Word-final T-deletion in Southern German: An Exploratory Study

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The recordings of 20 native German speakers were analysed to identify the strongest factors affecting the rates of word-final t-deletion. Deletion rates were shown to be higher for /t/s in semiweak verbs, when preceded or followed by sibilants, and in a conversational speaking style. In addition to this, frequent words showed higher deletion rates. English and German t-deletion were comparable to some extent in this study. However, deletion rates by morphological complexity showed differences between the languages: monomorphemic words, in particular, had lower deletion rates in German than in English. It was also shown that reading aloud reduces the deletion rates significantly, which is in line with previous research.

1 Introduction

The phenomenon of word-final t-deletion is the variable omission of /t/ in a word-final position, often in a consonant cluster. It is a well-studied phenomenon in English, especially American English (Neu 1980, Guy 1980). Though t-deletion has also been shown to be in effect in other languages, like Dutch (Mitterer and Ernestus 2006), the research is still very English centric.

To expand the catalogue of research on t-deletion, this exploratory study analyses free speech and reading passage recordings by Southern German speakers, examining both the rates of word-final t-deletion and the linguistic and social factors that favour its occurrence. It then examines the four most frequent words in more depth. The aim of this study is two-fold: first, it describes in which circumstances t-deletion occurs and what makes it more likely to occur in German; second, it examines how transferable findings from English and other languages are to German.

Three factors make this an interesting focus for research: both English and German have a considerable amount of word-final /t/s, which can either be of morphological importance or not. It seems that t-deletion happens across many varieties of English (Tagliamonte and Temple 2005) and is not a purely phonetic phenomenon. Given the relatively minimal amount of research in German, the question remains as to how comparable the phenomenon is between English and German.

2 Literature Review

2.1 T-deletion in English and its Implications for German

In English, the omission of both word-final /t/ and /d/ affects word-final consonant clusters (1). It is seen in monomorphemic as well as bimorphemic words and in nouns as well as verbs. All classes of verbs (regular, irregular, and semiweak) are affected, but not to an equal extent (see below).

(1) Examples of t-deletion in English
just → *jus∅*   *mapped* → *map∅*   *kept* → *kep∅*
fast → *fas∅*   *sagt* → *sag∅*   *braucht* → *brauch∅*

In German, however, this deletion process competes with a different process: *Auslautverhärtung*. This is a German-specific rule by which final voiced consonants are consistently devoiced, also called fortition (Salmons 2012). When a suffix is added to a word that has undergone final devoicing and the devoiced consonant is no longer word-final, it is produced as a voiced consonant again (2).

(2) Examples of final devoicing in German
t ~ d → *[t]*   *Rä[d]er but Ra[t]*
k ~ g → *[k]*   *Ta[g]e but Ta[k]*

In the current paper, I exclude /d/ from the envelope of variation, to focus entirely on the deletion and avoid effects of *Auslautverhärtung*. It is left for future work to consider whether t-deletion can occur with a devoiced word-final /d/ in German.

Studies about the extralinguistic factors influencing t-deletion have largely focused on American English. Labov (1967) found that middle-class speakers delete /t/ less in careful speech and more in casual speech. Others

have found that men delete /t/ more often than women (Byrd 1994, Neu 1980, Wolfram 1969), and that young people delete /t/ more often than older people (Guy 1992). Faster speech may lead to more deletion (Byrd and Tan 1996, Guy 1980), while dysfluent speech may result in the articulatory strengthening of sounds, and therefore result in lower deletion rates (Fougeron and Keating 1997, Shriberg 1999). Fougeron and Keating (1997) argue that word-final consonants at a prosodic boundary have more extreme lingual articulations, independent of the type of consonant, which could lead to /t/s being strengthened rather than deleted before pauses.

