Debonding and Clipping of Prefixoids in Germanic: Constructionalization or Constructional Change?

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Abstract This paper is concerned with the debonding of three Germanic prefixoids: Dutch *kei* 'boulder', German *Hammer* 'hammer', and Swedish *kanon* 'cannon'. Drawing on an extensive corpus-based and statistical analysis, we compare the formal properties (construction types), semantics (degree of bleaching), collocational properties and productivity of bound and free uses of each prefixoid. We show that debonding of prefixoids is a productive process of lexical innovation in Germanic languages, which may lead to the creation of new intensifying adverbs or evaluative adjectives. In addition, we explore whether debonding of prefixoids can be fruitfully analysed from a constructional perspective. More in particular, we address the question of whether the observed changes accompanying debonding are best accounted for by Traugott and Trousdale's concept of 'constructionalization', or by Hilpert's concept of 'constructional change'. To this end, we explore a variety of quantitative methods, including productivity measures and distinctive collexeme analysis. We conclude that the quantitative differences between the bound and the free forms of the three prefixoids studied in this paper allow us to consider them as two separate constructions, but that the distinction is a gradient one.

Keywords Debonding · Clipping · Prefixoids · Intensification · Constructionalization · Constructional change · Germanic languages (Dutch · German · Swedish)

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1 Introduction[1]

In this article, we will examine how the Germanic constructicon is expanded by a process we label 'debonding' – a composite change whereby bound morphemes (clitics, affixes, affixoids) in a specific context develop into free morphemes (Norde 2009: 186). Focus will be on debonding of three Germanic prefixoids that derive from nouns denoting a hard or high impact object: Dutch *kei* 'boulder', German *Hammer* 'hammer', and Swedish *kanon* 'cannon'. Drawing on an extensive corpus-based analysis of bound and free uses of these three prefixoids, we aim to demonstrate that debonding of prefixoids is a productive process of lexical innovation in Germanic languages, which may lead to the creation of new intensifying adverbs or evaluative adjectives. In addition, we aim to explore whether debonding of prefixoids can be fruitfully analysed from a constructional perspective. More in particular, we will address the question of whether the semantic and formal changes accompanying debonding are best accounted for by Traugott and Trousdale's (2013) concept of 'constructionalization', or by Hilpert's (2013) concept of 'constructional change', which includes changes in frequency. In so doing, we will complement the study by Trousdale and Norde (2013) who examine two other types of degrammaticalization (degrammation and deinflectionalization) from a constructionist perspective.

The body of the paper is organized as follows. In the next section, we will outline our constructionist approach to debonding and clipping of prefixoids, as well as discuss the notions of constructionalization and constructional change. In Sect. 3, we will present the sources and method of our empirical studies. Sections 4, 5 and 6 will be dedicated to a detailed analysis of Dutch *kei*, German *Hammer* and Swedish *kanon* respectively. For each prefixoid, we will compare the formal properties (construction types), semantics (degree of bleaching), collocational properties and productivity of its bound and free uses. The results of these three case studies will be compared and analysed statistically in Sect. 7. We conclude the paper with a discussion of the central question: do the results of our data analysis allow us to treat the debonding of a bound prefixoid as an instance of constructionalization?

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2 Theoretical Preliminaries

2.1 Debonding and Clipping of Prefixoids

Affixoids form a specific class of bound morphemes that have been characterized as morphemes "which look like parts of compounds, and do occur as lexemes, but have a specific and more restricted meaning when used as part of a compound" (Booij 2009: 208, see also Booij 2010: 55ff.).[2] They form a very productive class – Hoeksema (2012), for instance, lists 696 Dutch compounds with prefixoids, and his list is far from exhaustive. When affixoids develop out of left-hand members of head-final compounds, they typically acquire evaluative meaning (in [N-N] compounds) or intensifying meaning (in [N-ADJ] compounds), as in Dutch *wereld-wijf* 'fantastic woman' (< *wereld* 'world'), or *bloedmooi* 'drop dead gorgeous' (< *bloed* 'blood'). The lexical basis of such modifying prefixoids is often a noun, but adjectives (e.g. *dolverliefd* 'madly in love (< *dol* 'mad')), or verbs (e.g. *loeistrak* 'tight as a drum' (< *loei-* 'to blast, roar')) can develop into prefixoids, too.[3] In many cases, there exists a cline from determinative compounds via simile compounds to evaluative/intensifying compounds, as the following examples show (Norde and Van Goethem 2014: 259)[4]:

(1) [N-N] compounds: German *Riesenhand* 'hand of a giant' (determinative) – *Riesenbühne* 'giant stage' (simile) – *Riesenstimmung* 'great atmosphere' (evaluative)

(2) [N-ADJ] compounds: Swedish *jättelik* 'giant-like' (determinative) – *jättestor* 'as big as a giant' (simile) – *jättegullig* 'very cute' (intensifying)

On the formal side, prefixoids often have specific characteristics as well. For instance, some Dutch prefixoids are followed by a linking vowel [ə], e.g. *bere-* (< *beer* 'bear'), *reuze-* (< *reus* 'giant'), or *rete-* (< *reet* 'ass'). Moreover, Dutch prefixoids can be emphasized either by vowel lengthening (*reeeeetegoed* 'ass good > excellent'), or by reduplication (*spek- en spekglad* 'bacon and bacon slippery > very slippery'). German prefixoids, on the other hand, are prosodically different from

[2]There is some controversy regarding the morphological status of prefixoids. Although it is generally acknowledged that they are semantically different from the free morphemes they derive from and may have specific formal properties, several authors have argued that this does not imply that they form a distinct type of morpheme. This issue is outside of the scope of this paper – for discussion, see Norde and Van Goethem (2015); Norde and Morris (2018) or Battefeld et al. (2018), and references therein.

[3]Prefixoids with intensifying function in [N-ADJ] compounds are found in all Germanic languages except English. English did borrow *über-* from German (*übercool, übersexy*; Van der Wouden and Foolen 2017: 85), but this is not a prefixoid in the strict sense because it does not correspond to a free English lexeme.

[4]On the development of affixoids see further, among others, Stevens (2005); Pittner and Berman (2006); Berman (2009); Leuschner (2010); Hoeksema (2012); Klara (2012); Meibauer (2013); Hüning and Booij (2014); Battefeld et al. (2018).

determinative compounds, compare the different stress patterns in *ˈHammerklavier* 'hammer piano > fortepiano' and *ˈHammerklaˈvier* 'outstanding piano' (Schlücker 2013: 457).

In this article, we will focus on another typical formal property of such evaluative/intensifying prefixoids, which is that they can be severed from their head and written as a separate word before its R1. Once separated from its head, the prefixoid may acquire new morpho-syntactic functions, such as taking scope over an entire NP (as in (3)), or modifying a verb (as in (4)). That these free morphemes developed out of the prefixoid, and not out of the corresponding noun, is not only evidenced by their evaluative or intensifying meaning, but, in some cases, also by their form: when the prefixoid had a linking vowel (example (5)), or consonant (example (6)), these are preserved in the free form. Conversely, if a vowel is dropped in the prefixoid, as in German *end-* (< *Ende* 'end'), it is also absent if the prefixoid develops into a free morpheme, as in (7).[5]

(3) *das spiel hat eine* ***riesen*** *deutsche community wo man genug hilfe findet.*
'the game has a huge German community where one can find plenty of support'
(DECOW 2012)

(4) *min fredag startade* ***kanon***
'my Friday started wonderfully'
(SECOW14AX)

(5) *Onze kinderen hebben zich* ***reuze*** (**reus*) *vermaakt* (. . .)
'Our kids enjoyed themselves tremendously (. . .)'
(NLCOW 2012)

(6) *Ik hou* ***ziels*** (**ziel*) *van jou meer dan van wie dan ook.*
'I love you with all my soul, more than (I love) anyone'.
www.quizlet.nl/chapters/1179678/part-155-zayn/

(7) *würd mich über eine antwort* ***end*** (**Ende*) *freuen!!!*
'(I) would be much looking forward to a reply!!!'
(DECOW14AX)

The development of free morphemes out of erstwhile bound ones are examples of debonding (Norde 2009: 186). Debonding may affect clitics, affixes (both inflectional and derivational), and affixoids. Examples include the Northern Saami postposition *haga* 'without', which developed out of an abessive suffix, or the independent uses of English *ish* (Norde 2009: 186–227). Examples of debonding of prefixoids were discussed earlier in, for instance, Norde and Van Goethem (2014, 2015), Van Goethem and Hiligsmann (2014), Van Goethem and De Smet (2014), Van Goethem and Hüning (2015) and Battefeld et al. (2018). The specific linguistic context for debonding of prefixoids is one in which the bound prefixoid can be reanalysed as an attributive adjective (in case of [Prefixoid-N] constructions), as in

[5]Thanks to Sarah Sippach for drawing our attention to German *end*, and finding corpus examples.

(8), or an adverb (in case of [Prefixoid-ADJ] constructions), as in (9) (note that the adverb takes scope over two coordinated adjectives):

(8) *ich habe einen **riesen** fehler gemacht*
'I have made a huge mistake'
(DECOW 2012)

(9) *Het klinkt allemaal **reuze** leuk en aardig: vergeven en vergeten, streep eronder en doorgaan!*
'It all sounds very nice and neat: forgive and forget, let bygones be bygones and move on!'
(NLCOW 2012)

Debonding of prefixoids into adjectives is a gradual process – adjectives that develop in this way are usually not inflected, at least not initially (Van Goethem and De Smet 2014: 253). Furthermore, debonding of prefixoids is often 'sneaky' in the sense of De Smet (2012: 7), who defines this sneakiness as "apparently thriving on structural ambiguities and (possibly superficial) resemblances to existing patterns". This may be illustrated by German *riesen* 'giant': in 19 out of 32 adjectival contexts,[6] the adjectival suffix *–en* is required (Norde and Van Goethem 2014: 270), so that *einen riesen Fehler* in (8) above looks like a perfectly grammatical construction. Similarly, Dutch *reuze* can be interpreted as an adjective in *–e*, which is the suffix used in most attributive contexts (Van Goethem and Hiligsmann 2014: 60). At a later stage, the debonded adjectives may acquire adjectival inflections, such as the indefinite neuter singular in the German example in (10), or the comparative form in the Dutch example in (11):

(10) *Ein **rieses** Dankeschön nochmal*
'A huge thank you, once more'
(DECOW2012)

(11) *Ik krijg ineens een leuk idee: een nog **reuzere** mergpijp op taartformaat!*
'I suddenly have this great idea, an even bigger (lit. more giant) marrow-bone (kind of Dutch pastry) the size of a pie!'
http://forum.deleukstetaarten.nl/viewtopic.php?id=30091

However, free uses of erstwhile prefixoids may also be the result of clipping in a specific (predicative) context (Van Goethem and De Smet 2014, Van Goethem and Hiligsmann 2014, Van Goethem and Hüning 2015, Norde and Van Goethem 2015, Battefeld et al. 2018). For instance, in example (12) *stapel* derives from *stapelgek* (lit. 'pile mad'), whereas *piep* in (13) derives from *piepjong* (lit. 'squeak young'). In these cases, the meaning of the full compound is transferred to the free

[6]German adjectival inflection features three genders, four cases, as well as a contrast between definite and indefinite forms in the singular; and 4 cases and definite/indefinite contrast in the plural. This makes 32 contexts, although many of these forms have the same suffix.

prefixoid. Note that the corresponding attributive constructions in (14) and (15) are ungrammatical (Van Goethem and Hiligsmann 2014: 58).

