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Indexical meanings of variation in /s/ and /t/ in the speech of adolescent girls in Copenhagen

Lillelund-Holst, Aleksandra Culap; Pharao, Nicolai; Maegaard, Marie

Published in:

Revista de Estudos da Linguagem

Publication date:

2019

Document version

Publisher's PDF, also known as Version of record

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Citation for published version (APA):

Lillelund-Holst, A. C., Pharao, N., & Maegaard, M. (2019). “Not from a ‘Danish’ home; typical of trying to sound ‘tough’”: Indexical meanings of variation in /s/ and /t/ in the speech of adolescent girls in Copenhagen. *Revista de Estudos da Linguagem*, 27(4), 1701-1736.



**“Not from a ‘Danish’ home; typical of trying to sound ‘tough’”
– Indexical meanings of variation in /s/ and /t/ in the speech
of adolescent girls in Copenhagen**

***“Não é de família dinamarquesa; mas é típico de tentar parecer
‘dura’” – Significados indiciais das variáveis /s/ e /t/ na fala
de meninas adolescentes em Copenhagen***

Aleksandra Culap Lillelund-Holst

Department of Nordic Studies and Linguistics, University of Copenhagen, Copenhagen
/ Denmark
dcr699@hum.ku.dk

Nicolai Pharao

Department of Nordic Studies and Linguistics, University of Copenhagen, Copenhagen
/ Denmark
nicolaip@hum.ku.dk

Marie Maegaard

Department of Nordic Studies and Linguistics, University of Copenhagen, Copenhagen
/ Denmark
mamae@hum.ku.dk

Abstract: The aim of this article is to examine the social meaning of /s/- and /t/-variation for Copenhagen girls in two different registers. The examined features consist of [s] and [tʰ], which are considered the standard variants, and [s+] and [tʰ] which carry different social connotations. Both variables are examined in the registers MODERN COPENHAGEN SPEECH and STREET LANGUAGE in two different matched guise experiments. Stimuli for both experiments consist of segmentally manipulated natural speech, and experiment

I was conducted with open responses, while experiment 2 used fixed scales based on experiment 1. Both experiments show that /s/-variation has little to no effect in both registers. This is surprising because [s+] is commonly perceived to index femininity and to be an integrated part of the STREET register. For/t/-variation, the presence of [tʰ] significantly indexes non-Danish ethnic background and the Western suburbs of Copenhagen, which are traditionally associated with the working class and mixed ethnic backgrounds. Finally, there are significant effects of prosodic frames alone. These link MODERN COPENHAGEN SPEECH to intelligence and the Northern suburbs of Copenhagen, which traditionally denote upper middle class, and STREET LANGUAGE to non-Danish ethnic background, the Western suburbs of Copenhagen, and playing tough.

Keywords: indexicality; perception; female speech; sociophonetics; Danish.

Resumo: O objetivo desse artigo é examinar os significados sociais das variáveis /s/ e /t/ em dois registros distintos na fala de meninas em Copenhague. As variantes examinadas são [s] and [tʰ], consideradas variantes padrão, bem como [s+] and [tʰ], que veiculam diferentes conotações sociais. Ambas variáveis são examinadas nos registros FALA MODERNA EM COPENHAGUE e LINGUAGEM DE RUA, em dois experimentos do tipo *matched-guise*. Os estímulos para ambos experimentos consistem de trechos de fala natural manipulados, mas o experimento 1 foi conduzido com respostas abertas, enquanto o experimento 2 utilizou escalas, estabelecidas com base no experimento 1. Os dois experimentos mostram que a variável /s/ não tem praticamente nenhum efeito na percepção dos registros. Esse é um resultado inesperado, na medida em que [s+] é comumente percebido como um índice de femininidade e é parte integrante do registro LINGUAGEM DE RUA. Para a variável /t/, a presença de [tʰ] indicia significativamente uma descendência não dinamarquesa e é associada aos subúrbios do oeste de Copenhague, tradicionalmente associados a classe trabalhadora e miscigenação étnica. Finalmente, há efeitos significativos de frames prosódicos, isoladamente: por um lado, FALA MODERNA EM COPENHAGUE é associada a inteligência e aos subúrbios do norte da cidade (estes últimos, tradicionalmente entendidos como uma região de classe média alta); por outro lado, por meio dos mesmos frames prosódicos, LINGUAGEM DE RUA associa-se a etnia não dinamarquesa, aos subúrbios do oeste de Copenhague, e a uma postura “dura”.

Palavras-chave: inicialidade; percepção; fala de mulheres; sociofonética; dinamarquês.

Submitted on March 4th, 2019

Accepted on September 4th, 2019

1 Introduction

The study of indexicality is integral to the field of sociolinguistics, particularly with the increase in so-called third wave studies (ECKERT, 2010). The indexicality or social meanings of variants of phonetic variables have been shown to be dynamic rather than fixed, and this has been studied in different ways. Some studies have shown how the social meanings of linguistic features may change over time (e.g. MOORE; CARTER, 2017, MAEGAARD *et al.*, *forthc.*) either cross-generationally or in real time. Other studies have shown how the meaning of linguistic variants can vary not only across time or speakers, but may in fact co-exist in the same moment in time. Approaches like this can be broadly said to work within a framework of indexicality that is based on Silverstein (2003)'s notion of indexical order. Particularly influential in the field of sociolinguistics has been Eckert's (2008) concept of indexical fields, in which the many different social meanings that can be seen to be associated with a particular phonetic variant are connected in a network of related social meanings which then go on to form associations with different stereotypical personae. For instance, Podesva (2007) argues that the use of /t/-release serves different functions for the speaker Heath depending on the situation in which he is employing this particular phonetic resource: when he releases his /t/ in conversations with patients at his job, he is drawing upon the association of /t/-release with professionalism and education, whereas when Heath uses /t/-release at a barbecue party with friends, the feature is used as a resource for portraying a particular kind of gay persona. In other words, Podesva (2007) shows that the same feature can be used for very different indexical means by the same speaker depending on the situation, the topic of talk and the relations he has with his interlocutors.

That listeners also ascribe different social meanings to the same phonetic variant has been shown in a handful of studies using the matched guise technique (LAMBERT *et al.*, 1960) in different speaker evaluation experiments. A number of such studies have focused on the indexicalities of fronted versus alveolar variants of the phoneme /s/ in varieties of English. The use of fronted /s/ (henceforth [s+]) in English seems often to evoke stereotypical perceptions of male speakers as gay (CAMPBELL-KIBLER, 2011; LEVON, 2006, 2014; MACK; MUNSON,

2011) and, conversely, perceived gender identity has been shown to have an effect on perceptions of /s/ quality in English (STRAND; JOHNSON 1996, MUNSON, JEFFERSON; McDONALD, 2006). In Danish, [s+] also seems to be quite strongly associated with femininity or gayness (PHARAO *et al.*, 2014, PHARAO; MAEGAARD, 2017). However, [s+] has also been observed to be used in social and linguistic contexts where the social meanings appear to be clearly different. In a follow up study to the investigations of the social meanings ascribed to [s+] in Copenhagen Danish, the variation in /s/ was combined with variation in the production of /t/ in order to study how indexical meanings of a phonetic feature are influenced by the cluster of other features with which it co-occurs (PHARAO; MAEGAARD, 2017). Two such clusters are those that are stereotypically associated with “Modern Copenhagen speech” on the one hand, and “Street language” on the other. These clusters – which we will refer to as MODERN and STREET in keeping with the practice from previous studies – are associated by young Copenhageners with categories of speakers that stereotypically have very different social characteristics, in particular with respect to gender and ethnicity. We refer to these clusters with the term *register* (e.g. AGHA, 2004), since this term and the theorization around it focuses on the link between the linguistic cluster and social meaning and at the same time stresses the historical emergence of this link. Like other cultural models, registers are formed by the history and the changes in the community in which it is brought into existence. In Copenhagen, and in Denmark generally, the increasing migration, especially from the 1960s onwards, has changed the demographic composition of society, and new ways of speaking have developed – “street language” being one of the more salient ones. However, it is not the case that “street language” is only used by speakers of immigrant background (e.g. MAEGAARD, 2010; MADSEN *et al.*, 2016), or that there is no intra-individual variation. Ideologically, the STREET register is linked to certain speaker types, but this does not mean that it is the case in actual usage, and that is why we find the term *register* more appropriate than e.g. *variety* or *dialect*.