The surrounding phonological environment plays a considerable role in t-deletion. Preceding sibilants and other preceding consonants are known to favour t-deletion (Guy 1980, Labov 1967, Neu 1980, Wolfram 1969, Labov 1989, Labov et al. 1968). This finding has also been replicated by Mitterer and Ernestus (2006) in Dutch, suggesting that /s/ leading to higher deletion rates is a cross-linguistic phenomenon, and something to expect in the German data. Similarly, the following sound affects how often /t/ is deleted. Following consonants heighten the probability of deletion over following vowels and following pauses, effects which may be variety-independent and cross-linguistic (Edwards 2016, Patrick 1991). Labov (1989) suggested that the sonority hierarchy predicts deletion rates (3).

(3) Following phonological environment (from most favouring deletion to the least) (Labov 1989)
    Stops > affricates > fricatives > nasals > approximants > vowels

In (3), approximants include laterals and rhotics. The one problem with (3) is that it is unclear where pauses should be placed in the sonority hierarchy.

It has been shown that lexical frequency affects deletion rates. Neu (1980) and Gregory et al. (1999) both found that frequently used and more predictable words (for example, *just, went*) were more likely to undergo deletion, presumably due to the listener's ability to predict words without needing the full phonological form.

Morphological class might also play a part. For t-deletion in general, the bimorphemic category mainly consists of verbs which are subdivided into strong, weak, and semiweak. Weak verbs are verbs which show the dental suffix (-*ed* in English, -*te*/-*t* in German) in the past tense and the participle (*sagen, sagte, hat gesagt* 'say'). Strong verbs have no dental suffix in the preterite and an -*n* suffix in the participle (*gehen, ging, ist gegangen* 'go'). Semiweak verbs have dental suffixes but also irregular stem changes (*bringen, brachte, hat gebracht* 'bring'). Guy (1980) found that morphological class distinctions were important for English.

Monomorphemic forms (e.g., *mist*) appear to be more liable to undergo deletion than bimorphemic (e.g., *missed*) forms (Labov 1967, Labov and Cohen 1967, Wolfram 1969). Guy and Boyd's (1990) variable rules analysis shows a .65 factor weight for a monomorphemic word to undergo deletion, whereas regular verbs have a factor weight of .55. According to the authors, when the /t/ carries morphological meaning, it is less likely to be deleted since it is important for meaning comprehension. This finding could transfer to German since, like in English, a word-final /t/ in verbs in German often signals a certain tense or person, and there are no other suffixes including a word-final /t/, which means this affects only verbs.

In this same study (Guy and Boyd 1990) found that semiweak verbs display more deletion than other verbs. According to the authors, this is due to the fact that the stem change also marks the past tense which makes -*ed* less crucial to understanding (e.g., *sleep/slept* vs *map/mapped*). This could explain why there is a .55 factor weight for semiweak verbs and a comparatively lower .35 factor weight for regular verbs (Guy and Boyd 1990).

Guy (1991) postulates that there is a deeper internal reason for monomorphemic words having the highest deletion rates. He argues that the word-final /t/ is added at different morphological levels to the different types of words: monomorphemic words start out with them (stem level), semiweak verbs receive their suffix on the next level since there is a stem change (word level), and regular verbs receive theirs at the highest level, or phrase level. To explain the different rates of deletion, Guy suggests that deletion can happen at each of the three levels and is statistically independent. This means that monomorphemic words have the possibility of undergoing deletion three times, whereas regular verbs only get this chance once.

However, it should be mentioned that Tagliamonte and Temple (2005) did not find a significant effect of grammatical conditioning in British English. This could indicate that the effect is not as strong across varieties, and therefore languages, as expected.

2.2 T-deletion in German

One of the few sociolinguistic variationist studies on t-deletion in German is Zimmerer et al. (2011), in which participants were asked to produce verb forms. Participants were shown a screen with the verb in the infinitive and the target person and number, and asked to produce the form. Since only /t/ can occur word-finally in this specific setting, deletion of /d/ was not examined. The crucial form was the 2nd person singular, which in German

is formed by adding *-st* to the verb stem. The authors chose this particular verb form since the /t/ is always preceded by /s/, which makes at least the preceding sound constant.

