

Towards an Empirically-based Model of Age-graded Behaviour: Trac(ing) linguistic malleability across the entire adult life-span

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1 Age-grading and Panel Research

Mainstream sociolinguistic theory defines age-grading as “linguistic change at the individual level” (Wagner 2012a:371, see also Labov 2001:76-77, Sankoff and Blondeau 2007:562). The sociological concept of the linguistic marketplace (Bourdieu and Boltanski 1975) has provided the key motivating factor for modelling age-graded behavior. As people move into adulthood, some speakers – especially those in occupations that are sensitive to normative expectations of linguistic “standardness” – are hypothesized to respond to these pressures by adopting prescribed variants. Downes’ model of age-grading (1998) postulates a curvilinear pattern of language use across the adult life-span: a non-standard peak in adolescence is followed by incremental retrenchment, resulting in a middle-age trough, and finally, a “tail” in older age as normative expectations abate (see also Buchstaller 2006, Chambers 2008). This U-shaped pattern at the individual level is theorized to repeat generation after generation, resulting in stable variability at the community level.

But while age-graded variability has been assessed largely on the basis of apparent time and trend data, panel data – repeated recordings from the same speakers as they age – represents the best way to explore age-specific patterns across the life-span of the individual (Wagner 2012a). To date, panel research has provided support for some of the basic postulates that underpin age-grading, including increasingly standard choices at the cusp of language-sensitive life-stages (Van Hofwegen and Wolfram 2010, 2017, Wagner 2012b). However, the lion’s share of panel data covers only parts of the entire adult life-span, such as from adolescence to post-adolescence (Wagner 2012b) or from middle age to retirement (Beaman 2021). Other studies rely on recordings that were conducted many years apart (Mechler and Buchstaller 2019), leaving them unable to pinpoint when in a speaker’s life history certain changes in linguistic habits have occurred.¹ What sociolinguistics lacks are dynamic panel corpora that trace adult behaviour with respect to age-graded variables across the life-span as a whole. In this paper, we report on a novel dynamic panel corpus that allows us to model the trajectory of age-graded variables across the main life-stages that characterise the adult life-span. We explore the variable realisation of (ing) across a combined panel corpus comprising a total of 12 speakers ranging between ages 19 and 78 who were recorded at two or three points in their lives.

2 Previous Work on (ing)

The nasal alternation – the realisation of the suffix *-ing* as velar or alveolar – is a sociolinguistic marker that varies in Englishes worldwide on the basis of class, occupation, socio-economic factors, and gender (Trudgill 1974, Labov 2001, Hazen 2006). (ing) is also contingent on a range of intralinguistic factors, such as priming effects, phonological context, and grammatical category (Schleef et al. 2011, Mechler and Buchstaller 2019, Tamminga 2019).

Apparent time research has highlighted “long-term community stability” (Wagner 2012a:183) of (ing) in a number of locales, suggesting that age-related patterns should be interpreted as an indication of age-grading rather than a change in progress (but see Forrest and Wolfram 2019 who provide evidence for change in (ing) over time in speakers of African American Language (AAL)). Two panel studies explore changes in variable use of (ing) within the individual speaker at specific educational junctures. Van Hofwegen and Wolfram (2010, 2017) illustrate early sociolectal adjustment, whereby pupils move away from vernacular features at the onset of primary schooling but increase vernacular choices as they move towards adolescence. Wagner (2012b) explores the consequence of educational choices at the cusp between secondary and tertiary education. She finds that the patterning of (ing) is indicative of students’ aspirations; individuals who matriculate at ivy league universities adopt more standard linguistic behavior in high school than those who go to other universities.

¹ Other panel studies rely on singular speakers (Rickford and Price 2013, MacKenzie 2017, Brook et al. 2018 *inter alia*), making generalisations tenuous.

While these panel studies provide crucial information about age-related patterns in linguistic choices at key life-stages, they are only snapshots of our linguistic trajectory as a whole. The desideratum remains. We need panel data-sets that allow us to model speaker behaviour with respect to age-graded variables across the entire life-span. Also, since panel research has shown that cohort patterns tend to hide complex life-span trajectories (Mechler and Buchstaller 2019, Beaman 2021, Sundgren et al. 2021), we need to consider populations that differ according to their positionality vis-a-vis superimposed norms.

