2$  in context according to the conditions in (20).

$E_1$  represents the prototypical sense of *hammer*, while  $E_2$  represents *make-safe*. The arrow leading from  $E_2$  to  $E_1$  represents the flow of information associated with  $E_2$  to  $E_1$  in order to trigger analogical association of  $E_1$  with  $E_2$ , given the proper contextual information. The dotted lines surrounding  $E_1$  and  $E_2$  represent the fact that analogical association of  $E_1$  with  $E_2$  is always influenced by contextual background information which is part of a speaker's knowledge of how  $E_1$  and  $E_2$  are used. The respective semantic specifications of  $E_1$  and  $E_2$  have already been discussed in Figure 2 and Figure 4, above, and are repeated in Table 3 below. Recall that *Ed* and *the metal* of the  $U_N$  in Figure 5 are licensed by  $E_1$  (= the prototypical sense of *hammer*) which only leaves open the question of how *safe* is licensed in the  $U_N$ .

In order to explain why the specifications of  $E_1$  leak to yield a nonconventionalized resultative phrase, namely *safe*, condition (20a) calls for an event

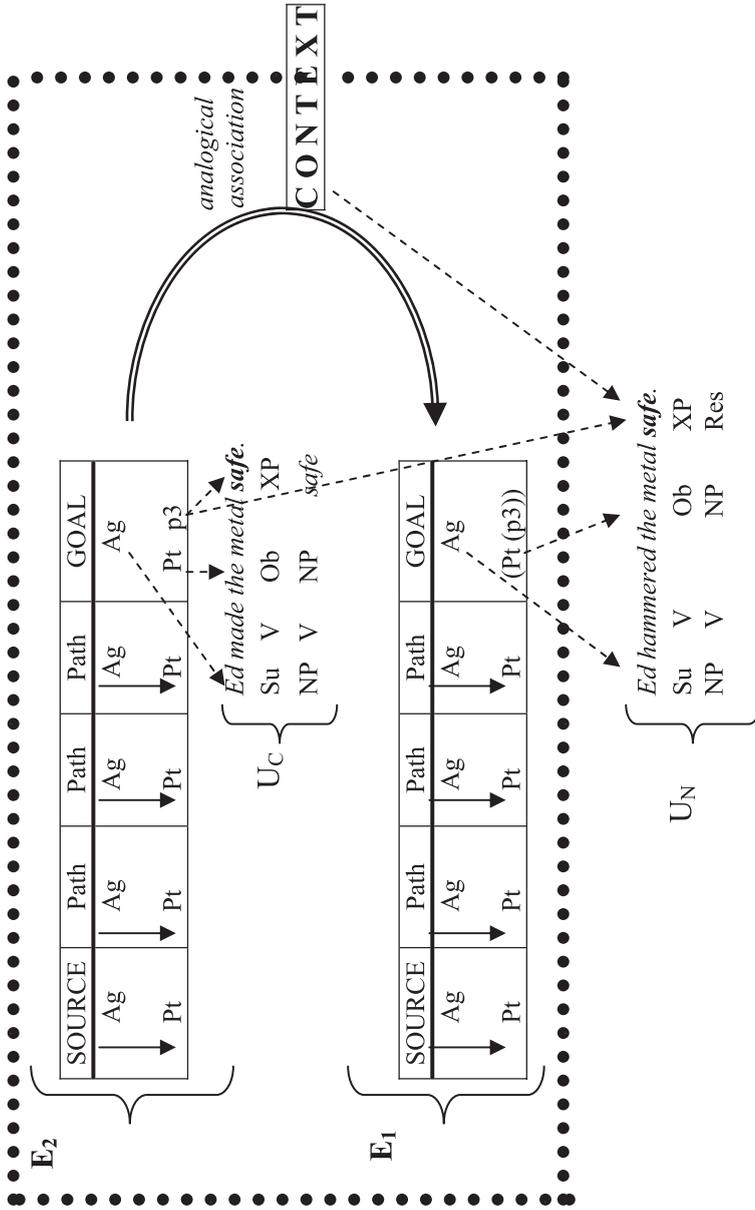


Figure 5. Licensing of nonconventionalized utterance Ed hammered the metal safe

frame  $E_2$  that licenses conventionalized utterances ( $U_C$ ) expressing part of the form-meaning pairing of  $U_N$  and that is more abstract at some level. Our discussion in Section 4.1 has shown that *make-safe* is to be regarded as a conventionalized collocation which may be represented by an event frame as diagrammed in  $E_2$  in Figure 5 (in combination with the semantic specifications for  $E_2$  in Table 3). Based on its event-frame specifications,  $E_2$  licenses  $U_C$ s such as *Ed made the metal safe* (as the upper section of Figure 5 illustrates). Moreover, *make-safe* expresses part of the form-meaning pairing of  $U_N$  by identifying the meaning of *safe* with the end point of an activity that seeks to overcome a danger or threat and by pairing this meaning with a syntactic frame of the form [NP V NP *safe*]. Finally, *make-safe* is more abstract than *hammer-XP* because it does not specify the manner in which the activity employed to overcome the danger or threat is carried out. This means that *make-safe* fulfills all of the conditions of (20a) and can thus function as  $E_2$  as the basis of an analogical association for  $E_1$ . However, before  $E_1$  may leak to give way to nonconventionalized utterances in analogy to the specifications of  $E_2$ , the conditions of (20b) need to be met as well.

Condition (20b(i)) calls for semantic compatibility between the two event frames such that those specifications of  $E_1$  which are not overridden by  $E_2$  can be construed as an instance of  $E_2$ . Since the agent *Ed* and the patient *the metal* of the  $U_N$  in Figure 5 are directly licensed by  $E_1$ , both need to fulfill this requirement for coercion to take place. Table 3 lists the semantic specifications for the respective event participants of  $E_1$  and  $E_2$ .