(12) *Ik ben **stapel** op mooi gemaakte kinderfilms*
'I am mad about beautifully made children's movies'
(NLCOW 2012)

(13) *En met 54 jaar ben je ook niet meer zo **piep***
'And at 54 one is not the youngest anymore'
(NLCOW 2012)

(14) **Een stapele jongen* 'a mad boy'

(15) **Een piep meisje* 'a very young girl'

The use of clipped prefixoids in predicative position may be favoured by the existence of the structurally similar predicative bare noun construction, which is found in all three languages studied. In these constructions, illustrated in (16) and (17), the bare noun expresses a general quality, e.g. a profession or nationality, and has become less noun-like in the sense that it cannot be modified by an adjective, and more adjective-like because it can be modified by an adverb (cf. Berman 2009: 99–101)[7]:

(16) *Er ist (*netter) **Lehrer***
'He is a (nice) teacher'

(17) *Er ist **ganz Lehrer***
'He is the typical cliché of a teacher'

These constructions are structurally very similar to free prefixoids in predicative position, which can likewise be modified by an adverb:

(18) *Ja wir wissen das Spiel sieht **total mist** aus.*
'Yes we know, the game looks totally crap'
(DECOW2014AX)

In some works (e.g. Pittner and Berman 2006, Berman 2009) the predicative bare noun construction is even considered the *only* source of evaluative adjectives that are homophonous with prefixoids. On the other hand, Van Goethem and Hüning (2015) have shown that, e.g., Dutch *top* and German *spitze* (both meaning 'top') have developed out of two source constructions: debonding of the corresponding prefixoids and noun to adjective change in predicative position (on multiple source constructions see further Trousdale 2013, Van de Velde et al. 2013).

[7]Thanks to Roland Pooth for providing us with example (17).

2.2 *Constructionalization and Constructional Change*

In this article we will discuss debonding and clipping of prefixoids from a constructionist perspective. Since prefixoids are neither free morphemes nor prefixes, they are best analysed in a framework which treats symbolic form-meaning pairings (i.e. constructions) as the basic unit of analysis, without putting constraints on the category of a construction or one of its parts. In constructional approaches to language and language change, words and larger units are defined by their formal and semantic properties, and these properties link them both to constructions that are similar in meaning and/or form, and to more schematic constructions that generalize over similar types. In the case of prefixoids, this means that e.g. Dutch *bere-* and *reuze-* are laterally linked because of their similarity in function, whereas both are vertically linked to (or 'sanctioned by' in construction grammar terms) the more general schema for intensifying prefixoids with an adjectival base in (19) (see further Norde and Van Goethem 2015; Norde and Morris 2018):

(19) $[<a> [b]_{Ai}]_{Aj} \quad \Longleftrightarrow \quad [[\text{very } [\text{SEM}]_i]_j$

Recently there has been a growing interest in changes in constructions and the emergence of new constructions (cf. among others Bergs and Diewald 2008; Hilpert 2013; Traugott and Trousdale 2013; Trousdale and Norde 2013; Barðdal et al. 2015; Van Goethem et al. 2018; a recent survey of the field is given in Noël 2016). From this usage-based view of language change, it is taken for granted that changes do not occur in isolation, but that linguistic context is highly relevant (e.g., Bergs and Diewald 2009). From such a diachronic point of view, Hüning and Booij (2014) have convincingly argued that the 'umbrella' notion of 'constructionalization' (Traugott and Trousdale 2013) is more appropriate than the notions of grammaticalization and lexicalization to account for hybrid and context-dependent changes, such as the rise of affixoids. Hüning and Booij (2014: 600) argue that "[T]he general concept of constructionalization (. . .) offer[s] a way out of the problems associated with the "element based view" and with the idea of a "cline", (. . .)" because in Construction Grammar the idea of a cline can be replaced by a taxonomic network of related constructions (Trousdale 2008: 172).

Another basic tenet of the Construction Grammar approach is that the underlying mechanisms of change are analogical thinking and subsequent neoanalysis[8] (cf. Traugott and Trousdale 2013). In 2.1, we have illustrated that language users recognize the formal and semantic connections between evaluative modifiers in compounds or intensifying prefixoids, on the one hand, and evaluative adjectives or intensifying adverbs, on the other, and that this may trigger attraction to these other constructions in the network and ultimately the shift from bound to free morphemes.

[8]Neoanalysis is a term taken from Andersen (2001) and refers to the creation of a "new representation in the mind of a language user" (Traugott and Trousdale 2013: 21), which is argued to be "a micro-step in a constructional change" (p. 36).

For all these reasons, we believe it is interesting to apply the constructional perspective to debonding. To this end, we first need to briefly discuss the two main constructional approaches to language change, as advanced by Traugott and Trousdale (2013) and Hilpert (2013) respectively.

Traugott and Trousdale (2013) define the notion of 'constructionalization' as follows:

> **Constructionalization** is the creation of $form_{new}$-$meaning_{new}$ (combinations of) signs. It forms new type nodes, which have new syntax or morphology and new coded meaning, in the linguistic network of a population of speakers. It is accompanied by changes in degree of schematicity, productivity, and compositionality.[9] (Traugott and Trousdale 2013: 22).

Traugott and Trousdale (2013: 22) specify that

> [M]inimally, constructionalization involves neoanalysis of morphosyntactic form and semantic/pragmatic meaning (...). Formal changes alone, and meaning changes alone cannot constitute constructionalization.

When the change affects only the semantic or the formal pole of the construction, but no new construction is created (which would imply both formal and semantic change), Traugott and Trousdale (2013: 26) call this a 'constructional change' instead of a constructionalization:

> A **constructional change** is a change affecting one internal dimension of a construction. It does not involve the creation of a new node. (Traugott and Trousdale 2013: 26)

Constructional changes that typically 'feed' constructionalization are pragmatic inferences, semanticization of those inferences, form-meaning mismatches and some small distributional changes. Constructionalization may be followed by further constructional changes, such as expansion of collocations and, in some cases, morphological and/or phonological reduction.

Whereas the development of new constructions is mostly *gradual*, or "a succession of micro-steps preceding the creation of a new node" (Traugott and Trousdale 2013: 29), some (lexical) micro-constructions arise "with no prior constructional changes discernible" (ibid). This distinction is important when comparing debonding to clipping: both processes involve the free use of bound morphemes, but whereas debonding is gradual, clipping is instantaneous. As has been shown in Van Goethem and Koutsoukos (forthcoming), the Dutch compound member *luxe* 'lit. luxury; luxurious' (e.g. *luxehotel* 'luxury hotel') was first used as a free form in attributive constructions (e.g. *een erg luxe hotel* 'a very luxurious hotel'), where it still collocates with a noun, before gradually expanding to other contexts such as the predicative one (e.g. *het hotel is erg luxe* 'the hotel is very luxurious'), whereas a clipped prefixoid such as *piep* 'very young' (< *piepjong* lit. 'squeak young') did not develop in such a bridging context.

[9] As the parameters of schematicity and compositionality, as defined by Traugott and Trousdale (2013), are difficult to operationalize in our case studies, we will not use them in the remainder of this article.

In the second major introduction to Diachronic Construction Grammar, Hilpert (2013) does not use the term of 'constructionalization' but refers to the emergence of new constructions as 'constructional change'. In his view, constructional change not only manifests itself through form and meaning change, but through changes in frequency or distribution as well:

> **Constructional change** selectively seizes a conventionalized form-meaning pair of a language, altering it in terms of its form, its function, any aspect of its frequency, its distribution in the linguistic community, or any combination of these. (Hilpert 2013: 16).

An important difference between Traugott & Trousdale's definition of constructional change and Hilpert's is thus that Hilpert includes frequency as a third level of change: "[E]ven if a change does not create new functions or new structures, a rearrangement of relative frequencies still brings about a constructional change" (Hilpert 2013: 17). Changes in frequency may refer to text frequency, but also to the relative frequency of the functional and structural variants of the construction.

The central aim of this paper, then, is to investigate whether debonding can best be accounted for by Traugott and Trousdale's (2013) concept of 'constructionalization', or by Hilpert's (2013) concept of 'constructional change'. According to the definition, this implies changes in formal, semantic and/or distributional properties. We will investigate this question through three different cases of debonding, which will be subject to a detailed qualitative and quantitative analysis of their formal and semantic properties, as well as of their change in collocational properties and productivity. Before examining the case studies, we will present the corpora and discuss some methodological issues in Sect. 3.

3 Sources and Methods

Data for this study are drawn from COW14 (Corpora from the Web),[10] a gigatoken database of tagged and lemmatized texts from the web, compiled at the FU Berlin in 2011 and 2014 and released in 2014–2015 (Schäfer 2015). This corpus is perfectly suited to the study of language change in progress from a comparative perspective: it provides similar data sets from different languages, among them Dutch, German and Swedish, and a substantial portion of these data come from informal sources,[11] which is the typical locus of recent and innovative constructions. The subcorpora used for this study are given in Table 1. If no alternative source is given, all examples mentioned in the remainder of this paper are drawn from one of these three subcorpora.

To collect our data, we proceeded as follows: using the Colibri[2] query interface, we carried out a search for both the bound and free forms of Dutch *kei*, German *H/hammer* and Swedish *kanon.* Since written corpus data do not allow us to check

[10]The corpus is available, after registration, at https://www.webcorpora.org//

[11]We quote literally from the corpora, which means that spelling errors have not been edited.

Table 1 Subcorpora used in this study

COW14 Subcorpora	Number of tokens	Number of sentences
NLCOW14AX	4,732,581,841	259,717,960
Dutch subcorpus (Belgian and Netherlandic Dutch)		
DECOW14AX	11,660,894,000	624,767,747
German subcorpus (Austrian, Swiss and German German)		
SVCOW14AX	4,842,753,707	306,599,971
Swedish subcorpus (Finland Swedish and Sweden Swedish)		

phonological criteria such as stress, the distinction between bound and free forms has been exclusively based on spelling. The results were imported into Excel, and we used the RAND function in Excel to shuffle them. The first results in the concordance were checked manually and all irrelevant hits were discarded until we had a sample of 1000 relevant occurrences for each construction, which made 6000 occurrences in all.

In the case of bound *kei*, we removed irrelevant examples such as *keizer* 'emperor' and determinative compounds such as *keisteentjes* 'cobble-stones' or *keileem* 'boulder clay'. With respect to free *kei*, all occurrences of the noun *kei*, in its literal or figurative meaning (e.g. *een kei in wiskunde* 'a crack mathematician'), were excluded, so that the comparison between the bound and free forms is exclusively based on the use of *kei* as prefixoid or part of a simile compound and its debonded uses. Similarly, for bound *Hammer-/hammer-,* we removed determinative compounds (e.g. *Hammerschlag* 'hammer blow'), classifying compounds (e.g, *Hammerhai* 'hammerhead shark') and other irrelevant results such as *hammermäßig* 'hammer-wise'.[12] For the free *hammer* construction, we took a random sample of 1000 tokens of lower case *hammer*. We did not include *Hammer* (with upper case *H*) in this analysis, because a pilot study revealed that only very few upper case *Hammer* constructions were relevant tokens.[13] From the raw *hammer* data, we discarded irrelevant hits such as the noun *hammer* (erroneously written in lower case), or *hammer* as short for *haben wir* 'have we' (colloquial). As far as our third prefixoid, Swedish *kanon*, is concerned, we discarded irrelevant examples (e.g. *kanonen* 'the cannon; cool', *kanonkula* 'cannonball', *kanonisk* 'canonical', *kanonjär* 'cannonneer'). For free *kanon* we had to remove all examples where *kanon* was the original noun 'cannon', or a homographic noun meaning 'canon'.

[12]Each single token had to be analysed separately, because some tokens had to be discarded, whereas other were relevant to this study. For example, *Hammerfilm* could mean 'a movie from the *Hammer House of Horror* studios' or 'a great movie'. Tokens with the former meaning were removed from the data set.

[13]Of the first 200 tokens in the sample, only 51 were relevant to our study. This would imply that we would have needed to sift through 4000 tokens (manually) to obtain a 1000 token sample including upper case *Hammer*.

The remaining examples were tagged for R1 (i.e. the second compounding element in bound constructions, or the first word to the right in free constructions), part of speech of the R1, semantic type (e.g. simile) and particular properties such as reduplication. For *H/hammer* we furthermore noted whether the prefixoid was spelled with upper case or lower case, and whether the free form of the prefixoid was preceded by an article (definite or indefinite).

