

Sound change, priming, salience

Producing and perceiving variation
in Liverpool English

Marten Juskan

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4 A few words on salience and exemplar theory

This chapter contains some thoughts on the notion of salience and its role within the framework of exemplar theory. Both concepts are of prime importance for this study, and it is therefore vital that some basic assumptions pertaining to these notions be defined before we move on to the empirical results that they will help interpret and explain.

4.1 Salience

In this book, the concept of salience has already been brought up several times by now, without, however, having received a definition of any kind. Since the term is omnipresent in sociolinguistic research chances are that most readers will have a pretty good idea of what ‘salience’ is, but it is not at all unlikely that there will not be just one idea, but several ideas. This is because sociolinguistic salience is a notoriously vague concept that is defined in a number of different ways by different researchers. I do not intend to partake in the discussion as to which of the various definitions of salience is the most useful one, since – as I hope to make clear below – the question of what *makes* a linguistic variable salient is largely irrelevant to the present study. This study is rather interested in what salience *does*, primarily in perception. A short review of some relevant literature is nevertheless necessary in order to avoid confusion as to what exactly is meant when the term ‘salience’ is used in this work. However, this account will deliberately be as brief as possible; more detailed analyses of salience, its history, and use in sociolinguistics can, for example, be found in [Kerswill & Williams \(2002\)](#), [Rácz \(2013\)](#), and [Auer \(2014\)](#) – all three of which are also the primary sources of what is to follow below.

4.1.1 Salience and circularity

Strictly speaking, providing a basic definition of salience that all or at least the majority of researchers can agree on should be a rather straightforward and un-

controversial task. As the *Oxford English Dictionary* puts it, salience (in psychology) is the “quality or fact of being more prominent in a person’s awareness or in his memory of past experience” – in simpler terms, salience is the quality of ‘sticking out’ from the rest. Kerswill & Williams (2002: 81) stay very close to this general description when they define (socio-)linguistic salience as “a property of a linguistic item or feature that makes it in some way perceptually and cognitively prominent”. While the two definitions are very similar, there is actually a crucial difference, because Kerswill & Williams talk about salience as something that *makes* a feature stick out, not just the simple fact that it *does*. This type of definition can easily lead to what Auer (cf. 2014: 9) criticises as mixing *criteria* that allow us to identify salient features with the *causes* of salience, i.e. the traits that *make* a variable salient in the first place. He does, however, acknowledge that criteria and causes often *are* difficult to distinguish because they can actually be dependent on each other. His example is based on overt corrections, which are not only evidence for the salience of the corrected feature, but which also have their share in *making* the feature salient within the speech community.

A more serious problem ensues when *criteria* and *effects* of salience (on language change) are not strictly kept apart. This issue is addressed by Kerswill & Williams (2002: 82) as well, who argue that when salience is used as “a potential explanatory factor, (...) the concept all too easily lapses into circularity and mere labelling”, a point that is illustrated very well by their critique of Trudgill (1986). According to Trudgill, salient markers can be distinguished from non-salient indicators (see §4.1.3) by the fact that, among other things, the former are stigmatised and undergoing change while the latter are not. The problem is that stigmatisation and the change that it often entails (for example, when people start avoiding the stigmatised variant) are not only the prerequisites of marker status, but also its outcome – people are aware of non-standard variants because they are stigmatised, and the variants are stigmatised because people are aware of them. This essentially boils down to saying that a variable is salient because it is salient, which means that ‘salience’ loses any explanatory potential altogether.

In the present study, this would correspond to (1) hypothesising that only salient variables will create a priming effect, (2) running a perception experiment directly, and then (3) claiming that the presence of a priming effect for some variables but not for others is evidence for their salience, (4) which in turn explains their behaviour in the perception test. To avoid this kind of circularity it is therefore absolutely crucial to establish the salience status of the test variables *independently*, which is why the production data were collected.

Research based on the notion of salience is perhaps particularly prone to falling victim to the circularity trap because “salience *attempts* to combine both structural (language-internal) factors with sociolinguistic and psychological (extra-linguistic) factors in a single explanatory concept” (Kerswill & Williams 2002: 83, my emphasis), but many researchers actually focus primarily on one particular aspect only. However, if salience is to have any explanatory value (which necessitates avoiding circularity), “it *must* have recourse to extra-linguistic factors, which will be a combination of cognitive, social psychological or pragmatic factors” (Kerswill & Williams 2002: 83, my emphasis).

4.1.2 Cognitive vs. social salience

The way it is commonly used, sociolinguistic salience is thus a concept that combines cognitive and social components. However, as Rácz (cf. 2013: 11) points out, it actually makes sense to distinguish cognitive and social salience. The cognitive aspect is at least implicitly present in the most basic definition of salience: for something to ‘stick out’ it needs to have some quality that makes it more prominent in perception, and since this is inevitably linked to processing it is part of the cognitive domain. Social salience, according to Auer (cf. 2014: 10), is based on the fact that a particular feature can be linked to a certain (social) type of speaker, who, in turn, is associated with social and emotional evaluations, which are then transferred to the linguistic feature itself. The stronger these negative or positive evaluations are, the more (socially) salient the feature will be. Naturally, a feature has to be noticed first before it can be socially evaluated and judged, so cognitive salience is in fact a prerequisite of social salience. If a feature is *cognitively* salient it can acquire social meaning and thus become *socially* salient, too – crucially, though, it does not have to (cf. Rácz 2013: 11). Cognitive salience is thus a necessary, but not a sufficient condition for social salience.

