Varietal Differences in the Grammaticalization of *Keep V-ing*

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1 Introduction

English commonly employs auxiliary verbs to indicate verbal qualities such as tense, aspect, or modality. Some of these auxiliary verbs developed from lexical sources that have undergone grammaticalization processes. Many of these verbs fall into intermediate categories between prototypical auxiliary verbs and prototypical full lexical verbs (Quirk et al. 1985). One such example is the catenative verb *keep*, which marks for two different aspects: continuative or iterative.

Catenative verb constructions (CVCs) constitute a class of verb constructions with a non-finite internal complement (Huddleston & Pullum 2002). One type of this construction is *keep V-ing*, where the verb *keep* takes a non-finite internal complement in the form of an *-ing* verb.

Keep marks for two different aspects in these constructions: continuative or iterative. Within the literature concerning aspect, there is no readily agreed upon definition for continuative aspect. For the purpose of this paper, the definition of continuative aspect provided by Santos (2017: 23) as expressing "ongoingness of the action" where the "the situation is not only in progress, but it has also been in progress longer than expected" will suffice. Additionally, the definition of iterative aspect provided by Crystal (2003: 257) as referring "to an event which takes place repeatedly" will suffice. The examples in (1a) and (1b) illustrate utterances interpreted as having continuative aspect, while the examples in (1c) and (1d) illustrate iterative aspect.

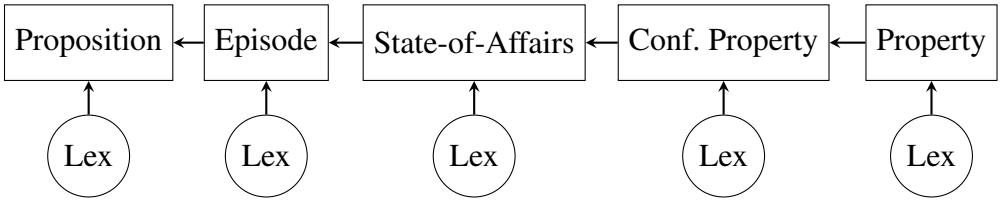
(1) a. She **kept waiting** for him to do something. (BNC)
b. Gerard **keeps moving** down the hallway. (COCA)
c. He **kept asking** where he could send flowers. (BNC)
d. He **kept replaying** the confrontation with Mike in his head. (COCA)

Marking for these aspects occurred in two distinct stages. The first of these stages grammaticalized *keep* from a full lexical item to a continuative aspectual marker, the second from a continuative aspectual marker to an iterative one (Santos 2017). This shift from lexical item to grammatical element fits with the unidirectional definition of grammaticalization from Hopper & Traugott (2003), where lexical items grammaticalize into grammatical markers, but not vice-versa. These grammatical markers are divided into semantic layers, which are defined in terms of scope relations (Hengeveld 2017).[1] Within the framework of Functional Discourse Grammar, an utterance's semantic aspects occur at the Representational Level. The semantic units that comprise this level are divided into layers hierarchically based on the scope of the grammatical elements that operate on the layer (Villerius 2017). Villerius (2017: 114) describes these layers, moving from low to high scope:

> The Configurational Property is a description of the predicate and its arguments in a State-of-Affairs; the State-of-Affairs is a real or hypothesized situation, which can be located in time and space and evaluated in terms of its reality; the Episode is a thematically coherent combination of States-of-Affairs characterized by unity or continuity of time, location and individuals; the Propositional Content is a mental construct about a set of States-of-Affairs, which can be located neither in space nor in time, but only evaluated in terms of its truth.

The unidirectionality originally proposed by Hopper & Traugott (2003) is built on by Hengeveld (2017), which proposes that further grammaticalization occurs moving from low scope to high scope. While the directionality moves from lower scope to higher scope, grammaticalization from lexical item to grammatical marker does not necessarily begin at the lowest scope:[2]

(2)



1 Both Hengeveld (2017) and Villerius (2017) operate from the Functional Discourse Grammar framework.

2 Figure partially recreated from Hengeveld (2017: 26).

Based on this description of grammaticalization, *keep* grammaticalizes as a configurational property, describing the imperfect temporality in a State-of-Affairs. This is the first stage of grammaticalization, where *keep* develops to mark for continuative aspect. Next, *keep* moves to the State-of-Affairs layer (a higher scope) to mark for event quantification. This is the second stage of grammaticalization, where *keep* develops to mark for iterative aspect.

(3)

Keep marks for continuative aspect when when the *V-ing* is characterized by an atelic Aktionsart (activities and states) and iterative aspect when when the *V-ing* is characterized by a telic Aktionsart (accomplishments and achievements) (Santos 2017).