The follow up study including variation in /t/ found that the effect of [s+] on the perception of male speakers of MODERN as feminine and gay was significantly attenuated when the [s+] occurred in an utterance that also contained a palatalized variant of /t/, the [tʲ] variant which has

commonly been observed in the STREET register (MAEGAARD, 2007, STÆHR, 2010). Together with previous studies of the indexicality of [s+] in American English when it occurs in combination with variants of the variable (ING) (CAMPBELL-KIBLER, 2012) as well as Levon's (2014) study of [s+] in combination with (th)-fronting in British English, the follow up study clearly indicates that the social meaning ascribed to a particular variant can be highly dependent on the variation with which it co-occurs, be that segmental or prosodic variation.

However, all of these studies have kept the nature of the voices used in the speaker evaluation experiments stable by only using samples of speech produced by males to study the relationship between different types of phonetic variables. In the present study, we continue the work on the social perception of variants of /s/ and /t/ in the registers MODERN and STREET in Copenhagen Danish by using samples of speech from female adolescents. By comparing our results with those obtained in the studies using male voices for the stimuli, we will be able to study the effect of speaker gender as well as studying the relationship between the different types of segmental and prosodic variation, which was carefully controlled in the stimuli. Specifically, we study the role of speaker gender in the social meanings associated with /s/ fronting and /t/ palatalization in the MODERN and STREET registers of Copenhagen Danish and ask:

- 1) What social meanings are associated with [s+] in female speech?
- 2) How are these meanings affected by [tʰ] in female speech?
- 3) What differences are there between the social meanings found for female speech and those previously reported for male speech?

2 Background

The present study involved a number of steps deemed necessary to answer the questions posed above. In line with Maegaard (2007, 2010) and Pharaoh *et al.* (2014), it was decided to first collect listener responses to the variation to be studied by using questionnaires with open questions. This was to ensure that the scales to be used in a subsequent experiment would be locally meaningful. Thus, rather than simply using the same 8 scales that had been used in the studies of the variables in male speech,

data was collected to enable us to construct scales based on traits that were deemed relevant when the variables occur in female speech. While it may at the outset seem reasonable to expect that boys and girls can be meaningfully evaluated on the exact same scales, we would argue that this could lead to a risk of missing the specific dimensions of social evaluation that are linked to speaker gender. In particular, we suspected that sexual orientation would not play a role in the evaluation of the features when they occur in female speech.

2.1 The variables studied

In Danish phonology, the alveolar articulation of /s/ is described as the ‘standard’ pronunciation, both in Copenhagen speech, and in Danish in general (GRØNNUM 2005, p. 111). However, there is variation, and the most salient ‘non-standard’ variant is probably the fronted variant [s+]. This is a free variant of /s/, and not an allophone bound to a particular phonological context or position in the syllable or word. As already mentioned, the [s+] variant has been shown to be associated with femininity and gayness by listeners, when they encounter it in the speech of male adolescents speaking with the prosodic pattern characteristic of MODERN. Furthermore, an audiologopedic study of [s+] in Danish has analysed the variant as a speech impediment (HUTTERS; BAU 2006). But they also noted that this so-called disorder is mainly tied to female speakers. Thus [s+] is referred to as “young girls’ lisp” (*ungpigelæsp*) in Hutters and Bau (2006), imbuing it with certain connotations even when it occurs in female speech. Maegaard (2007) also looked at speech production, specifically phonetic variation in a Copenhagen school. Here, it was found that [s+] was used mainly by the group of girls labelled the ‘nice Danish girls’ (MAEGAARD, 2007). Together this shows a connection between [s+] and femininity in public discourse as well as in studies of speech perception and production. However, Maegaard (2007) also found a relatively high frequency of [s+] in the group of boys known in school as the ‘foreign boys’, where ‘foreign’ is used by the adolescents themselves to label people with a minority ethnic background, i.e. immigrants of first and second generation descendants of immigrants, in particular from Turkey and the Middle East. This connection is more surprising, since the linguistic style, the clothing, and the behavior associated with these boys is stereotypically

linked to a streetwise, heterosexual masculinity that is very different from stereotypical gay masculinities or hyper-femininity, which as mentioned above appears to be what [s+] indexes in boys who use the MODERN register. As was also shown in Pharao *et al.* (2014), the [s+] did not have an effect in the STREET register, so it can be said that for certain types of male speakers, [s+] does not index gayness or femininity, but instead contributes to (or at least is not incompatible with) constructions of another kind of masculinity where heterosexuality and toughness are prominent parts. It also shows that the same variant [s+] may function as a stereotype in one context but as a marker in another context (in the sense of LABOV, 1971). Looking at the ascription of social meaning to variants within a more contemporary theoretical framework, we could suggest that the feature [s+] is to be viewed as part of different registers (AGHA, 2007), and perhaps even different indexical fields (cf. MAEGAARD; PHARAO, *fhc.*), and that this is why the social meaning of [s+] varies across users and their speech.

For the phoneme /t/, it is also the case that the alveolar variant is the standard pronunciation (GRØNNUM, 2005). Interestingly, the non-standard variant of /t/ that is most salient in Copenhagen-based speech is the palatalized variant [tʃ]. While there are words in Danish that phonetically start with [tʃ] (e.g. ‘tjener, tjekke, tjans’ *waiter, check, gig*), these contain combinations of /t/ and /j/ to speakers of Danish, i.e. the realization [tʃ] in these words is not the result of a process of palatalization, but simply a combination of the alveolar stop and the palatal glide, and minimal pairs exist, e.g. /tjɛgə/ *check* vs. /tɛgə/ *thatch* and /tjænʔs/ *gig* vs. /tænʔs/ *tooth’s*. However, Maegaard (2007) as well as Stæhr (2010) found the realization of /t/ as [tʃ] to be prevalent in the speech of adolescent boys, and in particular those with an immigrant background. Maegaard (2007) also found evidence for the variant in the speech of adolescent girls, but it was very rare and never occurred in the group labeled ‘foreign girls’. Hyttel-Sørensen (2011) found that this feature was very salient even for primary school children, who would spontaneously mention it as a feature of the way boys with immigrant background speak. In fact, Hyttel-Sørensen (2011) shows that primary school children sometimes perceive a female speaker of STREET using [tʃ] for /t/ to be a boy. That [tʃ] also has indexical value for adolescent Danes in Copenhagen was shown in Lillelund and Pharao (2014) and Pharao and Maegaard (2017),

where it was found that [tʰ] would lead even male speakers of MODERN to be rated higher on the scales *immigrant* and *gangster* by most listeners. Furthermore, it attenuates the perception of male speakers of MODERN using [s+] to be perceived as “feminine sounding”, suggesting at least an indirect link to masculinity for [tʰ].