Zimmerer et al. (2011) found that the following segment was the strongest predictor for t-deletion. Here vowels disfavoured deletion the most while /s/ encouraged deletion the most. Confirming earlier studies (Fougeron and Keating 1997, Shriberg 1999), Zimmerer et al. (2011) also found dysfluencies to lead to less t-deletion. They controlled for age, socioeconomic status, the phonological environment, verb class, and the speech style (fluent, dysfluent). However, it should be kept in mind that, in contrast to most of the studies in English, the results are not based on free speech but on a verb production task. Another important factor which could affect the data is that the /t/ is not the entire morpheme; rather, the morpheme consists of /st/.

2.3 German

This section concentrates on the features of German which affect word-final /t/ and the amount of tokens of /t/ found in the recordings.

One factor which may affect the amount of tokens in the recordings is the disappearance of the preterite. German speakers appear to use the past perfect more than the preterite. Apart from the second person singular (*du sagtest*) and plural (*ihr sagtet*), none of the regular preterite forms in German end with /t/. The regular past perfect, on the other hand, forms with the stem, the /ge-/ prefix, and /-t/ for each person (*gesagt*). In certain persons (3rd person sg. for example) *hat* or *ist* are another token of /t/. Russ (1989) and Salmons (2012) seem to agree that the disappearance of the preterite is primarily a Southern German phenomenon, which has since spread to other parts of the German-speaking world. This preference could lead to more /t/ tokens because the preterite shows fewer word-final /t/ tokens than the past perfect.

3 Methodology

3.1 Ethics

This study was carried out in accordance with the University of Edinburgh's Research Ethics guidelines. Before the recording, each participant was advised of their rights (especially their right to withdraw) and filled out a consent form about participation and the way in which the author would deal with the data gathered during the study, especially ensuring participant anonymity.

3.2 Participants

The participants were 20 native speakers from Southern Germany (either Bavaria or Baden-Württemberg), who now live in or around Munich. Half of the speakers were between 18 and 21 years of age; the other half were between 48 and 57. The gender distribution was also equal for all the groups (with 5 men and women in each age group).[1] However, due to a recording problem, one female speaker from the older group had to be excluded. There was also one 80-year-old female speaker who was clearly in neither age group, and who had never lived in Munich. Preliminary analysis found that her pattern of deletion was different enough for her to be excluded from the analyses.

3.3 Procedure

All data come from sociolinguistic interviews. The participants were all recorded in a quiet room with a phone through the app PCM recorder (Version 5.6.1). They were all told to speak as they would normally speak with the author, also a speaker from Southern Germany. Participants were not aware of the variable of study but were told that it was a dialect study. The sociolinguistic interview (conducted by the author) was followed by a text to be read aloud and a questionnaire. The questions asked during the interview varied due to the flow of conversation but revolved around jobs, life after school, and identity.

Tables 1 and 2 show the distribution of morphological and phonological environments in the read text. The first three rows only describe verbs, while the last row presents all other tokens. All numbers in brackets show the number of different lexical items (type frequency) rather than the absolute number of tokens (token frequency). The read text was written by the author (see Appendix) and consisted of as many different settings for word-final /t/ as possible, with 42 individual tokens and 26 different lexical items.

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[1] Since the questionnaire was in German, it asked for people's *Geschlecht*, which means both sex and gender. A third option was given; however, no participant chose this option.

Table 1: Number of tokens according to their morphological class in the text

Morphological class	Number of tokens (lexical items)
irregular	5 (3)
regular	6
semiweak	3
underived	28 (14)

The phonological environments of the read text tokens, shown in Table 2, included different preceding sounds (fricative, lateral, nasal, rhotic, stop, vowel, and a separate category for sibilants) and following sounds (coronal stop, non-coronal stop, fricative, lateral, nasal, pause, vowel, and again a separate category for sibilants). In contrast, the phonological environments from tokens obtained from the interview speech resulted in no following approximants or rhotics.