This database forms the basis for the quantitative analyses in the sections below. For each bound and free form, we will analyse four properties: (i) construction type (the part of speech the bound or free prefixoid collocates with), (ii) (in case of [Prefixoid-ADJ] constructions) semantic bleaching (the proportion of simile and intensifying constructions), (iii) collocational properties (R1 types and tokens) and (iv) productivity. We use two measures for productivity: type/token ratio (TTR) and Potential Productivity (PP). The latter is discussed in Baayen (2009), and is calculated by dividing the number of hapax legomena of a particular word formation pattern in the corpus by the total number of tokens of that pattern (Baayen 2009: 902). This ratio will allow us to compare the potential growth rate of the bound and free morphemes in both languages.

In Sect. 7, we will offer statistical analyses of all three case studies in order to assess whether formal, semantic, and collocational differences as well as differences in productivity between bound and free *kei, hammer* and *kanon* are significant. If the probability that an attested difference between the bound and the free form is due to chance is smaller than 0.05, we will argue that we are dealing with a constructional change. Since all four properties that we examine in this paper are quantifiable, constructional change, or the absence thereof, can be calculated with the help of associative statistics. A more tricky issue however, is how we can identify constructionalization. As Hilpert (2015: 134) aptly puts it: "Just after how many constructional changes exactly do we have a construction that counts as a new node?" We will return to this question in Sect. 8.

4 Dutch *kei*

The Dutch noun *kei* means 'boulder, cobble-stone' and is attested as left-hand member of simile compounds at least since the nineteenth century. According to Van der Sijs (2010), the compound *keihard* 'rock-hard, as hard as (a) stone' goes back to 1872; its first attestation in the Dictionary of Dutch language (WNT, s.v. *keihard*) is from 1921 (20). The same dictionary lists an occurrence of the simile compound *keidood* 'stone-dead' from 1803 (s.v. *kei*[I]) (21).

(20) *De kluiten droogden glashard op, (. . .), waardoor een bovenlaag van* ***keiharde*** *knikkers . . . verkregen werd* (1921)
'The clods got as hard as glass when they dried up, (. . .), as a result of which an upper layer of rock-hard marbles . . . was obtained'

(21) *Hij viel van de stelling en hij was* ***keidood*** (1803)
'He fell from the stand and he was stone-dead'

In the same period, *keihard* is already attested with a metaphorical meaning, too ('very hard, with a lot of power'). In these cases, *kei* can be analyzed as an intensifying prefixoid meaning 'very':

(22) *Een* ***keihard*** *schot (met den voetbal)* (1872)
'A powerful shot (with the football)'

(23) *Wanneer een voorwaarts op een achterspeler toeloopt en deze laatste trapt den bal* ***keihard*** *in het gelaat van den toeloopenden voorhoedespeler* (. . .) (1909)
'When a forward runs into a back player and the latter kicks the ball at full speed in the face of the vanguard player who is running in his direction (. . .)'.

The WNT dictionary does not mention the use of *kei* in combination with other adjectives than *hard* or *dood* nor the use of *kei* as a free intensifying morpheme. In the sections below, we will examine in more depth the formal (4.1) and semantic (4.2) properties of bound and free *kei*, and its collocational properties and productivity as both a bound and free form (4.3).

4.1 Construction Types

We analysed a corpus sample of 1000 relevant tokens of both bound and free *kei*. For bound *kei*, this sample includes occurrences in which *kei* forms part of a simile or an intensified compound, either written as one word (983 occurrences) or hyphenated (only 17 compounds). The sample of free *kei* includes 1000 instances in which *kei* is written as a separate word and still preserves its simile or intensifying meaning. As indicated in Sect. 3, occurrences of the noun *kei* have been excluded since these are not debonded uses of the compound member.

Table 2 presents the construction types of bound and free *kei* as observed in both corpus samples.

Table 2 indicates that bound kei mostly combines with adjectives (24–25) or adverbs (26); some examples do not contain sufficient context to determine whether the compound head was an adjective or an adverb (27). In one example only, bound *kei* combines with a nominal head (28).

Table 2 Bound and free *kei* – construction types

POS R1	Bound *kei*	Free *kei*
Adj/Adj P (or interjection)	514 (51.40%)	631 (63.10%)
Adv	460 (46.00%)	302 (30.20%)
Adj/Adv	25 (2.50%)	0
N/NP	1 (0.10%)	3 (0.30%)
Quant	0	48 (4.80%)
V	0	10 (1.00%)
No R1 (predicative use)	0	6 (0.60%)
	1000 (100%)	**1000 (100%)**

(24) *Vissen leven in een **keiharde,** stressvolle wereld onder water waar het constant "eten of gegeten worden" is.*
'Fish live in a tough, stressful underwater world with a constant threat of "to eat or to be eaten".'

(25) *Laminaat ligt, maar ik ben ook **keikapot** . . .*
'Laminate is ready, but I'm exhausted also . . . '

(26) *Ik was **keihard** aan het meezingen met het liedje I will always love you van Dolly Parton.*
'I was singing loudly along with Dolly Parton's song "I will always love you".'

(27) *En gelukkig overal **keihard**, volume op standje 10*
'And luckily everywhere very loud(ly), at volume 10'

(28) *Hij is echt een **keisukkel** (. . .)!*
'He is really a complete idiot (. . .)!'

Free *kei* is used in a broader range of construction types than bound *kei*. Besides having scope over adjectives (29) and adverbs (30), which are still the most frequent heads, free *kei* can also intensify quantifiers (31) and verbs (32). Scope over a noun, as in (33), is still marginal. In 6 examples, *kei* is used as a predicative adjective without modifying a head (34): this signals that debonded *kei* has undergone "flexibilization", i.e. an increase in syntactic freedom (Norde 2009: 131). Moreover, as shown by the examples (35–36), *kei* may also have scope over (adjectival or noun) phrases, which signals "scope expansion" (Norde 2009: 131) compared to bound *kei*.

(29) *Heb het wel al miljoen keer gezegd maar ik ben echt* ***kei en kei trots*** *op je!!!*
'Have said it a million times already but I'm really super proud of you!!!'

(30) *Om 13 u verwachten ze me in het Jan Palfijn om een biopsie te nemen van mijn pancreas via mijn maag (. . .) En ik moet daarom dus* ***kei lang*** *nuchter zijn!*
'At 1 p.m. they expect me in the Jan Palfijn hospital for a biopsy of my pancreas through my stomach (. . .) And therefore my belly needs to be empty for such a long time!'

(31) *Ik heb dagen dat ik echt helemaal niets eet en dagen dat ik* ***kei veel*** *eet!*
'There are days that I am really eating nothing and days that I eat very much!'

(32) *Nogmaals* ***kei bedankt*** *dat ik hier mag wonen ik voel me echt thuis.*
'Thanks again very much that I can live here, I feel really at home.'

(33) *'s middags voelde ik me goed, 's avonds* ***kei keelpijn*** *en ziek . . . dag erna dood ziek*
'In the afternoon I felt good, in the evening terrible sore throat and sick . . . next day sick as a dog'

(34) *(. . .) uitdagingen, die hij tof,* ***kei****, en hip moest vinden.*
'(. . .) challenges, which he had to find nice, cool, and hip.'

(35) *Ze komen dus* ***kei te laat****, maar dat moeten ze maar op de koop toenemen.*
'So they are arriving way too late, but they have to put up with that.'

(36) *En zeg nou zelf, 50 cent is echt* ***kei geen geld****.*
'And let's face it, 50 cents is really no money at all.'

Free *kei* mostly acts as an adverb modifying an adjectival, adverbial (including quantifier) or verbal head. On the other hand, *kei* has an adjectival function when it has scope over a noun or noun phrase, or when it is used predicatively. Its adjectival status manifests itself when *kei* is coordinated with other adjectives, as illustrated in example (34). This shows that the debonding of *kei* also involves "recategorialization" (Norde 2009: 131). To sum up, it is shown that free *kei* has some "innovative" uses in relation to bound *kei* that result from debonding, although they are not (yet) very frequent.

4.2 Semantic Properties

Table 3 provides an overview of the semantics of bound and free *kei*. We only include examples where the simile reading is potentially available, i.e. where *kei* has scope over adjectives, adverbs and quantifiers; when *kei* modifies verbs, nouns or is used predicatively, it always has an intensifying or evaluative value.

Bound *kei* acts as an intensifying prefixoid in the great majority of occurrences (91.29%). The remaining instances are all examples of *keihard* used as a simile compound ('as hard as stone'). Examples (37) and (38) illustrate the two semantic types: *keihard* is used as a simile in (37) and as an intensifying compound in (38):

Table 3 Bound and free *kei* (R1 = Adj(P)/Adv/Quant) – semantics

	Bound *kei*	Free *kei*
Simile	87 (8.71%)	16 (1.63%)
Intensifying meaning	912 (91.29%)	965 (98.37%)
	999 (100%)	**981 (100%)**

(37) *Chocola uit Ghana heeft – om smelten in tropische temperaturen te voorkomen – een lager vetgehalte en is dus* ***keihard****.*
'Chocolate from Ghana – in order to prevent melting in tropical temperatures – has a lower fat content and that's why it is so hard.'

(38) *Dat laatste lieg ik* ***keihard****, want ik ga daar als eerste van genieten !!!*
'About that last thing I'm just really kidding, cause I will be the first to have fun!!!'

As Table 3 and example (39) show, the simile interpretation of *kei hard* is still available for the free form, albeit more exceptionally. We suggest to regard these 16 occurrences as deviant spellings of simile compounds. In all other occurrences, free *kei* has an intensifying meaning, as in example (40).

(39) *De klei wordt* ***kei hard*** *en neemt gewoon geen vervuiling op*
'The clay gets rock hard and just does not take any pollution'

(40) *United brands … een muts, sjaal en wanten (****kei Ally McBeal-achtig*** *dus) van hetzelfde*
'United brands … a hat, scarf and mittens (very Ally McBeal-ish) of the same type'

Surprisingly, in a number of occurrences *kei* even intensifies intrinsically non-gradable adjectives, such as *vrijwillig* 'voluntary' (41) and *vatbaar (voor)* 'susceptible, prone (to)' (42).

(41) *Bij het binnenkomen hadden we ons '****kei vrijwillig'*** *opgegeven voor het kauwgom-bellen-blazen (…)!*
'When we entered we signed up 'very voluntarily' for chewing gum-blowing!'

(42) *Ben* ***kei vatbaar*** *voor dit soort klote dingen.*
'[I] am very prone to this kind of fucked up things.'

Both bound and free *kei* can form part of an emphatic reduplicative construction (see 2.1); three different types of reduplication occur in the corpus sample:

(43) *Daten is **kei-en keihard,** en je kunt meedogenloos tegen de keien worden gesmeten*
'Dating is extremely tough, and you can end up thrown ruthlessly against the rocks'

(44) *Jayh – Doe de thing is echt **keikeikeihard**.*
'Jayh – Do the thing is really amazing.'

(45) *Het is een nieuw soort horrorfilm, (. . .), met 2 dames als hoofdrolspeelster, die allebei **keihard (maar dan ook KEIhard**) moeten vechten voor iets dat ze graag willen (. . .).*
'It's a new kind of horror movie, (. . .), with two women as protagonists, who both have to fight really hard (and I mean REALLY hard) for something that they want badly (. . .)'

The emphatic reduplicative construction is not restricted to purely intensifying morphemes; it is also available for simile compounds,[14] and remarkably, we even observed reduplication of free similative *kei* (46). We regard these cases as instances of simile compounds written as separate words (instead of the standard spelling *kei-en keihard*).

(46) *Niet lekker, het koekje was **kei en kei hard**, ze zijn zo de vuilnisbak ingegaan, jammer.*
'Not tasty, the cookie was rock-hard, they ended up in the bin, too bad.