Table 3. *Compatibility of event-frame specifications of  $E_1$  and  $E_2$  to trigger analogical association in context and to allow for coercion*

	$E_1$	$E_2$	Semantic overlap/ compatibility
<b>Ag</b>	Entity striking (repeatedly) with a hammer	Entity or activity capable of eliminating the (potential) danger or threat posed by patient	YES
<b>Pt</b>	Physical object	Entity or activity that poses a (potential) danger or threat to (human) beings or other entities	YES
<b>p3</b>	SYN: AP/PP, SEM: denoting a location or a state that can be construed as being directly caused by the energy emitted by the agent	“safe,” SEM: state which no longer threatens by danger or injury	CONTEXT

The semantic/pragmatic specifications for agent (Ag) of  $E_1$  and  $E_2$  overlap and are compatible, because *Ed*, which is licensed by  $E_1$ , can be construed as an agent of  $E_2$ : it is common world knowledge that under the right conditions,

humans are typically capable of eliminating (potential) dangers or threats posed by other entities. It is also common knowledge that physical objects such as metal can pose dangers or can threaten other entities because of their sheer existence. This means that the specifications for the patient of  $E_1$  — *the metal* — are compatible with the specifications for the patient of  $E_2$ , in other words, *the metal* can be construed as an entity posing a potential danger or threat. Since both agent and patient participants of  $E_1$  can be construed as instances of  $E_2$ , condition (20b(i)) is fulfilled.

This brings the discussion to the final condition, namely (20b(ii)). This condition requires for each form-meaning specification associated with  $E_2$  that overrides or augments any of  $E_1$ 's specifications to be construed in the  $U_N$  the same way as it is to be construed according to its specifications inherent to  $E_2$ . For the  $U_N$  in Figure 5, this means that *safe* needs to be construed as “a state which no longer threatens by danger or injury,” as the specifications for p3 of  $E_2$  in Table 3 indicate. Comparing these specifications with the specifications for p3 of  $E_1$  in Table 3, it seems, at first, as if *safe* cannot be coerced as “a state which no longer threatens by danger or injury.” This leads us to considering the role of contextual background information in coercing *safe* in the  $U_N$  in Figure 5 the same way as it is required by  $E_2$  in Figure 5. Recall Example (3), from section one, here repeated as (21), where the sentences preceding the final sentence fulfill the function represented by “CONTEXT” in Figure 5.