Taken together, studies of language use, popular discourse about youth language and experimental results from the study of male-adolescent speech, all show the variation in /s/ and /t/ in Copenhagen-based speech to be doing indexical work related to stereotypical gender roles.

2.2 Associations of MODERN and STREET in previous evaluation studies

The linguistic features which are associated with the concept of STREET have been described in a number of sociolinguistic studies (QUIST 2000, 2008; MAEGAARD, 2007; MADSEN, 2008; MØLLER, 2009; STÆHR, 2010; AG, 2010; HANSEN; PHARAO, 2010; MADSEN; MØLLER; JØRGENSEN, 2010; MØLLER; JØRGENSEN, 2011). Our stimulus samples include only one characteristic feature of STREET, namely the prosodic patterns. The characteristic feature of STREET prosody is a perceived difference in rhythm from the MODERN register. It is described in Quist 2000 as sounding more “staccato” than MODERN and was shown in Pharao and Hansen (2005, 2010) to be closer to patterns found in syllable-timed languages, since the difference in duration between phonologically short and long vowels is neutralized in STREET by making long vowels as short as short vowels (on average, for details see PHARAO; HANSEN, 2010). The prosody of STREET was shown to have indexical effects of its own in Pharao *et al.* (2014), Lillelund and Pharao (2014) and Pharao and Maegaard (2017) where it was clearly tied to perceptions of speakers as having a ‘foreign’ or ‘immigrant’ background, and was also found to be a particularly salient characteristic of this register in Møller (2009)

The concept of the type of speech labeled MODERN is also well described in Danish sociolinguistics. In a series of speaker evaluation experiments, where MODERN was represented in the stimulus material, Kristiansen and colleagues have shown that MODERN is consistently evaluated more positively than “Conservative Copenhagen speech” (and more positively than the local dialect as well) on scales concerning *self-assurance*, *fascination*, *coolness*, and *friendliness* (for an overview

of this research, see KRISTIANSEN, 2009). Furthermore, Kristiansen *et al.* (2013) and Tøndering and Phrao (fthc.) show that Danish listeners can place the origin of a speaker with quite high accuracy on the basis of prosody alone, and that the prosody found in MODERN leads to between 70 to 89 % of listeners to identify the speaker as coming from Copenhagen. This suggests that the MODERN prosody, which is more stress-timed, is closely associated with Copenhagen-based speech in the minds of listeners and that prosody generally is an important feature in the construction of register (and even varieties) for Danish listeners.

These short summaries of studies of language-ideological structures point to important differences in how STREET and MODERN are perceived. It should be stressed that all of these studies have obtained largely homogeneous responses. In other words, people do recognize the features associated with the concepts of STREET and MODERN and react to them in accordance with established, highly shared, ideological schemes.

3 Experimental design

The matched-guise technique used in this study is a variant of the original matched-guise technique, which has been in use since 1960 (LAMBERT *et al.*, 1960). It is aimed at eliciting implicit language attitudes and is also useful for investigating how members of a speech community evaluate linguistic variation within various relevant registers. This also includes insight into the activation of social stereotypes associated with particular registers and with different types of linguistic variation, making the matched-guise a suitable choice in terms of experimental design for this type of study. The design is similar to Lillund and Phrao (2014) and Phrao and Maegaard (2017) which investigated the indexical meanings for /s/-variation and /t/-variation among Copenhagen boys by using variants of /s/ and /t/ spliced into recordings of short utterance with either MODERN or STREET prosody. This study expands on that by changing the gender of the speakers, but otherwise the experimental design is the same: Experiment 1 uses an open-ended questionnaire, the responses of which are converted into relevant scales used in Experiment 2. Both experiments include guises taken from recordings for a study of adolescent speakers of MODERN and

STREET by Phrao and Hansen (2010) where participants completed a map-task designed to elicit particular phonetic features. From these recordings, four female speakers were chosen; two representing MODERN and two representing STREET. Two short speech samples were selected from each speaker, one containing three tokens of /s/, while the other contained three tokens of /t/, after which tokens of [s] and [s+] and [t] and [tʰ] respectively were spliced into the samples, thus creating a complete set of matched guises for each of the four speakers. All tokens were manipulated to have the same duration and intensity as the original they replaced. The tokens of [s], [s+] and [t] were extracted from the speech of a girl judged to be speaking STREET and the [tʰ] token from a boy judged to be speaking MODERN. We chose to use a token of [tʰ] produced by a boy because during the splicing process it became clear that the acoustic difference between [t] and [tʰ], when produced by a girl in the recordings we had available for creating the stimuli, was often perceived as a dental-alveolar contrast instead of an alveolar-palatalized one, in particular when played over speakers, rather than presented over headphones. In other words, when the two variants were contrasted in running speech produced by female adolescents, the alveolar variant, [t] (with a CoG of 8054 Hz) sounded fronted, and the palatalized variant [tʰ] (with a CoG of 6549 Hz) sounded alveolar, even when presented to phonetically trained listeners. We conducted a pilot test with 10 subjects, who were naïve to the purposes of the final study. This pilot test was aimed at determining whether using a [tʰ] token produced by a male adolescent (with a CoG of 4566 Hz) would make the guises of the female adolescents sound unnatural. This was compared to naturalness judgements of the same clips, but with the original palatalized /t/ produced by a female speaker. The results showed that guises containing either of the two [tʰ] tokens sound equally natural, so in order to ensure maximal variation between the tokens used in the final experiment, the male-produced token was spliced into the samples of female speech to produce the [tʰ] guises. This can be said to weaken the ecological validity of the /t/ guises. However, recall that palatalized /t/ was documented in the data for Maegaard (2007), an extensive study of phonetic variation among adolescents in a Copenhagen school. We measured CoG for both /s/ and /t/ in an excerpt of the recordings made by Maegaard, and for one of the ‘Danish girls’, we found that about

half of the tokens measured had a CoG in the 3900 – 4700 Hz range. In other words, the male-produced token of [t̥] we used in our stimuli falls within the range found in spontaneous speech recordings of adolescent girls from the same environment as the girls in the recordings we based our stimuli on. Due to differences in recording circumstances, it was not possible to splice tokens of [t̥] from the Maegaard (2007) recordings into our stimuli while also maintaining a naturalistic impression – which is why we used the male-produced token from our own recordings. Given that similar acoustic values were obtained in the Maegaard (2007) recordings, we feel confident that the ecological validity of our stimuli was not severely hampered. The differences between the centers of gravity for all four tokens in the final experiment are shown in table 1.

TABLE 1 – Acoustics of the stimuli

/s/	CoG	/t/	CoG
[s+]	7454 Hz	[t]	8054 Hz
[s]	5717 Hz	[t̥]	4566 Hz

In summary, a total of 8 guises for /s/ variation (2 STREET VOICES x 2 segmental variants + 2 MODERN VOICES x 2 segmental variants), as well as 8 guises for /t/ variation (2 STREET VOICES x 2 segmental variants + 2 MODERN VOICES x 2 segmental variants) were created.

4 Experiment 1 – open responses

4.1 Method

Experiment 1 was an open-ended questionnaire. The stimuli consisted of the aforementioned speech samples from four different girls, two representing each register. For each speaker, one sample contained three instances of /s/ and the other sample three instances of /t/, and both samples were created in two versions: for the /s/ samples, one with [s] and another with [s+]; for the /t/ samples, one with [t] and another with [t̥]. In total, experiment 1 contained 16 guises.

