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Grammaticalization and the linguistic individual: new avenues in lifespan research

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Abstract: This paper reviews theoretical and methodological advances and issues in lifespan research and discusses how the issues at stake are addressed in an ongoing research project. Summarizing the state of the art, we conclude that next to nothing is known about lifespan changes affecting syntactic or grammaticalizing constructions that goes beyond exploratory or anecdotal evidence. The *Mind-Bending Grammars* project, which examines the adaptive powers of adult cognition and constraints on these powers, aspires to make headway in this area. In this paper, we introduce some of the major goals of the project and present a new large-scale longitudinal corpus of 50 adults that was established to study grammatical change across the lifespan. Particular attention is paid to the constraints on the adoption of novel grammatical patterns in the aging mind. Taking *be going to* as a case study, we present evidence that (highly educated) healthy monolingual speakers continue to participate in grammatical innovations across the lifespan.

Keywords: lifespan change; *be going to*; grammaticalization; longitudinal corpus; language and aging.

1 Introduction

While it is widely recognized that language users continue to expand their vocabulary well into adulthood (e.g. Brysbaert et al. 2016), the issue of grammatical change in adults is still largely unsettled, with views ranging from grammatical change being possible only in first language acquisition (e.g. Lightfoot 1999) to change being almost exclusively the business of adult interaction (e.g. Croft 2000). These seemingly conflicting views can be reconciled if we acknowledge that an individual's mental grammar is both systematic and adaptive in nature (cf. Beckner et al. 2009), and thus conceive of a person's mental grammar as a structured system that interacts with language use at the aggregate level of the community. Against this background, we take initial steps to clarify how much grammatical innovation is possible in adult life. Unlike most grammaticalization research, which typically takes an aggregate view on language change and tends to concentrate on generational changes rather than lifespan changes, we aim to establish whether robust communal patterns of change can also be traced down to the micro-level of the individual mind and, consequently, what this tells us about the possibility of linguistic change past adolescence.

After a brief overview of the main theoretical and methodological advances and issues in research on lifespan change (Section 2), we discuss how the issues at stake are addressed in a collaborative research project (Section 3). In particular, Section 3 outlines the project's objectives and introduces the EMMA corpus, a large-scale longitudinal corpus of 50 adults that was established to study grammatical change in individuals (Petré et al. *forthc*.). Zooming in on the case of *be going to*, we exemplify how the combination of grammaticalization research and the lifespan perspective can lead to interesting insights into the adaptive powers of adult cognition and their constraints.

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2 Socio-cognitive underpinnings of learning and lifespan change

The impact of early experience on behavior and achievement later in life is well documented. Childhood trauma, for instance, is associated with a higher risk of depression in adulthood (Heim et al. 2008), and early exposure to alcohol with increased odds of lifetime dependence (Grant and Dawson 1997). Positive impact, while generally less researched than negative impact, is also attested. For example, early musical training has been shown to foster brain development, and has long-term positive effects on verbal abilities and reasoning skills (Miendlarzewska and Trost 2014). Similarly, bilingualism is associated with enhanced executive function in children, specifically attention and working memory, and has been shown to postpone age-related losses in this domain (Bialystok et al. 2004). Such lasting effects have traditionally been related to the notion of *critical periods*, which posits that learning in various domains is contingent on sharply defined developmental windows of neural plasticity.

Variants of the critical period hypothesis have been proposed for language learning (e.g. Penfield and Roberts 1959; Lenneberg 1967). These were highly influential and sat well with the dominant linguistic enterprise in the second half of the twentieth century. Assuming that a person's grammar is largely fixed by early adulthood (Chomsky 1995), generativists view children's acquisition processes as the primary locus of diachronic change (e.g. Lightfoot 1979, Lightfoot 1999; Clark and Roberts 1993; Henry 1997). While these approaches rely on the idea that children's reanalysis of ambiguous input propels linguistic change, sociolinguistic studies have underscored the social embedding of variation and change, thereby, among other things, extending the scope to various age groups which may exhibit differential accommodation of innovative variants (e.g. Tagliamonte and D'Arcy 2007). Like the generative enterprise, however, early methodological advances in the field of sociolinguistics, in particular apparent-time studies, postulate the validity of the critical period for language acquisition. That is, only if speakers' linguistic repertoires remain stable after adolescence can age-stratified variation be assumed to reflect diachronic linguistic developments.