- (21) *The door of Ed's old Dodge had a piece of metal sticking out. When getting out of the car, Ed had cut himself on the metal and had to go to the hospital to get stitches. The next day, Ed hammered the metal safe.*

The information provided by the previous context leading up to the final sentence in (21) illustrates that contextual background information is crucial to construing *safe* in the  $U_N$  in Figure 5 as “a state which no longer threatens by danger or injury.” More precisely, the context in (21) identifies the event participants *Ed* and *the metal* — which are licensed by  $E_1$  (the prototypical sense of *hammer*) — as standing in the same semantic relation to *safe* in  $U_N$  as *Ed* and *the metal* to *safe* in  $U_C$  licensed by  $E_2$  in Figure 5 (cf. our discussion of condition (20b(i)) above). In other words, due to contextual background information provided by the sentences that precede the final sentence in (21), *safe* is correctly interpreted as presupposing that at some point prior there was a state of affairs that posed a danger or threat: by identifying *the metal* as a particularly dangerous object capable of injuring people in such a way that they have to get stitches, *the metal* is contextually categorized as a threat to other people. It is this contextual coercion of *the metal* as a dangerous object that allows us to construe *safe* the same way in a  $U_N$  with *hammer* as with a  $U_C$  licensed by a conventionalized event frame such as  $E_2$  in Figure 5. That is, the combination of information contributed by *hammer* and by contextual background informa-

tion in (21) allows *safe* to be construed as a possible end result state of hammering because the metal does not pose a danger or threat any more. This influence of contextual background information is illustrated in Figure 5 by the two arrows leading from  $E_2$  and from "Context" to *safe* in the  $U_N$  at the bottom of Figure 5. The information provided by context, as well as  $E_2$ , in Figure 5 means that *safe* can be construed as "a state which no longer threatens by danger or injury." Thus, condition (20b(ii)) is fulfilled. Once all of the conditions in (20) are met, the argument specifications of the prototypical sense of *hammer* ( $E_1$ ) may leak in order to license the nonconventionalized utterance *Ed hammered the metal safe*, as illustrated in Figure 5.

## 5. Conclusion

This article has identified the factors that allow for a verb's conventionalized argument structure specifications to leak, thereby allowing otherwise unacceptable nonconventionalized utterances to be judged acceptable by means of coercion. It has been argued that leakage phenomena are best accounted for in terms of analogical association of one of the verb's conventionalized argument structure specifications (represented by an event frame, or mini-construction) with two other important sources of information. The first is a conventionalized argument structure specification of another verb which serves as the basis for analogical association for the first verb's leaking argument structure. The second source of information is contextual background information which provides the missing information needed to contextually coerce the constructional specifications of the first verb according to the constructional specifications of the second verb. The present work shows that contextual background information makes it possible to interpret the constructional specifications of one verb (and its possible arguments) in an utterance according to the constructional specifications of another verb (and its possible arguments) in another utterance, thereby allowing for a construal in terms of the other verb in the context of an utterance. This construal is responsible for allowing the second verb to provide its own constructional argument to the first verb's argument structure, thereby overriding its original argument structure specifications and thus licensing a novel, nonconventionalized utterance.