In a number of instances, the compound *keihard* seems to have undergone semantic extension. In examples such as (47) and (48), *kei* still functions as an intensifying prefixoid, but the adjective or adverb *keihard* is used in contexts where the use of *hard* alone would not fit. The meaning of this 'lexicalized' *keihard* can be described as 'obvious(ly), loud and clear'.

(47) *Het staat er **keihard (*hard)**, zwart-op-wit.*
'It is loud and clear, black-on-white.'

(48) *Dat ze het doen weet je nu ook **keihard (*hard)**!!*
'That they are doing it, now at least you know it loud and clear'

This lexicalized use is also attested for separated *kei hard* (49). Example (50) is a particular use of lexicalized *kei* on its own. This case probably illustrates a clipped form of *keihard* which retains the meaning of the entire compound form (cf. Norde and Van Goethem 2015).

[14]This finding supports Hoeksema's (2012) account, according to which similes ("compounds expressing stereotyped comparisons") and compounds beginning with an intensifying prefixoid ("analogical extensions of comparison-based compounds") belong to the same class of "elative compounds", and may undergo emphatic reduplicative conjunction in a similar way as regular adverbs of degree (e.g. *ijs- en ijskoud* 'ice and ice cold; extremely cold', *erg maar dan ook erg koud* 'very but indeed very cold; really very cold', *zeer en zeer koud* 'very and very cold') (Hoeksema 2012: 98–99). Since this emphatic construction is available for both intensifying compounds and adverbs, it is not a conclusive criterion to range these uses of *kei* as instances of either an intensifying adverb or an orthographically separated prefixoid.

(49) *En misschien is daar ooit iemand in getrouwd, die nu* ***kei hard (*hard) gescheiden*** *is.*
'And perhaps someone ever got married there, who is now irrevocably divorced'

(50) *Maar het tegendeel werd mij op dat moment* ***kei bewezen***.
'But the opposite was clearly proved to me at that time.'

We can conclude that, at the semantic level, bound and free *kei* are used with a simile or an intensifying meaning. Free *kei* has not undergone any extension to new meanings or resemanticization. Language users tend to associate the simile interpretation with the compound *keihard* (written as one word).

4.3 Collocational Properties and Productivity

Table 4 shows the different types of adjectival and adverbial heads of bound *kei*; the occurrence *keisukkel* 'great idiot' (nominal head) has been excluded in order to make the data set uniform for the calculation of the productivity measures. As already suggested by the preceding examples, bound *kei* combines in the vast majority of cases with the adjective/adverb *hard* 'hard': *keihard* even covers 89.39% of the total corpus sample. *Keigoed* 'very good', *keigaaf* 'absolutely great', *keileuk* 'very nice' and *keigezellig* 'very cosy' complete the top 5, but their total token ratio only amounts to 6.40%. All the other types occur less than 5 times in the corpus, including 21 hapax legomena. Because of the small number of different adjectival/adverbial types (only 35) and the fact that *kei* almost exclusively combines with a single type, bound *kei* has a very low type-token ratio (0.04). Its potential productivity (0.02) is extremely low as well: it indicates that compounding with *kei* is running a "high risk of saturation", in Baayen's (2009) words. Potential expansion to new heads is therefore implausible.

Tables 5, 6 and 7 contain information about the collocational properties and productivity of free *kei* used as a modifier with scope over adjectives/adjectival phrases, adverbs and quantifiers (Table 5), verbs (Table 6) and nouns/noun phrases (Table 7).

Table 4 Bound *kei* (R1 = Adj/Adv) – collocates and productivity

Types	Number of tokens	%
hard 'hard'	893	89.39%
goed 'good'	26	2.60%
gaaf 'great, cool'	19	1.90%
leuk 'nice'	12	1.20%
gezellig 'cosy'	7	0.70%
n < 5 (incl. 21 hapax legomena)	42	4.20%
Types: 35 **TTR = 35/999 = 0.04** **PP = 21/999 = 0.02**	**Tokens: 999**	**100%**

Table 5 Free *kei* (R1 = Adj(P)/Adv/Quant) – collocates and productivity

Types	Number of tokens	%
hard 'hard'	274	27.93%
leuk 'nice'	108	11.01%
goed 'good'	95	9.68%
veel 'many'	47	4.79%
tof 'great'	33	3.36%
mooi 'beautiful'	28	2.85%
gezellig 'cosy'	24	2.45%
lang 'long'	16	1.63%
gaaf 'great'	15	1.53%
(n = 13) (2 types)	26	2.65%
(n = 12) (2 types)	24	2.45%
(n = 11) (2 types)	22	2.24%
(n = 10) (2 types)	20	2.04%
(n = 8) (1 type)	8	0.82%
(n = 6) (5 types)	30	3.06%
(n = 5) (3 types)	15	1.53%
n < 5 (incl. 87 hapax legomena)	196	19.98%
Types: 155	**Tokens: 981**	**100%**
TTR = 155/981 = 0.16		
PP = 87/981 = 0.09		

Table 6 Free *kei* (R1 = V) – collocates and productivity

Types	Number of tokens	%
bedanken 'to thank'	5	50.00%
(n = 1) *amuseren* 'to have fun', *bewijzen* 'to prove', *genieten* 'to enjoy', *gunnen* 'to grant, to allow', *lachen* 'to laugh'	5	50.00%
Types: 6	**Tokens: 10**	**100%**

Table 7 Free *kei* (R1 = N(P)) – collocates and productivity

Types	Number of tokens	%
(n = 1) *film* 'movie', *keelpijn* 'sore throat', *geen geld* 'no money'	3	100%
Types: 3	**Tokens: 3**	**100%**

It is worth noting that, among the 155 different adjectival/adverbial types, 10 types are loanwords from English (*cool, cute, happy, awesome*, etc.), covering a total of 23 occurrences, while only one compound with bound *kei* contains an English loanword (*keichill*). Language users possibly tend to write combinations with English loanwords as two separate words because this is the standard spelling for English compounds.

Given the low number of tokens of *kei* with scope over verbs and nouns, we will not calculate its productivity for these construction types. With respect to the

adjectival/adverbial/quantifier types, the adjective/adverb *hard* is clearly still the most frequent type (27.93%), but its frequency is much lower than that observed in combination with bound *kei* (89.39%). Instead, the distribution of free *kei* is spread over a far greater number of types (TTR = 0.16). Thanks to a higher number of hapax legomena, unbound *kei* also shows a greater potential productivity than bound *kei* (PP = 0.09). Both the type/token ratio and the potential productivity measures indicate that free *kei* is much more productive than bound *kei*. This does however not imply that bound *kei* is not a productive form with respect to its absolute frequency for instance, but the ratios indicate that it is almost saturated by one single type. The combination *kei* with *hard* reflects the oldest stage of the simile compound and is so high in token frequency that there may be a tendency to lexicalization (see 4.2) and univerbation, whereas more recent types with lower token frequency are more often orthographically separated from *kei*.

5 German *Hammer*

German *Hammer* 'hammer' is used as a noun referring to the tool, as well as in exclamations and predicative constructions to express a series of emotions, ranging from frustration and indignation to surprise and appreciation. In Grimms' German dictionary (s.v. *Hammer*), these emotive uses are associated with the mythological hammer of the god Thor, a source of both fear and admiration. The following historical examples[15] illustrate metaphorical and exclamative uses of *Hammer*:

(51) *Mein Wort ist ein* ***Hammer****/der die Felsen zerschmettert.* (DTA 1603)
'My word is a hammer that crushes the rocks' (DTA 1760)

(52) *Daß dich der* ***Hammer****!*
'OMG!'

An early example of the simile compound *hammerhart* 'hard as a hammer' is given in (53). The quotation marks may imply that the expression had not yet been conventionalized at the time.

(53) *Der Stein [. . .] war so groß wie eine Tischplatte, feinkörnig* ***"hammerhart"*** *[. . .].* (Die Zeit 1949)
'The stone [. . .] was as large as a tabletop, finegrained, and iron-hard [. . .]'

These figurative uses of *Hammer*, which have been around for centuries, have most likely played a part in the rise of *Hammer-/hammer-* as an evaluative and intensifying prefixoid. In the sections below, we will discuss formal, semantic and collocational properties of *Hammer-/hammer-*, in the same way as we have done for *kei*. To ease reading, we will henceforth write *hammer* to refer to both upper case and lower case spellings.

[15]The examples are from *Deutsches Textarchiv* (http://www.deutschestextarchiv.de)

5.1 Construction Types

German compounds are head-final, which implies that the second compound member determines the part of speech. Accordingly, formations with *hammer* should be written in upper case when R1 is a noun, and with lower case when R1 belongs to a part of speech other than nouns, according to German spelling rules. When R1 is an adjective initial capitals may be used as well, but only in combination with a hyphen, as in example (54). Hyphens may furthermore be used in compounds to emphasize the first compound member,[16] which may account for the hyphen in (55). However, hyphens are not consistently used, as the contrastive examples in (55) and (56) show. This suggest that users are uncertain about the morphological status of *hammer*, although spelling inconsistencies may also be due to the informal register represented by the COW corpus. With nouns, there is a lot of variation – most examples of lower case nouns are spelling errors (other nouns in the context of these examples lack upper case initials as well). The frequencies of all spelling variants are listed in Table 8.

(54) *Das Game is so* ***Hammer-geil***
'The game is so totally cool'

(55) *Vor uns liegt ein echtes* ***Hammer-Wochenende***
'We've got a really great weekend ahead of us'

(56) *Dann steht einem* ***Hammerwochenende*** *nichts mehr im wege.*
'Then nothing can prevent us from a great weekend.'

As Table 9 shows, bound *hammer* is most frequently used with adjectives (57), followed by nouns (58), adverbs (59), and quantifiers (60). Interestingly, the prefixoid may also collocate with other prefixoids, as in (61).

(57) *Naja, jetzt bin ich ja zufrieden mit der Vichy Nutrilogie 2, die für* ***hammertrockene*** *Haut gedacht ist*;).
'Well, at the moment I am happy with Vichy Nutrologie 2, meant for extremely dry skin;)'.

Table 8 Spelling variants of bound *Hammer-/hammer-* according to part of speech of R1

	Noun	Adjective	Adverb	Quantifier	Other
upper case	294	10	0	1	0
lower case	72	558	56	7	2
hyphen	232	28	1	0	0
no hyphen	134	540	55	8	2

[16] http://www.duden.de/sprachwissen/rechtschreibregeln/bindestrich#K26

Table 9 Bound and free *hammer* – construction types

POS R1	Bound *hammer*	Free *hammer*
Adj (or interjection)	567 (56.80%)	119 (11.80%)
Adv	56 (5.60%)	4 (0.40%)
N	366 (36.60%)	172 (17.20%)
Prefixoid	3 (0.30%)	0
Quantifier	8 (0.80%)	3 (0.30%)
Verb	0	18 (1.80%)
No R1 (predicative use)	0	685 (68.50%)
	1000 (100%)	**1000 (100%)**

(58) *Außerdem gefällt mir der Kandidat, der bei TV Total gecastet wurde, der hat echt eine* ***Hammer-Stimme****.*
'Moreover I like the candidate that had been casted by TV Total, he really does have an awesome voice.'

(59) *Goku wurde von dem cyborg* ***hammerhart*** *geknebeld.*
'Goku was tied up by the cyborg very rigidly'.

(60) *Ich finde 300 g Futter + Snack* ***hammerwenig****.*
'I find 300 grams of (dog) food plus a snack very little.'

(61) *für so einen preis muß bei mir das mu [makeup]* ***hammersuper*** *sein.*
'for such a price I think makeup has to be absolutely amazing'

From Table 9 it is evident that there is more variation in free *hammer* constructions than there is in bound *hammer-* constructions. Like its bound equivalent, free *hammer* may collocate with adjectives (62), adverbs (63), quantifiers (64), and nouns (65).

(62) *Nächste Folge wird* ***hammer spannend*** (. . .)
'The next episode is going to be absolutely thrilling'.