These characterizations of *keep V-ing* prompted us to explore how the constructions are used differently in British English and American English. After annotating preliminary data for aspect and Aktionsart, we found a statistically relevant relationship between variety of English and aspect.[3] This preliminary testing led to the following research question:

> Is there a significant relationship between variety of English (British vs. American) and lexical aspect of *keep*?

In response to this research question, we hypothesized that British English selects more for the iterative *keep V-ing* construction than American English does. In this paper we will present our methods used, results found, and conclusions drawn in proving this hypothesis.

2 Methods

In order to adequately pursue our hypothesis, two extremely large sets of data were needed. We chose the British National Corpus (2007) (BNC) as our source for

3 We ran a χ-squared test on these two variables, which returned a p-value of .01184, indicating a statistically significant relationship.

British usage of *keep V-ing*, and the Corpus of Contemporary American English (Davies 2008) (COCA) to be our American source. We searched the corpora using the Open Corpus Workbench (Evert 2019) (CWB) Corpus Query Processor (CQP). The queries were as follows:

(4) BNC: *[hw="keep"] [pos="V.*"] ([word!="by"] [pos!="N.*"])*
COCA: [lemma="keep"] [pos="v.*"] ([word!="by"] [pos!="n.*"])

'Find an instance of *keep* followed by a verb, which cannot be followed by a phrase which starts with the word *by* followed by a noun.'

These queries returned about 33,000 and 4,000 results for the COCA and the BNC respectively, which were both too large for our purposes as they would be manually annotated. The CQP command `reduce` was used to take random samples of 3,000 from each corpus instead. We ran Wilcoxon paired rank testing on attestation rates for the top hundred *V-ing* to ensure the samples were representative of the larger data sets.[4]

The final samples of 3,000 tokens from each corpus were hand annotated for tense, subject person, *V-ing*, and the interpreted aspect (continuative, iterative, or ambiguous).[5] After all 6,000 tokens were annotated, R (R Core Team 2019) was used along with the `tidyverse` (Wickham 2017) set of packages to run statistics and visualize the data.

3 Results

χ-squared tests were run in R to determine whether or not variety of English, as well as tense, subject person, and the *V-ing*, has a significant effect on the interpreted aspect. Results for variety/corpus (Table 1) indicate a significant relationship (p-value = 1.818×10^{-7}), and combined with the contingency table it can be observed that the BNC used the iterative *keep* construction about seven percent more often than the COCA. If these corpora are representative of their respective varieties, then we have proven our main hypothesis.

4 H_A for paired rank test is that there is a difference between the two samples. We want high p-values to say that there is no significant difference and the sample represents the corpus. BNC: 0.9319 COCA: 0.9892

5 Inter-annotator agreement testing was done using a separate sample of 100 tokens from both corpora. $\kappa_w = 0.682$ ("Substantial Agreement") (Viera & Garrett 2005)

	COCA	BNC
Continuative	997 (33.6%)	788 (27.3%)
Iterative	1,735 (58.4%)	1,888 (65.3%)
Ambiguous	238 (8.0%)	215 (7.4%)
Total	2,970	2,891

Table 1: Aspect by Corpus
$\chi^2 = 31.041$, df = 2, p-value = 1.818×10^{-7}

	Past	Present	Future
Continuative	597 (25.2%)	1,096 (33.3%)	92 (44.4%)
Iterative	1,618 (68.4%)	1,915 (58.3%)	90 (43.2%)
Ambiguous	152 (6.4%)	275 (8.4%)	26 (12.5%)
Total	2,367	3,286	208

Table 2: Aspect by Tense
$\chi^2 = 91.022$, df = 4, p-value < 2.2×10^{-16}

	1st	2nd	3rd	N/A
Continuative	388 (28.8%)	386 (40.9%)	975 (27.8%)	36 (56.2%)
Iterative	858 (636%)	457 (48.5%)	2,286 (65.2%)	22 (34.4%)
Ambiguous	103 (7.6%)	100 (10.6%)	244 (7.0%)	6 (9.4%)
Total	1,349	943	3,505	64

Table 3: Aspect by Subject Person
$\chi^2 = 112.62$, df = 6, p-value < 2.2×10^{-16}

In addition to variety of English, both tense (Table 2) and subject person (Table 3) have a significant effect on the interpreted aspect, as indicated by a p-value of less than 2.2×10^{-16} for both variables.

The final variable annotated for, *V-ing* has a significant relationship with interpreted aspect (p-value < 2.2×10^{-16}); however, due to the extremely high variability of *V-ing*, these results are not particularly telling or useful. Rather than

comparing every *V-ing* to interpreted aspect in a χ^2 test, semantic categorization of the verbs would allow for a more succinct and fruitful analysis of the relationship.