3 Data and Methodology

Following Sankoff and Blondeau’s (2007) contention that a triangulation of data-sets is the best way to understand the relationship between the individual and the community, the present paper draws on a combination of trend and panel data from Tyneside, an urban conurbation in the North East of England. The trend sample relies on the 1990s Phonological Variation and Change project collected in 1994 (Milroy et al. 1999) and the Diachronic Electronic Corpus of Tyneside English corpus collected in the early 2000s (Mearns et al. 2016). Sixteen speakers were selected from each time-slice, equally stratified by age, gender, and socio-economic status, which allowed us to explore the extent to which (ing) has been stable across the community.

The panel sample consists of two separate data-sets (12 speakers in total) which, together, cover the entire adult life-span. The “young panel” consists of six speakers, first recorded between 2007-2009 during their B.A. studies at Newcastle University, and again between 2013-2014 as they started to enter the workforce. One speaker pair (Charlotte and Lynn) was re-recorded a third time in 2020, when they were establishing themselves as young professionals. The “old panel” comprises a set of six speakers first recorded in 1971 in their 20s and 30s and again between 2013-2014 when they were on the cusp of retirement. Three of these speakers were recorded a third time between 2019-2020 post-retirement. As Figure 1 illustrates, these two panel data-sets in combination allow us to model linguistic malleability between the ages of 19 and 78. This enables us to answer our overarching research question: Is there evidence in this panel data supporting the U-shaped curve posited in sociolinguistic theorising?

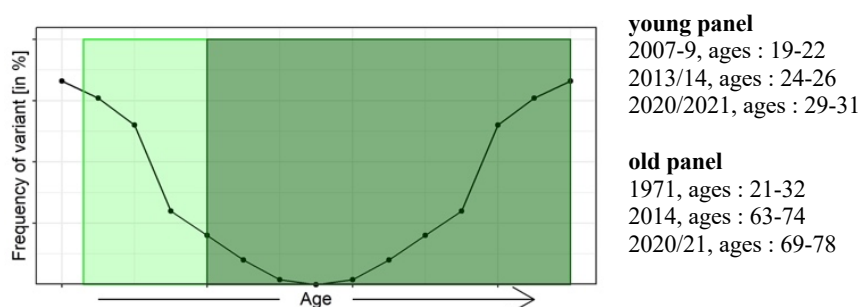


Figure 1: Classic age graded pattern (adapted from Buchstaller 2006) with shaded areas showing the ages covered by our data.

All candidate tokens were identified automatically in LaBB-CAT (Fromont and Hay 2012). Tokens that did not fit the variable context (e.g., *intermingle*, *ginger*) were excluded. All tokens were coded auditorily ($n=9,566$). Panel tokens ($n=5,650$) were double-coded by the first and third author, resulting in an inter-coder reliability rate of 89%. Mismatches were checked by the second author and discussed with the whole team. When no agreement could be reached, the token was excluded. Tokens in unclear speech, citation forms, and forms that were not syntactically incorporated were also excluded. This process yielded a total of 3,500 tokens in the trend sample, and 4,068 across the old and young panel samples.

The literature reports that (ing) shows relatively stable correlation with several social factors, which we also consider here: speakers’ socioeconomic class at each available time-point, binary gender following speakers’ self-identification, age, and time-point.

We undertake separate analyses for the panel and trend data-sets. The panel data includes as linguistic factors: preceding and following phonological context (coded based on automatically extracted values from LaBB-CAT as labial, coronal, dorsal, a combined vowel/glottal category, and for following, an additional pre-pausal context determined on the basis of the transcriptions); number of syllables (Schleef and Flynn 2015); speech rate

(syllables/min); grammatical category (coded as verb-participle, gerund-participle, simple noun, proper noun, gerundial noun and other following Mechler and Buchstaller 2019); *-thing* prominals were further coded in terms of grammatical status based on whether they served as general extenders. The trend data was coded following similar guidelines, but grammatical category was collapsed into a three-way distinction; adjectives, simple nouns, proper nouns, and gerundial nouns were coded as a single category, verb- and gerund participles were coded together as verbs, and *-thing* pronominals were coded separately. The data were probed in R (R Core Team 2020) with chi-squared analysis and classification trees using *rpart* (Therneau and Atkinson 2019), a method for structural mapping of binary decisions.