The questionnaire used in experiment 1 contained one open-ended question: *Hvad er dit umiddelbare indtryk af denne person?* ‘What is your immediate impression of this person?’ This wording was used so as not to direct explicit attention towards the linguistic aim of the experiment. The informants were told the experiment was conducted by researchers from the University of Copenhagen and that they were going to hear 16 different speakers their own age, after which they should write a few words about their immediate impression of the speaker. The guises were played in a fixed order to avoid the same guise twice in a row and with approximately 30 seconds between each guise.

Experiment 1 was carried out at two high schools in Copenhagen, which mainly differ in the number of students with a minority ethnic background, one having a larger percentage than the other. A total of 95 students between the ages of 17 and 21 participated as informants. Following the experiment, the informants filled out a questionnaire with background information and participated in a group discussion regarding the aim of the experiment; none had worked out the actual aim, but both the /s/- and /t/-variation had been noticed and so had the two registers.

When looking at the responses, certain categories appeared to be meaningful and relevant to the informants. Coding the responses was in part a matter of interpretation for the coder, but many responses were in the form of keywords or very short sentences that all related to *gender*, *ethnic background*, *linguistic characteristics*, *personality*, *geography*, *social characteristics*, *appearance*, or *type*. Most responses contained more than one categorization, and all categorizations were coded and counted once per response. An example of this is shown in table 2.

TABLE 2 – Examples of responses to the open question together with coding

Response	Code
Example 1	
<i>Forvirret</i>	<i>forvirret</i>
‘Confused’	confused
<i>Doven</i>	<i>doven</i>
‘Lazy’	lazy
<i>Barnlig</i>	<i>barnlig</i>
‘Childish’	childish
<i>Umoden</i>	<i>umoden</i>
‘Immature’	immature
Example 2	
<i>Hård type med accent</i>	<i>hård</i>
‘Tough type with an accent’	tough
<i>Opvokset et sted med ”ghetto” typer</i>	<i>ghetto</i>
‘Raised with “ghetto” types’	ghetto
<i>Perkeraccent</i>	<i>perker¹ accent</i>
‘Perker accent’	<i>perker¹ accent</i>

4.2 Results

Across all guises, the more anterior variant of either variable, i.e. [s+] and [t] appear to be treated in much the same way by listeners, as we will show in our analysis below. Further, the less anterior variants [s] and [t̥] also appear to be treated equally by listeners. This is in some ways surprising, because [s] is generally considered the standard variant of /s/ in Danish (as discussed above), and therefore it might a priori be expected to pattern with [t], the standard variant of /t/, in the evaluations, rather than [t̥]. As we shall see below, this expectation cannot be seen to be supported in the evaluation of the variants in the speech of female adolescents.

¹ Perker is a (usually pejorative) slang term for immigrants particularly from the Middle East.

For *gender*, the speakers in guises with the more anterior variants are generally perceived as female where gender is mentioned, MODERN guises more so than STREET guises. With the less anterior variants, a larger subset of listeners perceived the speakers as male, particularly when listening to speakers of STREET. This supports the notion that there seems to be a connection between STREET and masculinity as already hypothesized from earlier studies, where the use of [tʰ] among female adolescents is extremely rare (MAEGAARD, 2007), and among male adolescents it indexes a STREET persona characterized by masculinity, among other traits (MADSEN, 2013). The counts for each gender in each guise is shown in table 3.

TABLE 3 – Counts for gender in each guise

STREET					MODERN				
	[s+]	[s]	[t]	[tʰ]		[s+]	[s]	[t]	[tʰ]
Female	37	32	31	17	Female	42	28	38	25
Male	4	6	1	4	Male	0	4	0	2

For *ethnic background*, a clear distinction between Dane and non-Dane is apparent. Speakers using STREET are generally perceived as non-Danes regardless of /s/ variation, and, conversely, speakers using MODERN are perceived as Danes. Variable /t/ does seem to play a role as indexical marker for foreign-ness, as the presence of [tʰ] activates a foreigner stereotype consistently across *both* registers. The presence of [t], on the other hand, seems insignificant in both registers, in the sense that it neither enhances nor diminishes the foreign-ness or Danishness of the activated stereotype belonging to each register. This indicates that ethnic background is a relevant characteristic when working with the two registers and this type of /t/ variation. The counts for ethnic background in each guise are shown in table 4.

TABLE 4 – Counts for ethnic background in each guise

STREET					MODERN				
	[s+]	[s]	[t]	[tʰ]		[s+]	[s]	[t]	[tʰ]
Dane	7	6	7	4	Dane	25	15	31	14
Non-Dane	37	35	37	52	Non-Dane	2	3	1	25

Linguistic characteristics is a group of responses primarily concerned with how and how well the speakers speak Danish. In all STREET guises, the less anterior variant is commented on more often than the more anterior variant, and the same is the case for /t/ variation in the MODERN guises. Only for /s/ variation in the MODERN guises are the ratios of comments roughly the same. This indicates that the listeners do perceive the variation, but possibly not in the same manner across the registers. It is also worth noting that particularly for the STREET guises, many comments revolve around bad Danish, speaking with an accent, or using *ghetto* slang, all of which seem to correspond to features generally associated with the STREET register. This contrasts with the speakers from the MODERN register, who are generally described as speaking good and proper Danish. Once again, [s] stands out because many comments revolve around the speakers of the guises with [s] “chewing gum while speaking”, “speaking with a lisp” or “with a blocked nose” (none of which was actually the case). [tʰ] also stands out and is explicitly pointed out in both registers. However, in STREET it merely seems to reinforce the activation of the foreigner stereotype, while the presence of [tʰ] in MODERN is more ambiguous. It does seem to also activate the foreigner stereotype, even possibly to an extent where it completely blocks out the MODERN stereotype, but it is also noted that it sounds fake and like the speaker is exaggerating their pronunciation. This poses the question: is it even possible for female speakers to use [tʰ] as a linguistic resource in MODERN? In STREET, it seems to alter the perceived stereotype slightly, but in MODERN it seems to be at odds with the register (as signaled by the prosody), thus making the combination unfeasible in the minds of adolescent listeners. Note that this is at odds with the findings from production as described above in the review of Maegaard (2007). The counts for the most distinct linguistic characteristics in each guise are shown in table 5.

TABLE 5 – Counts for linguistic characteristics in each guise

STREET					MODERN				
	[s+]	[s]	[t]	[t̥]		[s+]	[s]	[t]	[t̥]
Accent/slang/ ghetto language	19	15	16	22	Accent/slang/ ghetto language	-	-	-	13
Lisp/blocked nose	1	4	1	-	Lisp/blocked nose	14	15	1	2
Poor Danish	5	18	9	18	Poor Danish	1	5	3	4
Good Danish	2	4	2	6	Good Danish	16	5	23	4
[t̥]	-	-	2	6	[t̥]	-	-	-	21
Sounds fake	-	-	-	2	Sounds fake	-	-	-	2

Personality contains the largest number of individual responses ranging between 27 % and 47 % of all responses for each guise. There also seems to be an additional layer to the activated stereotypes compared to linguistic characteristics. The speakers in the STREET guises are generally perceived to be friendly, helpful, and confident with only very few mentions of the rough attitude and lack of interest in academics that is typically associated with adolescent males using the STREET register. Instead, the listeners characterize them as young and a little insecure, but overall friendly and normal, which again points to the stereotype associated with STREET being very different for adolescent girls than adolescent boys. For the MODERN register, the results are not as clear-cut. Both /s/ guises are perceived in a generally negative way as being insecure, unintelligent and annoying, while also being young and normal, but there seems once again to be a difference between the two variants. The [s+] guises are also perceived as confident and intelligent, pointing to a vague and not very well-defined stereotype, whereas [s] guises have very few positive comments overall, leaving the stereotype with a largely negative characterization. The positive additions to the activated stereotype for guises with [s+] are particularly surprising, because they contrast with a fairly well-known stereotype typically associated with [s+] called *poptøsen* ‘the pop girl’. The term itself has been in use in Danish since 1989 (DET DANSKE SPROG- og Litteraturselskab, 2019), and the concept has remained largely unchanged through its common representation in Danish media and discourse. She is blond, shallow and

not terribly smart, and as indicated by the name, she follows whatever happens to be popular. The label *poptos* was used by the respondents in Maegaard’s study, especially when categorizing female guises containing [s+] (2007, p. 223; 2010, p. 201). We do not see this stereotype in the responses for [s+], but it could be argued that she is somewhat present in the responses for [s], just not using the actual word *poptos*. We will return to this in the discussion. Variable /t/ in MODERN is similar to the STREET register overall regarding the ratio of positive comments. The presence of [t] activates an older, intelligent, and confident persona, while [t̥] activates approximately the same characteristics as the STREET register – confident, helpful, and young. The counts for the most distinct personality traits in each guise are shown in table 6.