(63) *matt du kannst* ***hammer gut*** *küssen* *:) *
'Matt, you kiss extremely well'

(64) *aber das is bestimmt* ***hammer viel*** *arbeit . . .*
'but that is clearly going to be a whole lot of work'

(65) *Ganz ehrlich, ich glaube Dragon Age ist ein* ***hammer Spiel*** *mit* ***hammer Story*** (. . .)
'Quite frankly, I find Dragon Age an awesome game with an awesome story (. . .)'

In examples (62–64) *hammer* can be substituted by canonical intensifying adverbs such as *sehr* 'very' or *furchtbar* 'terribly', suggesting it is functionally similar to adverbs (but adverbs are not formally distinguished from the corresponding adjectives, so it is not possible to establish whether full conversion has occurred). On the other hand, when *hammer* precedes a noun, as in (65), it is clear that it has not (yet) become a fully-fledged adjective, as *hammer* does not formally agree with the noun (in which case we would expect *hammeres* and *hammere* respectively). Nevertheless, there is evidence that some speakers interpret *hammer* as an adjective like any other, with the correct inflections such as the indefinite neuter nominative

singular (66), which is furthermore modified by the adverb *total* 'totally', the definite masculine dative singular in (67), or the comparative and superlative in (68), followed by the interesting meta-comment that this is not a grammatical construction, which suggests that the speakers are well aware that they are using innovative forms.

(66) *oh man ein total* ***hammeres*** *ende*
'Oh man, a totally awesome ending'
www.fanfiktion.de/r/s/4a22e2fb0000e22606705dc0/date/0/1

(67) *Alles in allem ein super Gesamtpaket zu einem* ***Hammeren*** *Preis.*
'All in all, a super package deal for a terrific price.'
http://www.fat-burners.org/in-den-wissenschaftlichen-ueberpruefungen-zeigte-sich-eine/

(68) *das cover,* ***hammer****! die story,* ***hammerer****! der mann, am* ***hammersten****!!! (ich weiß das das grammatikalisch falsch ist, mir egal!)*
'The cover, awesome! The story, even more awesome! The man, most awesome! (I know this is grammatically incorrect, don't care!)'
https://www.amazon.de/Mad-Love-Tower-Don-Both/product-reviews/3945164346?pageNumber=6

As Table 9 also shows, however, that free *hammer* occurs in more construction types than bound *hammer*. It may modify a verb (69), or occur in predicative position. The latter construction is very frequent, and out of these 685 tokens, 335 have a definite article (example (70)), 20 have an indefinite article (example (71)), whereas 330 have no article at all (example (72)). Battefeld et al. (2018) note that the presence or absence of the indefinite article does not make a semantic difference. Morphosyntactically, however, *hammer* preceded by an article behaves more like a noun than bare *hammer*, as shown in (73), where *hammer* is modified by an adjective.

(69) *"you are not alone" von michael, er hat es* ***hammer gesungen***
'Michael's "You are not alone", he sung it magnificently'

(70) *düsseldorf war* ***der hammer****!!!*
'Düsseldorf was fantastic!!!'

(71) *(. . .) bin ich seit einem jahr in pension – mit nur 62% der bezüge. Ist schon* ***ein finanzieller hammer****!*
'(. . .) since a year I am retired – with only 62% retirement benefits. A financial blow for sure!'

(72) *Wir leben inner leistungsgesellschaft, und der Druck ist* ***hammer****.*
'We live in a meritocracy, and the pressure is enormous.'

(73) *aber* ***der absolute hammer*** *is der dirrty look mit den blond/schwarzen haaren.*
'but the real smasher is the dirty look with blond/black hair.'

According to Pittner and Berman (2006: 241), predicative *hammer* is the result of noun to adjective "conversion" in predicative position (cf. examples (16–17) in

Sect. 2.1), and they explicitly rule out the role of prefixoid constructions[17] such as *hammerhart* 'very hard' in the emergence of adjectival *hammer*. Example (72) however, casts doubt on this claim, since *hammer* may be a clipped form (compare *hammerharter Druck* 'very strong pressure'). A more likely scenario is one in which debonding, clipping and noun to adjective conversion in predicative contexts all contributed to the rise of free *hammer* constructions and possibly reinforced one another (see Van Goethem and Hüning 2015 for a similar analysis of Dutch *top* and German *spitze*).

5.2 Semantic Properties

When *hammer* collocates with an adjective, adverb or quantifier it can, like Dutch *kei*, have either simile or intensifying meaning. Table 10 shows a substantial difference between bound and free *hammer* in this regard: whereas 39 occurrences of bound *hammer* represent the simile construction *hammerhart*, free *hammer* is exclusively intensifying.

Hammerhart 'hard as a hammer' makes up more than a third of bound *hammer* constructions, but we only count them as similes when they refer literally to the substance of objects or body-parts (74), sound (75), or impact (76). In most cases however, *hard* is used in a metaphorical sense, e.g. 'cool' (77), 'serious' (78), or 'difficult' (79). Since these examples do not express a comparison to the physical properties of a hammer, we count them as intensifying.[18]

(74) *Ich nahm mir einen großen Hammer, prüfte ihn auf Härte und stellte fest, daß er* ***hammerhart*** *war.*
'I took a large hammer, checked its hardness and concludes it was hard as a hammer.'

(75) *Ich höre gerne laut Musik und lege Wert auf ordentlichen Klang – also glasklare Höhen und* ***hammerharte*** *Bässe* ...
'I love listening to loud music and I appreciate a good sound, meaning crystal-clear highs and very loud basses...'

Table 10 Bound and free *hammer* (R1 = Adj(P)/Adv/Quant) – semantics

	Bound *hammer*	Free *hammer*
Simile	39 (6.18%)	0 (0%)
Intensifying meaning	592 (93.82%)	125 (100%)
	631 (100%)	**125 (100%)**

[17]They do not use the term prefixoid, however, but speak of an "Adjektivkompositum mit intensivierender Bedeutung".

[18]Note also that, even in simile constructions such as (75), an intensifying reading is not precluded – *hammerharte Bässe* can also mean 'very cool basses' (Lars Erik Zeige, p.c.).

(76) *Er bekommt einen* ***hammerharten*** *Faustschlag ins Gesicht.*
'He gets an iron hard punch in the face.'

(77) *Die Coverart ist auf jeden Fall* ***hammerhart!***
'In any event, the cover art is totally cool!'

(78) *Natürlich kann es sich in Einzelnen Fällen um* ***hammerharte*** *Allergien gegen Fischeiweiß usw handeln.*
'Naturally, in some cases, this may be due to serious fish protein allergies etc.'

(79) *Eigentlich müsste ich richtig viel lernen, da ich demnächst ne* ***hammerharte*** *Klausur schreibe* (. . .)
'Actually I need to study a lot, because I will have a very tough exam soon (. . .)'

When *hammer* has an intensifying function, it may collocate with a variety of adjectives (cf. Tables 13 and 14). The meta-comment in example (80) shows moreover that *hammer* is a strong booster, as *hammergeil* is considered the final point on a rating scale:

(80) *Von spitze über geil, echt geil, einfach geil, voll geil bis zu* ***hammergeil*** *reichen die Bewertungen*
'The scores range from top via cool, really cool, simply cool, fully cool to *hammer* cool'

To further increase its intensifying function, *hammer* may co-occur with one or more other prefixoids for emphatic effect, both when the R1 is an adjective (81) or a noun (82)[19]:

(81) *Er sieht einfach* ***hammer-mega-geil*** *aus.*
'He just looks absolutely totally cool'.

(82) *Ich investiere meine Zeit in eine Sache, die mir vorab von RTL als der* ***Hammer-Super-Knaller-Mega-Event*** *verkauft wird, und erlebe so was . . .*
'I invest my time in something RTL claimed was going to be a fantastic event, and now this . . . '

When R1 is a noun, *hammer* may enhance the positive meaning of the noun, as in (83), or conversely its negative meaning, as in (84). In most cases, however, it has ameliorative function, as in (85).

(83) *wenn ihr mal ein eigenes, richtig gutes* ***Hammer****-Schnäppchen [. . .] habt*
'in case you would happen to have a really good real bargain yourself'

(84) *Ein* ***Hammer****-Gewitter: Regen, wie aus Eimern geschüttet [. . .]*
'An intense thunderstorm: rain by the buckets [. . .]'

[19]The sample does not contain examples of emphatic reduplication (compare the *kei* examples (43–46) above).

(85) *ich hab fast ein jahr in kapstadt gewohnt und es ist eine* ***hammerstadt***
'I have lived in Cape Town for almost a year and it's a great city'

5.3 Collocational Properties and Productivity

In this section, we list the most frequent R1s of both bound and free *hammer* as well as their type/token ratio and potential productivity. With nouns (Tables 11 and 12) *hammer* is quite productive – with both free and bound forms, more than half of the tokens are hapax legomena, and the most frequent tokens in absolute numbers form a relatively modest set in terms of relative frequency. Moreover, although ranked differently, many of the most frequent nouns with bound *hammer* are among the most frequent collocates of free *hammer* as well.

As far as adjective constructions are concerned, we already noted in the previous section that *hammerhart* occurs with far higher token frequency in the bound *hammer* sample. Furthermore, Tables 13 and 14 show that bound and free *hammer* have the same #1 adjective R1, *geil*, and some similarities in lower ranking adjectives as well. Productivity is low with both constructions.

Table 11 Bound *hammer* (R1 = Noun) – collocates and productivity

Types	Number of tokens	%
Bild 'picture'	10	2.73%
Deal 'deal'	10	2.73%
Preis 'price'	10	2.73%
Ding 'thing'	9	2.46%
Zeit 'time'	9	2.46%
Song 'song'	8	2.19%
Spiel 'playing'	8	2.19%
Gruppe 'group, band'	8	2.19%
Album 'album'	7	1.91%
Stimme 'voice'	6	1.64%
Wetter 'weather'	6	1.64%
Transfer 'transfer'	6	1.64%
Teil 'part'	5	1.37%
Nummer 'track, song'	5	1.37%
n = 4 (4 types)	16	4.37%
n = 3 (11 types)	33	9.02%
n = 2 (26 types)	52	14.21%
n = 1	158	43.17%
Types: 213	**Tokens: 366**	**100%**
TTR = 213/366 = 0.58		
PP = 158/366 = 0.43		

Table 12 Free *hammer* (R1 = Noun) – collocates and productivity

Types	Number of tokens	%
Stimme 'voice'	8	4.65%
Game 'game'	7	4.07%
Spiel 'playing'	6	3.49%
Bild 'picture'	5	2.91%
Grafik 'graphics'	4	2.33%
Teil 'part'	3	1.74%
Stimmung 'atmosphere'	3	1.74%
Angebot 'supply'	3	1.74%
Track 'track'	3	1.74%
Konzert 'concert'	3	1.74%
n = 2 (16 types)	32	18.60%
n = 1	95	55.23%
Types: 121	**Tokens: 172**	**100%**
TTR = 121/172 = 0.70		
PP = 95/172 = 0.55		

Table 13 Bound *hammer* (R1 = Adjective, Adverb, Quantifier) – collocates and productivity

Types	Number of tokens	%
geil 'cool'	276	43.67%
hart 'hard'	234	37.03%
schwer 'heavy, difficult'	15	2.37%
genial 'brilliant'	9	1.42%
stark 'strong'	8	1.27%
gut 'good'	6	0.95%
viel 'many'	6	0.95%
schnell 'fast'	5	0.79%
n = 4 (4 types)	16	2.52%
n = 3 (3 types)	9	1.42%
n = 2 (7 types)	14	2.22%
n = 1	34	5.38%
Types: 56	**Tokens: 632**	**100%**
TTR = 56/632 = 0.09		
PP = 34/632 = 0.05		

Finally, Table 15 lists the verbs that may occur as R1 with free *hammer*. It is clear that these do not represent a very productive construction type, and therefore we did not calculate its type/token ratio or potential productivity.