4 Results

4.1 Trend Data

We first turn to the trend sample to test whether (ing) has remained stable over time in Tyneside. Figure 2 plots the relative proportion of (ing) realization by sex, socio-economic status, time point and relative age in the trend data-set. We observe four take-aways from this plot. First, the alveolar form is the dominant variant in Tyneside, accounting for 74.4% of all tokens (80.5% in 1994 and 66.7% in the 2000s). Second, [ɪŋk] realizations are a minority variant (n=51; 1.5% of overall data), nearly all of which are found in *-thing* pronominals.² Given the rarity of this variant, we do not consider it in the statistical analysis, but include it in figures to characterize the full extent of the variable. Third, we find evidence that (ing) is age-graded in Tyneside: in both corpora younger speakers show higher average rates of the alveolar variant than older speakers. In these respects, the community is “stable” over time. The fourth and most striking observation from this plot is the interaction between age and socioeconomic class. In 1994, older middle-class speakers produce the velar variant approximately 35% of the time. In the 2000s, this rate has shot up to over 90% for older middle-class speakers, irrespective of gender, creating a massive gap between old middle- and working-class speakers. There is some evidence that young, middle-class women follow this pattern, as they, too, show increased rates of the velar variant (11.5% at T1 and 41.7% at T2). Working-class speakers, by contrast, exhibit largely similar rates of the velar variant at both time points. We take this as evidence that overall changes to (ing) in the trend sample are strongly tied to speakers’ economic activity/socio-economic class, as well as the indexical meaning of the variable (Levon and Fox 2014, Schleef and Flynn 2015).

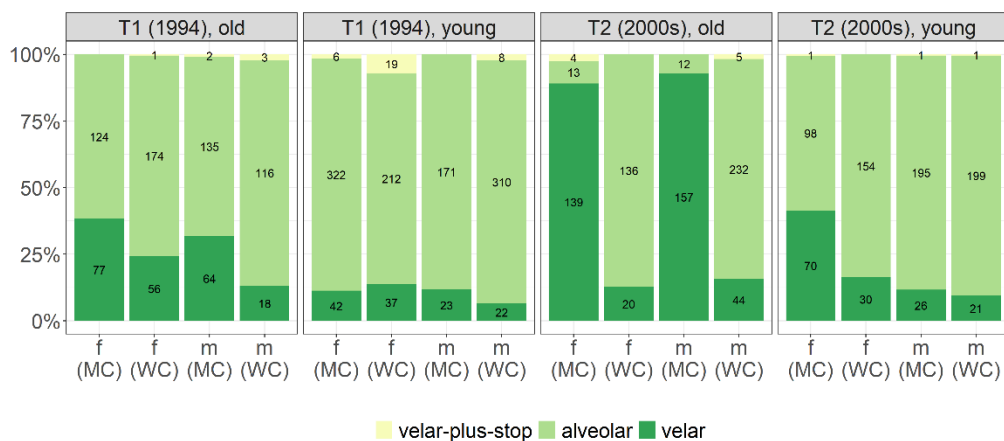


Figure 2. Proportion of (ing) variants by time-point, age group, sex, and socio-economic class for the trend sample.

To further investigate changes in linguistic and social patterning over time, we built a classification tree, drawing on grammatical category, preceding and following phonological context, time point (1994 v. 2000s), age group (old v. young), speaker sex, and socio-economic

² All but four tokens (one token each of *having*, *banqueting*, *making* and *upbringing*) which were coded as [ɪŋk] were pronouns, fitting with established claims that velar-plus-stop variants are more common in nouns than verbs (e.g., Clark and Asprey 2013).

