Fabian Fleissner*

From linguistic creativity to conformity: The case of [*zur* N_{ung} *kommen/bringen*][1]

https://doi.org/10.1515/gcla-2025-0005

Abstract: This study explores the diachronic changes in the pattern [*zur* N_{ung} *kommen*/*bringen*], arguing for its status as a semi-schematic construction in late 19th-century German, expressing converse/anti-converse diathesis, constituted through the interplay of the two verbs. Through evidence supporting this status, I aim to show that the role of creativity in the emergence of new schematic constructions should, in part, be reconsidered — a perspective that diverges from the recent argument presented by Norde and Trousdale (2024). In particular, I challenge the proposal to categorize diachronic developments leading to schematization as E-creative within the framework proposed by Sampson (2016). While creativity introduces linguistic innovations, I propose shifting the focus to conformity as a driving force in schematization, as norm-oriented language users adopt and entrench these patterns through consistent usage.

Keywords: linguistic creativity, F-creativity, E-creativity, verbo-nominal constructions, constructionalization, schematicization, nominalization

1 Introduction

Challenges in CxG research over the past decade include the adequate description of linguistic creativity and the conceptual harmonization with already established ideas regarding the organization of linguistic knowledge (see Hoffmann 2020 for an overview). Neither has yet been achieved in a consensual way. This may seem

1 This paper emerged from the project *Interplay of Word Formation and Syntax: Nominalization Strategies in Verbo-Nominal Constructions and Secondary Prepositions* (Project No. 197124), funded by the Swiss National Science Foundation (SNSF). I would like to take this opportunity to express my gratitude to my colleagues Regina Ruf and Elena Smirnova for the enriching exchange and collaboration over the past four years. I also thank the reviewers for their constructive comments on the revision process.

* **Corresponding author: Fabian Fleissner**, Department of German Studies, University of Vienna, Universitätsring 1, 1010 Vienna, Austria, fabian.fleissner@univie.ac.at

surprising at first, given that Sampson (2016) provides a model whose adequacy most authors take for granted: The fundamental assumption is the distinction between F-Creativity (Fixed Creativity) and E-Creativity (Enlarging Creativity) as two different dimensions of linguistic innovation. F-Creativity involves creating new expressions within the existing grammatical 'rules', using them to generate novel utterances without altering the grammatical system itself, aligning with generative approaches like Chomsky's (1975 [1964]: 7–8) concept of creativity. In contrast, E-Creativity goes beyond this by expanding the grammatical system, allowing for the creation of new constructions and patterns. Sampson is not a construction grammarian, nor does he explicitly or implicitly situate his model of creativity within the CxG framework. For Sampson, creativity is, in any case, something that relies on a rule-based system as its frame of reference. The defining principle of creativity — whether it respects or transcends system boundaries — ultimately determines the classification into F and E. Implicitly, creative processes are primarily tied to individual language users, but CxG also aims to describe the linguistic system at the community level. Integrating this model into a framework that deals with the emergence of constructions, particularly schematic constructions resulting from collective conventionalization, poses an inherent difficulty. This problem is addressed in different ways, each focusing on different aspects. For some authors, creativity is predominantly understood in terms of productivity – how established abstract schemas are used to license novel utterances (Goldberg 2019; Hoffmann 2019). This perspective ultimately reflects a view focused on F-creativity, which describes the productive reuse of existing linguistic patterns. Expanding on this, Norde and Trousdale (2024) propose an adapted version of Sampson's model that incorporates two distinct types of F-creativity. Beyond full sanctioning by an established schema (F1-creativity), language users may produce utterances that are only partially sanctioned by such schemas (F2-creativity). In their analysis of Dutch pseudoparticiples, they outline a scenario in which F1-, F2-, and E-creativity operate at different stages of diachronic development, with E corresponding to what is referred to in CxG as the emergence of a new schematic construction, as a schema can hardly be derived from individual language use. For others, E-creativity is characterized by a complete disconnection from linguistic conventions. From this perspective, E-creative expressions do not belong to language proper, as they lack grounding in established norms. Consequently, proponents of this view argue that linguistic innovation is mainly reducible to F-creativity (Bergs 2018; Bergs and Kompa 2020). From a diachronic perspective, both positions raise important questions. The emergence of new constructions – particularly schematic constructions – cannot always be fully explained by F-creativity alone, as it depends on processes of innovation that transcend the boundaries of existing schemas, as Norde and Trousdale (2024) convincingly argue from a theoretical perspective. The emergence of new schematic constructions can

involve, or be rooted in, E-creativity. However, this is difficult to pinpoint and can often only be identified at the community level. One fundamental problem of historical linguistics is that, ultimately, a (albeit cumulative) set of synchronic observations is used to make diachronic claims. The development of new grammatical patterns or constructions is inherently a process of collective efforts and E-creativity remains invisible until it stabilizes and becomes observable through established usages at a certain point. This stabilization reflects the acceptance of a pattern or a construction within a speech community, making cumulative frequency the key to identifying constructionalization. Therefore, E-creativity is difficult to detect in linguistic data, as it only becomes measurable once repeated usage leads to entrenched patterns, which would more likely be situated within the realm of F-creativity. Processes like constructionalization are not singular acts of innovation but gradual developments in which emergent regularity and generalizability make the role of E-creativity evident. Many authors implicitly acknowledge this issue, which results in concrete judgments being made about F-creativity, while E-creativity remains relatively vague, emphasizing the incremental and gradual nature of linguistic creativity, not only within the respective concepts but also across them (see Herbst 2018; Uhrig 2018; Norde and Trousdale 2024). In addition, a lot of important cognitive principles employed within the CxG framework are far from creative. This raises the question of whether constructionalization — particularly schematicization — and creativity necessarily need to be reconciled at all. In usage-based approaches in CxG, there is at least consensus that language users acquire constructions through repeated exposure to specific utterances (e.g., Lakoff 1987; Croft 2001; Goldberg 2003, 2006; Bybee 2006). These approaches suggest that a language user's mental constructicon is shaped by both hearing and using language, with domain-general cognitive processes like analogy, categorization, chunking, and cross-modal association playing key roles in how constructions become entrenched in the mind. Each instance of language use leaves an imprint on a language user's constructicon, and the type of construction that becomes established depends on input frequency effects. High token frequency, for example, leads to a stronger entrenchment of constructions (Langacker 1987, 59–60; Croft and Cruse 2004, 292–293). All the aforementioned principles are not only production-oriented but (arguably even more so) perception-oriented, as they are essentially based on pattern recognition. Pattern recognition, strictly speaking, is always about searching for and identifying rules and systematic structures, rather than a drive for innovation. Therefore, there can be no linguistic definition of creativity that is system-immanent. A system cannot be creative; only language users can be. In addition, the emergence of new constructions does not necessarily enlarge the system, which, with regard to E-creativity, entails not only terminological inconsistencies. On the contrary, from a quantitative perspective, it often limits it, particularly in the case of schematic constructions: Once a constructional

meaning becomes dominant, alternative interpretations of the pattern are no longer permitted, or at least become less frequent.

In the following, I will argue that constructionalization, and particularly schematization, is primarily not a creative process. Schematic constructions are the result of processes where patterns stabilize and become enriched with regularity. The perpetuation of recognized patterns or perceived regularities is at best conformist. This does not mean that creative processes do not play an important role prior to schematization. They are likely a fundamental prerequisite, as both F-creative and E-creative utterances open the door to various potential usage patterns that can later become conventionalized. This accounts for the fact that different dimensions of creativity (F1, F2, … E) are gradual in nature. However, schematization is only possible once the creative potential has been exhausted or is no longer utilized. To illustrate this, two things need to be demonstrated: evidence of schema formation in a diachronic context and a reliable method for quantifying the creative potential of a community. I will attempt to address both.

The research object, which my argumentation will build upon, is a verbo-nominal pattern in German, whose constructional status I aim to demonstrate: [*zur* 'to' N_{ung} *kommen*/*bringen* 'come/bring']. The exclusive interplay of the two verbs is linked to grammatical functions whose synchronic contrastivity justifies the assumption of a schema. The diachronic emergence of the schema is preceded by the free and potentially creative use of an independent pattern. In Section 2, I will outline the cognitive principles underlying this process. Section 3 addresses the question of how the creative potential of a community can be quantified. Section 4 provides a description of the data and methods, and Section 5 presents and discusses the empirical results.

2 The emergence of a schema

2.1 Research object and preliminary assumptions

One central premise of this study is that the VP [*zur* 'to' N_{ung} *kommen*/*bringen* 'come/bring'] represents a semi-schematic construction C in German, which can no longer be considered an instantiation of the more abstract regular syntactic structure(s) S [P_{loc} N_{loc} $V_{movement/transfer}$], providing the basis for several constructions of MOVEMENT and TRANSFER. I adhere to Goldberg's (2006) definition to distinguish patterns from constructions in the narrower sense. This also means that occurrences of S can attain constructional status (and probably have to at a certain point, given sufficient frequency), but I will not make any claims about this in the following.