TABLE 6 – Counts for personality traits in each guise

STREET					MODERN				
	[s+]	[s]	[t]	[t̥]		[s+]	[s]	[t]	[t̥]
Young	7	5	9	7	Young	13	14	4	7
Older	-	4	-	1	Older	1	2	10	3
Normal	6	2	1	-	Normal	9	5	4	-
Helpful/friendly	11	7	9	9	Helpful/friendly	6	2	5	6
Confident	3	10	6	9	Confident	12	8	15	11
Smart	2	2	-	-	Smart	8	3	11	3
Insecure	7	4	6	3	Insecure	9	9	6	6
Unintelligent	2	4	5	3	Unintelligent	3	7	1	3
Poor attitude/ annoying	2	4	3	5	Poor attitude/ annoying	10	10	5	5
Overall positive	44	35	38	33	Overall positive	49	28	38	38
Overall negative	31	24	23	27	Overall negative	49	49	18	24

As for *geography, social characteristics, appearance, and type*, various, subtly different stereotypes are activated. For *STREET*, the already known stereotype from the ghetto or the Western suburbs of Copenhagen (traditionally a working-class neighborhood that now has a high percentage of inhabitants with immigrant backgrounds) is activated across the register. The presence of [t] diminishes some of the negative connotations related to *STREET*, particularly the connection to the ghetto, but in terms of personality characteristics, *STREET* as a register activates similar levels of being a gangster or a “perker” and equal levels of playing tough regardless of variable /t/. Playing tough, in this case, should not be confused with actual toughness. The respondents express a clear distinction between pretend toughness and real toughness, and while pretend toughness occurs much more frequently in the responses, there are also examples of actual toughness indicating that adolescent girls can be and are perceived as legitimately tough in some contexts. For /s/ variation, it appears that [s] activates a slightly rougher version of the stereotype than [s+]. This divide between the less anterior and more anterior variants is also present in *MODERN*, where the more anterior variant point to upper class, the Northern suburbs of Copenhagen (generally considered very affluent), and a typical blonde, Danish girl. Here we also see some links to the stereotypical *poptøs*, but they are not as readily apparent or distinctive as we would have expected. The [s] variant activates a less well-defined stereotype, but points towards the urban parts of Copenhagen and playing tough. The counts for the most distinct aspects of *geography, social characteristics, appearance, and type* are shown in Table 7. As these are among the least frequent responses in the questionnaire, the counts here are lower than in the other tables. The presence of [t] in *MODERN* results in categorizations in the upper part of Table 7, notably “from the Western suburbs”. There are also three responses in the “upper middle class” category, pointing towards the more affluent, upper-class stereotype, but these are, however, infrequent – compared to the same categorizations made for the [t] guises.

TABLE 7 – Counts for geographical features, social characteristics, appearance and type in each guise

street					modern				
	[s+]	[s]	[t]	[tʰ]		[s+]	[s]	[t]	[tʰ]
Plays tough	2	2	6	6	Plays tough	-	1	-	3
“Perker”/gangster	7	6	8	6	“Perker”/gangster	-	-	-	2
Dark hair	-	1	1	2	Dark hair	-	-	-	1
Western suburbs/ ghetto	4	6	2	14	Western suburbs/ ghetto	-	1	-	4
Petite	3	4	6	3	Petite	4	5	-	3
Northern suburbs	-	-	-	-	Northern suburbs	2	-	1	1
Upper middleclass	-	-	-	-	Upper middleclass	3	2	7	3
Blonde	1	-	-	-	Blonde	7	3	5	1

In summary, both variables /t/ and /s/ seem to have some effect on the stereotypes activated by the two registers. It also appears that [s+] and [t] can be interpreted as being the unmarked variants, which for [s+] is unexpected and does not align with previous descriptions of Danish /s/. To investigate the extent of the effects of this variation in a quantifiable manner, eight fixed scales have been chosen on the basis of the responses in experiment 1 reported here. They appear to be relevant across both registers and both types of variation. *Ethnic background*, *Northern suburbs*, and *Western suburbs* are not only relevant based on these results, they were also used in the previous studies of this variation in Copenhagen Danish for male voices (e.g. PHARAO; MAEGAARD, 2017), which also makes them relevant for comparison. Personality traits like ‘intelligent’, ‘confident’, ‘helpful’, and ‘annoying’ are also relevant across both registers as they occur with relatively high frequency. Finally, “plays tough” is relevant to the perceived fakeness that some listeners report, which falls well in line with previous studies reporting on the *wannabe* phenomenon, where speakers are perceived to be using linguistic resources they are not actually socially entitled to, resulting in inauthenticity (cf. PHARAO *et al*, 2014).

5 Experiment 2 – fixed scales

5.1 Method

Experiment 2 is based on the same speech samples as experiment 1. However, in order to investigate not only the effect of /s/ and /t/ variation, but also whether the order of /s/ and /t/ holds any significance, it was necessary to modify the samples. This was done by cutting the /s/ and /t/ guises for each speaker in half and combining them with the other guise from the same speaker. This means that while experiment 1 has one set of guises for /s/ variation and one set of guises for /t/ variation, experiment 2 has one set of guises with one /s/ token and two /t/ tokens, and one set with one /t/ token and two /s/ tokens. Allowing for all possible combinations, this adds up to four guises per sample and eight guises per speaker. In total, this is 32 guises and table 8 shows all the possible combinations.

TABLE 8 – Combinations of variable /t/ and /s/ in the guises for experiment 2

1 [t] & [s+]	5 [s+] & [t]
2 [t] & [s]	6 [s+] & [tʰ]
3 [tʰ] & [s+]	7 [s] & [t]
4 [tʰ] & [s]	8 [s] & [tʰ]

32 guises based on only eight unique samples is not ideal for within subject design. Experiment 1 showed that just two guises of the same sample will stand out to some listeners, so four guises would increase that risk. Therefore experiment 2 has a between-subjects design, with 16 guises in two separate sets.

The questionnaire used in experiment 2 was the same for both sets of guises and contained eight scales based on fixed characteristics that were selected due to their prevalence in the responses gathered in experiment 1. Each of the characteristics (shown in table 9) was rated on a scale from 1 to 5, where 1 corresponds to *No, not at all* and 5 corresponds to *Yes, very*. Again, the participants were not informed of the linguistic purpose of the experiment, and the guises were played in a fixed order to ensure maximum distance between similar guises. In addition, to ensure

that the guises would be rated based on female stereotypes, this time listeners were explicitly told that they were to listen to 16 different girls.