status (middle- vs. working-class). Figure 3 depicts the tree with the lowest cross-validated error and corroborates the observations from Figure 2. The initial split is across age group, providing support that (ing) in Tyneside is strongly age-graded. Within the young speakers, no further conditioning factors are identified, suggesting that young speakers at both timepoints either show little differentiation across linguistic or social lines, or that these factors have little opportunity to surface because of young speakers’ near-ceiling use of the alveolar variant. The second split is among older speakers, grouping working-class individuals separately from middle-class speakers. Timepoint is a robust predictor for middle-class speakers, where the dominant variant shifts from alveolar in 1994 to velar in the 2000s. Within the group of working-class speakers, we see evidence of a linguistically conditioned effect, whereby *-thing* pronominals are considerably more velar than tokens coded as either nouns or verbs (similar to results in Schlee et al. 2011). Taken together, this tree demonstrates (1) that old speakers exhibit more complex social and linguistic patterning than young speakers (with the above caveat); and (2), that the standardization pressures that underpin socio-economic structure have had disparate impacts on old and young speakers across time. Old middle-class speakers have clearly shifted their behaviour away from a vernacular form and towards one that has been indexically linked with education, formality, and effort (Schlee et al. 2017), likely also relating to linguistic marketplace pressures.

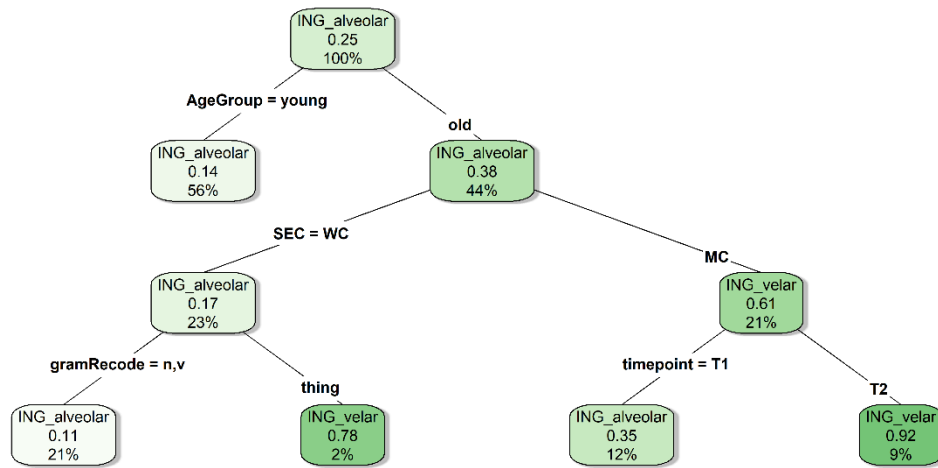


Figure 3. Recursive classification tree built from trend sample data for alveolar and velar (ing) variants.

Having established how (ing) patterns in the trend sample, we now turn our attention to the observed malleability within the individual speaker across their lifespan.

4.2 Panel Data: Old Panel

We begin our analysis with the old panel, which covers three crucial junctures across the adult life-span. The first recording (T1) catches speakers as they enter the workforce, the second (T2) at the cusp of retirement, and the third one in post-retirement (T3). Figure 4 shows that a speaker’s sociodemographic trajectory contributes to marked differences in their choice of (ing) variants. There is an obvious effect of class orientation; velar (ing) is favored by middle-class speakers, while working-class speakers favor the alveolar form. Furthermore, most speakers are malleable across their life-span. For middle-class speakers Aidan, Fred, and Nelly (top row), we observe an increase in the use of the velar variant from T1, at the early stages of their professional career, to T2, when they were about to retire or had recently done so (Aidan $\chi^2(1, 220)=13.19, p<.001$; Fred $\chi^2(1, 203)=29.06, p<.001$; Nelly $\chi^2(1, 163)=4.15, p=.042$). This pattern is in line with previous panel studies, which have shown that speakers with an “upwardly mobile professional, marital, and residential trajectory” (Johnstone et al. 2006:91) conform to normative expectations associated with white collar, outward facing positions (Wagner 2012b, Buchstaller et al. 2017). Crucially, in post-retirement (T3), we observe a reversal in Fred and Nelly towards more vernacular variants. This reversal, which reaches significance for Fred ($\chi^2(1, 338)=15.96, p<.001$), corroborates the presumed “tail” in older age; this upswing in vernacular usage has, until now, only been hypothesized in the sociolinguistic literature

(Buchstaller 2006). In fact, Fred explicitly comments on such shifts in his linguistic behavior in his T3 interview as being the result of classroom participation: “I lost ... most of my Geordie accent at ... grammar school and teaching”.