The analysis outlined in this article contrasts with Goldberg's (1995, 2006) constructional account which postulates independently existing meaningful constructions capable of supplying additional arguments to a verb's argument structure. Whereas Goldberg argues in favor of such powerful entities, this article has shown that her analysis is problematic when it comes to limiting the scope of such constructions. By putting less emphasis on independently existing constructions for encoding purposes and focusing our attention on

a more concrete level of analysis, such as conventionalized lexicalized instances of argument structures, the alternative presented above seeks to avoid the problem of overgeneration. Based on an analysis of corpus data, my approach to CxG thus emphasizes the status of conventionalized lexicalized argument structures in terms of mini-constructions (or event frames) and regards Goldberg-type constructions as an epiphenomenon related to frequency of actual occurrences of different types of syntactic frames across the lexicon. My proposals do not conflict with Goldberg's more recent views about the status of abstract constructions (see Boas 2011a). Rather, my fine-grained analysis of the different meanings associated with LUs is complementary to Goldberg's account and provides the type of detailed information that Goldberg (2009: 105, fn. 2) acknowledges: "[I]f we compare the contribution of verb and construction to subtle aspects of meaning involving manner or means, the verb would be more predictive than the construction." Finally, I argued that the network of frames can be effectively linked to syntactic information to arrive at higher-level constructional abstractions which ultimately link the *hammer* construction and the *make* construction.

With respect to the question of whether the rules of language are completely rigid or completely flexible, as suggested by Hopper (1991: 18–19), the discussion of leakage phenomena has shown that neither extreme point of view is sustainable. That is, the conditions on leakage identified in this article turn out to allow for leaking argument structures in principle, but only when certain requirements are fulfilled and coercion is possible.

Clearly, the usage-based constructional approach to leakage phenomena presented here leaves open a number of interesting questions that require additional research. The first question concerns the theoretical status of frequency with respect to the conventionalization process of verb senses. Given the usage-based approach to CxG, it is not entirely clear at what point a mini-construction's conventionalized specifications are changed permanently to represent novel verb usages. In other words, when should an utterance be regarded as nonconventional, i.e., being licensed by a mini-construction in combination with another mini-construction and contextual background information, or as conventional, i.e., being licensed by a single conventionalized mini-construction? This means that further research employing historical corpus data is needed to determine how frequent a novel use of a verb has to be in order to be regarded as conventionalized. See, for example, Barðdal (2008) for a case study on new verbs and their argument structures in Icelandic. The results from this research will also inform research on the role of innovation and propagation in language change as seen from an evolutionary perspective (see Croft 2000 and Traugott 2008). The second question requiring further research concerns the role of contextual background information and its influence on leakage phenomena. By studying instances of coercion leading to leakage be-

yond the single example presented in this article, it should be possible to identify broader categories according to which contextual background information can be categorized in terms of conventionalized categories. This research is needed to reveal the full range of contextual factors necessary to license leakage. Finally, in order to gain a greater understanding of how coercion may lead to leakage, research must be undertaken to reveal whether the same factors suggested in this article are at work in licensing leakage with other verbs and syntactic frames.

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## Notes

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2. This sentence is based on Green's (1972) example *\*He hammered the metal beautiful[safe] tubular*.
3. To check the acceptability of (3), a survey of 40 native speakers of English (undergraduate students) was conducted at the University of Texas in Spring 2009: 23 informants found (3) acceptable, 9 judged it marginally acceptable, and 8 found the example unacceptable.
4. Cf., e.g., Simpson (1983), Goldberg (1995, 2006), Wechsler (1997), Rappaport Hovav and Levin (1998, 2001), Napoli (1999), Boas (2003, 2005, 2011a), Broccias (2003), Goldberg and Jackendoff (2004), and Levin and Rappaport Hovav (2005), among many others.
5. Aarts (1992) briefly discusses examples such as (3) and mentions the possibility of "extra-grammatical principles whose application is context-driven" (1992: 62). However, he does not pursue this idea any further.
6. Croft (2000) uses the term "leakage" in a similar context, but slightly differently. On his view, leakage occurs "via spreading activation through the cognitive links established between words/constructions with similar meanings/functions in a single language system" (2000: 154).
7. The term construction is defined by Goldberg (2006: 5) as follows: "Any linguistic pattern is recognized as a construction as long as some aspect of its form or function is not strictly predictable from its component parts or from other constructions recognized to exist. In addition, patterns are stored as constructions even if they are fully predictable as long as they occur with sufficient frequency." See Croft (2001: 17–21), Fried and Östman (2004: 18–23), and Goldberg (forthcoming), among others, for other definitions of the term.
8. Figure 1 illustrates how the constructional semantics (constructional roles) of the resultative construction and the verbal semantics (participant roles) of an intransitive matrix verb are fused in Goldberg's framework in order to combine their respective semantics to form the resultative interpretation that is associated with the verb in the construction. The boxed diagram in Figure 1 represents the resultative construction and consists of three different layers: In the top line of the box we find the construction's own meaning (Sem). It contains the