Distinguishing cognitive from social salience can potentially help in sorting out some of the apparent confusion in salience research, because it allows to separate problems concerned with, for example, the interplay of social salience and language change, from a discussion that is more focussed on the primary causes of salience in the cognitive domain, irrespective of whether or not they result in social salience in a particular context. However, researchers are not really agreed on what makes something *cognitively* salient, either. While he does not claim that this is the only source of salience, Rácz (cf. 2013: 9) largely equates cognitive salience with surprise and operationalises it by means of transitional probabilities: a feature is surprising if it is unexpected in a particular context, i.e. when it has a low probability of occurrence.

Jaeger & Weatherholtz (cf. 2017: 37) embrace the same idea of surprisal as a function of unexpectedness, or low probability of occurrence, in a given context and equate it with informativeness – the more surprising an input, the more information is gained by processing it. They champion this operationalisation of salience not only because it is relatively easy to quantify, but also because surprisal has been found to play a role in research looking at reading times and implicit learning (cf. Jaeger & Weatherholtz 2017: 37). Crucially, Jaeger & Weatherholtz see surprisal as (one of) the cause(s) of *initial* salience, when the listener first encounters a given variant. Long-term salience, as the result of cumulative exposure, on the other hand, is based on “informativeness about social group membership” (Jaeger & Weatherholtz 2017: 38), i.e. on the association of a feature with a group of speakers, in whose speech it is usually frequent and thus not unexpected any more.

This account may well be able to explain the diverging levels of salience reported in the literature for the four variables analysed in this book. Lenition of /k/ and fronted NURSE are largely limited to Liverpool English, while velar nasal plus and happy-tensing are also found in other accents. From the point of view of the speech community as a whole, the former two have thus a lower probability of occurrence, and are also more informative with respect to their association (only) with Liverpool speakers.

Conceiving of salient features as surprising (and ‘informative’) ones is thus in line with research in psycholinguistics and the cognitive sciences, and this approach may also go some way to explaining the salience of certain sociolinguistic variables. But at least in sociolinguistics, surprisal is by no means the only option. Many other factors have also been proposed as potential sources of cognitive salience, for example (high) frequency or phoneme status (cf. Auer 2014: 8). Furthermore, it seems quite clear that attention, as a top-down factor, interferes with the bottom-up stimulus property of unexpectedness, for example when subjects are asked to count passes in a basketball video and fail to notice a person in a weird costume (a highly surprising event) crossing the scene (cf. Zarcone et al. 2017: 8). It can thus be said that attention “weights surprisal effects from one level or another, depending on the current goals and on perceived rewards” (Zarcone et al. 2017: 8).

With regard to the effects of salience on linguistic behaviour – usually change, convergence, and divergence are the focus of interest – I agree with Auer (2014: 17) who claims that sociolinguistic salience is “hierarchically organised” in the sense that “cognitive [causes of salience] are subordinate to social ones” (my translation). He argues that cognitive aspects do contribute to the sociolinguistic

salience of a variable, but much less so than social ones, and explains that this is because cognitive factors of salience are ‘filtered’ by the social layer (cf. Auer 2014: 18). What this means in practical terms is that only certain cognitively salient features are selected for social evaluation (i.e. they receive social attention) while others do not acquire social meaning. In the first case cognitive factors merely ‘reinforce’ sociolinguistic salience (which is nonetheless dominated by social evaluations), while in the latter (i.e. when cognitively salient features are not used to do social work), the resulting salience of the feature is ‘markedly’ lower (cf. Auer 2014: 18). Moreover, “from a sociolinguistic perspective, the choice of features which become [sociolinguistically] salient is in large part an arbitrary one” and seems to depend primarily on “community consensus” (Llamas et al. 2017: 56), which is why I would argue that, *for a sociolinguist*, the question of what makes something cognitively salient can be considered secondary to the (descriptive) knowledge about which features the community agreed to pay attention to.

4.1.3 Salience in this study

Since the primary hypothesis of this study is that only variables having a very high degree of *sociolinguistic* salience are capable of creating priming effects in perception experiments (cf. §1.1), it follows that the focus in independently assessing the salience of the variables presented in Chapter 3 should be on social aspects. I will, therefore, only be interested in *if* a variable is sociolinguistically salient for speakers, but not in *why* it is. It is, for instance, quite possible that a variable that is found to be socially salient is so because it is more informative than others with respect to unambiguously indexing a particular speech community. Given the fact that I am interested in the *effects* of salience rather than its *causes*, however, this piece of information, while interesting, is irrelevant to the present study. For this reason, cognitive aspects of salience will largely remain unaddressed in this book.