Table 2: Number of tokens according to their preceding and following sound in the text

Sound	Number of preceding tokens (lexical items)	Number of following tokens (lexical items)
fricative	7	8 (7)
lateral	1	2 (2)
nasal	5 (2)	2 (2)
sibilant	8 (6)	3 (3)
stop	1	3 (2)
vowel	17 (8)	8 (6)
rhotic	3 (2)	-/-
coronal stop	-/-	5 (5)
pause	-/-	11 (11)

After the interview, the participants were asked to fill out a questionnaire about themselves, concentrating on geographical experience and exposure. The questionnaire and the read text can be found in the appendix.

3.4 Coding

Coding was done by the author, and every instance of word-final /t/ was included in the envelope of variation. The dependent variable is discrete with two variants: deleted and undeleted. The coding was done auditorily using Praat (Boersma and Weenink 2016) such that, for ambiguous tokens, the spectrogram on Praat was consulted visually. No interrater reliability checks were performed due to time constraints.

When coding for the dependent variable, even the slightest indication of a present /t/, whether audio or visual, was taken to be "undeleted". This is in accordance with Tagliamonte and Temple (2005:286), "we consider any phonetic reflex of underlying /t,d/ to be a realization, and therefore a nonapplication of the deletion rule". Furthermore, whenever the following word started with a /t/ or /d/, the token was coded as deleted unless the speaker clearly used two instances of /t/.

Despite research on English concentrating on consonant clusters and excluding tokens with certain following (sibilants and /t,d/) and preceding sounds (rhotics and nasals), all these environments were included in the envelope of variation in the current exploratory study in order to examine whether the same exclusions should be applied to German as to English t-deletion research.

The independent variables which were coded for were speech style (free, reading), preceding sound, following sound, and morphological class. For regression analysis, the preceding and following sounds were collapsed into wider categories (fricatives, sibilants, sonorants, stops, and vowels; see 5.3.5). The sounds that made up each category are in Table 3.

Table 3: Sound categories and the phones included in these

Labels	Phones
fricative	[ç], [x], [f], [v]
rhotic	[r]
approximant	[j], [h]
lateral	[l]
sibilant	[s], [z], [ʃ], [t͡s]
coronal stop	[t], [d]
nasal	[n], [m]
stop	[b], [p], [k], [g]

4 Results

All statistics were modelled in R studio (Version 1.1.456 and R Version 3.5.1) (RStudio Team 2015). From the 3.5 hours of recordings of 20 participants, 3002 tokens of word-final /t/ were collected. The results showed that phonological environment was the strongest favouring factor, especially following stops and preceding sibilants, while reading as the speech style was the strongest disfavouring factor.

A mixed-effects logistic regression model was created to analyse which factors were the strongest predictors for t-deletion. All fixed effects were included in the model and WordCategory (a collapsed category of what word the token was)[2] and speaker were included as random effects. Environment categories were collapsed as previously mentioned. The best-fit model did not contain speaker age or gender as both contrasts showed relatively similar deletion rates (with young speakers at 41%, older people at 39%, women at 39%, and men at 42%).

The R code to form the model is in (4). Figure 1 was generated using package sjPlot (Lüdecke 2018).