semantic arguments of the construction (the constructional roles) and represents their semantic relations with respect to each other. Thus, the resultative construction is associated with the semantics 'X CAUSES Y TO BECOME Z.' Solid lines between the semantic roles and roles in the predicate's role array indicate that the semantic role must be fused with an independently existing verbal participant role. Broken lines indicate that the construction is able to provide additional participant roles. The middle line of the construction contains the open slots into which the verb's participant roles fuse, and in the bottom line we find the overt syntactic realizations of the semantic arguments of the combined verb-construction semantics. Roles represented in bold are 'profiled' arguments, i.e., entities in a verb's semantics that are "obligatorily accessed and function as focal points within the scene, achieving a special degree of prominence (Langacker 1987)" (Goldberg 1995: 44).

9. More general constraints on the fusion of constructional semantics and verb semantics are Goldberg's *Semantic Coherence Principle* and *Correspondence Principle* (see Goldberg 1995: 50).
10. Related issues that are problematic for the architecture of Goldberg's framework (e.g., over-generation, constructional polysemy) are pointed out by Kay (1996, 2005), Nemoto (1998, 2005), Boas (2005, 2008), and Iwata (2002, 2004).
11. Whereas the initial extraction of the 674 sentences from the BNC was done automatically by using the Stuttgart Corpus Work Bench, the resulting list of 674 sentences was sorted out by hand.
12. The term "syntactic frame" is used here in a very broad sense including not only what has traditionally been called "syntactic frame" such as transitive or resultative, but also idiomatic expressions and collocations.
13. Example: *Willie became aware of a steady, yet rather unnerving sound just ahead as if someone was hammering the rails.* (BNC) Optional modifications of the transitive frame (e.g., PPs expressing the instrument used for hammering such as *with one great fist* as in *He hammered the table with one great fist.* (BNC)) are not explicitly mentioned here, but are included in the list of transitive usages in (10a).
14. Example: *Someone was hammering in the cellar.* (BNC) Optional modifications of the intransitive frame (e.g., PPs expressing the instrument used for hammering such as *with another* in *To open the walnuts we placed them on one stone and hammered with another.* (BNC)) are not explicitly mentioned here, but are included in the list of intransitive usages in (10b).
15. Example: *They can tell us what tool to use to hammer upholstery nails into a chair.* (BNC)
16. Example: *Hanif, meanwhile, has been chained to his desk since his mid-teens hammering out novel after novel.* (BNC)
17. Example: *And Meg told the watching millions that her mum hammered on his door and woke him from a nap during a break in filming.* (BNC)
18. Example: *Some of the group were hammering at the rocks through which the road cut.* (BNC)
19. Example: *Paisley used his time to hammer home the religious significance of the battle . . .* (BNC)
20. Example: *I cut out a straight section of wire coat hanger, heated one end until it was cherry red, hammered it flat . . .* (BNC)
21. Example: *Former Shelbourne striker Gill has hammered in five goals . . .* (BNC)
22. Example: *"There ain't no hurry, you got another ten minutes," but by then we're both hammering down the escalator.* (BNC)
23. Example: *IBM has hammered away at the software engineering anvil.* (BNC)
24. Example: *The first nail in the executive's coffin was hammered in by the Westminster government.* (BNC)
25. Example: *They hammered my guts out.* (BNC)