In very general terms, the question of interest in the present study is thus simply “[w]hether a variable is recognised in any way”, which means that this book is in line with many other sociolinguistic studies, where this is “what researchers (...) usually mean when they talk about *salience*” (Rácz 2013: 4, emphasis in original). In contrast to Rácz (2013), who explicitly includes his own work in the above statement, I will not, however, regard a feature as salient if it is recognised in *any* way, but only if it is ‘recognised’ as socially meaningful. The next question, then, is of course how we know that a variable is socially meaningful for speakers. While Chapter 3 provides a rough distinction into salient and

non-salient variables of Liverpool English as they are presented in the literature, these classifications are (1) primarily based on the observations of experts (dialectologists) or laypersons with a special interest in linguistic phenomena (e.g. the authors of the *Lern Yerself Scouse* series), and/or (2) grounded on databases that are often several decades old (Watson & Clark 2013 and Watson & Clark 2015 are notable exceptions to both points). An additional, up-to-date assessment of salience among the speakers of the variety themselves therefore seems desirable to make sure the conclusions drawn in the literature are still valid, and, if possible, to arrive at a more fine-grained ordering of variables on the salience scale.

Unfortunately, uncovering social attitudes towards a particular phonetic-phonological feature is seldom a straightforward task. This is because “language users are usually very much aware of particular words or intonation patterns *other* people use (...), but are much less attentive to phonetic differences” (Rácz 2013: 3, emphasis in the original). Directly asking subjects about phonetic or phonemic characteristics of an accent is still an option, but one that, for the majority of speakers, will only work in the case of the most heavily stigmatised features. A more indirect measure is required to capture the middle ground of variables that do carry some social meaning, but not enough to attract overt commentary. In this study, as in many others, this indirect measure is based on the *effects* of social salience, the most important of which include *social stratification*, *hypercorrection*, and, above all, *style shifting*.

Social stratification is based on the idea that “the normal workings of society have produced systematic differences between certain (...) people”, which can be thought of in terms of status or prestige, and assumes that these social differences are mirrored in linguistic behaviour: when two people can be ranked with respect to a social status criterion, they will be ranked identically with respect to their use of a non-standard feature (Labov 1972: 44–45). What this means in practical terms is that, for instance, middle-class speakers will usually have lower frequencies of usage than working-class speakers. In this work, the term will also be extended to gender differences, but certainly not because I wish to imply a social ranking between women and men. Rather, this is because, in numerous sociolinguistic studies, women have been shown to be more sensitive to linguistic forms that are socially relevant (cf. Labov 2001: 290–291), so if women use a variant in a different way than men then this suggests that said variant has acquired at least a certain degree of social meaning.

As a general term, hypercorrection refers to the “misapplication of an imperfectly learned rule” (Labov 1972: 126). In sociolinguistics, the term is traditionally used to describe cases where a particular group of speakers (sub-)consciously

tries to approximate the linguistic usage of a (prestigious) target speech community, but fails in their endeavour because the speakers actually ‘overshoot the mark’ and end up with realisation rates that are beyond the model set by the target group (cf. Labov 1972: 126). In the present study, the term hypercorrection will mostly be used in the more general sense, which extends its scope to any case where a given rule has been learned ‘imperfectly’, e.g. when speakers use an even more non-standard variant in more formal speech styles (compared to spontaneous speech) or when they correct the ‘wrong’ member of a merger. Both applications of hypercorrection imply (sub-)conscious awareness of socially meaningful variation, as both the target (in the Labovian definition) or the rule (in the more general reading) have a social component.

Style shifting, finally, is similar to social stratification (in fact, another term that is used by Labov is stylistic stratification). However, in style shifting, use of linguistic features is not correlated with social status of the speakers, but with the degree of formality of the communicative situation. A non-standard variant will thus be used most in very informal (e.g. a conversation among friends), less in more formal (e.g. a job interview), and least in the most formal speaking registers (e.g. reading out a written text) – of course, the reverse is true for standard, prestigious variants. The presence of style shifting presupposes (sub-)conscious evaluation of the linguistic feature, which results in it being considered more or less appropriate in a given, socially loaded, communicative situation. In consequence, “social awareness of a given variable corresponds to the slope of style shifting” (Labov 2001: 196).

Based on social stratification, hypercorrection, and style shifting, Labov’s 1972 hierarchy of *indicators*, *markers*, and *stereotypes* is a convenient way of categorising linguistic variables according to their sociolinguistic salience. An indicator is a (non-standard) linguistic feature which is shared among a particular group of speakers and can therefore act as a defining characteristic of that speech community (which it indexes, i.e. ‘points to’), particularly to outsiders. The speech community itself is, however, completely unaware of the feature and uses it to the same degree in all communicative situations, so there is no style shifting. When a speech community starts to become (sub-consciously) aware of a feature it is increasingly invested with social meaning and associated with a particular degree of (non-)formality. These markers show social stratification (i.e. they are used more by some social groups and less by others) and style shifting: frequencies of non-standard realisations decrease systematically in more formal speaking styles. A *stereotype* finally, does not only exhibit social stratification and style shifting, but has actually crossed the threshold to conscious awareness, and is ex-

plicitly commented on by members of the speech community (cf. Labov 1972: 178–180). Speakers are thus completely unaware of *indicators*, only sub-consciously aware of *markers*, and fully conscious of *stereotypes*.