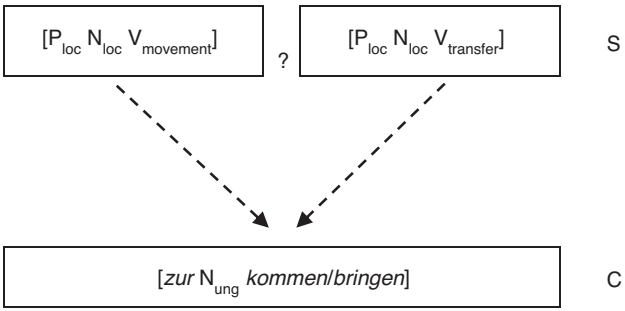

Figure 1: The diachronic relationship between S and C.

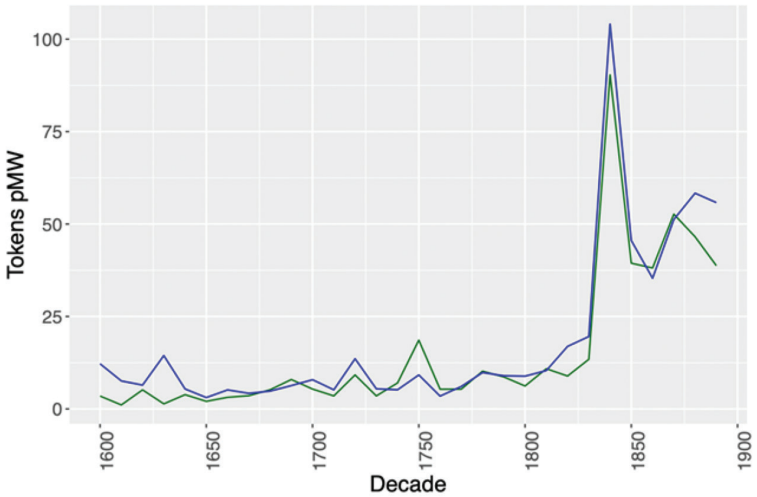

Figure 2: Development of token frequency of [*zu* N_{ung} *kommen*] (blue) und [*zu* N_{ung} *bringen*] (green).

The two verbs *kommen* and *bringen* inherit their respective syntactic properties as full verbs to C, which is why I do not consider additional verb-specific complements to be part of C's meaning. The relationship between S and C is therefore primarily diachronic in nature, see Figure 1.

The following diachronic observations support the assumption of a productive and schematic construction C. Figures 2 and 3 illustrate the development of token and type frequencies between 1600 and 1899.[2] Both the token frequency and

2 The frequency trajectories of the datasets are drawn from a forthcoming study by Fleissner and Smirnova.

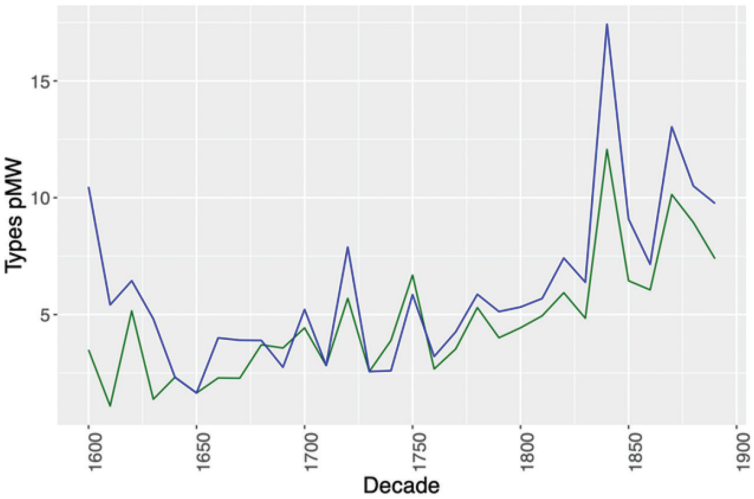

Figure 3: Development of token frequency of [*zu* N_{ung} *kommen*] (blue) und [*zu* N_{ung} *bringen*] (green).

the type frequency of constructions with *kommen* and *bringen* increase steadily over time. The rise in token frequency is clearly associated with the rise in type frequency, as evidenced by the uniformity of the frequency curves. This indicates that the increase is not only driven by a small number of individual constructions that become more frequent over time. Instead, it reflects the gradual emergence of a structural pattern that increasingly attracts a wider range of specific *ung*-nominalizations. This is a process that cannot be observed in any other type of word formation, even those that occasionally appear in similar contexts with comparable semantics.

Another important observation, which is also clearly visible in Figures 2 and 3, is the establishment of the paradigmatic relations between the two constructions [*zu* N_{ung} *kommen*] and [*zu* N_{ung} *bringen*]. While the frequency trajectories up until the late 18th century could be interpreted as more or less independent developments, from the early 19th century onward, the frequency curves clearly follow the same trend, both at the token and type level. The COME construction seems to take a small lead, with the BRING construction developing in relation to it.

To justify both the diachronic path S → C and the synchronic status of C, several theoretical assumptions are required. (i) The semantic diversity of S provides the necessary cognitive base structure that leads to the meaning of C. (ii) The meaning of C is tied to specific formal regularities that distinguish it from S. Therefore, the meaning of C is not synchronically motivated by the meaning of S. (iii) The formal and semantic structure of C is constituted through the usage of both C1 [*zur* N_{ung}

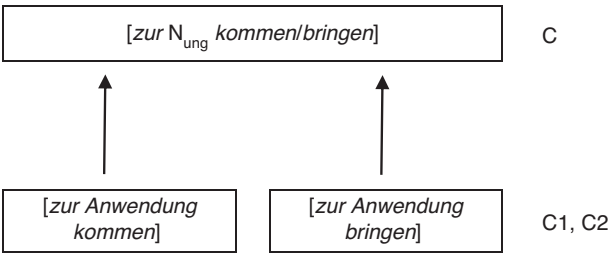

Figure 4: Simplified constructional network of C.

kommen] and C2 [*zur* N_{ung} *bringen*], suggesting the presence of a single superordinate node instead of two, see Figure 4.

In the following, I will outline the cognitive prerequisites for these formulated assumptions.

2.2 The cognitive foundation of S → C

The key to the autonomous development of C lies in its specialization in a specific word formation type with respect to the noun slot. *ung*-nominalizations are typically deverbal and, consequently, eventive in most cases.[3] Therefore, they are rarely found in concrete MOVEMENT or TRANSFER constructions. Exceptions like *Wohnung* 'apartment' or metonymic extensions of eventive entities to their spatial surroundings, as in *Vorlesung* 'lecture' or *Sitzung* 'session' are fossilized forms and a quantitatively marginal phenomenon within S. They are not diachronically or cognitively antecedent to the general eventive semantics.

The actual instantiations of MOVEMENT and TRANSFER constructions with deverbal nouns (including other word formation types) result from conceptual metaphors in that they create spatialized target domain entities from prelinguistic source domains: STATES/EVENTS ARE LOCATIONS (see Johnson 1987; Lakoff and Johnson 2003).

(1) *Ein Verzweiffler vertiefft ſich noch je mehr und mehr mit Sůnden/dann nachdem er einmal* ***zur Verzweiflung koñen****/wird er ſo verſtockt und verwegẽ/daß er gedenckt/es iſt doch nun alles vergebens.*[4] [Bauler 1681]

3 For an overview of the history, semantics, form, and restrictions of the deverbal word-formation suffix *-ung*, see Demske (2000, 2002), Hartmann (2016), and Hartmann (2017).

4 Examples from the DTA-corpus are cited according to the following pattern: [Deutsches Textarchiv 2018].

'A despairing person sinks deeper and deeper into sin; for once he has come to despair, he becomes so hardened and reckless that he thinks, 'It is all in vain anyway.'

(2) *Mir ift bange, daß ſie* ***mich zur Verzweifelung bringen*** *werde.* [Richardson 1750]
'I am afraid that she will bring me to despair.'

Both constructions rely on a functor-argument metaphor, which integrates semantically incompatible concepts. This occurs when the argument compels a metaphorical interpretation of the functor, as it conflicts with the functor's selectional restrictions (see Ellison and Reinöhl 2022). These functor-argument metaphors function as analogical or proportional metaphors, structured as A is to B as C is to D. They involve relational terms with one or more argument slots, creating an analogy between distinct conceptual domains. In MOVEMENT and TRANSFER constructions with non-concrete locations, the conceptual resolution requires the verbs to adopt an abstract interpretation. Abstract movements with COME are usually interpreted as CHANGE OF STATE (1), abstract TRANSFERS with BRING as CAUSATIVE (2), see Figure 5.