Research into cognitive development, including language acquisition, finds its parallel in research strands focusing on aging. In line with the western cultural understanding of aging as cognitive decline, mirroring childhood and adolescent growth in cognitive abilities in reverse, various studies have linked healthily aging with lower cognitive performance (Emery 1986; O'Sullivan et al. 2001; Burke 2006; Deary et al. 2009; Singh-Manoux et al. 2012; Lindenberger 2014), sometimes arguing that some aspects of age-related cognitive decline set in after adolescence only to continue progressively in time (e.g. Salthouse 2009). Changing linguistic abilities have also attracted scrutiny in the context of pathological aging, with neurodegenerative disorders like Alzheimer's and Parkinson's disease causing various forms of language impairment (Illes 1989; Szatloczki et al. 2015; Fraser et al. 2016).

The focus on cognitive development in one strand of research, and on aging in the other, strengthens the idea of discontinuity and clear-cut developmental stages. It also means we know comparatively little about linguistic capacity in the middle age range (Eckert 1997: 165). However, with more and more researchers advocating a more dynamic and comprehensive view of cognition than the rise-and-fall pattern traditionally purported, this may start to change. While no-one denies the greater plasticity of younger brains and the vast changes neural and cognitive systems undergo during childhood, many now prefer to refer to those periods in which brain structure and function is unusually susceptible to experience as *sensitive* rather than *critical* periods, which "underscore the potential for learning and brain plasticity to continue throughout the lifespan" (White et al. 2013: 1).[1] An early example of lifespans viewed dynamically is Baltes (1987), who argues that development is a lifelong process and that any developmental change, regardless of when in life it takes place, is paired with gains and losses. Also, different processes dominate at different stages in life. White and colleagues (2013), for instance, show how drastic changes witnessed in sensitive periods are driven

1 Reviewing recent event-related brain potential (ERP) studies in second-language morphosyntax, Steinhauer (2014) finds that neurocognitive processing mechanisms in L2 learners are not immediately, but increasingly native-like. Steinhauer (2014: 393) furthermore argues that "age-of-acquisition effects in SLA are not primarily driven by maturational constraints" as it is often impossible to differentiate between ERPs of native speakers and those of late, but highly proficient L2 learners.

primarily by bottom-up processes, while afterwards environmental input is increasingly modulated by top-down processes. In bottom-up or statistical learning, a system that is initially "underspecified" or "broadly tuned" to environmental input is gradually replaced by more refined neural representations that react more selectively to input based on experience (cf. the Hebbian principle "neurons that fire together, wire together"). Once representations are in place, top-down processes, such as attention, gain importance in the regulation of bottom-up signals to exploit the "residual capacity for adult cortical reorganization" (White et al. 2013: 3). Both bottom-up and top-down processes interact throughout the lifetime, but their relative predominance varies as a function of age.

Differentiation is needed also with regard to the type of ability or task involved, how performance scores on those tasks were measured, and what they actually tell us about the possibility of lifelong learning. With regard to language learning, Craik and Bialystok (2006: 131) point out that aging affects access to information rather than knowledge (i.e. linguistic representations) itself. Experimental studies that only measure access to representations therefore present a distorted picture. A related issue that has often been disregarded in experimental design is "the statistical skew of human experience, or the way knowledge increases with experience" (Ramscar et al. 2014: 7). Ramscar and colleagues illustrate this methodological issue with the task of recalling birthdays, which becomes more complex with every exposure to a new birthday. A person who recalls 600 birthdays with 95% accuracy, they note, can hardly be argued to have a worse memory than someone who recalls merely 6 correctly 99% of the time. Similarly, adults' lower performance on Paired-Associate-Learning tests "reflect the 'cost' of learning" rather than prove age-related declines in information-processing (Ramscar et al. 2017: 1171). Failure to factor in learning thus perpetuates the "myth of cognitive decline" (Ramscar et al. 2014).