Originally, Labov conceived of this hierarchy as a sort of sociolinguistic life cycle that every linguistic feature invariably went through: starting out as an indicator, acquiring social meaning and turning into a marker, before finally becoming the object of stigmatisation which eventually leads to disappearance. He later on corrected this interpretation, however, after several decades of sociolinguistic research had shown that some indicators do not seem to ever turn into markers and that heavily stigmatised variants can nevertheless survive (Labov 1994), for instance when they enjoy covert prestige as markers (this time in the every day sense of the word) of a local identity. In any case, this question does not affect the usefulness of the indicator-marker-stereotype hierarchy as a means of categorising variables according to how aware speakers are of them.

Based on the work of Silverstein (cf., for instance, Silverstein 2003) Johnstone et al. (cf. 2006: 78) have introduced new terminology centred around *first-*, *second-*, and *third-order indexicality*. There is a large degree of overlap between these terms and Labov's indicator-marker-stereotype distinction, while, of course, the two frameworks are not completely identical. Notable differences can, for example, be found between stereotypes and third-order indexicality: the former is (traditionally, at least) closely linked to stigmatisation and a higher chance of disappearance of the feature, while the latter term focusses on the conscious use of these features in performances of local identity and presumes that the relevant linguistic variants are, at this stage, primarily associated with place, and less with other social categories such as class (cf. Johnstone et al. 2006: 81–84). As we will see later, features of Scouse that can be classified as Labovian stereotypes *are* actually used in accent performances, and do not seem to be disappearing either, so it might seem preferable to use Johnstone et al.'s terminology. However, with respect to a hierarchical ordering of variables according to how conscious speakers are of them, indicator, marker, and stereotype – on the one hand – and first-, second-, and third-order indexicality – on the other hand – can be regarded as synonyms. Since the degree of sociolinguistic awareness is what this study is interested in, I will therefore stick to the more traditional Labovian terminology.

Rácz (2013: 6) criticises the indicator/marker distinction as “impl[y]ing a complete absence of gradience” while linguistic awareness should be conceived of as having “many levels, very few categorical”. I agree with the second part of this statement, but I do not see why one would have to give up on the convenience of Labov's classification (which is indeed rather categorical in nature) just because

one believes that salience is gradient. It seems to me that it is quite possible to distinguish, for example, different *degrees* of style shifting (How many styles are kept distinct? How significant are the differences?), *in addition to* a simple binary assessment of whether style shifting is present or not, and the same should hold for social stratification or hypercorrection. Such an approach should allow us to arrive at more fine-grained classifications of variables such as, for example, ‘solid marker close to stereotype status’ or ‘indicator showing the beginnings of style-shifting’.

No matter how fine-grained the classification, however, what I intend to do is clearly what Kerswill & Williams (2002) have called using *salience* as a label, which means that it is “no more than another term for the indicator/marker distinction” (Rácz 2013: 32). This statement is certainly true with respect to the present study, but, as I hope to have made clear, the use of salience as a ‘mere label’ should not constitute a problem against the backdrop of what this book is interested in. I do not, in fact, *need* more than a convenient label that describes how much social meaning a particular variable carries for its users. In contrast to the argument presented by Kerswill & Williams (2002) – who mainly talk about research investigating change and contact – salience *will* nevertheless have an explanatory value in the present study when it is linked up to how sociolinguistic variables behave in priming experiments. Salience, in this book, will thus be understood as meaning the amount of (social) awareness speakers have of a sociolinguistic variable. As such, it will be measured by the presence and, if applicable, degree of social stratification, hypercorrection, style shifting, and explicit comments and evaluations.

4.2 Exemplar theory

Any linguistic study that deals with the perception of speech is faced with the theoretical problem of how listeners process the range of intra- and inter-speaker variation that is abundant in naturalistic language data. Sociophonetic studies in particular have largely turned away from traditional accounts which assume that variation in the speech signal is normalised away to make the input fit into highly abstract and idealised mental categories. Most researchers explain their results against the backdrop of exemplar theory, and the present study is no exception in this respect. I will therefore provide a short overview of the assumptions and principles of this theory before addressing the place of salience in this model. Just as in §4.1, my account (which is inspired by the one presented in Juskan 2011) must be considered nothing but a brief summary, albeit one that should be

more than sufficient for the purposes of the present study. The reader is referred to [Pierrehumbert 2006](#) for a more detailed discussion.

4.2.1 **Basic principles**

Exemplar theory has its origins in psychology (cf. [Medin & Schaffer 1978](#)), where it was conceived as a general theory to model how information is stored, organised, and accessed in long-term memory. The basic tenet of this model is that every stimulus, or sensory experience, leaves a memory trace in the perceiver's mind. Crucially, now, these traces, or 'exemplars', are specific in nature, so what is remembered is not a (single) abstract and idealised prototype of a category, but rather there will be a whole number of similar, but still slightly different exemplars. The information that is stored for any episodic memory is not restricted to the single feature of an exemplar that is most useful (or maybe even sufficient) to distinguish different mental categories. Instead, the memory trace is poly-dimensional and can include several characteristics (cf. [Pierrehumbert 2006](#): 517). For a visual stimulus, for instance, this might include shape, colour, size, and others, even when only the shape is relevant in that hypothetical context. In fact, exemplars are even 'indexed' with additional information that is not directly linked to physical or sensory properties of the stimulus itself, but which pertains to the situation or the circumstances under which the experience in question was made. It would, for example, be remembered that the hypothetical visual stimulus from above was encountered in an experimental setting as part of a categorisation task – and possibly also whether the stimulus was categorised correctly or not (cf. [Medin & Schaffer 1978](#): 210–212). The outcome in long-term memory of a number of similar sensory experiences will thus be a cloud of specific exemplars which are indexed with all sorts of additional information.