CHANGE OF STATE and CAUSATIVE events share a parallel semantic structure, which they inherit from their source constructions. This structural parallelism is not incidental but deeply rooted in the conceptual and grammatical properties of the original spatial image schemas. In the case of [*zur* N *kommen*], the structure reflects a metaphorical mapping of movement toward a STATE, preserving the endpoint focus inherent in spatial uses of COME. Similarly [*zur* N *bringen*] extends this schema by incorporating an additional CAUSATIVE event, reflecting the agentive TRANSFER of an entity (causee) to the same metaphorical endpoint. The shared spatial origins of these constructions ensure that they operate within the same overarching conceptual frame. While COME emphasizes the result of the metaphorical

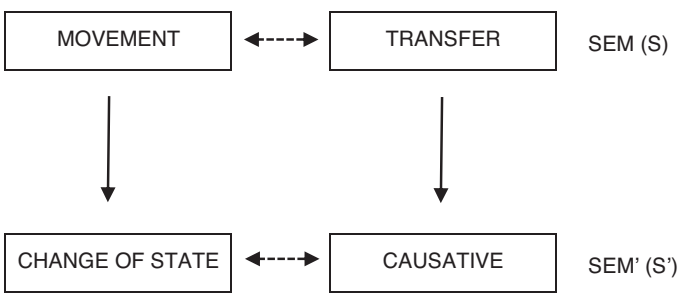

Figure 5: The image-schematic basis of S.

MOVEMENT (> CHANGE OF STATE), BRING introduces an agent (causer) that actively causes the transition, thereby aligning with a TRANSFER (> CAUSATIVE) interpretation. Both constructions overlap semantically: TRANSFER is also a CHANGE OF STATE of an entity but with an additional argument, which is formally represented by an additional TRANSITIVE event. As their cognitively primal schemas involving spatial MOVEMENT and TRANSFER, CHANGE OF STATE constructions are mono-eventive, CAUSATIVE constructions are bi-eventive.

Even though historical examples like (1) and (2) show that *ung*-nouns appear in regular but abstract MOVEMENT and TRANSFER constructions, they do so only rarely in Present Day German. While the construction [*zur Verzweiflung bringen*] is still commonly used as a lexicalized multi-word unit (see Fleissner and Smirnova Forthcoming), [*zur Verzweiflung kommen*] can at best be considered unusual and is hardly found in 20th-century corpora.

The most frequent and most recent construction type (C) of this pattern differs from MOVEMENT and TRANSFER constructions (including CHANGE OF STATE and CAUSATIVE constructions) in several respects, see (3a–4c).

(3) a. *Auch die Wasserregulatoren* ***kamen*** *zuerst in England* ***zur Anwendung*** *und bestanden daselbst ursprünglich aus einem langen, viereckigen Blechkasten…* [Beck 1897]
'The water regulators were first applied (lit. came to operation) in England and originally consisted of a long, rectangular metal box…'
b. ***Kommt*** *der Plan* ***zur Ausführung****, so ist Leopoldshafen so ziemlich antiquirt, und Karlsruhe selbst…* [Augsburger Allgemeine 1840]
'If the plan is implemented (lit. comes to execution), Leopoldshafen will be rendered somewhat antiquated, and Karlsruhe itself…'
c. *in allen Hauptzweigen ſei es doch auch in der Malerei nur der Menſch, der* ***zur Darſtellung komme****, denn die Landſchaftmalerei…* [Vischer 1856]
'In all main branches, even in painting, it is ultimately the human figure that comes to representation, as landscape painting…'

(4) a. *Der Richter hat nur wirkliches Recht* ***zur Anwendung*** *zu* ***bringen****.* [Gerber 1865]
'The judge is only to apply (lit. bring to execution) actual law.'
b. Nachdem dies Exempel statuirt war, ***brachte*** *der Kaiser die übrigen Artikel des Edictes nicht* ***zur Ausführung****.* [Berg 1864]
'After this precedent was set, the Emperor did not bring the remaining articles of the edict to execution.'
c. Zu diesem Zwecke wollen wir einen einfachen Fall ***zur Darstellung bringen****…* [Menger 1871]
'For this purpose, we will present (lit. bring to representation) a simple case…'

The pattern realizations belonging to C share the same semantic content, which is characteristic of the pattern itself and cannot be directly derived from its components. A key property of C is that its instantiations stand in a very close paradigmatic relationship to one another. This paradigmatic relationship is motivated, on the one hand, by the productive pattern itself and, on the other hand, by the respective lexical filling of the open nominal slot. The construction types with *kommen* and *bringen* can, simplified, be seen as diathetic variants of the base verb. The COME construction C1 reduces the verbal scene by omitting the agent, thus being agent-averse or deagentive. For the examples in (3a–c), a converse or passive-like meaning can be formulated as a common denominator. The semantic differences between the individual realizations in (3a–c) arise from the semantics of the deverbal noun (in this case: *Anwendung* 'application', *Ausführung* 'execution', and *Darstellung* 'representation'), which, in turn, maintain a transparent relationship with the base verbs *anwenden* 'to apply', *ausführen* 'to execute', and *darstellen* 'to represent'. The BRING constructions in (4a–c), on the other hand, act as a transitive counterpart, restoring the agent role. The converse interpretation is inherent to C2, as it exhibits reversed diathetic relations compared to the CAUSATIVE: There is no causee performing the verbal action expressed by the *ung*-noun; instead, the formally identical argument becomes the internal argument of the *ung*-noun. In contrast to C1, C2 eliminates the agent-averse perspective by reintroducing an agentive subject. I therefore refer to the constructional meaning of C2 as 'anti-converse'.

The notion of 'reintroducing' the agent into the structure in relation to COME needs to be supported by data and placed into a diachronic sequence, but it is plausible from a theoretical perspective. To begin with, it should be stated that CHANGE OF STATE constructions with COME generally require only one valency-increasing operation to evoke a converse interpretation, that is, an inversion of the argument structure. This converse interpretation is not limited to the preposition *zu* or to *ung*-nouns but is also attested in other COME constructions, which can be traced back at least to Middle High German (cf. Fleissner 2025 for COME constructions with *in*). The mismatch of a converse interpretation is therefore at least partially sanctioned. It thus appears that German COME constructions are inherently more insensitive to diathetic directions expressed by their eventive nominal elements than other VPs. Accordingly, different interpretations can be found for the same noun within [*zur* N_{ung} *kommen*], see examples (5)–(6).

(5) *das arbeitende Bewußtseyn kommt also hiedurch* ***zur Anschauung*** *des selbstständigen Seyns…* [Hegel 1807]
'The working consciousness thus comes to the perception of the independent being…'

(6) *der Character der Schule kam mir dann klarer* ***zur Anſchauung***. [Heine 1830]
'The character of the school then became clearer to me in perception.'

In (5), there is an abstract MOVEMENT (> CHANGE OF STATE) construction with a regular direction of action in the sense of an ACHIEVEMENT. The direct object of the base verb *anschauen* 'observe' appears as a genitive complement of the noun *Anschauung* 'perception'. In (6), on the other hand, the external argument of the base verb appears in the subject position, resulting in a converse interpretation. It is difficult to quantify the frequencies of the two meanings through qualitative individual analyses, as the contexts are not always clear and often involve ambiguous structures, especially in older texts. These uncertainties from a contemporary linguistic perspective can probably, at least partially, be assumed to exist in historical settings as well, which is why such ambiguities are likely to serve as important bridging contexts. Naturally, converse interpretations are particularly expected when the corresponding noun is derived from a transitive verbal base and already introduces two potential arguments into the construction. Since *ung*-nouns are typically derived from transitive verbs (see Demske 2000: 369), they should preferentially appear in structures which favor a converse interpretation. However, it is neither inherent to the properties of *ung*-nouns nor to their transitive verbal bases to realize the accusative object in the subject position in the absence of passive voice. It is therefore reasonable to assume that the converse interpretation is determined by the COME construction itself.

While it is unproblematic to relate the converse COME construction to the cognitively antecedent MOVEMENT (> CHANGE OF STATE) pattern, it is challenging to argue for a parallel cognitive pathway for the BRING construction as a diathetic counterpart. The seemingly obvious approach would initially be to derive their anti-converse interpretation directly from the preceding TRANSFER (> CAUSATIVE) structure, see Figure 6.

Such an explanation would require two steps: first, the integration of *ung*-nouns derived from transitive verbs as events initiated by a causee; second, a conversion of the argument structure of the noun and its external argument. An objection to this is data-based: In contemporary German, a construction necessary

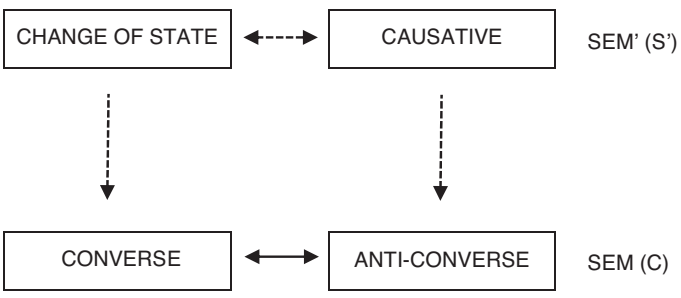

Figure 6: Proposal A – conceptual development of C.