26. For *example*, the intransitive frame is used to express different senses of *hammer*, such as a pure physical activity sense in which an agent's strikes blows and thereby affects a patient (which is understood) (e.g., *Someone was hammering in the cellar.* (BNC)), a sense expressing excitement or anxiety (e.g., *His heart was hammering.* (BNC)), and a motion sense (e.g., *The cab hammered through Acton.* (BNC)), among many others. The transitive frame is used to express physical impact (e.g., *Someone was hammering the rails.* (BNC)), defeat in battle or sports (e.g., *Outsiders Gothenburg hammered Dutch champions PSV to set up a decisive clash with favourite AC Milan for a place in the final.* (BNC)), and communicative acts (e.g., *I'll hammer a cry of despair.* [BNC]), among many others.
27. Such an analysis should investigate the relationships between individual senses of *hammer*, their associated syntactic frames, their sense extensions, as well as metaphorical usages. For an example of an in-depth investigation of a verb's polysemy network, see Fillmore and Atkins (2000) on the polysemy of *crawl*.
28. A *distinction* is made here between caused-motion and resultative frames, because — although their syntactic frames overlap (cf. NP V NP PP) — they differ with respect to their semantics.
29. For a detailed overview of Frame Semantics, see Petruck (1996) and Ruppenhofer et al. (2006).
30. Note that semantic frames are different from syntactic frames. Whereas syntactic frames are structural units that represent a particular number and sequence of syntactic constituents at the syntactic level, semantic frames are cognitive structuring devices referring to conceptual entities (frame elements or event participants) and their semantic relations to each other.
31. The *hammer*-frame is a very specific frame of physical impact including particular types of instruments (e.g., hammers, rocks, etc.). Within a hierarchy of semantic frames, it inherits information from more abstract frames such as the *hit*-frame, for example. See Petruck et al. (2004) for a discussion of frame-to-frame relations in FrameNet, the practical implementation of Frame Semantics.
32. In this view, a phonological string (representing a morphological paradigm) commonly identified as “the verb” serves as an identificational device that allows reference to a multitude of different events and perspectives thereof. This means that the phonological string *hammer* identifies both the prototypical physical impact sense represented by Figure 2, and other senses associated with *hammer*, such as *hammer out X* (meaning *to produce*, e.g., *Hanif, meanwhile, has been chained to his desk since his mid-teens, hammering out novel after novel . . .* [BNC]), *hammer on X* (meaning physical impact without changing the shape or location of the patient, e.g., *Tears blurred her vision as she swung out, hammering on the horn.* [BNC]), and *hammer home X* (*to make a point about something*, e.g., *To hammer home the point, he denied his players from having a late Christmas dinner by taking them straight back . . .* [BNC]), among many others.
33. For the sake of clarity, this event frame does not include a representation of the instrument involved in hammering.
34. Note that the semantic specifications given for the event participants in Figure 2 are only very minimal. Due to space limitations we do not attempt here to give a full list of semantic properties that members of a speech community associate with the respective event participants.
35. Obligatory and optional event specifications are equal to on-stage and off-stage information. That is, whereas information about the agent event participant is conceptually relevant knowledge that is necessary for the understanding of the prototypical sense of *hammer*, patient and result state/location information is not conceptually relevant knowledge, because it can be implicitly understood because *hammer* evokes the “hammering frame” (cf. our discussion above). The difference between obligatory or on-stage information and optional or off-stage