Table 14 Free *hammer* (R1 = Adjective, Adverb, Quantifier) – collocates and productivity

Types	Number of tokens	%
geil 'cool'	69	55.20%
gut 'good'	7	5.60%
cool 'cool'	5	4.00%
billig 'cheap'	3	2.40%
genial 'brilliant'	3	2.40%
hart 'hard'	3	2.40%
viel 'many'	3	2.40%
n = 2 (7 types)	12	10.00%
n = 1	20	16.67%
Types: 33	**Tokens: 125**	**100%**
TTR = 33/125 = 0.26		
PP = 20/125 = 0.16		

Table 15 Free *hammer* (R1 = V) – collocates

Types	Number of tokens	%
aussehen 'to look, appear'	6	33.33%
machen 'to make'	3	16.67%
rejoinen 'to rejoin'	1	5.56%
zeichnen 'to draw'	1	5.56%
rappen 'to rap'	1	5.56%
spielen 'to play'	1	5.56%
kühlen 'to cool'	1	5.56%
singen 'to sing'	1	5.56%
abgehen 'to fail'	1	5.56%
sich freuen 'to look forward to'	1	5.56%
schreien 'to cry'	1	5.56%
Types: 11	**Tokens: 18**	**100%**

6 Swedish *kanon*

The Swedish noun *kanon* 'cannon, which ultimately derives from Italian *cannone* (< Latin *canna* 'tube, cane' + the augmentative suffix *–one*), was borrowed into Swedish in the seventeenth century. One of the earliest examples given in the Dictionary of the Swedish Academy (SAOB, s.v. *kanon*) is (86).

(86) *Stenbock ... låter spela på Slottet medh* ***Canoner***. (1656)
'At the castle, Stenbock had cannons fired.'

The noun soon came to be used metaphorically as a curse, e.g. in *Bomber och Canoner!* 'bombs and cannons!' (1791). In the 1920s, it started to appear in sports journalism (Lundbladh 2002: 30) to refer to high speed or impact (*kanonskott* 'canonball shot') or exceptional strength (*kanonform* 'top condition'). The first attested [*kanon*-ADJ] formation is *kanonfull* (first attested 1909, according to

SAOB),[20] literally meaning 'cannon drunk'.[21] In this sense, *kanon* could also be used independently, as in *dricka sig fullständigt kanon* 'to get wasted (lit. drink oneself cannon)'. Clearly, the typical properties of a cannon (strength, impact and loudness) invited metaphorical extension, which in turn led to the evaluative and intensifying properties discussed in Sect. 6.2. The first occurrence of an evaluative [*kanon*-N] construction, *kanonväder* 'great weather' is mentioned in the 1986 edition of the Swedish Word List (SAOL) and labelled 'colloquial'; the first intensifying [*kanon*-ADJ] construction, *kanonbra* 'very good' appears in the 1998 edition, likewise with the addition 'colloquial'.

6.1 Construction Types

As for the other two prefixoids, we selected 1000 bound and 1000 free forms of *kanon*. Of the bound forms, 11 are hyphenated (e.g. *kanon-blogg* 'great blog', *kanon-kul* 'really cool'), 989 are written as one word. As Table 16 shows, the distributional differences between bound and free *kanon* are substantial.

Bound *kanon* is most frequently used with adjectives as R1 (87), followed by nouns (88), adverbs (89), quantifiers (90). Example (91) illustrates that *kanon* can also be followed by other morphemes, such as the English suffix *–ish* (91):

(87) *Verkar vara en* ***kanonfin*** *häst!*
'This seems to be a very fine horse!'

(88) *hoppas du haft en* ***kanonkväll*** *på stan!*
'(I) hope you had a great evening in town!'

Table 16 Bound and free *kanon* – construction types

POS R1	Bound *kanon*	Free *kanon*
Adj (or interjection)	495 (6.90%)	151 (15.10%)
Adv	69 (43.10%)	16 (1.60%)
N	431 (43.10%)	162 (16.20%)
Quantifier	2 (0.20%)	3 (0.30%)
Verb	0 (0%)	124 (12.40%)
Predicative use	0 (0%)	544 (54.40%)
other	3 (0.30%)	0 (0%)
	1000 (100%)	**1000 (100%)**

[20] An earlier example (1889) is however found in a historical corpus in *Språkbanken* (https://spraakbanken.gu.se/). Thanks to Henrik Rosenkvist for finding this example.

[21] This is a common association in other languages as well, compare French *bourré comme un canon*, German *voll wie eine Kanone*, Dutch *zo dronken als een kanon*.

(89) *Nu ikväll kom jag på att det var* ***kanonlänge*** *sen jag skrev en sån.*
'Tonight I realized it's been ages (lit. very long) since I wrote one of those'

(90) *Jag jobbade ju hos Lotta o vi hade* ***kanonmycke*** *folk (. . .)*
'I was working at Lotta's and we had a lot of guests (. . .)'

(91) *Kommer bli* ***kanonish****!*
'It's going to be fantastic (ish)!'

Free *kanon* occurs in the same constructions as bound *kanon*, i.e. in collocations with adjectives (92), adverbs (93), quantifiers (94) and nouns (95), but is it also found in other construction types.

(92) *Jag älskar jul och traditioner tycker det är* ***kanon mysigt,*** *gör inte ni?*
'I love Christmas and traditions, I think it's really cosy, don't you?'

(93) *I lördags blev det babysim som vanligt och det gick* ***kanon bra****!*
'On Saturday we went baby-swimming as usual and it went really well!'

(94) *Annars var de* ***kanon mycket*** *gott.*
'Apart from that they were really very tasty.'

(95) *tummen upp även för fotografen, som gjort ett* ***kanon jobb****!*
'Thumbs up for the photographer too, who has done a terrific job!'

Additionally, free *kanon* collocates with verbs (96),[22] and it is part of the fixed expression *att ha kanon* 'to have a great time' (97):

(96) *Själv sov jag* ***kanon****, men jag blev fruktansvärt sur när jag vaknade av min väckarklocka.*
'I myself slept very well, but I was very irritated when the alarm woke me up.'

(97) *Barnen har hur roligt som helst och vi vuxna har det ocksa* ***kanon****.*
'The kids are having a blast and we adults are also having a great time.'

Most frequently of all, however, free *kanon* is found in predicative position, as in examples (98–99), where it translates as 'great, fantastic'. In these constructions, *kanon* may be a clipped adjective (*kanonbra* 'very good'), but it may also have developed out of debonded *kanon*, which spread from attributive to predicative position.

(98) *Och tillsammans med parmesan blir det* ***kanon****.*
'And together with parmesan it is going to be delicious.'

(99) *Två av böckerna är riktigt* ***kanon****!*
'Two of the books are really great!'

[22] Unlike German and Dutch, Swedish (marginally) allows bound prefixoids with verbs (Ascoop and Leuschner 2006: 246), but these do not occur in our sample. A Google search yields few examples (e.g. *vi kanontrivdes* 'we enjoyed ourselves tremendously' (*thailandforum.se › sp)*).

It is difficult to determine the part of speech of predicative *kanon*. Unlike in Dutch and German, predicative adjectives are inflected in Swedish so that, if *kanon* were a fully-fledged adjective, we would expect a neuter form *kanon**t*** in (98) and a plural form *kanon**a*** in (99). The absence of inflection is however in line with Van Goethem and De Smet's (2014) observation that debonding of affixoids is gradual, and that inflectional properties may be acquired at a later stage.[23] We do in fact find inflected forms elsewhere, but they appear to be very rare:

(100) *Det kunde vara **kanont** om ochså personen kunde spela på saxofon.*
'I would be great if this person could also play the saxophone.'
www.danslogen.se › Forum › Dansband

(101) *Poolerna var **kanona** att simma i.*
'The pools were great to swim in.'
eyesoffinland.blogg.se/2008/may/minnen-fran-kreta.html

Other constructions which suggest adjectival status of *kanon* are ones in which *kanon* is modified by an adverb (or two adverbs, as in (102)), or in which *kanon* is coordinated with another adjective, as in (103):

(102) *Nu har jag kommit hem och denna dagen har varit **helt jävla kanon**!*
'Now I have come home and this day has been totally bloody great!'

(103) *Min jul har vart **kanon och mysig***
'My Christmas has been awesome and comfy'

On the other hand, there is evidence that *kanon* is still interpreted as a noun by some speakers, since it may also occur in the definite form (104), and even in the genitive plural (105).[24] In neither case is there a difference in meaning.

(104) *Denna helgen ska bli **kanonen**!*
'This weekend is going to be fantastic!'

(105) *Sen strör man på lite kanel & socker så blir det **kanoners**!*[25]
'Then sprinkle with a bit of cinnamon and sugar and it will be fantastic!'

Summing up, predicative *kanon* has both adjectival and nominal properties. While this may be problematic for a grammatical theory which requires discrete categories, it is not for the constructional approach, in which categories are considered gradient (Traugott and Trousdale 2013: 74).

[23] Other debonded prefixes or prefixoids, e.g. *super* or *skit* 'shit', do not inflect either. Moreover, there are a few indeclinable Swedish adjectives, e.g. *bra* 'good, fine', or *kul* 'cool'. Interestingly, these adjectives can be used as exclamatives as well, just like *kanon*, *super* and *skit*, so it may well be that *kanon* will continue to pattern with these adjectives and not acquire inflection.

[24] Another example of a free prexoid occurring in the genitive plural is *kalasers*, from the intensifying prefixoid *kalas-*, originally a noun meaning 'party' (Ledin 2012).

[25] Generally, *kanoners* and free *kanon* can be used in the same constructions, with the same meaning (*kanoners/kanon bra* 'very good', *kanoners/kanon dag* 'great day' etc.), but *kanoners* is far less frequent in SECOW14AX (1400 raw hits) than *kanon* (more than 10,000 hits, which is the maximum number of results in Colibri^2 queries).

6.2 Semantic Properties

As we saw at the beginning of this section, the first adjective which *kanon* collocates with is *full* 'drunk', in which *kanon* is already used metaphorically. This may explain why *kanon*, unlike *kei* and *hammer*, is not used in simile constructions (adjectives meaning 'drunk' do not occur in the sample either). *Kanonhård* 'very hard' is attested only once, and in a figurative sense (*två kanonhårda kamper* 'two very tough matches'). In other words, in Adjective/Adverb/Quantifier contexts both bound and free *kanon* have a purely intensifying function. For instance, adjectives like *duktig* 'good at, clever', *snygg* 'cute' or *trött* 'tired' clearly have no link to physical properties typically associated with cannons. A further striking example is (106), in which *kanon* is attached to an adverb with a negative prefix (*o-troligt* 'in-credibly').

(106) *Benpasset gick* ***kanonotroligt*** *bra*
'The leg exercises went really incredibly well'

When *kanon* collocates with nouns or verbs, it almost always has ameliorative meaning (cf. examples (88) and (95) above), the only two exceptions being formations in which R1s are inherently negative, viz. *kanonhuvudvärk* 'splitting headache', and (possibly) *kanonfylla* 'state of being stone drunk.' The meta-comment in (107) furthermore shows that *kanon* is considered gradable.

(107) *Hur* ***kanon*** *är det på en skala?*
'How awesome is this on a scale?'

Summing up this section, it is clear that *kanon* as a prefixoid has generally lost the association with the original noun 'cannon', and that semantic differences between bound and free forms are very small.

6.3 Collocational Properties and Productivity

Looking at [*kanon*-N] constructions, we note that many of them are temporal nouns, such as 'day', 'evening', or 'weekend', or nouns referring to events or accomplishments, such as 'race', 'match', or 'job'. The association of loud noise or an explosion with a terrific time is not uncommon, compare English *blast*, which can be used in all three senses, or the Dutch and Swedish intensifying prefixoid *knal(l)* 'bang'. In other collocations, however, the association with typical properties is less obvious, e.g. 'blog', or 'picture'. From Tables 17 and 18 it also emerges that, at first glance, the R1 preferences of bound and free *kanon* are very similar, but free *kanon* is slightly more productive.