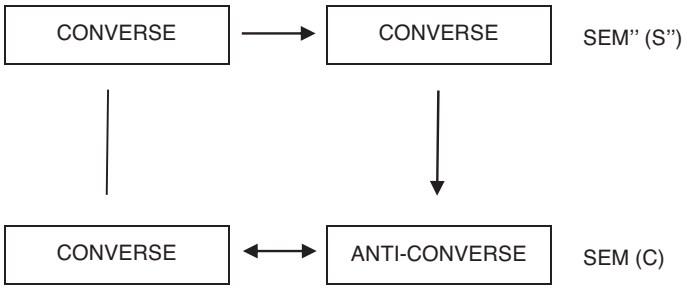

Figure 7: Proposal B – conceptual development of C.

for such an intermediate does not exist. CAUSATIVE constructions with transitive base events are at best unusual even in the infinitive form and are either ungrammatical or highly marked with *ung*-nouns, such as **den Arbeiter zur Anwendung (der Maschine) bringen* 'To cause the worker to apply the machine' or **die Maschine zur Anwendung des Prozesses bringen* 'To cause the machine to apply the process'. This would not be an issue if diachronic data showed such instances. In contrast to COME constructions like those in (5) and (6), a CAUSATIVE interpretation of a BRING construction would be much easier to identify. However, they do not appear in the corpora.

An alternative explanation would be that the argument conversion was paradigmatically motivated by the COME construction. In that case, the conventionalized meaning of [*zur* N_{ung}] would have been directly mapped onto the transfer construction via conceptual alignment, as shown in Figure 7.

An analogical intermediate step must be assumed here for the semantically flexible structure S'', which initially operates independently of the verb and serves as the basis for C. Such conceptual mapping also anticipates the paradigmatic relation necessary for C which is expressed in a diathetic opposition.

2.3 Investigating the constructionalization of C

The remaining question is how the proposed cognitive processes could be empirically demonstrated. As shown in Figures 1 and 2, both [*zu* N_{ung} *kommen*] and [*zu* N_{ung} *bringen*] seem to contribute to C in a similar way in terms of frequency, their trajectories showing a close relationship, as expected when they act complementarily at certain points. This development cannot be explained by the overall frequency trends of the general patterns of MOVEMENT and TRANSFER constructions, but these descriptive observations are not sufficient evidence for the constructionalization or schematization of C, although it can at least be considered as an indication (cf. Goldberg 2006 on frequency and constructionhood).

Two phenomena require investigation: first, the directional evolution reflected in the diachronic path; and second, the synchronically established schema, which necessitates a different approach. In this section, hypotheses are formulated and theoretically substantiated which will need to be tested in subsequent steps:

(I) Assuming that semantic and syntactic variations of S that lead to C1 emerged first and those that lead to C2 likely arose as an analogical extension, there would need to be a functional overlap between the structures involving COME and those involving BRING at the beginning of the paradigmatic development which later plays a quantitatively marginal role.

Such an area of overlap can primarily be examined through morphosyntactic peculiarities, without semantic bias regarding individual occurrences. To best mirror the converse structure of the COME construction functionally, passive constructions are particularly suitable for the BRING construction. It is therefore to be expected that, at the beginning of the investigated period, a disproportionately high number of passive constructions with BRING will be observable, which will decline over the course of the diachronic development. The diathetic opposition underlying C1 and C2 is therefore initially scarcely developed and only emerges as a result of consolidation tendencies in later periods in which the BRING construction increasingly takes on an active and finite character and the agentivity of the construction becomes increasingly significant. At the end of this development, the functional contribution of the verb *bringen* comes to the forefront, making it an interchangeable element in grammatical opposition to *kommen*. For the COME construction, different morphosyntactic patterns would need to be present, as the non-agentive nature of the subject is expected to limit the range of morphological forms available. Here, patterns typical of auxiliary verbs are expected to emerge: a general decline in non-finite forms, which typically favor full verb semantics. Such a process is usually referred to as grammaticalization; in this case, I refer to it as functionalization under similar conditions.

(II) If BRING constructions develop a paradigmatic opposition to COME constructions over time, the overlap of shared nouns between the two should increase.

This would indicate that both constructions are converging into a shared paradigm, with C2 gradually adopting the lexical properties of C1. The increasing overlap would reflect the integration of both structures into a more schematic pattern, suggesting that the paradigm is stabilizing its domain with respect to other instantiations of S'. To support this hypothesis, it is necessary to analyze the relative frequency and variety of shared nouns across both constructions over time. Based on the assumption of an increasing overlap, successful constructionalization would

require that, by the end of the development, both C1 and C2 favor largely the same pool of nouns. This entails a transition from a one-way process (C1 → C2) to a system characterized by mutual reinforcement (C1 ↔ C2), where individual elements in the paradigm support and motivate each other in both directions. Synchronically, it is no longer clear which construction serves as the constructional template for the other. This principle has primarily been studied from a morphosyntactic perspective.[5] A similar phenomenon could be observed here, despite the syntactic rather than morphological nature of the constructions. Language users conceptualize the schema not as two independent constructions but as a cohesive schematic template capable of accommodating contrastive grammatical functions, regardless of their initial asymmetry.

3 Towards a methodology for measuring linguistic creativity

A linguistic definition of creativity must meet at least two criteria: it must align with other cognitive and neuroscientific concepts of creativity, and it must neither be derived as a mere subcomponent of other linguistic concepts nor equated with them if this leads to ontological contradictions. Following Goldberg's uncontroversial assumption that creativity involves creating new words and patterns "beyond the resources in memory" (Goldberg 2019: 61), there are initially no issues with regard to the first criterion. Previous studies on creative cognition (see, for example, Beaty et al. 2016) share the hypothesis that two key components underlie all forms of creativity:

(I) Novelty: The idea or product must be original and unique, differing significantly from what has been done or thought before.

(II) Usefulness: The idea or product must be practical, valuable, or appropriate for a given context or problem.

In linguistic creativity, novelty involves generating new forms of expression that have not been previously encountered. This can include coining new words

5 As noted in studies on "Relational Morphology" by Jackendoff and Audring (2020), the relationship between forms and their derived counterparts often transcends a one-way process. Instead, suffixes like *-ism* and *-ist* illustrate how individual elements in a paradigm mutually reinforce each other, leading to a system that is motivated in both directions. A similar phenomenon can be observed here, despite the syntactic rather than morphological nature of the constructions.

(neologisms), using metaphors, or new syntactic patterns. The usefulness of linguistic creativity is measured by the ability of these new expressions to effectively express something that is perceived as novel and unexpected in a given context, while still fulfilling a communicative function. New forms must be comprehensible and meaningful within the context of the language and culture. This distinguishes creativity from errors and other mismatches that do not gain acceptance within the speaker community.

Problems arise primarily with the first criterion: Linguistics already has concepts that account for mechanisms exhibiting a novelty character in that they introduce new elements into existing structures; most notably processes associated with productivity, although there is no universally accepted definition or methodological consensus on this (see Berg 2020 for a methodological overview; Perek 2020 for a conceptual perspective). However, no form of productivity is necessarily creative. Productivity is a post hoc judgment about predictable and systematic aspects of language, where 'rules' are applied consistently across different contexts. This makes a relative statement about data and, more broadly, about systems, but not about language users. This constraint arises from the proportional nature of productivity measures, which compare the number of new or unique forms generated by a (usually morphological) process to the total number of forms or instances. In addition, only constructions can be productive. Creativity, on the other hand, resides in the language users themselves, and their forms of expression extend beyond constructions in the narrower sense. It is easy to imagine that creative speech is also possible with basic patterns such as argument structures. But these typically show little to no change in their productivity. What productivity fails to capture is the collective effort required to create a new form.[6] Quantifying this characteristic of language users is significantly more difficult, or at least more complex, as it involves accounting for several intervening factors. These include, above all, the size of the speaker community and their linguistic knowledge, which they can draw upon, and the number of neologisms, which is considered in relation to this.[7] While creativity is usually conceptualized as an individual cognitive process, there are compelling reasons

6 Of course, there is no such thing as 'collective effort' in the sense of cognitive exertion at the community level. When I refer to 'effort' in this context, I mean the likelihood of innovation in a community. As far as I know, no cognitive science framework establishes a direct connection between actual (individual) cognitive effort and the parameters considered in my proposed formula.

7 The latter is accounted for in Berg's (2020) neologism-based measure, which has proven more insightful in historical studies compared to other methods such as Type-Token Ratio, Potential Productivity (i.e., the number of hapaxes divided by the number of tokens, as proposed by Baayen 2009), and Hapax-Type Ratio.

to extend this notion to the community level. Measuring creativity at this broader level does not imply that communities possess agency or intentionality in the same way individuals do. Rather, it reflects the cumulative effect of individual innovations that gain traction within the speaker community. This aggregation of creative acts can manifest in recurring patterns of linguistic change, the spread of novel constructions, or shifts in communicative conventions. To take all of this into account, I propose a measurement described by the following formula:

$$CE = \frac{P}{A \times N}$$

It is important to note that the proposed measure of creativity is inherently text-based, making it well-suited for corpus-linguistic operationalization. The formula suggests that the collective creative effort (*CE*) a community requires to generate new items (*N*) is inversely related to both the number of language users (*A* for authors) contributing to this process and the accumulated pool of items (*P*), representing the linguistic heritage of the community. *P* refers to the pool of items that are already established and conventionally available within a given specific (constructional) pattern. Note that this pertains to the effort required within a community to create new items, not the size of the output. A higher (*CE*) value indicates that despite the available accumulated pool, the number of language users and/or the number of new types was relatively low, meaning that each new type required considerable effort to create. This means the community is facing challenges in innovation in this specific domain and innovative language users are accordingly creative. Conversely, a lower *CE* value suggests that new items are easier to produce, implying that the community is not very creative, has a large base of contributors, or can easily generate new forms based on the existing knowledge. This would be expected in the case of an existing schema that can generate new types, but with minimal creative effort. Even conformist language users contribute to the expansion of the pool of new types. *P* encompasses all the existing types from previous generations that current language users can draw upon. A high *P* can provide a robust foundation, offering numerous patterns and analogies for creating new items. Each new generation of language users can either build on or diverge from the linguistic patterns established by previous generations. A high *P* with low *N* might suggest that new generations are more conservative, relying heavily on established forms. Conversely, a low *P* but high *N* could suggest a generational shift toward innovation. A higher *A* should reduce *CE* because more minds have contributed to the innovation process. Ultimately, this means that from the point of successful

constructionalization, the effort required to create new forms should decrease, and this decline must correlate with other indicators of schema formation, as hypothesized in the previous section.