TABLE 9 – The scales used in Experiment 2

Immigrant background	Helpful
Plays tough	Intelligent
Annoying	Confident
Western suburbs	Northern suburbs

Experiment 2 was also carried out at two Copenhagen high schools, one of which also participated in experiment 1 and one which did not. Both these schools also differ in number of students with an immigrant background and are thus comparable to the high schools in experiment 1. A total of 108 students between the ages of 16 and 22 (mean 17) participated as informants, and as in experiment 1, all informants filled out a questionnaire with background information and participated in a group discussion about the aim of the experiment. Again, no informant figured out the precise aim of the task, although some had noticed the /s/- and /t/-variation as well as the two registers.

5.2 Results

Ordinal mixed-effects logistic regression models were fit to the responses on all of the 8 scales separately. Respondent and guise were included as random effects and interactions of /s/ and prosodic frame, and /t/ and prosodic frames were included as well as simple effects for school, self-reported ethnic background, order of the segmental variables in the guises and the set of guises, to test for a possible difference between the two sets. No effect was found for the sets for any of the 8 scales, and therefore the results reported below are based on responses from all of the 108 students. There was no effect of any of the background variables (i.e. there was no difference in responses between students from the two schools, nor any effect of whether listeners self-reported as having an immigrant background). In the following, we present the models for the responses to the scales *immigrant*, *Western suburbs*, *plays tough*, *intelligent* and *Northern suburbs*. For the three remaining scales

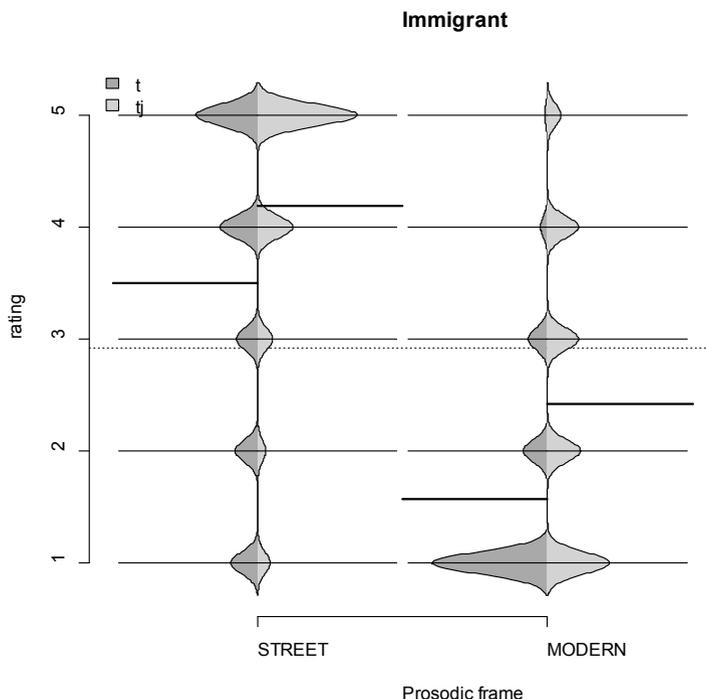
(*confident*, *helpful* and *annoying*) neither (s), (t) or the prosodic frame emerged as significant in the responses to the scales, even though they were frequently used as labels in the responses to the first experiment with the open question. Furthermore, the variable (s) never emerged as significant for any of the 8 scales. This was true regardless of the order of occurrence of the variables (s) and (t) in the guises (in contradistinction to the results found for male guises, cf. LILLELUND; PHARAO, 2014; PHARAO; MAEGAARD, 2017). We also did not find an effect of the interaction between the segmental variables and the prosodic frame. Thus, the following is a presentation of the stepped down models showing the effects of variable (t) and the prosodic frame. We start by looking at the scale *immigrant*.

TABLE 10 – Model summary for the scale *immigrant*

Factor	Estimate	Std. Error	z value	Pr(> z)
Prosodic frame (MODERN)	-3.40	0.69	-4.863	1.15e-06 ***
(t) type (palatalized)	1.25	0.56	2.196	0.0281 *

As the summary shows, there is an effect of prosodic frame, with MODERN guises rated lower on the scale *immigrant* than STREET guises, and guises with [tʲ] rated higher on the *immigrant* scale than guises with [tˢ]. Note that this is a simple main effect: the interaction between prosodic frame and (t) did not emerge as significant ($p = 0.67$). The partial effects of prosodic frame and (t) are shown in the beanplot in Figure 1. In a beanplot, distributions of responses are shown together with the mean rating. Furthermore, interactions of factors can be shown because the distributions are displayed with reference to the individual factors. In Figure 1 and in all subsequent figures in this article, dark grey distributions show the responses to guises containing the variant [t] and light grey distributions show the responses to guises containing the variant [tʲ]. The x-axis shows which of the two prosodic frames (STREET or MODERN) the distribution of responses belongs to. The distribution here is shown for each of the steps on the scale of 1 to 5. Means for each condition is shown by bold horizontal bars.

FIGURE 1 – Responses on the scale “immigrant” with distribution by variant and prosodic frame. The bold horizontal lines show the means for each condition.



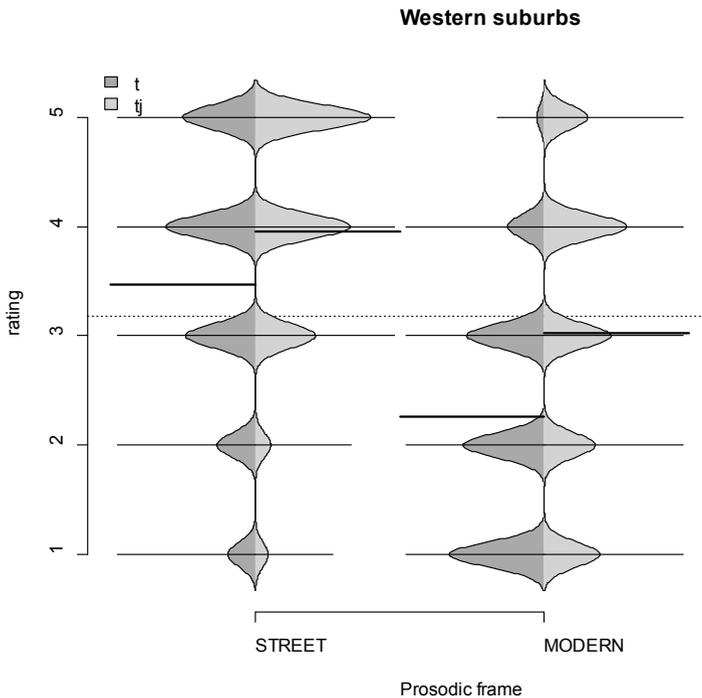
The distribution of responses to each of the steps shows that the effect of the prosodic frame is similar to that found in previous studies using male guises. The majority of responses to the STREET guises is 5 and 4 and the majority of responses to the MODERN guises is 1. It also shows that the variant [tj] has a similar effect in both prosodic frames showing that the effect of [tʲ] is different for the female guises, since it has an effect in both STREET and MODERN. Next, we look at the scale *Western suburbs*.

TABLE 11 – Model summary for the scale *Western suburbs*

Factor	Estimate	Std.Error	z value	Pr(> z)
Prosodic frame (MODERN)	-2.02273	0.43219	-4.680	2.87e-06 ***
(t) type (palatalized)	0.86773	0.35217	2.464	0.0137 *

Again, we find only main effects for the prosodic frame and the variant [tʲ] as illustrated in Figure 2.

FIGURE 2 – Responses on the scale “Western suburbs” with distribution by variant and prosodic frame. The bold horizontal lines show the means for each condition.