A strikingly different pattern is evidenced by the working-class oriented speakers (Figure 4, bottom row), Anne, Edith, and Rob. These three individuals increase their rates of alveolar (ing) across all time points covering the life-stages between early adulthood and old age. This pattern, which is clearly observable for all speakers, only reaches significance for Edith ($\chi^2(1, 125)=4.87, p=.027$). Rather than showing evidence of retrenchment, these speakers thus illustrate a gradual embracing of the vernacular form.

In the old panel, we therefore see a pattern of change across the life-span that is socially niched. Far from being stable, our old panel speakers are malleable, and this malleability is mediated by their socio-demographic trajectory: middle-class orientated speakers show retrenchment towards the standard, followed by a tail back to vernacular forms in retirement, while working-class speakers show a gradual increase of vernacular variants.

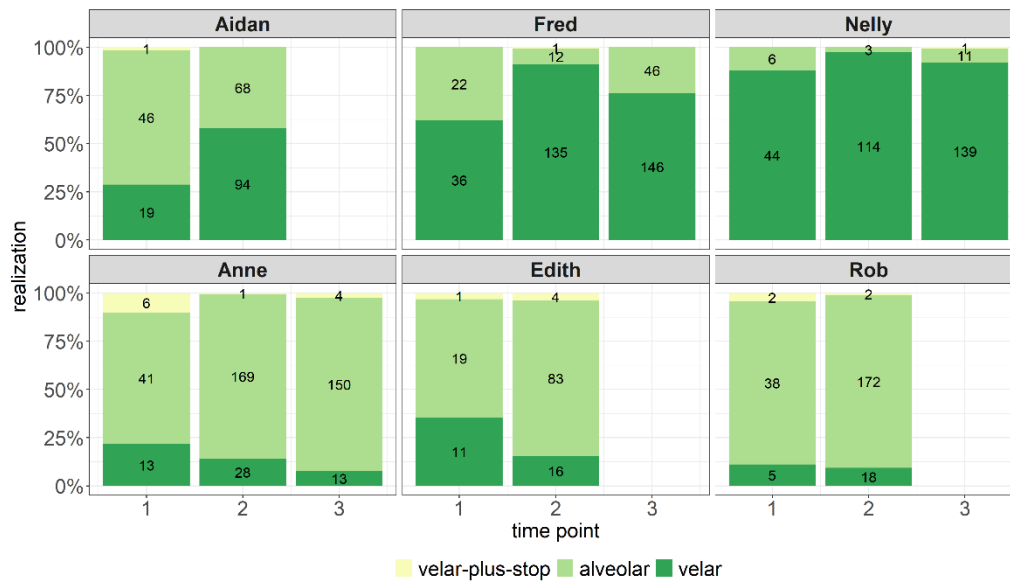


Figure 4: Proportion of three (ing) variants by time-point and speaker for the old panel.

4.3 Panel Data: Young Panel

We now turn to a discussion of the young panel to investigate whether this observation plays out in the early stages of speakers’ moving into the workforce. The proportion of (ing) variants is shown for each speaker in Figure 5. In comparison to the old panel, all young panel speakers show a clear preference for the alveolar variant, providing further evidence that this is the dominant variant in Tyneside. Most importantly, we observe that half of the speakers show clear changes (Jake, Amelia Lynn), while the other half (Jane, Paul, Charlotte) are remarkably stable over their lifespans.

We first consider Jake, whose alveolar (ing) rates increase significantly ($\chi^2(1, 354)=5.90, p=.015$) from T1 to T2. Jake’s social trajectory is characterised by a rise through the ranks of the city administration, having made his way from clerk in the dole office into the lower management of the local authority. Research has shown that there are benefits for locally integrated men to demonstrate their sense of local belonging by drawing on the indexicalities of non-standard forms. We thus interpret Jake’s behavior in line with Sundgren et al.’s (2021:49) finding that the retention or, indeed, increase in use of vernacular choices is a gendered strategy to “show ... high degrees of community integration which support[s] ... social aspirations”.