The traditional way of categorizing verbs by their Aktionsart proved unreliable and inaccurate for this paper due to its time and labor burden, compounded by the subjectivity of annotator decision on the Aktionsart of the *V-ing*. As a preliminary substitute, we performed a particle analysis and used association metrics and attestation ranks grouped by aspect to create rank to rank correlation graphs for the *V-ing* (Figure 1).[6]

	True	**False**
Continuative	64 (10.6%)	1,721 (32.7%)
Iterative	512 (84.6%)	3,111 (59.2%)
Ambiguous	29 (4.8%)	424 (8.1%)
Total	605	5,255

Table 4: Aspect by Particle
χ^2 = 151.84, df = 2, p-value = $2.2 < 10^{-16}$

This particle analysis in Table 4 reveals that there is a significant relationship between the presence of a particle verb and aspect (p-value = $2.2 < 10^{-16}$). A particle verb is more likely to occur with the iterative construction (84.6% of total particle attestations) than with the continuative construction. This analysis begins to illuminate some semantic differences between the *V-ing*. The following association metric analysis continues to illustrate differences between the verbs in each construction.

The graphs in Figure 1 compare the top 20 *V-ing* (including ties) for each aspect across each corpus. The lines in each graph have a slope of one and indicate where the verbs should fall if there were no relationship between aspect and *V-ing*. Verbs that fall above the line rank higher in the aspect on the vertical axis than in the aspect on the horizontal axis. Across both sets of graphs, the majority of the verbs

6 Association metric ($\alpha_{C/I}$) for a word in the given aspect (C/I):

$$\alpha_{C/I} = \frac{n_{C/I} - (n_{I/C} + n_A)}{n}$$

fall under the line, indicating that continuative and iterative aspects are strongly associated with different sets of verbs.

While this particle analysis and use of association metrics begin to illuminate the semantic differences between the *V-ing* that occur with each aspect, a more thorough system for semantic categorization is necessary. It is likely that *V-ing* has the most significant effect on which aspect is chosen. Further analysis would allow for better understanding of the effect of semantic categories on aspect.