(4) Best-fit Regression Model of t-deletion in Southern German
```
Deleted ~ Preceding + Following + Speech_style + Age*Gender + Morpho +
(1|speaker) + (1|WordCategory)
```
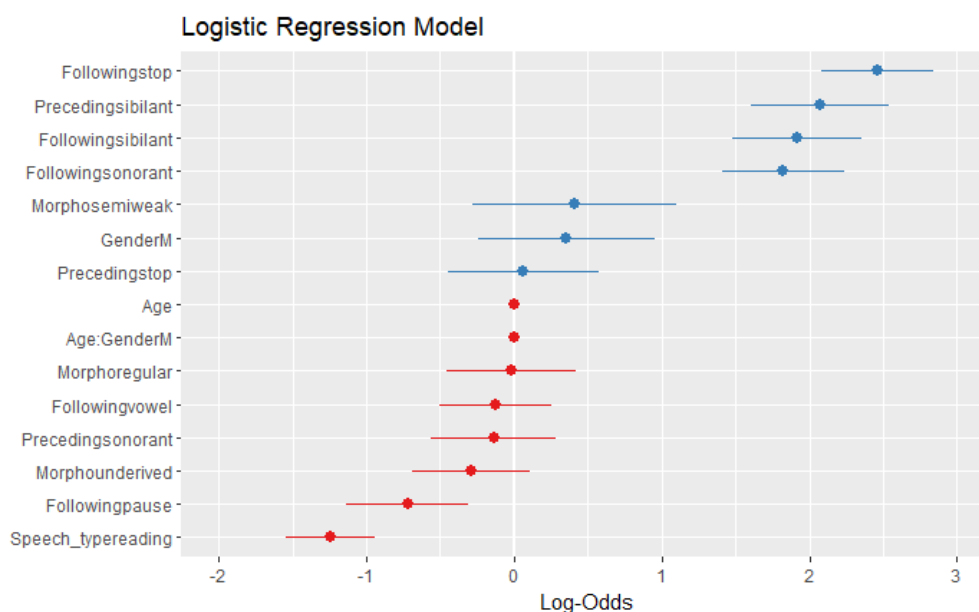

Figure 1: Best-fit logistic regression model of t-deletion in Southern German.

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[2] Variables were the 10 most frequent words and "other words".

Table 4: Best-fit logistic regression model of t-deletion in Southern German

Part type	Variable	Odds ratio	CI	*p*
Fixed parts				
	(Intercept)	0.22	0.07 – 0.70	0.10
	Preceding (sibilant)	7.98	5.00 – 12.74	<.001
	Preceding (sonorant)	0.88	0.58 – 1.34	.542
	Preceding (stop)	1.08	0.65 – 1.80	.762
	Following (pause)	0.49	0.32 – 0.73	<.001
	Following (sibilant)	6.78	4.38 – 10.51	<.001
	Following (sonorant)	6.18	4.10 – 9.33	<.001
	Following (stop)	11.72	8.00 – 17.16	<.001
	Following (vowel)	0.88	0.60 – 1.29	.516
	Speech style (reading)	0.29	0.21 – 0.39	<.001
	Age	1.00	0.99 – 1.01	.511
	GenderM	1.42	0.79 – 2.59	.244
	Morpho (regular)	0.99	0.64 – 1.54	.966
	Morpho (semiweak)	1.54	0.77 – 3.08	.221
	Morpho (underived)	0.76	0.51 – 1.14	.181
	Age:GenderM	1.00	0.98 – 1.01	.669
Random parts				
	$\tau_{00,\ speaker}$		0.072	
	$\tau_{00,\ WordCategory}$		2.721	
	$N_{speaker}$		20	
	$N_{WordCategory}$		11	
	$ICC_{speaker}$		0.012	
	$ICC_{WordCategory}$		0.447	
Observations			3002	
Deviance			2144.264	

The difference between reading aloud and speaking in an interview style had the strongest effect on t-deletion by a fair margin. For tokens collected during the read text the deletion rate was 19%, compared to 48% when the speaker was talking freely.

Following stops showed the strongest favouring effect by a large margin, especially following coronal stops which heighten the chances of t-deletion. The second strongest favouring factor was a preceding sibilant; however, following sibilants and following sonorants are also fairly close in terms of strength of effect. When the sonorants are divided into their original categories, it can be seen that the following nasals are the strongest favouring factor in the sonorant category. This effect is also significant. A following pause is the second strongest factor against t-deletion and also showed significance.

Although the different variables for the morphological class do show slight differences, they do not seem strong enough to draw a conclusion. None of the morphological variants are significantly different from the others

in their likelihood to condition t-deletion. However, the number of tokens for the semiweak variant was not high enough to conclude anything.

Neither the interaction between Age and Gender nor Age by itself show a trend in either direction. Gender by itself, however, seems to suggest slightly higher deletion rates for men.