- information is roughly equivalent to Langacker's (1987) characterization of profiled and backgrounded information.
36. Note that other types of ordering constraints hold for syntactic structures that are different from regular declarative clauses. This means that whereas the linking rules in (14) only apply to prototypical declarative clauses of the type in (Figure 3, a–c), specific constructions such as passive constructions, WH-clauses, and relative clauses bring their own particular linking specifications that apply to event frames of the type in Figure 2 yielding different syntactic orderings.
  37. Here, the term resultative phrase is used to refer both to end states (e.g., *flat*) and locations (e.g., *into the wall*).
  38. Sentences such as *The rain hammered against the stained glass windows* might be regarded as a possible counterexample. However, in such cases *the rain* is construed as the agent of the hammering activity and *the stained glass windows* as the patient. This means that such instances are also covered by the proto-typical event frame of *hammer* in Figure 2, together with the linking rules in (14). Thanks for Peter Lauwers for pointing out this example.
  39. In the narrow sense, event frames describe only the event semantics associated with a specific sense of a particular verb. However, since the event semantics are automatically mapped by syntactic linking rules determining the surface realization of event participants, each event frame has a specific form associated with it (form-meaning pairing). As such, the terms *event frame* and *mini-construction* are used to describe the same state of affairs, i.e., instances in which a particular meaning is paired with a specific structure.
  40. Compare this sentence with its corresponding (reduced) transitive version *Ed hammered the metal*.
  41. A precursor to Michaelis' override principle is Israel's (1996: 288) "*Production Principle*: Utterances should sound like things the speaker has heard before."
  42. The proposals presented here suggest that Goldberg's independently existing resultative construction is an epiphenomenon that results from the fact that prototypical *make* occurs with a resultative pattern with high frequency in the language. In order to capture the distribution of resultative usage patterns across a language, we may use the term of "Metaconstructions" as developed by Östman and Leino (2001). In their framework, metaconstructions are "templates for using language, analogy models for storing knowledge and creating new linguistic material." They "may be thought of as not only static descriptions of relations which hold between constructions, but also as dynamic instructions of how to form new constructions." (2001: 22).
  43. The data are taken from Boas (2003).
  44. In this article I focus on raw-frequency data for illustrative purposes. For a methodology for arriving at a more detailed quantitative analysis of raw frequency data, please see Stefanowitsch and Gries (2004).
  45. The term "lexicon" is not used here in the strict sense of traditional generative transformational grammar (cf. Chomsky 1981, 1995) in which it relates to the strict separation of a lexicon module and a grammar module (see Boas 2008 for a comparison of the role of lexical entries in generative transformation grammar and construction grammar). Instead, it is assumed here that the lexicon is an integral part of the grammar of a language. On this view, grammar consists of an inventory of lexical items ("the lexicon") and abstract grammatical constructions ("the constructicon"), with no strict border separating the two. The only way in which grammatical constructions are different from lexical items is in their degree of abstraction. That is, whereas lexical units (conventionalized event frames, or mini-constructions (e.g., the *drive-crazy* sense of *drive*) exhibit very narrow and specific semantic/pragmatic and syntactic requirements with respect to the types of constituents that they subcategorize for, grammatical constructions are much more abstract with respect to the range of constitu-

ents that may occur in them (e.g., agreement constructions, passive construction). Since there is no strict separation between “the lexicon” and “the construction,” a given construction will be characterized by the degree of specificity which it sets for its constituents. See Fillmore et al. (forthcoming) for more details.

46. A much more specific conventionalized instance of (potential) danger is the threat of loosing a sports game. In cases such as in (i), the team in question is in danger of loosing a game (= danger, threat), but then scores a goal, thereby overcoming the danger or threat, i.e., making “the game” safe:
- (i) *Sutton Coldfield fought back to 2–2 in the 57th minute, but England striker Tina Cullen made the game safe.*  
(BNC)
47. One possible objection to the analysis of *make-safe* in Figure 4 could lie in the observation that it is necessary to write an event frame for each resultative collocation occurring with *make* which would in turn enlarge the lexicon too much. Note, however, that such arguments based on the notion of economy on minimality have their drawbacks as well. That is, somewhere in the lexicon there must be an inventory of possible resultative collocations occurring with *make*, because each instance has its own specific semantics. On the view proposed here, listing conventionalized resultative collocations in the lexicon makes it also easier to rule out nonoccurring instances such as \**Ed made the TV broken*.
48. (19b) could also be rendered acceptable by a context in which this utterance would be felicitous: e.g. books for children that contain small pieces that might be swallowed by young children. Thanks to Peter Lauwers for pointing his out.
49. Note, however, that (19b) may be acceptable when it is embedded in a context which provides information that allows a construal according to which *the book* is an object posing a danger or threat.

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