The pattern is similar to the ratings on the scale *immigrant*, with the exception that the MODERN guises receive a higher overall rating on the *Western suburbs*-scale. This pattern is reminiscent of the connection found between the same scales in previous experiments with male guises, as shown in the correlation analyses presented in Maegaard and Phrao (2016).

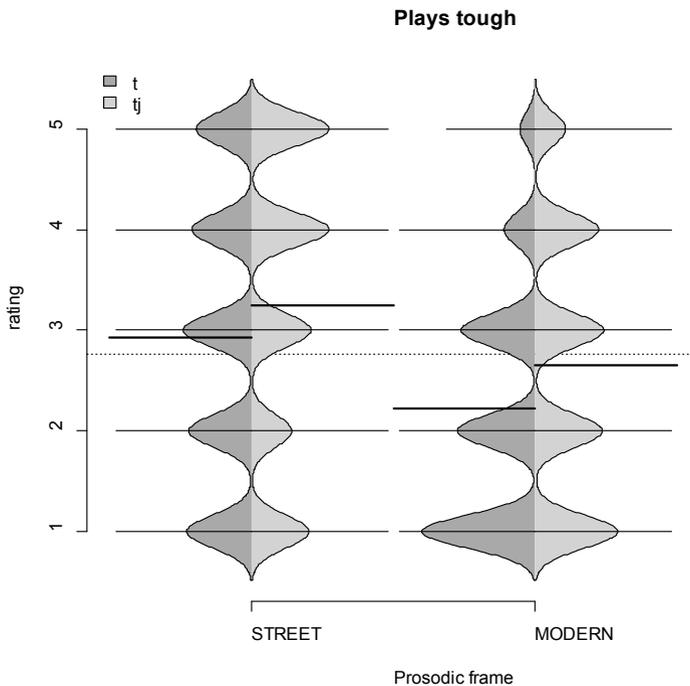
For the remaining scales we only found a main effect of the prosodic frames, but we continue to also present the differences between guises with [t^s] and [tʰ] in the illustrations to emphasize the lack of the effect. First, we look at the scale *Plays tough*.

TABLE 12 – Model summary for the scale *Plays tough*

Factor	Estimate	Std. Error	z value	Pr(> z)
Prosodic frame (MODERN)	-1.20443	0.42548	-2.831	0.00464 **

The effect is shown in Figure 3.

FIGURE 3 – Responses on the scale “Plays tough” with distribution by variant and prosodic frame. The bold horizontal lines show the means for each condition. Note that the differences between [t] and [tʰ] are not statistically significant.



It is worth noting that the average ratings for both registers are close to the center of the scale, indicating that the ratings should

not be interpreted as showing that the STREET register is perceived as particularly “tough sounding”, only that they are more so than the guises representing the MODERN register. Note also that the responses are more evenly distributed among the individual steps on the scale for the STREET guises, whereas MODERN guises rarely receive ratings of 4 and 5.

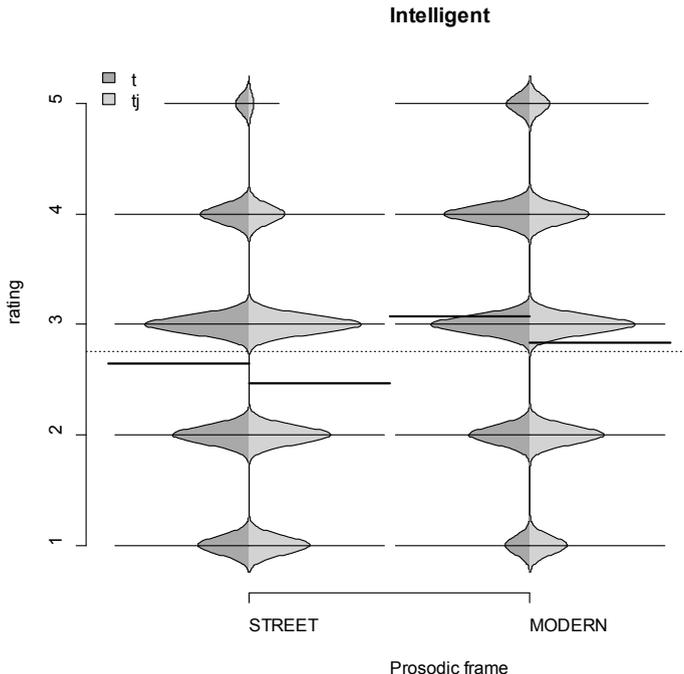
The model for the scale *intelligent* is shown below.

TABLE 13 – Model summary for the scale *intelligent*

Factor	Estimate	Std. Error	z value	Pr(> z)
Prosodic frame (MODERN)	.93	0.42	2.216	0.0267 *

For this scale, it is the MODERN frame that leads to an increase in rating as illustrated in Figure 4.

FIGURE 4 – Responses on the scale “intelligent” with distribution by variant and prosodic frame. The bold horizontal lines show the means for each condition. Note that the differences between [t] and [tʃ] are not statistically significant.



Again, the average ratings for both registers are close to the center of the scale, indicating that the prosodic frame of MODERN is not interpreted as “intelligent sounding” per se, only more than the STREET guises. Note also that for both prosodic frames the majority of ratings was 3, although of course the MODERN guises received significantly more ratings of 4, than the STREET guises did. Lastly, we look at the model for the responses on the scale *Northern suburbs*, which exhibits the same pattern.

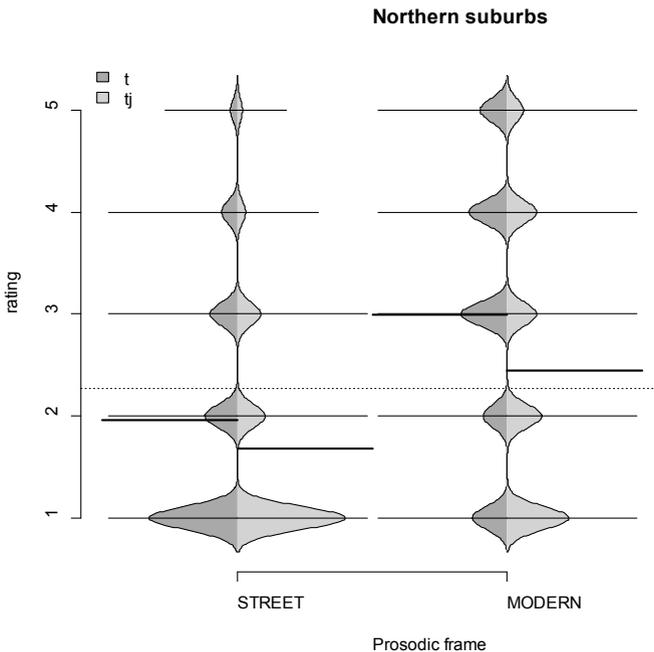
TABLE 14 – Model summary for the scale *Northern suburbs*

Factor	Estimate	Std. Error	z value	Pr(> z)
Prosodic frame (MODERN)	1.78	0.43	4.096	4.21e-05 ***

The effect is illustrated in figure 5.

FIGURE 5 – Responses on the scale “Northern suburbs” with distribution by variant and prosodic frame. The bold horizontal lines show the means for each condition.

Note that the differences between [t] and [tʰ] are not statistically significant.



Summarizing the results of the statistical models, we can say that both the STREET prosody and the palatalized variant of /t/ are closely associated with the traits “immigrant” and “Western suburbs”. The STREET prosody is also associated with “playing tough” when compared to the MODERN prosody, whereas the MODERN prosody seems to be most closely tied to the trait “Northern suburbs” and, in comparison with the STREET prosody, associated with being more intelligent. While some positive effects were found for the linguistic factors, the most striking result, especially in comparison to the results from the first experiment, as well as in comparison with the results from previous studies of male guises, is the finding that the variation in /s/ did not emerge as statistically significant for any of the scales used in the experiment.