Harada and colleagues (2013) mention another common methodological issue with studies of brain aging that is related to societal and intergenerational changes. Most studies, for obvious reasons, are not truly longitudinal but employ a cross-sectional design that draws on subjects from different ages as a proxy to age-related brain change. Such studies, Harada and colleagues argue, may be confounded in that it is not just age, but also cohort differences (e.g. as a result of different life experiences and skills acquired by, for instance, subjects born in the 1920s and 1980s) that explain performance. The effects of aging may thus be overrated. In fact, when reanalyzing a series of longitudinal and cross-sectional studies, Williams and Klug (1996: 219) found "cohort differences [to be] at least as strong as age differences".

A final point to be mentioned is how maturation and aging of the brain does not uniformly and simultaneously affect all cortical areas. Certain regions that typically support language functions (more specifically, posterior temporal lobes in the left hemisphere) are shown to mature later than any other area, which provides neurological evidence for the possibility of lifespan development of particular language skills (Sowell et al. 2003: 309, 314; cf. also Shafto and Tyler 2014).

Are these findings corroborated by linguistic studies? Language development across the lifespan is a relatively recent research paradigm in linguistics (cf. de Bot and Schrauf 2009; Gerstenberg and Voeste 2015a, Gerstenberg and Voeste 2015b). Linguistic flexibility with regard to lexis has not really been a matter of debate as it is widely assumed that lexical knowledge is accumulated over time, and that particular words may be adopted or fall out of use during the lives of individuals. Concerning phonology and morphosyntax, which are traditionally assumed to be more or less fixed by adulthood, a growing body of studies indicates that there is more variability across the adult lifespan than previously presumed (e.g. Yaeger-Dror 1989; Nahkola and Saanilahti 2004; Bergs 2005; Raumolin-Brunberg 2005, Raumolin-Brunberg 2009; Sankoff and Blondeau 2007; Raumolin-Brunberg and Nurmi 2011; Bowie 2015; Bowie and Yaeger-Dror 2015; Buchstaller 2015, Buchstaller 2016; MacKenzie 2017; Petré and Van de Velde 2018). However, most studies conducted to date concentrate on phonological change or are fairly small in size. Resources and/or circumstances often do not allow for the collection of panel data for more than two points in time, making it hard to trace developments over time. Longitudinal corpus studies of individuals, which track the dynamics of language over larger spans of time, have recently been successfully applied to map the effects of neurodegenerative disorders and detect their onset, but not usually beyond the lexical domain (Garrard et al. 2005; van Velzen and Garrard 2008; Le et al. 2011; van Velzen et al. 2014; Lancashire 2015). Moreover, they are generally focused on language pathology, with less interest for normal longitudinal cognitive developments.

The *Mind-Bending Grammars* project (Petré 2015–) aspires to make headway in this area. In what follows, we introduce the project's objectives and elaborate on the methods used to examine the extent to which healthily aging adults can adapt to ongoing change. We demonstrate the project's potential by means of the case of *be going to*, investigating whether and to what extent the adoption of innovative features is constrained by age.

3 *Mind-Bending Grammars*: a corpus-linguistic approach to lifespan change

The *Mind-Bending Grammars* project wants to settle how much innovation and change is possible across the lifespan in the domain of syntax. Major goals include (i) to fundamentally advance the debate on how intragenerational change differs from intergenerational change; (ii) to determine to what extent syntactic changes co-evolve; (iii) how social and cognitive factors interact.