5 Discussion

The deletion of word-final /t/ was most favoured by following coronal stops, following and preceding sibilants, and following nasals. The retention of word-final /t/ was most favoured by following pauses and the speech style of reading aloud. Morphological class was not found to be significant.

5.1 Extralinguistic Factors

The strongest extralinguistic effect is speaking style. A difference of 29% between reading aloud and free speech (19% and 48%, respectively) is striking and one of the strongest predictors overall in the logistic regression model. This extreme difference indicates style-shifting, possibly due to more attention being paid to speech when reading (Labov 1966).

Where speaker age and gender are concerned, this Southern German dataset hints at the same effects as previous studies of English (Byrd 1994, Neu 1980, Wolfram 1969, Guy 1992). Although speaker gender and age were not significant predictors, the data displayed a marginal trend of women having lower deletion rates than men (39% and 42%, respectively) and young people showing slightly higher deletion rates than the older age group (41% and 39%, respectively). The fact that younger people and men show the highest rates does indeed suggest that the variable is a non-standard feature, even if it is only a trend.

5.2 Internal Linguistic Factors

5.2.1 Surrounding Environment

The surrounding phonological environment has been shown to be one of the more important factors when examining t-deletion (Guy 1980, Labov 1967, Neu 1980, Wolfram 1969, Zimmerer et al. 2011).

As the model shows, following stops and, in particular, coronal stops encourage the deletion of /t/s the most by a considerable margin. This is in agreement with previous research (Labov 1989), but it could also be that it is simply a coding effect, since only two clear /t/s were coded as undeleted. This decision was made due to the fact that it is difficult to code for /t/s after coronal stops. Temple (2009) describes this effect as the sound being neutralised. Following /n/ as well as following /t,d/s "neutralise" the preceding segment, which is why they are often excluded from the envelope of variation. Since following nasals also show a favouring effect for t-deletion, it could be argued that this effect is also due to the coding, since /n/s can neutralise /t/s.

The strong deletion effect that following sibilants show in the model is in alignment with Mitterer and Ernestus (2006), who, having studied Dutch, suggested that this might be a cross-linguistic phenomenon within this language family. Sibilants were also the only level of the preceding category to significantly differ from the reference level of approximants. This result agrees with Zimmerer et al. (2011), who found this to be the strongest factor in t-deletion for German speakers in Cologne.

Edwards (2016) claimed that a following vowel or pause would lower deletion rates compared to a following consonant, and that this was a cross-linguistic effect. It seems that this claim has been substantiated by this dataset from Southern German, at least for following pauses.

Labov's (1989) sonority theory accounts for why the sounds appear like this when ordered according to the strength of their effect on t-deletion. This hierarchy is compared to the present study's results in (5).

(5) Labov's (1989) sonority hierarchy as compared to the present study's results:

Sonority hierarchy:	stops > affricates > fricatives > nasals > approximants > vowels
Preceding (this study):	sibilants > stops > laterals > other fricatives > nasals > rhotics > vowels
Following (this study):	coronal stops > nasals > sibilants > other stops > laterals
	> other approximants > other fricatives > vowels > pauses >rhotics

While we see some similarities between Labov's (1989) suggested scale to this study's scale, namely, stops at the one end with vowels/pauses at the other, there are still some differences which are not explained by the sonority hierarchy. The strong effect we see from preceding and following sibilants is not explained by this theory, for example, or the differences seen in the current study between laterals and rhotics.

5.2.2 Other Internal Factors

Frequent and predictable words have been shown to undergo deletion more than other words (Neu 1980, Gregory et al. 1999). While not operationalised in the current dataset for regression modelling, it is worth noting that four out of the five most common words in the dataset show higher deletion rates (and the one that does not show higher deletion rates is only so frequent because it was in the read text). *Ist, jetzt,* and *nicht* show higher deletion rates; *jetzt* is nearly categorically deleted. However, *mit* is different: it has a preceding vowel, which has been shown, in this dataset and previous research on English, to disfavour deletion, and yet here it has a high deletion rate. This is possibly due to the fact that it is a very predictable word and clear from the context. Additionally, the most common following segments for *mit* were coronal stops and sibilants, which strongly favour deletion. The model showed that the following segment affected deletion more than the preceding segment.