Table 17 Bound *kanon* (R1 = N) – collocates and productivity

Types	Number of tokens	%
dag 'day'	51	11.83%
väder 'weather'	46	10.67%
kväll 'evening'	29	6.73%
helg 'weekend'	24	5.57%
jobb 'job'	22	5.10%
pris 'price'	17	3.94%
start 'start'	13	3.02%
bild 'picture'	10	2.32%
ställe 'place'	10	2.32%
idé 'idea'	8	1.86%
match 'match'	6	1.39%
insats 'commitment'	6	1.39%
lopp 'race'	6	1.39%
år 'year'	5	1.16%
sida '(web) page'	5	1.16%
läge 'situation'	5	1.16%
n = 4 (4 types)	16	3.72%
n = 3 (8 types)	24	5.57%
n = 2 (23 types)	46	10.67%
n = 1	82	19.03%
Types: 133	**Tokens: 431**	**100%**
TTR = 133/431 = 0.31		
PP = 82/133 = 0.19		

Table 18 Free *kanon* (R1 = N) – collocates and productivity

Types	Number of tokens	%
dag 'day'	29	17.90%
kväll 'evening'	15	9.26%
helg 'weekend'	12	7.41%
väder 'weather'	11	6.79%
jobb 'job'	7	4.32%
pris 'price'	5	3.09%
lopp 'race'	4	2.47%
bild 'picture'	4	2.47%
lördag 'Saturday'	4	2.47%
start 'start'	3	1.85%
blogg 'blog'	3	1.85%
n = 2 (12 types)	24	14.81%
n = 1	41	25.31%
Types: 64	**Tokens: 162**	**100%**
TTR = 64/162 = 0.40		
PP = 41/162 = 0.25		

Table 19 Bound *kanon* (R1 = Adjective/Adverb/Quantifier) – collocates and productivity

Types	Number of tokens	%
bra 'good'	261	46.11%
fin 'fine'	96	16.96%
god 'good, tasty'	48	8.48%
kul 'cool'	33	5.83%
snygg 'cute'	21	3.71%
mysig 'cosy'	14	2.47%
trevlig 'nice'	14	2.47%
rolig 'nice, funny'	10	1.77%
skön 'beautiful'	7	1.24%
duktig 'good at, clever'	7	1.24%
härlig 'lovely'	6	1.06%
nöjd 'satisfied'	5	0.88%
läcker 'tasty'	4	0.71%
n = 3 (4 types)	12	2.12%
n = 2 (3 types)	6	1.06%
n = 1	22	3.89%
Types: 42	**Tokens: 566**	**100%**
TTR = 42/566 = 0.07		
PP = 22/566 = 0.04		

As we saw in the previous section, *kanon-* has predominantly intensifying function in constructions with adjectives, adverbs and quantifiers. As far as bound *kanon* is concerned, the top four correspond neatly to the token frequencies of the adjectives in the SECOW14AX corpus as a whole,[26] which corroborates our earlier observation that *kanon* in Adjective/Adverb/Quantifier constructions is substantially bleached. Again, the collocational properties of bound and free *kanon* are very similar, and free *kanon* is more productive than its bound counterpart (Tables 19 and 20).

When R1 is a verb, finally, productivity is low. Moreover, most verbs that collocate with (free) *kanon* are semantically close to predicative constructions, e.g. 'to go', 'to feel', or 'to suit'. Only in a few cases, e.g. 'sing', or 'sleep', does *kanon* function as a manner adverb (Table 21).

[26]The frequencies per million tokens for the lower case forms are: *bra* (indeclinable): 2138.973; *fin/fint/fina*: 823.2269; *god/gott/goda*: 681.9374; *kul* (indeclinable): 460.0758. The frequencies can be found at http://hpsg.fu-berlin.de/cow/frequencies/swedish/

Table 20 Free *kanon* (R1 = Adjective/Adverb/Quantifier) – collocates and productivity

Types	Number of tokens	%
bra 'good'	91	53.53%
fin 'fine'	13	7.65%
snygg 'cute'	10	5.88%
kul 'cool'	9	5.29%
god 'good, tasty'	8	4.71%
skön 'beautiful'	3	1.76%
duktig 'good at, clever'	3	1.76%
trevlig 'nice'	3	1.76%
mysig 'cosy'	3	1.76%
skoj 'fun'	3	1.76%
mycket 'much'	3	1.76%
fräsch 'fresh'	2	1.18%
trött 'tired'	2	1.18%
nöjd 'satisfied'	2	1.18%
n = 1	15	8.82%
Types: 29	**Tokens: 170**	**100%**
TTR = 29/170 = 0.17		
PP = 15/170 = 0.09		

Table 21 Free *kanon* (R1 = V) – collocates and productivity

Types	Number of tokens	%
gå 'to go'	60	48.39%
funka 'to function, to work'	30	24.19%
fungera 'to function, to work'	11	8.87%
passa 'to suit'	5	4.03%
sova 'to sleep'	3	2.42%
börja 'to start'	2	1.61%
trivas 'to enjoy, to feel well'	2	1.61%
jobba 'to work'	2	1.61%
sitta 'to sit; to fit'	2	1.61%
n = 1	7	5.65%
Types: 16	**Tokens: 124**	**100%**
TTR = 16/124 = 0.13		
PP = 7/124 = 0.06		

7 Contrastive Statistical Analysis

In this chapter, we summarize the quantitative results from the three preceding sections in order to assess whether there exist statistical differences between the bound and free constructions of *kei*, *hammer* and *kanon* for all four properties mentioned in Sect. 2.2: construction type (7.1.), semantic bleaching (the proportion of simile and intensifying functions in [Prefixoid-ADJ] constructions) (7.2.), collocational properties (7.3.), and productivity (7.4.).

7.1 Construction Types

As far as construction types are concerned, we distinguish four categories that may occur as R1: AAQ (which comprises adjectives, adverbs and quantifiers), N(ouns), V(erbs), and predicative constructions. We merge adjectives, adverbs and quantifiers into a single category because the function of the prefixoid is similar when it modifies one of these. This furthermore enables us to calculate the χ^2 scores in R, because otherwise there would have been too many cells with a frequency < 5, in which case the χ^2 approximation may be incorrect.

Figure 1 shows the distribution of R1 construction types across the bound and free variants of the three prefixoids. It is clear that there is very little variation where *kei* is concerned, whereas variation is more substantial with the other two prefixoids.

In Table 22, we see that all results are significant ($p < 0.05$), but whereas *hammer* and *kanon* get the smallest possible p given by the standard χ^2 function in R, the p for *kei* is much larger. Moreover, the effect size[27] is large for *hammer* and *kanon*, but lower than 0.10 for *kei*.

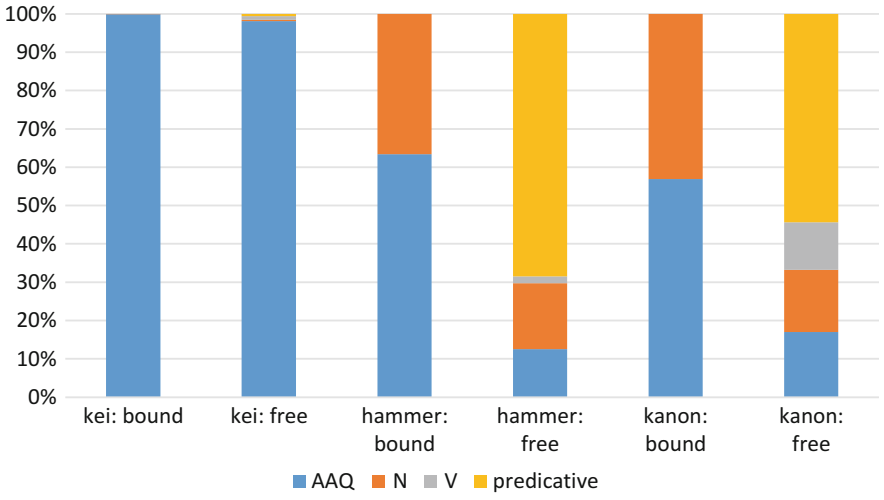

Fig. 1 Construction types – Part of speech of the R1

Table 22 Results of the χ^2 test for construction types

	kei	*hammer*	*kanon*
Pearson's χ^2	17.164	1114.3	1005.5
p-value	0.000654	< 2.2e-16	< 2.2e-16
Cramér's V	0.093	0.746	0.709

[27] The effect size is given as Cramér's V, which indicates correlation strength: 0.10–0.30 indicates a small effect size; 0.30 to 0.50 a moderate one, and >0.50 a large one. We used the vcd package for R (Meyer et al. 2016) to compute it.

7.2 *Bleaching*

For all three prefixoids, we measured the degree of semantic bleaching by comparing the proportion of similes to the proportion of intensifying constructions when R1 is an adjective, adverb or quantifier. Fig. 2 only represents these proportions of simile and intensifier meanings for bound and free *kei* and *hammer*; as mentioned in 6.2., Swedish *kanon* is not used in simile constructions in our sample[28] and is therefore not included in the figure. For both *kei* and *hammer*, we observe loss of the literal meaning in favour of the intensifying meaning, which we interpret as the result of bleaching.

In order to compare degrees of bleaching when the prefixoid collocates with an adjective, adverb or quantifier we also performed χ^2 tests, the results of which are given in Table 23. With both *kei* and *hammer* differences between the bound and the free forms are significant ($p < 0.05$), but the effect size is small.

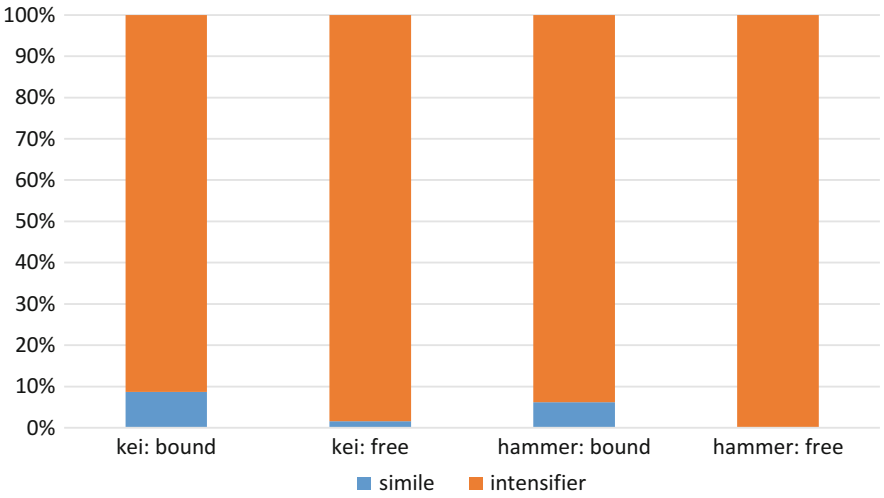

Fig. 2 Bleaching

Table 23 Results of the χ^2 test for bleaching

	kei	*hammer*
Pearson's χ^2	50.156	6.9318
p-value	1.42e-12	0.008468
Cramér's V	0.161	0.104

[28] In the raw corpus data (10,000 hits, the maximum), there is only one single example of the simile construction *kanonhård* 'cannon hard', so this particular collocation does not appear to be very productive.

7.3 Collocations

In order to establish to what degree the free and bound variants are used in different contexts, we performed a distinctive collexeme test, as described in Levshina (2015: 242ff.). This test was originally designed to compare the collocational preferences of two near-synonymous constructions in a corpus (Gries and Stefanowitsch 2004), and compares the observed frequency of a specific slot filler (R1) to the expected frequency of that R1. The purpose of this test is to compute if specific R1s are attracted to one of the two constructions.[29] We used the `pv.Fisher.collostr()` function of the Rling package (Levshina 2014), which computes the Fisher exact p-values for all R1s; these are subsequently log-transformed (using the negative base 10 logarithm). If the observed frequency is smaller than the expected frequency, the log-transformed score will remain negative. Conversely, if the observed frequency is larger than the expected frequency, the log-transformed score will become positive. The cut-off value was set at 1.3, which corresponds to a p-value of 0.05. In our case studies we use the free construction as a base. Hence, if the log-transformed p-value was >1.3, the R1 is distinctive for the free prefixoid, if it is < −1,3, it is distinctive for the bound prefixoid.