In order to examine these issues, the EMMA corpus (*Early Modern Multiloquent Authors*) was established (cf. Petré et al. *forthc.*). EMMA is a sample of 50 of the most prolific English writers born in the seventeenth century, mostly taken from the London-based intellectual elite. The corpus is designed specifically for the quantitative study of syntactic change across the lifespan from various perspectives, including cognitive dynamics of linguistic knowledge, historical sociolinguistics and intragenerational versus intergenerational change. While compiled for syntactic research, the corpus lends itself well to all kinds of linguistic research that benefits from the individual perspective.

The body of EMMA texts was mainly collected from the EEBO (2003–2018) and ECCO (2018) databases, following an extensive author selection process that draws on a number of criteria at both the individual and community level. At the individual level, we looked for authors that met the following conditions: (i) a large body of work comprising at least 500,000 words; (ii) a long career with a relatively even distribution of works; (iii) a demonstrable link to London society; (iv) further social, political, and stylistic connections to other individuals in the selection. In practice, we strove for an optimal balance between these criteria since not many authors were a perfect match. At the aggregate level, the authors were divided into five generations. To ensure comparability across generations, we aimed at an analogous distribution of the different main genres (including religious writings, science, drama and fiction) within each generation.

Contextual enrichment is provided at the level of individual authors and at the level of individual texts. Author-specific metadata were collected in a database, tracing, among other things, the authors' mobility and their connections with the other authors in the selection. Text-specific metadata were partly retrieved from the EEBO and ECCO databases, and partly added by ourselves. Importantly, EMMA takes individual texts rather than the printed volume as the basic corpus units. This approach allowed us to assign specific metadata to parts of a volume that would otherwise be lumped together (e.g. dating of individual texts and genre classification) and exclude parts of a volume that were not written by the author at hand.

So far the project has shed light on several aspects relating to syntactic change across the lifespan. Anthonissen (*forthc.*) has shown that when a construction has two different but equally grammatical uses, their relative weight may shift significantly across the lifespan, when adults participate in what is presumably a communal shift. Other studies have illustrated how community-level syntactic change is impacted by shared motivations for grammaticalization (Petré 2017) and have introduced empirical methods to quantify the qualitative shifts that are characteristic of first grammaticalization (Petré and Van de Velde 2018). Taking up the case of *be going to*, Petré and Van de Velde (2018) also traced the extent to which features signaling a higher degree of grammaticalization increased in frequency across the lifespan. While it could not be established that either stability or change is the norm, some individuals at least exhibited a significant increase of grammaticalized behavior across the lifespan.

In the remainder of this paper we would like to zoom in on a related aspect of aging and syntactic change: to what extent can age be argued to constrain the adoption of innovative features in grammaticalizing constructions? The type of change at issue, that is, the process by which lexical material acquires grammatical functions (Hopper and Traugott 2003), is traditionally the domain of grammaticalization research. A crucial

notion within this theory is that of reanalysis, which refers to the phenomenon whereby a language user parses an utterance differently from how it was intended, with a more grammatical function as a result. While the reinterpretation of structure has traditionally been associated with first language acquisition, the degree to which novel features that potentially signal reanalysis may be adopted past adolescence is as yet an open empirical question, a robust answer to which may have profound theoretical implications.

The case we will investigate is that of *be going to* (which includes non-progressive *go*, as the progressive form was not yet fixed; cf. Petré 2016). Up to the end of the sixteenth century, *be going to* was essentially a compositional combination of the progressive construction, signaling an ongoing activity, the verb *go*, and an optional adjunct of purpose, as in (1).

(1) *I am goyng to the Pope, to praie him to place me in mariage.* (1566)

Early in the seventeenth century, however, a grammatical construction starts to develop out of this source string (for details, cf. Danchev and Kytö 1994; Traugott 2012, Traugott 2015; Traugott and Trousdale 2013; Petré 2016, Petré *forthc.*), which at some point also involves the reanalysis of *be going* as an auxiliary and the *to* INF as its complement. From a semantic point of view, it has been argued that the new analysis is already in place when motion is lost from the construction (cf. Petré *forthc.*). An early instance of this extended use is (2).