4 Data and methods

The analysis is based on all data from the period 1601–1900 available in the DTA (Deutsches Textarchiv 2018). From this corpus, all instances of the pattern [*zu* N_{ung} *kommen/bringen*] were extracted.[8] The focus on constructions with *ung*-nominalizations is due to the fact that this word-formation process represents the most frequent and therefore prototypical instantiations of [*zu* N *kommen/bringen*]. The chosen usage-based approach aims to abstract constructions as generalizations or schemas from authentic data. A consistent structure across all contexts allows for the identification of functional commonalities and discrepancies between individual constructions, as expanding the scope to include all nouns would be expected to increase the degree of polyfunctionality. The 300-year investigation period was further divided into 12 sections, each representing a speaker generation. Both tokens and types were counted based on the nouns, while additional parameters (such as modifications and determiners) were ignored. Table 1 provides an overview of the data.

8 The search queries were conducted for each verb (*kommen* and *bringen*) according to the following patterns:

[lemma = "*Verb" & pos= "VV.*"][]{0,9}[word = "zur"%cd][]{0,0}[word= ".*ung"%cd]
[word = "zur"%cd][]{0,0}@[word= ".*ung"%cd][]{0,7}[lemma = "*Verb" & pos= "VV.*"]
[lemma = "*Verb" & pos= "VV.*"][]{0,9}[word = "zur"%cd][]{0,0}@[pos = "ADJA"][]{0,0}[word= ".*ung"%cd]
[word = "zur"%cd][]{0,0}[pos = "ADJA"][]{0,0}@[word= ".*ung"%cd][]{0,7}[lemma = "*Verb" & pos= "VV.*"]
[lemma = "*Verb" & pos= "VV.*"][]{0,9}[lemma = "zu"%cd & pos = "APPR"][]{0,0}@[pos = "ART"][]{0,0}[word= ".*ung"%cd]
[lemma = "zu"%cd & pos = "APPR"][]{0,0}[pos = "ART"][]{0,0}@[word= ".*ung"%cd][]{0,7}[lemma = "*Verb" & pos= "VV.*"]
[lemma = "*Verb" & pos= "VV.*"][]{0,9}[word = "zu"%cd & pos = "APPR"][]{0,0}@[pos = "ADJA"][]{0,0}[word= ".*ung"%cd]
[word = "zu"%cd & pos = "APPR"][]{0,0}[pos = "ADJA"][]{0,0}@[word= ".*ung"%cd][]{0,7}[lemma = "*Verb" & pos= "VV.*"]
[lemma = "*Verb" & pos= "VV.*"][]{0,9}[word = "zu"%cd][]{0,0}[word= ".*ung"%cd]
[word = "zu"%cd][]{0,0}@[word= ".*ung"%cd][]{0,7}[lemma = "*Verb" & pos= "VV.*"]

Table 1: Overview of the data for [*zu* N_{ung} *kommen*] and [*zu* N_{ung} *bringen*].

Generation	*Kommen* (Tokens)	*Kommen* (Types)	*Bringen* (Tokens)	*Bringen* (Types)
1 (1601–1625)	16	13	3	3
2 (1626–1650)	37	15	11	8
3 (1651–1675)	32	20	24	16
4 (1676–1700)	57	32	84	47
5 (1701–1725)	77	43	35	28
6 (1726–1750)	105	50	109	44
7 (1751–1775)	77	48	106	42
8 (1776–1800)	135	67	132	55
9 (1801–1825)	119	45	86	44
10 (1826–1850)	825	143	683	99
11 (1851–1875)	913	143	948	115
12 (1876–1900)	1150	155	830	119

This initial dataset serves as the foundation for testing Hypothesis I and for the related propositions outlined below. They share a production-oriented perspective, aiming primarily to demonstrate schema formation at the formal level. To demonstrate this, the grammatical categories of the involved verbs are analyzed, as the BRING construction is hypothesized to initially mirror the COME constructions and to occur more frequently in the passive voice. Over time, with increasing convergence, the BRING construction becomes established as a complementary counterpart. By the end of this process, this convergence should manifest in recognizable semantic patterns. Additionally, a collostructional analysis of individual types is conducted for the period 1851–1900 to verify the hypothesized high degree of schematization at the end of the studied timeframe. Collostructional analyses (cf. Gries and Stefanowitsch 2004) examine the statistical association between specific lexemes and the grammatical constructions in which they occur. A high collostructional strength indicates that an element (in this case, the noun) appears significantly more frequently in a given construction than would be expected by random distribution. This method allows the identification of both more

associatively exclusive constructions, which are closely linked to specific collocations and carry a distinct constructional meaning, and more associatively open constructions, which are more flexible in their selection and derive their meaning more strongly from the individual elements involved. To explore the relationship between the collostructional strengths of the same lexemes in the constructions [*zu* N_{ung} *kommen*] and [*zu* N_{ung} *bringen*], the 10 lexemes most strongly associated with each construction are compared in terms of their collostructional strength. These lexemes are combined into a single dataset, and a correlation coefficient (cf. Pearson 1896) is calculated to quantify the association of collostructional strengths across the two instantiations.

From the overall dataset, a second dataset was extracted, which captures the individual level of authors. All texts without identifiable authorship were excluded from the corpus, primarily affecting newspaper texts. Furthermore, the number of new types was counted for each generation to quantify their respective lexical output. Table 2 presents the modified data compilation.

Table 2: Generational output for [*zu* N_{ung} *kommen*] and [*zu* N_{ung} *bringen*].

Generation	*kommen* (Types)	*kommen* (New types)	*kommen* (Authors)	*bringen* (Types)	*bringen* (New types)	*bringen* (Authors)
1 (1601–1625)	10	10	4	3	3	2
2 (1626–1650)	15	14	12	8	8	7
3 (1651–1675)	20	15	15	16	13	11
4 (1676–1700)	32	27	24	47	38	21
5 (1701–1725)	43	30	15	27	17	11
6 (1726–1750)	49	27	32	43	21	24
7 (1751–1775)	48	22	31	42	22	29
8 (1776–1800)	61	35	46	55	25	41
9 (1801–1825)	45	25	40	44	22	37
10 (1826–1850)	113	71	74	72	39	70
11 (1851–1875)	143	72	79	115	59	75
12 (1876–1900)	151	62	110	118	55	101

The second dataset serves two purposes. It provides the foundation for a network analysis to to visualize and quantify the relationships between authors and the nouns associated with each construction; with the hypothesis that the proportion of shared nouns between [*zu* N_{ung} *kommen*] and [*zu* N_{ung} *bringen*] increases over time. This trend is expected to reflect a gradual semantic convergence during the development of C. The network analysis was conducted using the Python library NetworkX (Hagberg et al. 2008). The methodology involved constructing weighted, bipartite graphs to model the relationships between authors and nouns. To further substantiate the analysis, a normalized overlap was calculated as a measure of the extent of shared nouns. The normalized overlap captures the proportion of shared nouns and is defined as the size of the intersection of the noun sets for [*zu* N_{ung} *kommen*] and [*zu* N_{ung} *bringen*] divided by the geometric mean of their individual sizes. This metric ensures that the overlap is not disproportionately influenced by the absolute sizes of the data subsets but instead reflects the relative degree of convergence between them. A higher normalized overlap is interpreted as evidence for a stronger integration of shared nouns, which aligns with the hypothesis of increasing convergence as construction C evolves.

The second purpose is to measure creativity values and explore how they align with the other observations discussed. Specifically, this involves examining the extent to which the creation of new types within the dataset reflects varying levels of creative effort across generations. By focusing on patterns of F- and E-creativity, the dataset allows for an analysis of whether these creativity values correlate with the diachronic development of schematic constructions. Additionally, the alignment of these values with paradigmatic relations between the *kommen* and *bringen* constructions will provide insight into how creativity contributes to the stabilization and productivity of linguistic schemas over time.

5 Results

The results presented in this section are organized into three sections: formal and functional criteria, networks and creativity. Each section focuses on a distinct aspect of the analysis, providing detailed insights into the paradigmatic relations between constructions, the formal grammatical behaviors of the verbs involved, and the role of creativity in constructionalization.