This should not be taken to imply that there are no mental categories, because exemplar theory by no means denies their existence. It assumes, however, that they are created on the basis of – and in addition to – the individual exemplars that are stored in memory in full detail. Categorisation happens via the process of indexation just explained. When perceivers are confronted with stimuli as representatives of a particular category (for example that of 'circle') then the concrete realisations will be remembered as detailed individual exemplars, but each of them will *also* be indexed as being a member of that category. A mental 'bin' in exemplar theory thus consists not of a single idealised prototype, but rather of a cloud of individual instantiations that all share a given label.

Newly encountered input will then be perceived (and categorised) with respect to how similar it is to the traces that have already been acquired. If, for example,

a perceiver has remembered a cloud of small blue triangle exemplars, which are indexed as belonging to category A, and a second cloud of big red circles (indexed as instances of category B), then a newly encountered small blue circle is likely to be categorised as a kind of A because the stimulus is more similar to the A exemplars than it is to the B exemplars (provided shape, colour, and size all have equal weighting) (cf. [Medin & Schaffer 1978](#): 210–212). A stimulus ‘activates’ all remembered exemplars that are similar to it, which essentially means that they are cognitively foregrounded and therefore more ‘accessible’ (compared to other exemplars) for help in categorising the new input. Once an exemplar is stored in memory it can also act “as a retrieval cue to access information *stored with stimuli similar to the probe*” ([Medin & Schaffer 1978](#): 210, my emphasis). This means that a stimulus that is similar to one particular exemplar X will not only activate this one memory trace (and possibly a few others that are also extremely similar), but in fact the whole memory cloud of exemplars that share a particular label with X, for example category membership or context in which the exemplar was acquired. It will become clear in the following paragraphs that activation of exemplars via indexed information is a crucial aspect of exemplar theory for any sociolinguistic priming study.

4.2.2 Application in (socio-)linguistics

According to [Pierrehumbert](#) (cf. 2006: 517), [Goldinger](#) (1996) and [Johnson](#) (1997) were the first to interpret linguistic findings (from speech processing) with the help of exemplar theory. In traditional approaches, variation in the speech signal is normalised away to reduce different phones to idealised, essentialist forms which correspond to the abstract phoneme categories in the perceiver’s mind. In an exemplar theoretic account, speech sounds enter long-term memory as phonetically detailed exemplars, so “the lowest level of description is a parametric phonetic map rather than a set of discrete categories” ([Pierrehumbert 2006](#): 519). Phonemes do exist as mental categories, but as just explained for episodic approaches more generally, they have to be viewed as “clusters of similar experiences”, whose centres of gravity are malleable and can be changed by “incremental updating” of remembered exemplars (cf. [Pierrehumbert 2006](#): 519). A phoneme is thus a collection of phonetic variants (the memory traces) which are all indexed as being realisations of one particular phoneme (cf. [Pierrehumbert 2002](#): 113).

Indexation is, however, not restricted to phoneme assignment, but can also extend to other bits of linguistic information such as the immediate phonetic context. And of course any exemplar can be indexed with information that is

somehow related to the wider context the experience was made in (cf. §4.2.1). Sociophonetic studies usually assume that phonetically detailed exemplars are primarily indexed with social information about the speaker who uttered them, e.g. their regional origin, gender, age, etc. (cf. Hay, Nolan, et al. 2006: 370).

Activation of remembered exemplars is conceived of in the same way as in psychology. When speech sounds are perceived they activate any exemplars stored in long-term memory which are phonetically similar to the new input. The foregrounded memory traces then form the basis the input is processed and classified against. Activation can also be triggered indirectly via social information that the episodic memories are indexed with, a process which is actually very useful in dealing with variation in the speech signal.

Consider, for instance, the perception of vowels. It is a well-known fact that the formant structure of vowel realisations differs between women and men due to differences in vocal tract length. A perceiver who has been exposed to both female and male vowel articulations will therefore have two separate clouds of exemplars in long-term memory: one indexed with ‘female’, one with ‘male’. When this perceiver now engages in conversation with a person they have never met before a non-linguistic perception (such as a visual cue that the interlocutor is female) will activate the memory cloud indexed with the appropriate gender before the other person has uttered a single sound. Thanks to this pre-activation of potentially similar exemplars subsequent perception of new material should be easier and more successful. The two types of activation (via similarity and via indexation) can reinforce each other: In cases where perceived social information about the speaker and the phonetic shape of the input activate the same group of exemplars, full activation will be reached faster (cf. Hay, Nolan, et al. 2006: 370–371). If, however, social cues and the phonetics of the stimulus are at odds (for example when a woman has an unusually deep voice), the ‘wrong’ exemplars will be activated via indexation and misperception becomes more likely.