(2) *But when I am going to speake, my tongue doth quiver.* (1630)

While there is no difference in surface form with the lexical use, the loss of motion implies that the purposive *to* INF is no longer optional, since omitting it would now result in an incomplete sentence (**when I am going, my tongue doth quiver*). In addition, a spatial goal can no longer be inserted. As such this shift may be taken to signal a structural change. On a purely formal basis, the reanalysis becomes apparent with the appearance of instances like (3), known as "raising".

(3) *..., when there was going to be God manifest in the Flesh.* (1694)

Going here no longer has a subject of its own, and its transformation into an auxiliary is complete.

The chronology suggests two things. First, some kind of reanalysis has already taken place early in the seventeenth century. This is corroborated by the contemporary metalinguistic evidence, which indicates that the conventionalization of the new construction dates from around 1630–1640 (Petré and Van de Velde 2018: 877). Second, the late appearance of raising suggests that the shift towards a full-fledged auxiliary is gradual. These constraints are in line with existing claims that syntactic change is minimally disruptive, and ties with lexical uses are gradually loosened (De Smet 2012). As argued in Petré and Van de Velde (2018), early grammaticalizers may also be constrained in their use by what is endorsed by other language users in their social network. If the lexical use is the only one that is strongly entrenched in the majority of these users, they will be less inclined to pick up innovative uses, and potential innovators will be discouraged to realize their potential.

In line with these findings, we assume that the restrictions on adoption by speakers are a combination of cognitive and social factors. Cognitively, higher entrenchment of existing schemas correlates with lower degree of flexibility, and change requires more effort (possibly via the top-down processes mentioned in Section 2). Socially, people accommodate to their peers. Together, these factors result in a time lag between the first signs of reanalysis and the realization of its full potential.

What we will focus on here is the distribution of innovative feature adoption over age, and what this distribution tells us about change and reanalysis. On the basis of the previous literature, we identified three central innovative features that reflect the incremental realization of the new construction's potential.

(i) The extension from a subject in motion, and in control, to a subject that is no longer in motion, but still in control of their action, as in (2). This type of subject is typically human.
(ii) The introduction of inanimate subjects, as in (4).

(4) *Lo, I am even at the point of death, my grave is going to be made, and what good will the world do me?* (1654)

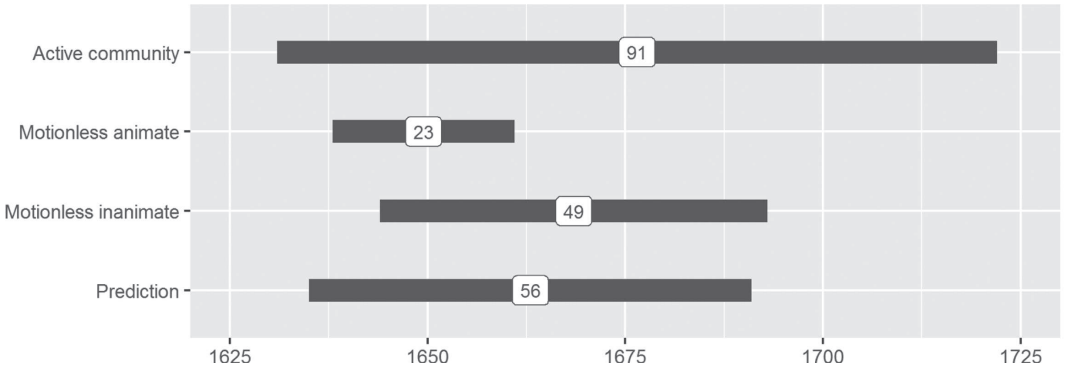

Figure 1: Innovative features across time.