Before examining the effect of morphological class, it should be mentioned that none of the effects were strong enough to draw a conclusion. However, trends can be observed. The morphological class effect will be examined in three steps. First, monomorphemic versus bimorphemic words will be examined. Then the verb classes will be analysed separately. After this, Guy's (1991) theory of strata in phonology will be examined with respect to the data.

According to previous research, monomorphemic or underived words should have lower deletion rates than all other morphological classes (Labov 1967, Labov and Cohen 1967, Wolfram 1969, Guy and Boyd 1990). However, this claim was not substantiated by this dataset. Even when excluding all tokens from the read text, underived words still form the morphological category with the lowest deletion rates. Only when the frequent words (*ist, jetzt, nicht, mit*) are included does the underived category show comparatively higher deletion rates, but then the effect seems more driven by frequency than monomorphemic status. Potentially, the lower deletion rates of underived tokens stem from the fact that many of the more frequent monomorphemic words (other than the excluded words) have a preceding vowel, which has been shown to hinder deletion rates. There is still an effect of morphology on t-deletion, but it seems that the effect in Southern German is different from the effect in English.

Guy and Boyd (1990) suggested that semiweak verbs have a higher probability for deletion than regular verbs. Even though the number of tokens were considerably different between semiweak verbs and other classes, the overall deletion rates are similar to Guy and Boyd's (1990): 47% for semiweak verbs and 23% for regular verbs. However, the model did not show this effect to be significant. The regression model found no significant effect of morphological class, supporting Tagliamonte and Temple's (2005) finding that grammatical conditioning is not significant.

5.3 German Factors: *Jetzt, halt, nicht,* and *ist*

The deletion rates of the four most frequent words will now be analysed according to their usage, environment, and extralinguistic factors to show t-deletion and the factors causing it with examples.

Jetzt will only be discussed briefly since it is possible that the almost categorical deletion rates of 95% are due to the fact that it is more phonetically difficult to pronounce the word-final /t/ after a /t͡s/ cluster. There were only 5 other tokens with this comparatively rare cluster and these were all verbs (e.g., *setzt, sitzt, benutzt*). The lack of tokens to compare *jetzt* with directly makes it difficult to ascertain whether the high deletion rates are due to phonetics, frequency, or predictability. Despite Guy (1990) suggesting that underived words are more likely to undergo deletion, this is unlikely to be the reason for deletion here, since it has been shown not to affect the other underived words in this data set. Additionally, 14 of the 20 speakers used the deleted variant of *jetzt* categorically, which would suggest a different process to the usual word-final t-deletion. Speakers with enough *jetzt* tokens to reliably analyse them were either categorical or between 85–90% deleted. However, even with these speakers, the token counts were not very high, so these data might not be reliable.

Halt is one of the more common modal particles in German (Elspaß n.d.). It can also convey emphasis and mood in spoken speech. Despite this word being one of the four most frequent words, it showed lower deletion rates than other words with preceding laterals (18% and 22%, respectively). This may be due to it being a filler word and used when the speaker is struggling for words and thus dysfluent. As an aside, an interesting result is that 83% of the tokens of *halt* were produced by the younger age group. This suggests that this is part of youth language.