Social indexation of phonetically detailed memory traces is not merely a theoretic assumption of exemplar theory but something that has been tested empirically. Strand & Johnson (1996) had participants classify synthesised vowels from a FOOT-STRUT continuum, which were presented together with photos of female and male faces. One and the same audio stimulus was classified differently depending on whether it had been accompanied by a photo of a woman or a man. This non-linguistic bit of information (gender of the speaker) was thus used in perception and biased subjects towards using ‘female’ or ‘male’ vowel boundaries when classifying the stimuli. The same effect could be achieved when confronting perceivers with a range of (consonantal) s-f variants. These two fric-

atives are primarily distinguished by their central frequency, and the boundary between the two phonemes (i.e. the point where, perceptually, a /f/ becomes a /s/) is typically lower for male than for female realisations. When subjects assumed a speaker to be male (because they had been shown a photo of a male) the threshold for categorising an auditory stimulus as an instantiation of /f/ was lower (cf. Strand & Johnson 1996; Strand 1999).

Of course, the sex/gender distinction is a rather crucial one in language perception, as men have vocal tracts that are physiologically different from those of women, which results in markedly lower resonance frequencies for the former. Since the difference is – at least to a degree – biologically determined and thus phylogenetically precedes other social categories such as class or occupation, it could be that gender of speaker is a piece of information that enjoys a particular status in linguistic processing.

Niedzielski (1999) has shown, however, that effects of social information on the perception of linguistic material are not limited to gender. She tested perception of Canadian Raising in Detroit. Many Canadian speakers have a raised onset in the /ɑʊ/ diphthong, so that the realisation of this vowel is often [əʊ]. These raised variants can also be found in the speech of Detroiters, but while Canadian Raising is a firm part of the stereotypical beliefs people from Detroit hold about Canadians, they are completely unaware of raised onsets in their *own* speech, which they consider to be standard US English (cf. Niedzielski 1999: 63). Niedzielski played her participants recordings of a female Detroit speaker, who naturally produced Canadian raising, presented them with 6 resynthesised vowels (ranging from hyper-low to hyper-raised onsets), and asked them to indicate which one sounded most like the one they had heard in the stimulus. All perceivers listened to the same voice, but half of them had ‘MICHIGAN’ written at the top of their answer sheet, while in the other group the corresponding label was ‘CANADIAN’. These labels had a significant effect: although everyone received the same acoustic input, subjects who had been primed for ‘Canada’ were significantly more likely to perceive Canadian Raising than those who had been primed for ‘Michigan’ (cf. Niedzielski 1999: 64–68).

While Niedzielski does not do so herself, these results can be interpreted as evidence for the existence of social indexation of phonetically detailed exemplars. When the concept ‘Canada’ is invoked (via the label on the answer sheet) participants activate memory traces that are marked (‘indexed’) as having been produced by speakers of Canadian English. These exemplars contain raised onsets of the /ɑʊ/ diphthong and, since they are cognitively foregrounded, they bias the perceptual system towards hearing these variants in the new input as well. If

the prime is ‘Michigan’, however, perceivers activate exemplars that are indexed with ‘US standard English’ (because Detroiters consider themselves to be speakers of standard English). The centre of gravity in this exemplar cloud is, of course, shifted towards lower onsets, so subjects are more likely to perceive non-raised variants of /ɑʊ/ when these memory traces bias perception (cf. Hay, Nolan, et al. 2006: 372).

Hay, Nolan, et al. (2006) later successfully replicated Niedzielski’s findings. They had an essentially identical methodology, but used the New Zealand-Australia opposition to prime participants, instead of Michigan-Canada as in Niedzielski’s study. Their experiment was concerned with the perception of short front vowels, particularly /ɪ/. This phoneme is often realised as a raised [i] by Australians, and as a centralised [ə] by New Zealanders. Speakers in both countries frequently comment on this feature under the label of the ‘fish ’n’ chips’ stereotype, as this is a common phrase that can be used to illustrate the differences in realisation (cf. Hay, Nolan, et al. 2006: 354). Participants were asked to match synthesised vowels to the ones they had heard in recordings of a female New Zealand speaker. The only difference between the experimental groups was once again the label at the top of the answer sheet. Results were comparable to Niedzielski 1999: subjects primed for New Zealand were more likely to perceive centralised tokens, while subjects primed for Australia were more likely to report more Australian percepts (cf. Hay, Nolan, et al. 2006: 359–363). Jannedy et al. (2011) have shown that a perceptual bias can even be generated when the priming categories are (socially and ethnically stratified) districts of one and the same city.