(iii) The introduction of an epistemic layer of prediction, as in (5). In the pre-grammaticalized use, while the *to* INF expresses a future activity, *be going*, as a main verb, does not have any epistemic function. The predictive semantics only appears once the *to* INF and *be going* have become holistically associated (cf. Budts and Petré 2016).

(5) *I see very well by your Looks, what 'tis you are going to say*. (1688)

To examine features in individuals, we collected data from a community of 43 informants, born between 1599 and 1663. Thirty-six informants were drawn from EMMA, seven from the corpus of Petré and Van de Velde (2018). The total corpus size is 89.7 million words. The estimated aggregate number of relevant instances is 7,301, with the median being 106. Of these, 5,767 instances have been analyzed in detail. The remainder appeared later in late individuals and are irrelevant for our current purpose.

At the aggregate level, each of the three extensions is considered "novel" as long as (i) at least one member of the community has already used it and (ii) not more than half of the members that are still active[2] in the community have already used it. Authors born less than 40 years before the end of the innovation window are not considered, because it is likely that they have acquired the feature in childhood. Also, the number of active community members for a given year has to be at least 5, which holds for the period 1631–1722 (median = 15, maximum = 31). Figure 1 visualizes the various periods of time in which each of the extensions is considered innovative according to these criteria.

Figures 2–4 show the extent to which these innovative features are first attested at different ages. The x-axis represents progressing age, divided into four ranges. The size of the active community is indicated below each age range. Adopters are divided into those who adopt within that range ("new adopters") and those who already adopted at a younger age ("previous adopters"). When a member reaches the age of 40 during the innovation window, but first uses a feature after it has ceased to qualify as innovative, this adoption is still included in the data. Due to a lack of data from childhood, the below 40 age range does not distinguish between first language acquisition and later acquisition: all innovators are considered "new adopters".

Overall the number of new adopters in each age range is low and therefore the percentages in these figures are far from robust. This is inevitable, as this kind of research is extremely data-intensive, so that only a few informants meet the criteria for inclusion – and even those probably show some accidental gaps. Still, the graphs arguably show an interesting pattern. Most people either acquired motionless and predictive uses in childhood or before the age of 40. Adoption at later ages is rare,[3] but not unattested. Late appearance of

2 Active means the period from debut to final work. Fluctuations in community sizes in Figures 2–4 are due to deaths or retirement.

3 Note that the first age range does not yet contain previous adopters. Direct comparison with other age ranges therefore requires calculating the ratio new adopters/non-adopters (excluding previous adopters). However, doing so does not really change the general picture. Also note that even our earliest-born authors (*b.* 1599) were probably exposed to the innovative uses before they reached the age of 40. The graphs therefore do not tell us much about how easily people still adopt that had already passed the age of 40 when the innovations first became noticeable in their environment.

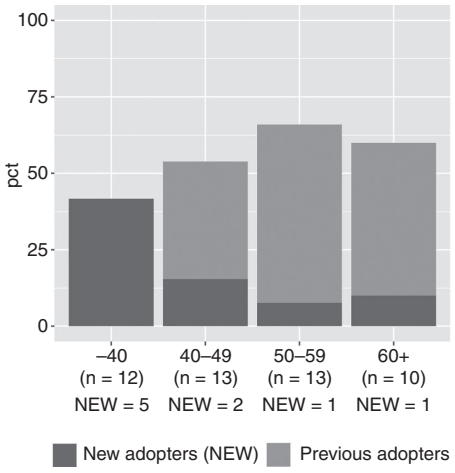

Figure 2: Age of first use of motionless *be going to* with animate subject.