The pattern is very different for Amelia and Lynn, who work as primary- and secondary-level educators, respectively. Both display linguistic trajectories that reflect standardization pressures, albeit at different time points in their lives. Amelia shows a marked uptick in her rate of standard forms already at T2, when she is a teaching assistant ($\chi^2(1, 220)=16.82, p<.001$). In her T2 interview, she asserts that she is very aware of her linguistic choices in the classroom, stating “I prefer ... kind of using the proper language”. This acute sensitivity towards prescriptive pressures could be the source of her increased use of the velar variant in her mid-

20s. Lynn, on the other hand, does not illustrate a retrenchment effect until her late 20s in T3 (and then, only a slight one) as she establishes herself as a teacher. One reason for this comparatively delayed and muted standardisation effect might be that Lynn remained in her neighborhood, teaching at her former high school. In her T2 interview, she discusses this fact together with considerations of authenticity: “the school where I teach is like literally like ten minutes from where I live so I kind of have the same accent as a lot of the kids really”. Entering the workforce thus seems to have triggered a shift towards higher proportions of velar (ing) for Lynn. The finding that both educators show modulation towards higher proportions of velar (ing) align with Wagner’s observation (2012b) that individual speakers’ aspirations impact linguistic choices during the transition from high school to university. Indeed, our data suggest that this effect might result in differentiated patterns at future junctures in life where Lynn and Amelia strive towards what they believe to be good linguistic role models for their students.

Our young panel also contains three speakers (Jane, Paul, Charlotte) whose alveolar rates remain stable across the life stages.³ This lack of retrenchment might seem surprising considering previous findings that young adults show increasing standardization (Wagner 2012b, Brook et al. 2018) as they move into life stages that expose them to “pressures to conform to societal norms” (Cheshire 2005:1556). For these three participants, however, marketplace pressures have not (yet) exerted their full force. We illustrate this pattern with Charlotte, whose post-adolescent trajectory is characterized by institutions of higher learning. She was enrolled in a PhD program in the humanities at T2 (age 24) and became a lecturer at a prestigious northern university by T3 (age 29). Yet, in spite of these language-sensitive occupations, Charlotte produces high alveolar rates across all three time points. One reason for this lack of retrenchment towards the standard might be that Charlotte’s professional trajectory has not yet reached the “career-rising years” (Guimãres 2014), which sociolinguistic research purports to be somewhere between thirty and forty-nine (Labov 2001, Buchstaller 2016). Another potential explanation is Charlotte’s strong regional identification to the North, where she has lived and worked for all of her life.⁴ She therefore might see little reason to alter her patterns away from targets that have been locally reinforced throughout her life.

Overall, our analysis reveals that the young panel speakers are on the cusp of the dip in vernacularity that has been hypothesized for age-graded variables. Importantly, a speaker’s position on this curve relates less to their chronological age than to their life stage, associated normative pressures of those life stages, and their positionality towards linguistic standards and their construction of self. We therefore argue that panel research needs to be cognizant of the fact that expectations vary according to socially-situated and age-differentiated marketplaces.

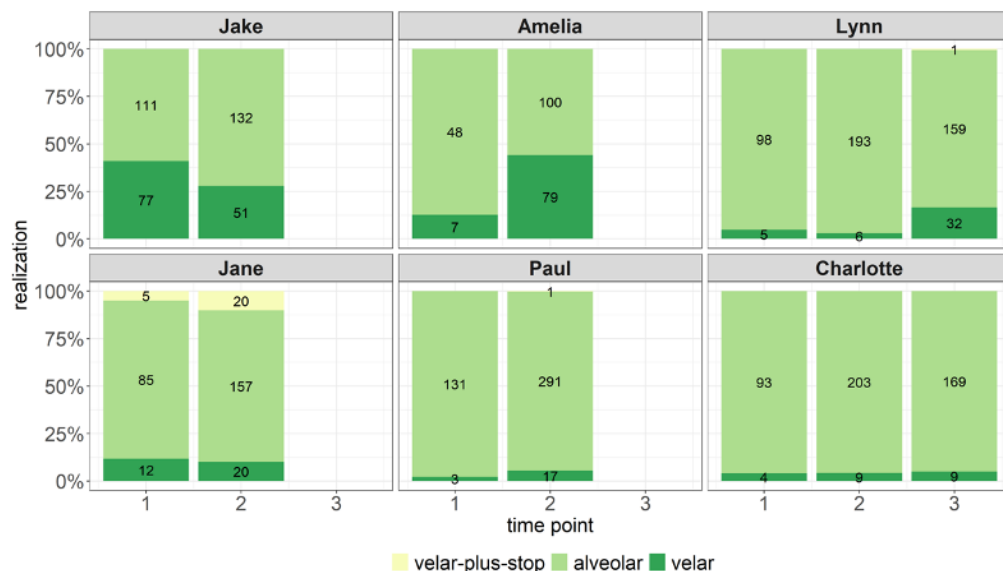


Figure 5. Proportion of three (ing) variants by time-point and speaker for the young panel.