5.1 Formal and functional convergence

For Hypothesis I, it was proposed that the presumed functional convergences would be reflected in the formal grammatical behaviors of the verbs involved. This

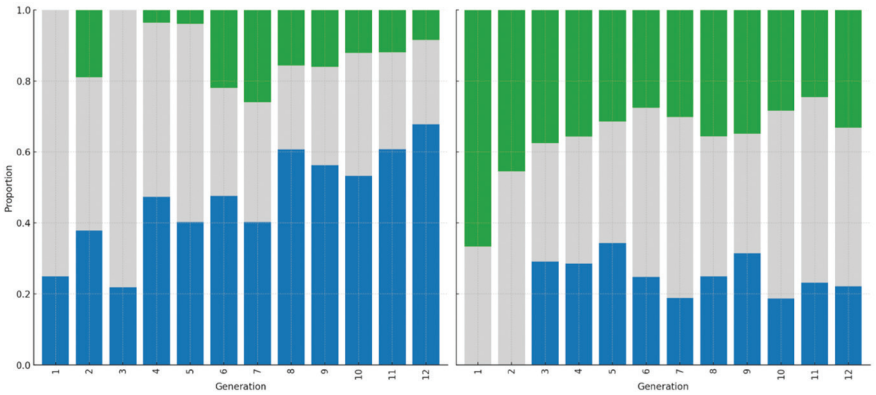

Figure 8: Development of morphosyntactic forms of *kommen* (left) und *bringen* (right): VVFIN (blue), VVPP (green), VVINF (grey).

should result in different patterns for *kommen* and *bringen*, with *kommen* demonstrating increasing functionalization and *bringen* reflecting its analogical extension. Figure 8 presents the results.

Hypothesis I finds confirmation in the data. For *kommen*, we can observe a gradual reduction in morphosyntactic flexibility, leading to a predominance of finite forms (VVFIN). This trend is all the more remarkable when considering that, during the same period, there is a general shift in German verb phrases toward periphrastic constructions. For *bringen*, there is a notable decline in passive constructions, while toward the end of the investigated period, a more balanced distribution of morphosyntactic forms becomes apparent. In the first two generations, BRING constructions exhibit hardly any prototypical agentive subjects. Apart from the dominant passive constructions, most other periphrastic constructions are combined with impersonal subjects. The only two instances exhibiting prototypical human agents are CAUSATIVE constructions with the noun *Verzweiflung* 'despair'. This strengthens the suspicion that the *bringen* construction emerged in dependence on the *kommen* construction and originally expressed the same converse reading with a passive analogical extension, which explains the high number of past participles (VVPP) in the early stages.

Evidence for the formation of a semischematic construction C is to be further provided by the collostructional analysis for the period 1851–1900, which encompasses the last two generations. Table 3 shows the results for the 10 nouns with the highest collostructional strength within [*zu* N_{ung} *kommen*] and [*zu* N_{ung} *bringen*].

The analysis reveals that all associations between the instantiations of C and their respective nouns are considered statistically significant (Log-Likelihood > 10.83 is highly significant at a 99.9% confidence level of $p < 0.001$). A comparison of

Table 3: Results of the collostructional analysis (top 10).

kommen	**COLLEX**	**CORP. FREQ**	**OBS**	**EXP**	**COLL. STR. LOGL**
1	*Anwendung* ‘application/usage’	5322	600	0.2	8928.0232
2	*Geltung* ‘validity/relevance’	1318	387	0	6548.4817
3	*Ausführung* ‘execution’	2813	149	0.1	1957.16
4	*Verwendung* ‘use/usage’	1535	137	0	1947.0716
5	*Erscheinung* ‘appearance’	6276	159	0.2	1850.2174
6	*Besinnung* ‘reflection/contemplation’	274	93	0	1596.0365
7	*Überzeugung* ‘conviction/belief’	1890	87	0.1	1115.8201
8	*Entwicklung* ‘development/evolution’	6655	103	0.2	1094.1098
9	*Abstimmung* ‘vote/coordination’	1639	80	0	1035.4455
10	*Darstellung* ‘representation’	4715	80	0.1	863.9475
bringen					
1	*Geltung* ‘validity/relevance’	1318	439	0	7723.72705
2	Anschauung ‘view/perception’	2211	241	0.1	3616.62722
3	*Anwendung* ‘application/usage’	5322	268	0.1	3594.57985
4	*Ausführung* ‘execution’	2813	201	0.1	2835.12702
5	*Darstellung* ‘representation’	4715	131	0.1	1590.59892
6	*Anerkennung* ‘recognition/acknowledgment’	1786	89	0	1185.0095
7	Abstimmung ‘vote/coordination’	1639	84	0	1123.09866
8	Entscheidung ‘decision’	1988	82	0	1059.85107
9	Verzweiflung ‘despair’	563	68	0	1030.29312
10	Erscheinung ‘appearance’	6276	78	0.2	818.80173

the top 10 lexemes in the two constructions reveals significant overlap, with several lexemes appearing prominently in both. Specifically, the nouns *Anwendung* 'application', *Geltung* 'validity, relevance', *Ausführung* 'execution, implementation', *Erscheinung* 'appearance', *Abstimmung* 'vote', and *Darstellung* 'representation, depiction' are shared between the constructions. The shared lexemes serve as prototypical representatives of each construction's converse meaning while maintaining a reciprocal relationship between the C1 and C2. *Geltung* and *Erscheinung* illustrate that a transitive base verb is not necessarily required for the converse interpretation of C. Instead, its meaning emerges inherently within the construction, focusing on a state or condition coming into existence or prominence without an explicit agent or causative action. While nouns derived from transitive verbs are the most transparently capable of expressing converse argument structures, other suitable nouns can also be coerced into C. The Pearson correlation between the collostructional strengths of the same lexemes in the two constructions is 0.690 (p-value: 0.009). This positive correlation indicates that the collostructional strength of a lexeme in C1 tends to predict its strength in C2 and vice versa. Thus, the strength in one construction serves as a moderately reliable predictor for its association in the other. Both C1 and C2 show a few unique lexical preferences. The only noun used in a non-converse CHANGE OF STATE construction with *kommen* is *Besinnung* 'reflection, contemplation'. This noun is absent in C2. Conversely, the C2 features nouns such as *Anerkennung* 'recognition', *Anschauung* 'view, perception', and *Entscheidung* 'decision', which do not appear among the top 10 nouns for C1, but align well with the construction's anti-converse interpretations. Interestingly, all of these nouns appear in positions 11–20 in the COME construction rankings, indicating that they are also strongly associated with C1. *Verzweiflung* is, as expected, the only instantiation of a CAUSATIVE construction with *bringen*. This strongly indicates that the constructions are semantically complementary, with the shared lexemes forming a core that bridges the two. To gain a broader perspective on the associations within each construction, it is essential to extend the analysis beyond the top 10 lexemes. The histogram in Figure 9 illustrates the distribution of collostructional strengths for the two constructions by taking into account the top 100 lexemes.

Both constructions exhibit right-skewed distributions, indicating that a small number of lexemes dominate with very high collostructional strengths. This pattern reflects the prototypical nature of constructional organization: a few strongly associated lexemes act as central, prototypical anchors, while less prototypical elements form a peripheral extension. The distribution for COME constructions stretches further to the right, suggesting that it includes lexemes with higher peak collostructional strengths compared to BRING constructions. Despite this difference, the overall patterns are similar, with both C1 and C2 relying on a core group of

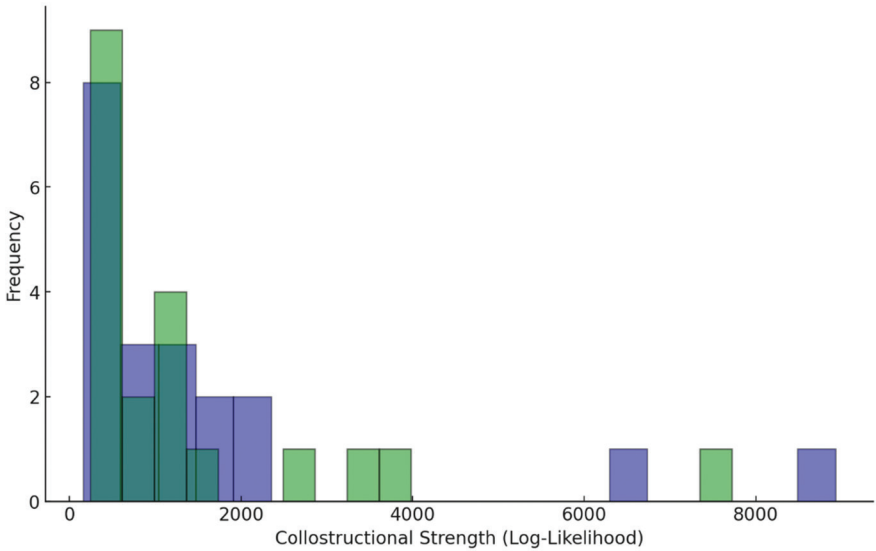

Figure 9: Distribution of collostructional strengths (top 100 lexemes) for *kommen* (blue) und *bringen* (green).

lexemes that exhibit strong associations and a long tail of weaker associations. This shared characteristic implies that both constructions center around a small set of highly prototypical lexemes, which define their semantic core and dominate their usage. Based on these findings, the constructional status of C is inferred for the late 19th century and, therefore, for the last two generations.