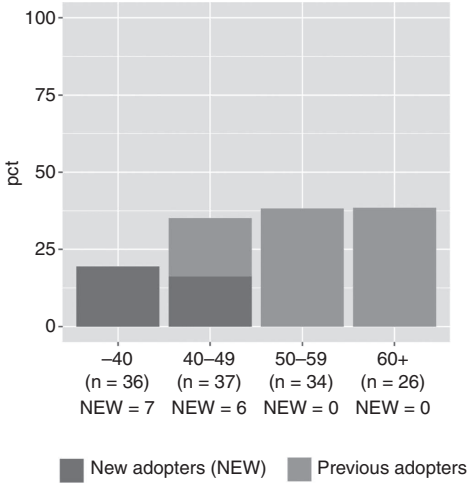

Figure 3: Age of first use of motionless *be going to* with inanimate subject.

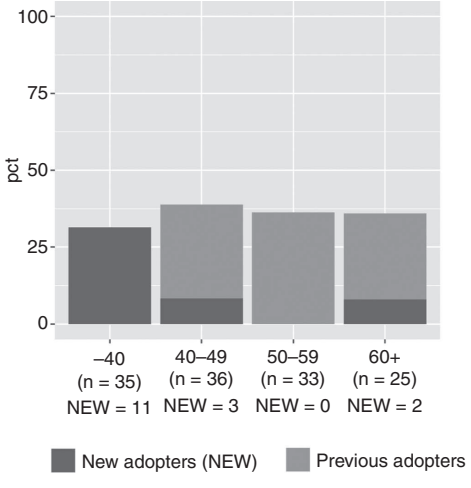

Figure 4: Age of first use of predictive *be going to*.

motionless use with animate subjects is found in Roger L'Estrange (age 51) and Peter Heylyn (age 61), who was born 1599 and is our earliest-born author. First predictions appear at the latest ages of 48 (Increase Mather), 60 (Robert Boyle), and 63 (Roger L'Estrange). By contrast, the latest age at which a motionless instance with

inanimate subject is first attested is 43 (Richard Baxter), and the adoption rate below 40 is also much lower than with prediction or animate motionless uses. Taken at face value, it appears that people were more reluctant to adopt this usage. Admittedly, the difference may result from the far lower frequency of inanimate motionless (59 instances) as compared to animate motionless uses (618 instances), and to a lesser extent, predictions (111 instances). The lower the frequency, the likelier it is that there are accidental gaps. Even if there are only a few accidental gaps, lower frequency means less exposure, and less opportunity to adopt. While such considerations may explain the overall lower adoption rates, the observation that no first attestations are found beyond the age of 43 is at least compatible with the hypothesis that it is harder to adopt motionless inanimates at an older age.

Conversely, some evidence can be adduced in favor of the hypothesis that the late first attestations of animate motionless uses and predictions are not due to gaps in the data. Peter Heylyn's use is well attested (92 observations) before his late non-motion attestation at the age of 61. Roger L'Estrange has a first instance of motionless *be going to* in his work at the age of 51, and a first prediction when 63. Until the age of 50 he only uses *be going to* with a frequency of 6 per million words (raw freq. = 2). After 50 this number soars to over 50 (raw freq. = 238), including eight motionless instances and three predictions. This timing tentatively suggests that he changed his use of *be going to* after his fiftieth birthday. Besides L'Estrange, Increase Mather and Robert Boyle are also late with their first predictive uses. Mather's case is promising, though not statistically significant (one-tailed Fisher exact comparing pre- to post-prediction yields $p = 0.14$): from the age of 48 one in 19 instances of *be going to* is a prediction, whereas they are absent among over 50 instances in earlier work. R. Boyle's case seems weak, as he only has a single predictive use. The only study that also observes morphosyntactic innovation in language users past the age of 40, Bergs (2005: 258–259), plausibly relates late behavioral turns to social network changes. This social dimension, however, is beyond our current scope.