³ Chi-square tests for all three speakers were not significant.

⁴ At T3 Chloe emphasizes her regional identification: “I’ve never would have really thought that I’d end up moving away from the North East.”

For additional insight into these trends, we fit a classification tree to the entire panel sample, which also draws on the same linguistic and social factors used above (grammatical category, preceding and following phonological context, time point, and age group). The tree, reproduced in Figure 6, in many ways mirrors the findings from the trend sample. The first split is again by age group (young vs. old), which supports the observation that (ing) is strongly age-graded in the Tyneside community. As with the trend sample, young panel speakers show no further splits across either linguistic or social factors, likely due to this subgroup's near-categorical preference for the alveolar variant. Stronger evidence for complex linguistic conditioning is found in the old panel. Grammatical category is the second split in the tree, which classifies *-thing* tokens as near-categorically velar (0.84) in comparison to verb-participles, which are mostly alveolar (0.38). The variable is also sensitive to preceding phonological context: coronals favor the velar variant (0.63), while preceding labials, dorsals, and vowels favor the alveolar variant (0.36).

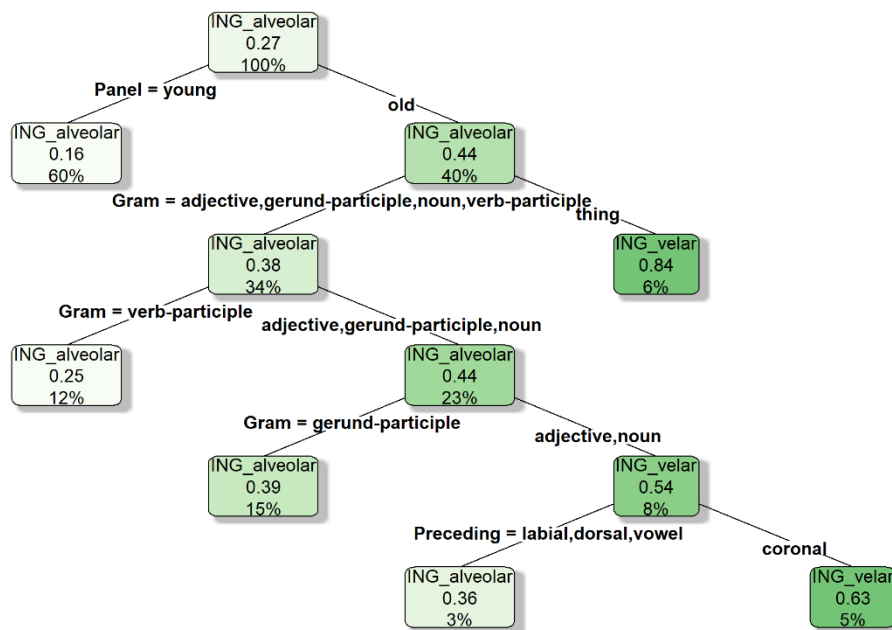


Figure 6: Recursive classification tree built from panel data for alveolar and velar (ing) variants.

In sum, there is evidence that age and socio-economic class are particularly important conditioning factors for (ing) realization in the panel data, mirroring our observations from the trend sample. The combined panel dataset thus provides us with a dynamic database that adds differentiated information about several mainstays of sociolinguistic theorizing, including the fact that the retrenchment in middle age and the tail in older age are socially and linguistically niched.

5 Discussion and Conclusion

As Sankoff and Blondeau (2007) remind us, the best way to capture ongoing change is to consider the community as well as the individual speakers embedded into it. In other words, trend and panel data together are needed to embed life-span change in the community that surrounds it. This paper reports on such a combined analysis of (ing) in the North East of England, a variable that has long been considered the stable variable *par excellence*.