5.2 Networks of constructions

In the network analysis, each generation is represented as a graph where to track diachronic changes in the relationships and overlap between the constructions. Nodes correspond to authors or nouns, and edges connect authors to the nouns they used. Nodes associated with the COME construction were distinguished from those associated with BRING by using different colors, while shared nouns that appear in both constructions were highlighted distinctly. The analysis also identified dual authors – those using nouns in both constructions – and incorporated dashed edges to visualize these bridging roles. The weight of the edges reflects the frequency of these connections, providing additional insights into the relative prominence of certain relationships. By combining the normalized overlap calculation with network visualizations, this approach offers both quantitative and qualitative

insights into the processes underlying the constructionalization C, with regard to the integration of shared lexical elements. Hapax legomena (words occurring only once) were excluded from this analysis, as they do not provide meaningful insights into network formation.

Hypothesis II is also supported by the data. As shown in Figure 10, the network analysis suggests a gradual increase in density and complexity over the generations. Early generations (1–3) display sparse networks with limited overlap, where only a few central nodes dominate. Generation 4 stands out as an outlier in the data, showing an unusually high overlap, which subsequently decreases in later generations. Upon closer examination, it becomes evident that the elevated overlap

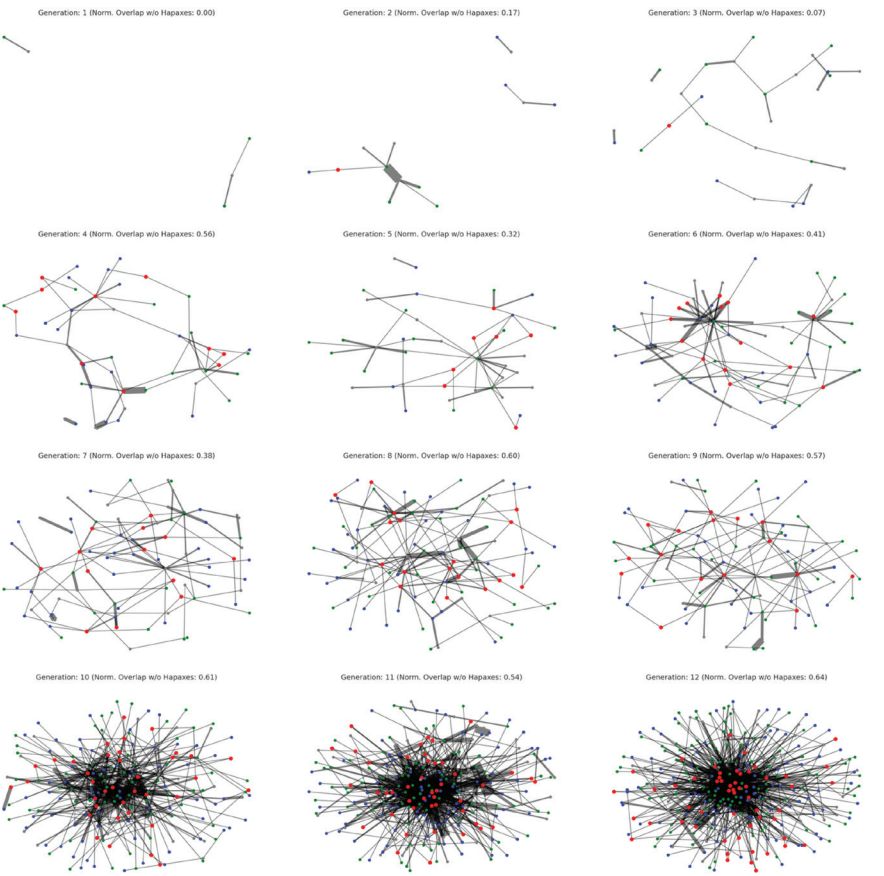

Figure 10: Results of the network analysis for 12 generations with normalized overlap.

in Generation 4 is primarily attributable to a single author: Johann Christoph Pinter von der Au emerges as a key figure. His role as a scientific writer highlights how the linguistic landscape of earlier periods can be heavily influenced by individual authors. This observation underscores two important insights: first, that the apparent patterns in such periods may be skewed by a small set of influential language users, and second, that examining the works of these individuals may provide valuable perspectives on the development of constructions. Pinter von der Au could be considered an 'early reasoner', someone who recognized the commutative potential of both structures and made use of their interchangeability. This suggests a level of linguistic awareness that merits closer study and raises broader questions about the role of individual agency in the evolution of language. As Anthonissen (2021) has shown, such micro-level analysis of key figures can provide important insights into macro-level changes.

With Generation 8, there is a noticeable leap in the overlap of nouns. This sudden increase suggests that a pivotal moment occurred during this period, accelerating the convergence or shared usage of the constructions associated with COME and BRING. The constructions might have reached a tipping point in terms of adoption, where their usage spread rapidly across the community. This could reflect a conceptual shift among language users, who began to perceive the two constructions as more interchangeable or complementary. Interestingly, after this leap, network density – measured in terms of both token and type connections – continues to grow in subsequent generations, but the overlap itself does not increase significantly. As shown in Figure 1, the extreme rise in tokens and types occurs around Generation 9, indicating a period of heightened usage. This suggests that while the constructions became more widely used in later generations, their semantic or functional overlap remained relatively stable after Generation 8. There is substantial evidence suggesting that during this period, the cognitive basis for the constructionalization of C was completed, marking a decisive shift from the free and variable use of structures to the establishment of a productive schema.

5.3 Coming full circle: the role of creativity

The observed shift toward schematicity marks a critical moment in the development of C, where its form and function stabilized, enabling consistent and systematic use within the linguistic community. It now remains to be clarified how these developments align with the overall creative efforts observed across the different generations. For this purpose, the formula outlined in Section 3 is applied. Figure 11 presents the results.

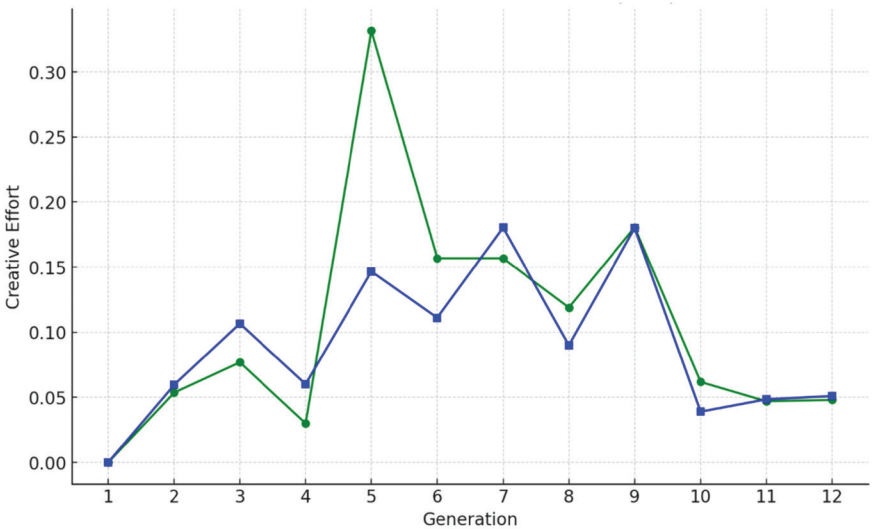

Figure 11: Development of creative effort of *kommen* (blue) und *bringen* (green).

The curves for creative effort across generations reveal distinct phases in the development of the structure. In the early generations (1–2), creative effort is minimal for both constructions, reflecting their nascent stage where they were not yet widely established or utilized. A divergence begins in Generation 3, where both constructions experience a rise in creative effort, with COME showing a steeper increase than BRING. This could indicate that structures leading to C1 gained traction or underwent more experimentation during this period. A striking pattern emerges in Generation 5, where BRING exhibits a dramatic spike in creative effort, far surpassing COME. In contrast, COME follows a more gradual trajectory, reaching its peak in Generation 7. This supports the previously gained impression that, at this point, creating new types for BRING constructions required greater effort compared to COME constructions, likely due to the delayed development of the former, though it was arguably inspired by the latter. The fact that only 3 out of 17 new types for *bringen* in Generation 5 have a correspondence in *kommen* across Generations 1–5 suggests that this is primarily an independent development within the BRING constructions. Most of the new types in Generation 5 appear to have emerged without significant semantic or structural influence from *kommen*. The shared types *Erfüllung* 'fulfillment', *Hoffnung* 'hope', and *Verantwortung* 'responsibility' do not exhibit converse or anti-converse interpretations and are rather instances of CHANGE OF STATE or CAUSATIVE constructions.

From Generations 6 to 9, both constructions align more closely, with their creative effort stabilizing at moderate levels. This phase suggests parallel development, where the constructions likely reached a similar stage of complementing within the linguistic system. However, after Generation 9, both constructions experience a sharp decline in creative effort, stabilizing at very low levels by Generations 10–12. This pattern supports the hypothesis that, as the constructions became more entrenched, the need for creative innovation diminished. As C became schematized, its reliance on individual creativity or innovation diminished. Instead, its use was increasingly guided by a well-established set of regularities and expectations, reflecting its transition from variability to a predictable and productive schema.