Whether subjects actually *believed* that the speaker was Australian turned out to be irrelevant: once exemplars indexed with ‘Australia’ had been activated by the prime they biased perception, irrespective of conscious evaluations of the prime (cf. Hay, Nolan, et al. 2006: 374). In a follow-up study Hay & Drager (2010) furthermore demonstrated that such priming effects can be generated by much more subtle and less direct cues. Instead of an explicit label on an answer sheet they used stuffed toys commonly associated with Australia (kangaroo, koala) and New Zealand (kiwi) to prime perceivers. The toys were merely present in the room where the participant was seated, but they were not directly linked to the experiment. All the same, they generated a priming effect that was comparable to the one found in the replication of the Niedzielski study (cf. Hay & Drager 2010: 871–872 and 874–875). Previous research has thus clearly shown that information about the regional origin of speakers is part of long-term phonetic memory, and that exemplars activated on the basis of this type of extra-linguistic information can bias subjects towards perceiving variants that are typically associated with the primed group of speakers.

4.2.3 Frequency and salience in exemplar theory

My hypothesis that exemplar priming in sociolinguistics is a phenomenon that only occurs with (highly) salient variables is not a purely exploratory one. Rather, it is actually directly motivated by the framework of exemplar theory, where salience has been suggested to play a role from the very beginnings.

For one thing, salience is believed to structure long-term memory to a certain degree by ‘ranking’ different aspects of a given exemplar. With respect to (indexical) information that is stored with a particular memory trace, for instance, [Medin & Schaffer \(cf. 1978: 210–212\)](#) already pointed out that not all bits need to be equally important, but that the different dimensions an exemplar is associated with can, in fact, be weighted. They use the example of a mannequin, a stimulus which, for almost any perceiver, will share many features with remembered exemplars of the category ‘human’ (e.g. overall shape, size, proportions, number of limbs...). However, the mannequin stimulus differs from the ‘human’ exemplars in a very ‘salient’ category, viz. that of animacy. As a consequence, no subject will cognitively include (i.e. ‘perceive as’) a mannequin among the exemplar cloud of humans, despite the large degree of overlap in features related to physical appearance. In perception, the difference in a salient feature category (animacy) thus overrides more numerous similarities in less salient ones.

While interesting, this is not the effect of salience that is most important for the study at hand, because it can, by definition, only unfold in this way once a stimulus has been remembered. Salience is, however, already a crucial factor during the act of perception *before* the stimulus enters long-term memory as an exemplar. Although humans do seem to be able to store quite an impressive amount of information (cf. [Johnson 2005](#), cited in [Rácz 2013: 44](#)) – meaning that our memory *could* theoretically contain all experiences ever made – we do not, in practice, remember every single stimulus we have encountered during our lifetime. Rather, exemplars fade over time if they are not activated, just like any other kind of memory, which results in “[d]ifferent exemplars hav[ing] different strengths” (cf. [Pierrehumbert 2002: 115](#)). For this reason, exemplar theory has “frequency effects everywhere” ([Pierrehumbert 2006: 524](#)). Variants that are encountered more often than others can be memorised more often, and will dominate memory structure in one of two ways.

Firstly, frequent remembrance of similar stimuli results in denser memory clouds, i.e. mental categories which simply contain more exemplars than others. By their sheer numbers, these exemplars develop a “cumulative force” that biases the processing of new material: subsequent input is likely to be categorised as a member of this dense cloud as well (cf. [Pierrehumbert 2006: 524](#)). Secondly,

a new experience can be so similar to an already remembered one that it will not be stored as a separate exemplar. Instead, it will “impact the same [neural] circuits”, which “involves updating or strengthening” of the extremely similar exemplar already stored in memory (Pierrehumbert 2006: 525). There is thus not an increase in the number of exemplars in a category, but – at least up to a certain extent – the existing memory traces themselves enjoy a “cumulative effect of exposure” (Pierrehumbert 2006: 525), i.e. they become more prominent or foregrounded due to a higher degree of remnant activation from the last exposure.

A crucial aspect here is that we are talking about *frequency of remembrance*, and not simply *frequency of occurrence*, of a particular variant. It is therefore not sufficient to consider the frequencies of certain tokens in, say, a corpus in order to model the memory structure of subjects who are exposed to these tokens. The reason for this is that long-term memory is not a mirror image of “undifferentiated raw experience” (Pierrehumbert 2006: 525). Instead, “a process of attention, recognition, and coding which is not crudely reflective of frequency” intervenes between the physical, sensory input on the one hand, and the act of actually storing an exemplar on the other (Pierrehumbert 2006: 525). As a general rule of thumb, research in psychology has shown that perceivers seem to pay more attention to ‘informative’ events (cf. also the discussion in Rácz 2013) and “[e]vents that are attended to are in turn more likely to be remembered” (Pierrehumbert 2006: 525). Pierrehumbert (cf. 2006: 525) stresses the fact that informative events are often infrequent. If one passes a particular shop every day, this event will soon not be informative any more and will (no longer) be attended to, resulting in an inability to remember details like specials of the day even a short time after the experience. If, however, on one occasion, there is a hot-air balloon in the car park next to the store, then this rare event will probably be remembered for a long time and in vivid detail.

Two points need to be mentioned here: (1) the tendency Pierrehumbert describes should not be taken to mean that high frequency and high informativeness are, a priori, mutually exclusive, and (2) even if they were, the general statement that events that attract attention are more likely to be remembered would still hold – and high frequency tokens could very well be attended to by perceivers for reasons other than their informativeness (particularly in terms of surprise). The bottom line is that which (and how many) exemplars are retained in long-term memory is not simply a matter of raw frequency in the linguistic input a person receives, but rather one of “*effective exposure*”, which is “a function of actual exposure as well as cognitive factors such as attention and memory” (Pierrehumbert 2006: 519, my emphasis).