Table 24 gives the total number of types for *kei*, *hammer* and *kanon* in combination with an adjective, adverb or quantifier, as well as the distinctive R1s for the free and the bound constructions respectively. The distinctive R1s are given in Tables 25, 26 and 27. The differences in collocational preferences are most pronounced in Dutch *kei*, with 19 distinctive R1s for free *kei* and one (*keihard*) for bound *kei*; note also that the logp for *keihard* is very high, meaning strong attraction (see Table 25). Differences in German are much smaller, with five distinctive R1s for the free form and 1 for the bound form. In German, too, the simile *hammerhart* is distinctive for the bound form, but the attraction is smaller than in Dutch (see Table 26). For Swedish *kanon*, finally, there is only one distinctive R1 for the bound form (*kanonfin* 'very fine') and none at all for the free form (Table 27). If we divide the total number of distinctive collexemes by the number of types, we arrive at very low ratios (see Table 24). We are not aware of a threshold above which differences

Table 24 Distinctive collexemes for R1 = AAQ

	kei	*hammer*	*kanon*
Number of types	163	67	49
Distinctive R1 free form	19	5	0
Distinctive R1 bound form	1	1	1
Ratio	20/163 = 0.12	6/67 = 0.09	1/49 = 0.02

[29] Note that we do not have the data for the entire corpus, but use the frequencies in the samples instead. Therefore, these statistics can only be used for comparison of the bound and free forms in the sample, not of those in the corpus as a whole.

Table 25 Distinctive AAQ collexemes for free *kei* and bound *kei-* (shaded)

R1	free	bound	logp
leuk	108	12	21.308810
veel	47	1	13.159363
goed	95	26	10.555802
tof	33	1	8.909595
mooi	28	4	5.094366
lang	16	0	4.906956
cool	13	0	3.982484
lekker	12	0	3.674783
trots	12	0	3.674783
vet	11	0	3.367309
erg	10	0	3.060062
gezellig	24	7	2.746519
blij	11	1	2.510308
lief	13	2	2.424480
fijn	9	1	1.963911
schoon	6	0	1.833337
vaak	6	0	1.833337
groot	5	0	1.527220
moeilijk	5	0	1.527220
hard	273	893	-184.6871126

Table 26 Distinctive AAQ collexemes for free *hammer* and bound *hammer-* (shaded)

R1	free	bound	logp
gut	7	6	2.6873645
cool	5	3	2.3774070
billig	3	1	1.8094533
geil	69	276	1.7295434
spannend	2	0	1.5672860
hart	3	234	-17.7354171

Table 27 Distinctive AAQ collexemes for bound *kanon-* (shaded)

R1	free	bound	logp
fin	13	96	-2.696587e+00

in collexeme distributions between two constructions can be said to be statistically significant, but since the number of distinctive collexemes relative to the number of types corresponds to a ratio ranging between 0 (no distinctive collexemes) and 1 (all collexemes are distinctive), we may assume the same ranges as Cramér's V for effect size (see footnote 27). We may thus conclude that there is a small effect for *kei*, and none for *hammer* or *kanon*.

We also looked at distinctive collexemes for *hammer* and *kanon* with R1 as a noun (*kei* hardly collocates with nouns at all), but we found only two distinctive nouns for free *hammer* and none at all for *kanon*, so we will not further discuss them here.

7.4 *Productivity*

Figures 3 and 4, finally, show differences in productivity between bound and free *kei*, *hammer* and *kanon*. Both with nouns and adjectives/adverbs/quantifiers, we see an overall increase in productivity, both type/token ratio and potential productivity. The differences are largest with *hammer*, followed by *kei* and *kanon*.

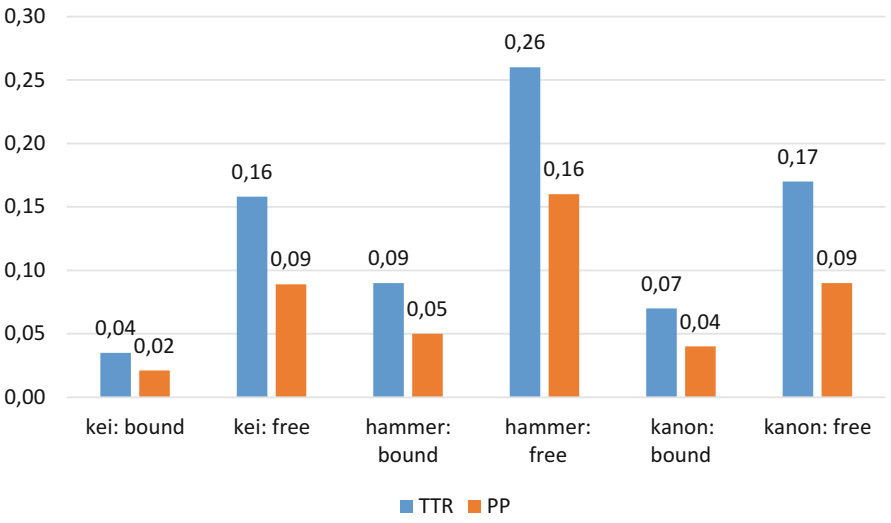

Fig. 3 Type/token ratio and Potential Productivity (R1 = AAQ)

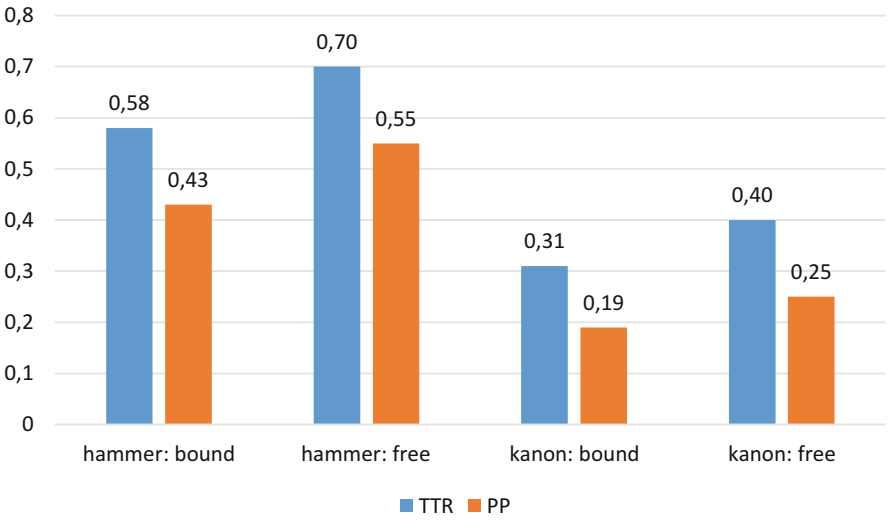

Fig. 4 Type/token ratio and Potential Productivity (R1 = Noun)

8 Summary and Conclusions

A summary of the preceding section is given in Table 28. From this table, it is evident that only Dutch *kei* has undergone all four constructional changes that we examined in this paper. With *hammer* the differences in construction types are larger, but the number of distinctive collexemes is too low to conclude that free *hammer* is sufficiently distinct from bound *hammer* as far as collocational preferences are concerned. In the case of *kanon*, only two constructional changes have occurred: there is a large difference in construction types and an increase in productivity, but no bleaching, and no difference in collocation preferences.

Let us return now to Hilpert's rhetorical question: how many of these constructional changes can be said to suffice in order for the free form to qualify as an instance of constructionalization? As we have seen, Traugott and Trousdale's (2013: 22) definition of constructionalization requires a change in both form *and* meaning, but these authors are not very explicit on which changes they consider formal, and which changes they consider semantic. Moreover, they do not tell us how to quantify changes in form or meaning. Nevertheless, if we consider the first constructional change in Table 28 as a formal change (after all, collocations with different parts of speech suggest changes in morphosyntactic properties), we note that all three prefixoids have undergone formal change (even in the absence of phonological change). Bleaching in [Prefixoid-ADJ] constructions, which can be considered a semantic change, is only attested for *kei* and *hammer*, but the effect size (Cramér's V) is small with both. *Kanon* is exclusively used as an intensifier in our sample. Distinctive collexeme analysis, which we used to test whether there has been a change in collocational preferences, shows only a small effect for *kei*, and none for *hammer* and *kanon*. Finally, all three debonded prefixoids show an increase in productivity as compared to the bound forms. According to Traugott & Trousdale's definition of constructionalization, then, only *kei* and *hammer* have developed a new node in the network, whereas *kanon* has only changed formally. This is somewhat

Table 28 Constructional changes – summary

Constructional change	*kei*	*hammer*	*kanon*
R1: PoS	χ^2: significant difference	χ^2: significant difference	χ^2: significant difference
	Cramér's V: < 0.01	Cramér's V: large effect	Cramér's V: large effect
Bleaching (R1 = AAQ)	χ^2: significant difference	χ^2: significant difference	n.a.
	Cramér's V: small effect	Cramér's V: small effect	
Distinctive collexemes (R1 = AAQ)	small effect	no effect	no effect
Productivity	increase	increase	increase

problematic, however, because it implies that there is a single node for bound and free *kanon*, in spite of clear differences in construction types and productivity. It should also be noted that free *kanon* is not just an orthographic variant of the bound form, as we have shown for Swedish *jätte* 'giant, very' (Norde and Van Goethem 2014).[30] For this prefixoid, distributional differences between bound and free *jätte* were statistically insignificant. The proportion of bleaching was similar, and unlike free *kanon*, free *jätte* does not modify verbs nor does it occur in predicative position. On the other hand, we would have to assume two separate nodes for bound and free *hammer*, even though there are no significant differences in distribution.

Another complicating factor is that the free prefixoids may have developed out of more than one source construction – apart from debonding in [Prefixoid-N] and [Prefixoid-ADJ] constructions, clipping of specific [Prefixoid-ADJ] constructions and predicative use of bare nouns may have played a role in the rise of free forms as well. If *kanon* is 'only' a formal change, then which source node(s) has changed?

Summing up, it seems that Traugott & Trousdale's framework with its focus on distinguishing constructionalization from constructional changes is difficult to apply to this particular case study. Rather than concern ourselves with the question of whether or not the emergence of free uses of prefixoids is constructionalization, we feel it is more insightful to look at observable changes at different levels, considering as many factors as possible that can be operationalized quantitatively, including collocational properties and productivity. Debonding of *kei*, *hammer* and *kanon* can therefore be considered an instance of 'constructional change' according to Hilpert's approach, because he (2013: 7) explicitly states that "frequency changes (. . .) are no less indicative of constructional change than are developments in meaning or the phonological and morphosyntactic substance of a construction."

To conclude, for all three case studies, we feel the quantitative differences discussed in Sect. 7 justify the conclusion that the bound and the free forms are different constructions (and hence distinct nodes in the constructicon). Although there is a tendency to write compound words as two words in Dutch, German and Swedish (probably under the influence of English), the free form is not merely an orthographic variant of the bound form. For in that case, we would not expect any distributional differences at all.

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[30]This spelling variant of *jätte* can be explained as due to the tendency in Modern Swedish to write compounds as two words (Teleman et al. 1999: 57).

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SAOB., *Svenska Akademiens Ordbok*: http://www.saob.se/.
SAOL., *Svenska Akademiens Ordlista*: http://www.svenskaakademien.se/svenska-spraket/svenska-akademiens-ordlista-saol.
WNT., *Woordenboek der Nederlandsche Taal* (via *Geïntegreerde Taalbank*): http://gtb.inl.nl/.