All evidence suggests that, despite the gradual nature of the developments, we can distinguish two phases that become apparent across all levels of analysis. The first phase is characterized by a more or less free variation of S, reflected in the emergence of constructions with different meanings. In this phase, we observe varying degrees of creative use: F-creativity predominantly occurs within the realm of MOVEMENT (CHANGE OF STATE) and TRANSFER (CAUSATIVE) constructions, as they rely on cognitively antecedent image schemas. In contrast, constructions with a converse semantic reading probably align more closely with E-creativity as they cause a mismatch in the organization of argument structures. With the schematization of C, a phase of conformity begins, making it easier for language users to produce new types, accompanied by a significant increase in token frequency. Semantically, the construction becomes more constrained, predominantly restricted to types that allow for a converse and an anti-converse reading. The entry into this productive phase cannot be described as creative, as it is primarily characterized by the consolidation of regularities and a semantic narrowing. This marks a shift away from the variability and innovation of the earlier phase towards a more rigid and systematic use of the construction. Language users who prioritize adherence to established conventions, play a pivotal role in adopting and repeating novel constructions, thereby enabling their entrenchment. Unlike creative language users who experiment with flexibility and variation, conformist language users reinforce linguistic patterns through consistent and predictable usage, allowing innovations to gain social legitimacy and broader acceptance. For future investigations at the individual level, it is crucial to broaden the focus to include an evaluation of creators, reasoners, and conformists as distinct groups contributing to this process. Creators introduce innovations, reasoners quickly identify and apply underlying patterns with minimal input, and conformists stabilize and disseminate these patterns through consistent adherence to norms.

References

Anthonissen, Lynn. 2021. *Individuality in language change*. Boston/Berlin: De Gruyter Mouton.

Baayen, R. Harald. 2009. Corpus linguistics in morphology: Morphological productivity. In Anke Lüdeling & Merja Kytö (Eds.), *Corpus linguistics: An international handbook* (pp. 900–919). Berlin & New York: Mouton de Gruyter.

Beaty, Roger E., Benedek, Mathias, Silvia, Paul J., & Schacter, Daniel L. 2016. Creative cognition and brain network dynamics. *Trends in Cognitive Sciences*, *20* (2), 87–95. doi: https://doi.org/10.1016/j.tics.2015.10.004

Berg, Kristian. 2020. Changes in the productivity of word-formation patterns: Some methodological remarks. *Linguistics*, *58* (4), 1117–1150. doi: https://doi.org/10.1515/ling-2020-0148

Bergs, Alexander. 2018. Learn the rules like a pro, so you can break them like an artist (Picasso): Linguistic aberrancy from a constructional perspective. *Zeitschrift für Anglistik und Amerikanistiki*, *66* (3), 277–293. doi: https://doi.org/10.1515/zaa-2018-0025

Bergs, Alexander, & Kompa, Nikola A. 2020. Creativity within and outside the linguistic system. *Cognitive Semiotics*, *13* (1), 1–21. doi: https://doi.org/10.1515/cogsem-2020-2025

Bybee, Joan. 2006. *From usage to grammar: The mind's response to repetition.* Cambridge: Cambridge University Press.

Chomsky, Noam. 1975.[1964]. *Aspects of the theory of syntax.* Cambridge, MA: MIT Press.

Croft, William. 2001. *Radical construction grammar: Syntactic theory in typological perspective.* Oxford: Oxford University Press.

Croft, William, & Cruse, D. Alan. 2004. *Cognitive linguistics*. Cambridge: Cambridge University Press.

Demske, Ulrike. 2000. Zur Geschichte der *ung*-Nominalisierung im Deutschen. Ein Wandel morphologischer Produktivität. *Beiträge zur Geschichte der deutschen Sprache und Literatur*, *122* (3), 365–411. doi: https://doi.org/10.1515/bgsl.2000.122.3.365

Demske, Ulrike. 2002. Nominalization and argument structure in Early New High German. *ZAS Papers in Linguistics*, *27*, 67–90. doi: https://doi.org/10.21248/zaspil.27.2002.150

Ellison, T. Mark, & Reinöhl, Uta. 2022. Compositionality, metaphor, and the evolution of language. *International Journal of Primatology*, *23*, 703–719. doi: https://doi.org/10.1007/s10764-022-00315-w

Fleissner, Fabian. 2025. How to get into containers: The emergence of German 'Come to mind' constructions. In Natalia Filatkina et al. (Eds.), *Dynamics at the lexicon-syntax interface: Creativity and routine in word-formation and multi-word expressions*. Boston/Berlin: De Gruyter Mouton.

Fleissner, Fabian, & Smirnova, Elena. (Forthcoming). Musterbasierte Wissenschaftssprache. Schematische *paper constructions* des Neuhochdeutschen. In Vilmos Ágel (Hg.), *Grammatik des Neuhochdeutschen zwischen Gegenwart und Geschichte*.

Goldberg, Adele E. 2003. Constructions: A new theoretical approach to language. *Trends in Cognitive Sciences*, *7* (5), 219–224. doi: https://doi.org/10.1016/S1364-6613(03)00080-9

Goldberg, Adele E. 2006. Constructions at work: The nature of generalization in language. Oxford: Oxford University Press.

Goldberg, Adele E. 2019. Explain me this: Creativity, competition, and the partial productivity of constructions. Princeton: Princeton University Press. doi: https://doi.org/10.1515/9780691183954

Gries, Stefan Th., & Stefanowitsch, Anatol. 2004. Extending collostructional analysis: A corpus-based perspective on 'Alternations'. *International Journal of Corpus Linguistics*, *9* (1), 97–129. doi: https://doi.org/10.1075/ijcl.9.1.06gri

Hagberg, Aric, Swart, Pieter, & Chult, Daniel S. 2008. Exploring network structure, dynamics, and function using NetworkX. In *Proceedings of the 7th Python in Science Conference (SciPy2008)*. CA: Pasadena, 11–15.

Hartmann, Stefan. 2016. *Wortbildungswandel: Eine diachrone Studie zu deutschen Nominalisierungsmustern* (Studia Linguistica Germanica, 125). Berlin/Boston: De Gruyter.
Hartmann, Stefan. 2017. „Nominalization" taken literally. A diachronic corpus study of German word-formation patterns. Bamberg: opus. doi: https://doi.org/10.20378/irbo-50502
Herbst, Thomas. 2018. Collo-creativity and blending: Recognizing creativity requires lexical storage in constructional slots. *Zeitschrift für Anglistik und Amerikanistik*, *66* (3), 309–328. doi: https://doi.org/10.1515/zaa-2018-0027
Hoffmann, Thomas. 2019. Language and creativity: A construction grammar approach to linguistic creativity. *Linguistics Vanguard*, *5* (1), 20190019. doi: https://doi.org/10.1515/lingvan-2019-0019
Hoffmann, Thomas. 2020. Construction grammar and creativity: Evolution, psychology, and cognitive science. *Cognitive Semiotics*, *13* (1), 20202018. doi: https://doi.org/10.1515/cogsem-2020-2018
Jackendoff, Ray, & Audring, Jenny. 2020. Relational morphology: A cousin of construction grammar. *Frontiers in Psychology*, *11*, 2241. doi: https://doi.org/10.3389/fpsyg.2020.02241
Johnson, Mark. 1987. *The Body in the mind: The bodily basis of meaning, imagination, and reason.* Chicago: University of Chicago Press.
Lakoff, George. 1987. *Women, fire, and dangerous things: What ategories reveal about the mind.* Chicago: University of Chicago Press.
Lakoff, George, & Johnson, Mark. 2003. Metaphors we live by (2nd ed.). Chicago: University of Chicago Press.
Langacker, Ronald W. 1987. *Foundations of cognitive grammar: Vol. 1. Theoretical prerequisites.* Stanford: Stanford University Press.
Norde, Muriel, & Trousdale, Graeme. 2024. Creativity, paradigms and morphological constructions: Evidence from Dutch pseudoparticiples. *Linguistics: An Interdisciplinary Journal of the Language Sciences*, 1–35. doi: https://doi.org/10.1515/ling-2023-0194
Pearson, Karl. 1896. Mathematical contributions to the theory of evolution. III. Regression, heredity, and panmixia. *Philosophical Transactions of the Royal Society of London A*, 187, 253–318.
Perek, Florent. 2020. Productivity and schematicity in constructional change. In Lotte Sommerer & Elena Smirnova (eds.), *Nodes and links in the network: Advances in diachronic construction grammar* (pp. 141–166). Amsterdam: John Benjamins.
Sampson, Geoffrey. 2016. Two ideas of creativity. In Martin Hinton (ed.), *Evidence, experiment and argument in linguistics and philosophy of language*. Berlin: Peter Lang, 15–26.
Uhrig, Peter. 2018. Constructional creativity in historical perspective. *Linguistics Today*, *12* (3), 145–162.

Primary sources

Deutsches Textarchiv. 2018. Deutsches Textarchiv: Grundlage für ein Referenzkorpus der neuhochdeutschen Sprache. Version 2018. Berlin-Brandenburg Academy of Sciences and Humanities. https://www.deutschestextarchiv.de