Despite Elspaß (n.d.) suggesting that *nich* is not a common variant in the area around Munich, this dataset shows heavy usage of the variant of *nicht.* The deleted variant appeared 79% of the time, which is strikingly high compared to other words with preceding fricatives (20%). However, since there is no internal linguistic explanation (e.g., a following segment that appeared more after *nicht*), *nich* is taken to be characteristic of the speakers' variety of German. The deletion rates of *nicht* by speaker vary more than the general deletion rates. The younger speakers deleted /t/ in *nicht* much more than speakers in the older age group: 87% as opposed to 64%, perhaps suggesting a change in progress. In contrast, there was no discernible difference between women (79%)

and men (78%). Two speakers were categorical in their deletion: one young man and one young woman. There was no speaker who categorically pronounced the /t/ in *nicht*. The higher than expected deletion rates for *nicht* may be due to a more general t-deletion phenomenon, or the usage of *nich* which has been reported in the North of Germany may have spread to Southern Germany.

The deletion rates of *ist* need to be discussed separately again since this is the only word with frequent /t/ deletion that is a verb; however, since it is the copula, it could be argued that it does not behave like other verbs. The final /t/ in *ist* was deleted in 91% of the tokens, and rates varied less across the speakers than *nicht*. This suggests that the deleted variant is an older or more established variant. A lack of difference between the age groups further suggests that the deleted variant is well-established. Two out of 20 participants used the deleted variant categorically, and the rest were between 82% and 97% (apart from the one young speaker who had a rate of 63%). Again, there was hardly any difference between men and women. The lack of difference between the age groups is evidence against the widespread perception that *ist* with t-deletion is a marker of youth speech (e.g., with Langenscheidt considering it as one of their youth words in 2016). This mismatch between production and attitudes suggests that t-deletion, at least for *ist,* is below the level of awareness. It is possible that the higher deletion rates are particular to Southern Germany and are indeed a feature of youth speech in the North. However, it is widely accepted that Munich residents have a more standardised dialect than the rest of Bavaria, which could mean that German speakers more generally show high deletion rates for *ist*.

6 Conclusion

The current study has shown that there is t-deletion in German and that it can be compared to t-deletion in English. Style was shown to be one of the strongest predictors of deletion rates. However, despite this sociolinguistic effect, age and gender did not appear to have an impact on deletion rates. The ways in which previous research and this study's data line up is mainly with respect to the effects of phonological factors. Following sibilants, especially, were a strong favouring predictor for t-deletion, and this is potentially a cross-linguistic effect.

The morphological aspect showed different results between the two languages. While semiweak verbs do show higher deletion as previously shown, monomorphemic words do not undergo deletion as much in German as in English. However, this may be due to a comparatively small number of tokens or a confounding factor such as speech style. Interestingly, some frequent words showed a difference in deletion rates for the two age groups (*nich(t)*) while others did not (*is(t)*). This is an unexpected and interesting result, since it could mean that for some words the t-deleted variant is a feature of the Southern German dialect.

Acknowledgements

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Appendix

Read aloud text

Der Elefant und sein Hut

Es war einmal ein Elefant. Dieser Elefant liebte seinen Hut. Er trug ihn jeden Tag und auch in der Nacht, während er in seinem Elefantenbett schlief. Doch eines Tages wachte er auf und fand seinen Hut nicht! Er suchte überall und konnte ihn nirgends sehen.
Also ging er zur Ente, die in ihrem Nest saß und fragte sie: „Hast du meinen Hut gesehen? Ich hab mir gedacht, dass du doch bestimmt alles mitbekommst!" Die Ente antwortete: „Nein, deinen Hut habe ich heut' noch nicht gesehen. Vielleicht hat der Esel ihn geklaut?" „Das würde er nie wagen!", erwiderte der Elefant empört.
Trotzdem ging er zum Esel und fragte ihn: „Weißt du, wo mein Hut ist?" „Ja, er ist vorhin hier vorbei geweht. Der Wind muss ihn aufgesammelt haben!" Schnell rannte der Elefant in Richtung des Windes. Dort! An einem Ast hing der Hut. Er bat das Eichhörnchen, das dort lebte, ihn herunterzuholen. „Danke, dass du mir meinen Hut gebracht hast!"
Er setzte ihn auf sein Haupt und war überglücklich, seinen Hut wieder zu haben. Doch nach diesem Abenteuer war er sehr geschafft und legte sich mit seinem Hut in sein Bett und schlief ein.