It is not really surprising that [Pierrehumbert \(2006\)](#) discusses the whole issue under the sub-heading *Salience*, because salient features are features that stand out in perception (whatever the exact cause for this may be), which is essentially the same as saying they attract above average degrees of attention. The way salience is understood in the present study (cf. §4.1.3) ties in with this: if speakers are (sub-)consciously aware of a linguistic feature because it carries social meaning, and this awareness shows in production differences (i.e. attention paid to their own speech), then it only makes sense to assume that they also pay more attention to these features in perception¹. If, in turn, salient variants receive more attention then it follows that they will be remembered more often, meaning that long-term memory will either contain more of these exemplars or it will be biased to a degree by salient memory traces that are cognitively more prominent. In both cases, exemplars containing salient variants should activate considerably faster and more strongly than less- or non-salient ones, and, as a consequence, the resulting priming effects should be more powerful for the former than for the latter.

Existing research in sociophonetics has, in fact, collected some evidence that hints at the possibility that exemplar priming might only work for highly salient variables. [Niedzielski \(cf. 1999: 69–75\)](#), for instance, found that the priming effect discovered in the perception of Canadian Raising was not statistically robust for vowels undergoing the Northern Cities Chain Shift (which served as secondary test variables). The 2006 study of [Hay, Nolan, et al.](#), in turn, produced two secondary findings which are also of considerable interest for the present study: (1) the priming effect was particularly strong for stimuli containing the word *fish* (which also occurs in the label commonly used to denote this shibboleth) (cf. [Hay, Nolan, et al. 2006: 363](#)), and (2) priming with the two secondary dependent variables /æ/ and /ɛ/ was statistically less robust or even completely non-significant (cf. [Hay, Nolan, et al. 2006: 367](#)). Both experiments have thus unearthed priming effects exclusively, or at least primarily, for linguistic variables that can be classified as sociolinguistic stereotypes.

¹In fact, several studies have produced evidence for a connection between production and perception. [Hay, Warren, et al. \(2006\)](#), for instance, found that New Zealanders' perception of /ɪə/-/eə/ pairs depends on whether the listeners merge these two vowels in their own production. In another study using synthesised vowel continua, [Kendall & Fridland \(2017\)](#) showed that perceptual discrimination of /æ/ and /a/ is influenced not by the absolute position of these vowels in US subjects' realisational spaces, but actually by the degree to which they produced a merger of the low back vowels /ɑ/ and /ɔ/ – which suggests that the link between production and perception can also have a more indirect base in the relations between vowels instead of their absolute positions.

While Hay, Nolan, et al. (2006) do hint at a possible connection between exemplar priming and the salience of the test variable, this is clearly not the primary concern of their study. Understandably, their discussion of this issue is therefore very brief and also somewhat speculative. To my knowledge, there is no study to date that has thoroughly and systematically investigated the impact that (social) salience has on the presence and strength of exemplar priming effects. It is the intention of the present study to start closing this very gap.

4.3 Summary

Salience is defined in a number of ways by different researchers and there is a particularly high degree of disagreement with respect to what causes a feature to be salient. This book does not partake in this discussion, but is merely interested in the *effects* of salience in perception, not its *causes*. Sociolinguistic salience will be understood as a scale of (sub-)conscious awareness. Features will be classified with respect to Labov's indicator-marker-stereotype hierarchy which, in turn, will be based on the presence and extent of social stratification, style shifting, and hypercorrection. For perception, exemplar theory (a model which assumes that long-term memory contains phonetically detailed exemplars indexed with social information) predicts that – thanks to the attention filter – salient features will be stored in memory more often and/or will be more prominent than non-salient ones. As a consequence, activation of salient exemplars should be easier, faster, and stronger. It is therefore to be expected that exemplar priming effects either do not occur at all or are at least considerably weaker when the test variable does not enjoy a high degree of (conscious) awareness among perceivers.

Sound change, priming, salience

This volume investigates the realisation and perception of four phonological variables in Liverpool English (Scouse), with a special focus on their sociolinguistic salience. Younger speakers' speech is found to be more local, but only for the two salient variables in the sample (NURSE-SQUARE and /k/ lenition), which appear to carry considerable amounts of covert prestige. Local variants of non-salient happy-tensing and velar nasal plus, on the other hand, are actually found to be receding, so at least to a certain extent Scouse also seems to be participating in regional dialect levelling.

The importance of salience is also obvious in the perception data, with only the two highly salient stereotypes generating robust effects in a social priming experiment (albeit in the unexpected direction). These results indicate that the investigated variables differ measurably not only in their use in production, but also in terms of how central they are to mental sociolinguistic representations of Scouse. They also tell us more about the way we process, store, and (re-)use sociolinguistic variation in perception. By defining likely contexts for significant priming effects they might finally even help in coming up with a more elaborate 'theory of priming' in the realm of sociophonetics.

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