6 Discussion

In terms of answering the question of what social meanings are associated with [s+] in female speech, it is interesting to note that there are no statistically significant differences for /s/ variation in experiment 2. Experiment 1 does show a slight difference in the activated social stereotypes, so that while the acoustic difference appears distinguishable to the respondents, they do not seem to ascribe meaning to it in the same way that they do in male speech or for /t/ variation in female speech. This indicates that girls may have completely free variation for the production of /s/, or at least that [s+] is more expected in female speech than it is in male speech, which would explain the lack of statistically significant differences in experiment 2. This result could partly be a consequence of the chosen scales. Since research into male speech has shown a link between [s+] and femininity, it could be hypothesized that the same link would occur in female speech. Experiment 1, however, showed no such link, and thus the scale was not used in experiment 2. However, an argument could be made for including femininity in a future study, as the pilot test did show some variation on that scale. But if femininity is, indeed, a relevant scale to include, then why did the respondents in experiment 1 not use the word *feminine* when describing the person in the recording? It could be a matter of implicitness. Earlier descriptions of female speech (MAEGAARD, 2007, 2010) point to the fact that both variants of /s/ occur across a broad spectrum of social stereotypes for girls and in many linguistic contexts, which may in turn lead to listeners not

ascribing specific social meaning to this particular variation because it is common and expected and thus does not carry explicit social meaning. This, however, does not mean that the meaning potential does not exist. It simply means that it is not activated under these particular circumstances, i.e. a listening experiment including only female voices whose femininity may well be implicit and therefore deemed not worth mentioning. The pilot test did show that speakers using the MODERN frame were generally considered more feminine than speakers using the STREET frame, and so were the [s+] and [t] guises as opposed to the [s] and [t̥] guises.

A *feminine* scale would possibly also more overtly point to the *pop girl* stereotype discussed in the results for experiment 1 and through that the ideological link between an overly feminine girl and [s+], which link to the effect of perceived femininity and gayness that [s+] has when encountered in male speech. While it may be the case that the label *pop girl* has fallen out of use for the generation of students who participated in this study, it seems likely that an inclusion of the scale *feminine* in a future experiment would help us get closer to the link between [s+] and gender in the minds of Danish listeners.

When adding [t̥] to both registers, the activated stereotype for STREET is considered more *immigrant*-like and more like someone from the *Western suburbs*, which was to be expected. For MODERN, however, a number of respondents commented explicitly that something seemed artificial or unnatural, with one even asking if the speakers had been instructed to read their lines using [t̥]. Considering that there was no reading and no instructions, this points to the quality of the manipulated guises being good enough to pass as authentic speech samples, but it also indicates that there is a conceptual issue with [t̥] occurring in the MODERN frame. This is further supported by the distribution of responses to the guises containing [t̥] in the MODERN frame. Recall from Figures 1, 2 and 5 that the distribution of responses to MODERN guises containing [t̥] was more or less evenly distributed among the 5 steps on the scales *immigrant*, *Western suburbs* and *Northern suburbs* as shown by the light grey distributions in the beanplots. These are the scales representing traits where the conflict between the frame and the [t̥] seems most explicit. The respondents were to some extent aware of this conflict, one saying that [t̥] did not fit in with the rest of the sample, so she just ignored it, and another saying that as soon as she heard [t̥], she immediately labeled the speaker an immigrant and did not consider the rest of the sample. While comments

like these seem to underline the clash between the MODERN frame and [tʰ] as well as be a point in favor of not combining MODERN and [tʰ], matters are not as simple as that. The original recordings used for the guises have girls speaking in the MODERN frame and authentically using [tʰ] without it being commented on. Maegaard also finds that while [tʰ] is rare in female speech, when it does occur, it occurs in the speech of girls perceived as Danish, not with immigrant girls (2007, p. 194, 2010, p. 196), which does not immediately align itself with the results of these two experiments. Nevertheless, earlier studies show that listeners may categorize speakers as immigrants when they hear a type of language use that they are not familiar with (see MAEGAARD, 2010 for a discussion of this). Thus, the categorizations of the MODERN [tʰ] guises as immigrant may be rooted in an experience of this combination of register and variant as strange. Furthermore, Maegaard's studies took place 15 years before the present one, and the social meanings of [tʰ] have arguably developed since then. The [tʰ]-pronunciation is often used in parodies, and is quite frequently reproduced in writings, often with a direct comment to minority speakers (HYTTEL-SØRENSEN, 2017; STÆHR, 2015).

Another possible explanation is rooted in the [tʰ] token itself, as the one used in both experiments is in fact produced by a male. Recall that what we perceived as a palatalized token of /t/ in female speech when listening over headphones, was perceived to be an alveolar variant of /t/ when heard over loudspeakers by phonetically trained listeners. It is quite likely that this is due to the acoustics of the token. While it had a spectral CoG that was 1500 Hz lower than the speaker's standard realization of /t/, it was still at 6549 Hz well above what is described as the typical range of 2000 to 4000 Hz for the CoG of postalveolar /t/ in other languages (TABAIN, 2001). The token we used ensured a greater contrast between the two variants of /t/ that listeners were to be presented with, and with a CoG of 4566 Hz it is much closer to the expected range. Recall also that in supplementary measurements of CoG in spontaneous speech of girls, we did find values in the 3900 – 4600 Hz range in recordings of a girl who had previously been heard as producing palatalized /t/. Furthermore, since participants in the pilot test judged guises containing this token of [tʰ] to be just as natural sounding as guises containing the token produced by a female speaker, and because the acoustics of the token produced by a male come closer to those expected for a postalveolar stop, we interpret the comments about a mismatch between the [tʰ] and

the MODERN prosody to reflect a stereotypical belief that girls do not use the [tʰ] variant, contrary to studies of language use. Certainly, the use of [tj] among adolescent girls is not as prevalent as the use of [s+], so while both Maegaard (2007) and Ag (2010) document the use of [tʰ] in the speech of girls, neither Madsen (2013) nor Hyttel-Sørensen (2017) find any trace of it. This greater variability across studies might explain why some respondents find it difficult to reconcile the occurrence of [tʰ] with MODERN prosody.

It is clear from the results of the experiments reported here that neither /s/ variation nor /t/ variation indexes the exact same traits and associated personae or stereotypes as those previously found for boys. There are some similarities: The two prosodic frames appear to carry similar connotations, and [tʰ] also indexes being an immigrant from the Western suburbs of Copenhagen. But no effect was found for the [s+] variant, possibly because it is used by many more different types of girls, leading to a more diverse indexicality. Interestingly, no effect was found for either of the segmental variants in connection with playing tough. Only prosody played a role here, with female guises with STREET prosody being judged as sounding more tough (or at least pretending to be) in comparison with girls with MODERN prosody. However, the difference was not large, and taken together with the lack of effect of the segmental variables, this may suggest that pretend toughness is not as relevant a trait as first indicated. What the results clearly demonstrate is that several factors interact in the meaning making process that occurs when listeners encounter phonetic variation. These factors are not limited to phonetic or linguistic aspects of the context in which the variation occurs, but also to a macro-social category like gender that is indexed by the voice of the speaker.

Authorship statement

The study was designed collaboratively between all three authors. Lillelund-Holst wrote the design sections and the majority of the first results section. Pharao wrote the second results section about the statistical analyses. Maegaard contributed to all other sections

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