Analysis of the trend data reveals that while social and linguistic conditioning is in line with previous work, such conditioning is less evident in young speakers, whose near-categorical alveolar rates may not provide an opportunity for such conditioning. Of particular significance is that we observe an increasingly stark age-graded effect that is further mediated by socio-economic class; older middle-class speakers have drastically shifted away from alveolar variants over a real-time period of barely a decade – a radical shift towards normative prescribed forms. We are left to ask, as Forrest and Wolfram do (2019:88), what do we actually mean when we

talk about a stable variable? Stable with respect to what? Only variable rates across community? Or also stable in terms of linguistic and social conditioning?

The panel analysis adds a dynamic perspective, exploring individual malleability in the use of (ing) across two overlapping data-sets that cover the adult life-span. This data provides, for the first time, the type of dynamic context that allows us to assess the veracity of the U-shaped curve hypothesized for the adult linguistic trajectory. This represents a significant step in research on age-graded variability.

To return to our original question, Wagner (2012b) was the first real-time confirmation that a diachronically stable variable does exhibit age grading in adult speakers, showing that the retreat from nonstandard variants at the cusp between high school and university is socially differentiated. Our young panel data pick up where Wagner's left off, at the inflection point between university and subsequent life, as speakers move into emergent adulthood. Our older panel continues dynamically and follows speakers into older age. This data-set has shown socially niched and highly individual trajectories that cannot be explained by the simple increase and decrease of normative pressures.

More specifically, our findings lead us to suggest that the progression from middle to older age has more substantial linguistic consequences (at least for middle-class oriented speakers) than the progression from university life into early adulthood. Young and old panel speakers exhibit largely different trajectories for (ing). While the old panel speakers show complex linguistic conditioning and socially-niched changes, the latter of which largely follow class-based or marketplace pressures, the young panel shows comparatively small changes and a much more uniform preference for the alveolar variant. We take these findings to suggest that whatever retrenchment occurs across the life-span is mediated by a complex set of locally specific pressures that articulate with the social meaning of the individual variable at hand. Indeed, the hypothesized U-shaped curve appears to apply only to old middle-class speakers; old working-class speakers, by contrast, show a clear increase in vernacularity across all time points.

At the same time, we see individualized reactions to movement into professional teaching amongst the younger speakers. In this way, our data align with previous research on aging processes, which has suggested that normative pressures associated with linguistically sensitive occupations might not display their most profound effect until speakers reach their (mid-)thirties (Labov 2001, Guimãres 2014, Buchstaller 2016). This effectively means that our younger panel speakers are simply not yet at the ages where we would expect to see extensive retrenchment towards more standardized forms. Note here that while two primary school educators, Amelia and Lynn, do show incipient retrenchment towards prescriptive norms, they do so to different degrees and at different points in their lives. The example of Charlotte adds further nuance, revealing that the concept of marketplace pressures *a la* Bourdieu and Boltanski (1975), defined as corporate pressures to perform in line with normative expectations, are either not operative for academic staff at a northern university; or they might come into play at a later time. On the basis of the patterns in our data, we suggest that panel research develop a more differentiated concept of the linguistic marketplace to conceive of pressures as operating both according to well-known institutionalised standards, as well as to expectations to conform to the practices that are promoted by the individual networks we move into as we age (Milroy et al. 1999).

Following Rickford and Price (2013), we draw on social constructivist approaches to age and aging to interpret the patterns in our data. Far from taking a blanket approach to the effects of age or specific life stages, sociolinguistic panel research must therefore be cognizant of the fact that, in addition to age specific expectations, individuals react in highly individualised ways to societal expectations of 'being a person of a certain age'. These expectations may draw on stereotyped and iconic performances tied to speakers of various genders, socio-economic, and professional backgrounds. It is within this context that we need to remember that our life histories are lived performances of our own selves, which might change as we move in and out of different professional networks and social circles.

We contribute here, for the first time, real-time evidence across the lifespan as a whole on an age-graded variable. Our results comport with Sankoff and Blondeau's (2007) assessment about the importance of combining trend and panel data to trace change across community and speakers. Indeed, our data suggests that what we need is differentiated trend and dynamic panel data to understand the observed variability across the community and the lifespan as a whole.

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