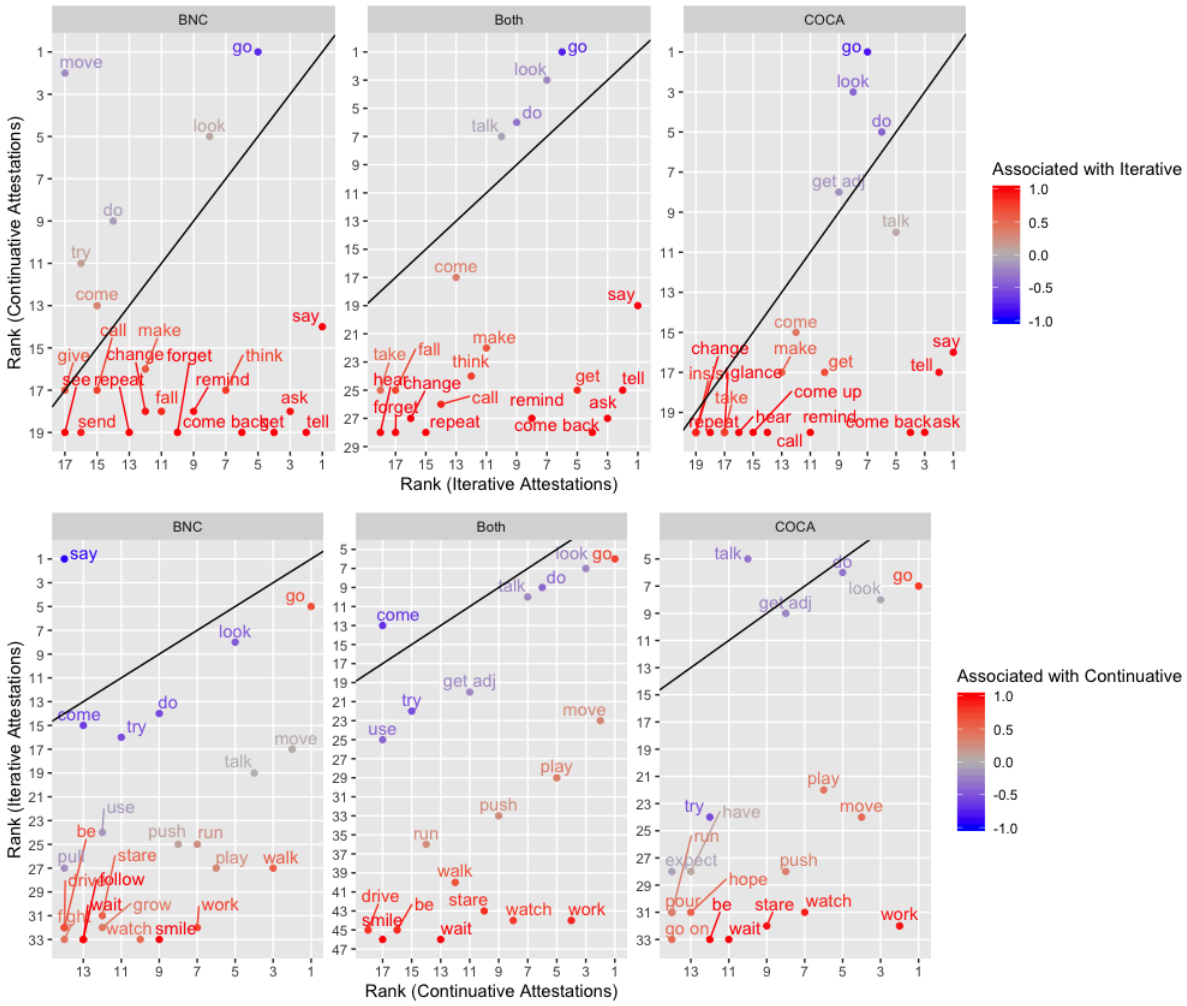


Figure 1: Attestation rank in the given aspect to attestation rank in the opposite aspect correlation graphs, with top 20 for given aspect on the *x*-axis

4 Conclusions

Following analysis of the data, there are three major conclusions that can be drawn. British English selects more for the iterative *keep V-ing* construction than American English does, other grammatical elements play a significant role in selecting for aspect, and the two aspects have unique distributions of the verbs with which they co-occur.

The main hypothesis of this paper is that British English selects more for the iterative *keep V-ing* construction than American English does. Following thorough analysis of the data, this hypothesis was proven to be true, confirming that variety of English does, in fact, play a significant role in determining the aspect of *keep*. One possible explanation for this difference is that the two varieties of English are in different developmental stages of the grammaticalization process. Due to the fact that British English selects more for the iterative construction, which developed later, it is possible that American English is lagging behind British English in terms of the grammaticalization of *keep*. This idea is not previously unheard of. Kortmann & Shneider (2012: 267-272) discusses the effects of language contact, standardization, and the differences between L1 and L2 varieties of English on the development and pervasiveness of their tense and aspect grammaticalization processes. It is possible that these factors can be expanded to describe the differences between the standard British and American varieties; however, further research is necessary to confirm this explanation.

Language contact is a strong force behind grammaticalization. Future research on grammaticalization patterns similar to English *keep V-ing* should be done cross-linguistically to confirm and extend the conclusions drawn in this paper. We performed a brief informal survey of native Welsh speakers as a precursor to this type of cross-linguistic study. They informed us that Welsh traditionally uses *dal i* or *parhau* to indicate continuative aspect, and *dal ati* or an adverb to indicate iterative aspect; however, *cadw*, originally a solely lexical verb, is beginning to mark for both aspects, possibly through language contact with English. A more thorough study of Welsh, compounded with exploration of other languages, would be another step in extending the conclusions drawn in this paper.

In addition to aspect and *V-ing*, the grammatical elements tense and subject person were annotated for. Both of these elements were found to have a significant impact on perceived aspect. It is expected that grammatical elements have an effect on the semantic reading of a an utterance, thus this conclusion is not unexpected.

Further analysis of this relationship can be done, but it is not the focus of this paper. For more information on the effect of grammatical elements on semantic reading, see Bache et al. (2011).

The analysis of particle relationship to aspect yielded a strong relationship between particle verbs and iterative aspect. This analysis, while low-scale, begins to illustrate that there are semantic differences between the *V-ing* in each aspect. These differences are further analyzed through association metrics and the rank to rank correlation graphs developed for each aspect. These rank to rank correlation graphs reveal that the aspects have unique distributions, with little overlap, of the verbs with which they co-occur. Additionally, there is some perceived linearity within these correlation graphs. It is possible that these lines illustrate the environments where the second stage of grammaticalization was innovated. This explanation seems logical as the verbs that make up this linearity are either ambiguous or rank highly for both aspects; however, again, further research and analysis must be carried out to confirm this explanation.

In order to provide consistent and fruitful analysis of the relationship between aspect and *V-ing*, a more concrete and objective system for categorizing verbs is necessary. Aktionsart is the current gold-standard for this type of analysis; however, even this system has its flaws. A possible solution would be to code for fewer features (e.g. +/-telic, +/-punctual) in order to provide clearer, but still effective, categorization.

5 Appendix

R code and data is available on GitHub at https://github.com/myoKun345/l4886_keep/.

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