Why would late first attestations be more likely with animate motionless uses and predictions? We would like to argue that the evidence naturally relates to the theoretical claim that grammatical change is gradual and proceeds in a non-disruptive manner (Traugott and Trousdale 2010; De Smet 2016), with backward pull-effects from associations with the still existing lexical uses (cf. the connectionist ideas in Petré *forthc.*). Motionless uses with animate subjects are a less disruptive innovation, as these subjects, being animate, are still in control of their actions, a semantic feature they share with the lexical source material. Also at a purely collocational level, most of the subjects that appear in the motionless uses are formally identical to those occurring in the lexical material. Similarly, the shift from describing or reporting on someone else's actions (as in *he is going to leave* – he just told me) to predictions (*he is going to leave* – I can see as he is taking his coat), is also not very disruptive, especially if one considers that at this stage predictions were limited to the imminent future. The extension to inanimate subjects, however, is arguably a cognitively much more challenging one, as it constitutes a more radical break with the lexical material. Possibly, for people beyond the age of 43 or thereabouts, the uses with animate, intentional subjects, were entrenched to such an extent that they in some way (because of comprehensibility or acceptability issues?) blocked this pathway of innovation.

A second question is to what extent late attestations are signs of late reanalysis or merely superficial pattern borrowing from younger peers. While borrowing cannot entirely be excluded, there are indications of cognitive interaction between entrenched and novel usage in EMMA's generation 1 (born before 1620). Recall that the metalinguistic evidence suggested that the conventionalization of motionless *be going to* started around 1630. Four out of five individuals born between 1599 and 1607, despite fairly robust attestation of *be going to*, do not adopt any of the novel features at all. Adoption at a later age is possibly prevented in them through a combination of entrenched lexical use, no or hardly any exposure to the novel features in childhood, and less exposure up to well into adulthood. Among the six adopting informants born up to 1616, we also find the five latest adopters (ages 36, 42, 45, 51 and 61) of motionless *be going to*. Whereas the three informants included in this innovation window who were born after 1616 have the innovative use right from their debut, these five latest adopters on average only adopt 19 years after their debut, suggesting that they are not borrowing on the fly without cognitive resistance. Moreover, all seven informants from generation 1 that adopt animate motionless uses do so first with *go* outside the progressive construction, as in (6).

(6) *If they would go to consider of their sin and misery …their worldly matters step in and turn away their thoughts.* (Baxter 1657)

Out of a total of 38 motionless instances in generation 1, 29 (76%) are not in the progressive. By contrast, generation 2 only rarely has motionless instances outside the progressive (10 out of 242 instances, or a mere 4%). The difference is in line with a more general increase of the progressive in the seventeenth century (Petré 2016), suggesting that generation 1 adapted the novel features to their overall more conservative grammar.

4 Conclusion

This paper introduced some of the major goals and methods of the ongoing *Mind-Bending Grammars* project (Petré 2015–), which examines the adaptive powers of adults and constraints on these powers. Particular attention was paid to the constraints on the adoption of novel grammatical patterns in the aging mind. Taking *be going to* as a case study, we have presented evidence that (highly educated) healthy monolingual speakers continue to participate in grammatical innovations across the lifespan. We selected three features (loss of motion, introduction of inanimate subjects, emergence of prediction) that were key in this grammaticalization process, and identified the window of opportunity during which these features were novel. For all three features, language users adopt less with increasing age. Still, for the first two, adopters are occasionally found past the age of 60. By contrast, the oldest attested age at which someone adopted the use of inanimate subjects is at 43 much younger. A tentative explanation is that high entrenchment of source constructions prevents adoption of more disruptive extensions such as the one to inanimate non-motion instances at more advanced ages. Overall, the data indicate that adults may adopt innovations in grammaticalizing constructions across the lifespan. Older adults may also adapt novel features to make them fit into their overall grammatical system, suggesting that they actually reanalyze rather than superficially borrow novel patterns without integrating them further.

Future prospects of the project include enhancement of the robustness of the results, further identification of the constraints on adults' adaptive powers, as well as advancing our knowledge of the interplay between a tendency towards internal cognitive systematicity (as possibly evidenced in the clustering of various related innovations in individual language users) and the role of social networks.

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