DOI: 10.1111/josl.12588

ARTICLE

Journal of Sociolinguistics WILEY

Swear(ING) ain't play(ING): The interaction of taboo language and the sociolinguistic variable

Matthew Hunt[1] | **Colleen Cotter**[2] | **Hazel Pearson**[2] | **Linnaea Stockall**[2]

[1]University of Southampton, Department of Modern Languages & Linguistics, Southampton, UK

[2]Queen Mary University of London, Department of Linguistics, London, UK

Correspondence
Matthew Hunt, University of Southampton.
Email: m.c.hunt@sotn.ac.uk

Funding information
Economic and Social Research Council, Grant/Award Number: ES/P000703/1; Gorilla Grants 2019 courtesy of Gorilla Experiment Builder

Abstract

Swearwords influence social evaluation of a speaker in a variety of ways depending on social context (Jay & Janschewitz (2008), The pragmatics of swearing. *Journal of Politeness Research. Language, Behaviour, Culture*, 4(2), 267–288). Little attention has been paid to the role of linguistic variation in social perceptions of swearing, however. This paper presents two experiments that test the role of sociolinguistic variation in the social evaluation of swearing. Experiment 1 is a variant categorization task, in which participants categorized acoustically ambiguous swearwords and phonetically matching neutral and non-words as ending in either "-ing" or "-in." Results suggest that swearwords led participants to hear "-ing" on ambiguous items. Experiment 2 is a matched-guise task in which listeners heard a passage featuring a mix of swearwords and neutral "-ing" words in one of four conditions: fully velar (*All-ing*), fully alveolar (*All-in*), only swearwords as velar (*Swear-ing*), or only neutral words as velar (*Swear-in*). Participants rated speakers on Likert scales (Schleef et al. (2017), Regional diversity in social perceptions of (ING). *Language Variation and Change*, 29(1), 29–56). Participants again displayed a tendency towards hearing "-ing" on swearwords. As a result, responses to the *Swear-in* guises were similar to those for the *All-ing* guises. The

consequences for our understanding of swearing, sociolinguistic perception and cognition, and style, are discussed.

KEYWORDS
sociolinguistic cognition, sociolinguistic perception, style, swearing, variable (ING)

1 | BACKGROUND

Swearwords present an interesting paradox for linguists. Despite its apparent potential for causing harm and offense, swearing continues to be ubiquitous across the majority of languages and cultures (Jay, 2009). More paradoxically still, of the subset of vocabulary items frequently circumscribed as "swearwords" in English, the items often considered the most offensive are also the ones that are uttered the most frequently (Beers Fägersten, 2012). Swearing must therefore be more complicated than simply being taboo or offensive.

Given that most instances of swearing are socially motivated (Beers Fägersten, 2012), we would expect a variety of social meanings to be available to speakers through swearing. Socially motivated language variation can index aspects of speakers' identities, including macrosocial category membership (e.g., gender, social class) and orientation towards locally relevant norms of communication (Eckert, 2000, 2008). Sociolinguistics is resplendent with examples of nonstandard language varieties that allow speakers to do their own context-specific "meaning-making" (Eckert, 2008, p. 465) and we would expect the same to be true for swearing, particularly because swearing arguably epitomizes the notion of nonstandardness.

In the literature, this is shown to be the case. Swearing is associated with a multiplicity of meanings outside of offensiveness, including toughness (Hughes, 1992), intimacy or trust (Stapleton, 2003), humor (Stapleton, 2010), trustworthiness and intelligence (DeFrank & Kahlbaugh, 2019), and increased persuasiveness (Cavazza & Guidetti, 2014). How swearing is perceived also varies as a function of contextual factors, with speaker gender (Beers Fägersten, 2012), ethnicity (Jacobi, 2014), and social status (Jay & Janschewitz, 2008) influencing how swearing is perceived.

Missing from these studies is a focus on internal linguistic variation. In social evaluation tasks, swearing is simply present or absent with the individual swearwords typically treated as unvarying entities. These studies do not consider how the social meanings attributed to swearwords may vary as a function of the way in which those words are used, despite the existence of a large amount of linguistic variation in swearing. In fact, a swearword's pronunciation can influence its pragmatic meaning. For example, subtle changes in the /ʌ/ vowel in *fuck* can mark different intended meanings (Gold & McIntyre, 2016). After measuring the duration of the /ʌ/ vowels in occurrences of *fuck* in The Wire, Gold, and McIntyre found that a longer duration could indicate a surprised or disbelieving use of *fuck*, whereas a shorter duration could reflect an idiomatic usage. Furthermore, just like any other set of words, swearwords will be pronounced by different speakers in ways which are bound to change how they are perceived; work in sociophonetics has shown this to be true for neutral words, so it follows that the same could be true for swearwords.

Work in sociolinguistic perception has already demonstrated that if two socially meaningful variables are present in the speech signal, each with their own distinct set of potential social meanings, the speaker is not associated with the sum total of those meanings. Rather, different variables can combine

to produce unique sociolinguistic profiles (Campbell-Kibler, 2011). In some cases, this can reflect the different levels of social salience that variables display (Levon, 2014). Furthermore, some variables may be variably prominent depending on the overall speech style in which they are used (Pharao et al., 2014).

As with any other set of lexical items, the pronunciation of swearwords is likely to vary across speakers, contexts and speech styles. It is therefore plausible to expect this variation to influence sociolinguistic perception. Listeners frequently make use of phonetic variation as a resource for social evaluation (Campbell-Kibler, 2005). As already discussed, listeners are similarly sensitive to the presence of swearwords. As such, the combination of a socially meaningful linguistic variable with a swearword, which is also socially meaningful, may produce a unique set of social meanings.

As perceptions of swearing vary due to language-external factors, we might also expect variation as a function of language-internal factors. Are all pronunciations of a swearword perceived the same? For example, should we expect listeners to react to a word like *fucking* uniformly, regardless of whether it is pronounced as [fʌkɪŋ] or [fʌkɪn]? If the social meanings attributed to swearing depend on who and in what context the swearing occurs, we might expect those meanings to also depend on how they occur.

This would have consequences for both swearing research and sociolinguistics. First, it would nuance previous claims made about the social significance of swearwords in person perception (Cavazza & Guidetti, 2014; DeFrank & Kahlbaugh, 2019) by showing that, even within uses of the same word, there is perceptual variation as a function of internal-linguistic factors. Second, it would nuance previous claims made about the social meanings associated with variation in pronunciation, such as variable (ING), either by extending these claims to swearwords or by demonstrating that swearwords are in some way exceptional. Finally, it would have consequences for sociolinguists across the discipline with regard to both sociolinguistic cognition and the conceptualization of style; swearing, we will show, is a good example of why we need models of sociolinguistic cognition in which language and social processing are modelled in parallel (Campbell-Kibler, 2016).

With this in mind, we present two related experiments to examine the potential relationship between swearwords and the socially meaningful linguistic variable (ING). Following Squires (2016), who draws on the work of Schmidt (1990), we separately consider two types of awareness: perceiving and noticing. *Perceiving* is the creation of "internal representations of external events" (Schmidt, 1990, p. 132); this roughly maps onto Labov's (1972) concept of the sociolinguistic indicator. *Noticing* involves internal representations of external events affecting conscious processes, without the representations themselves rising to the level of consciousness (Schmidt, 1990); this roughly maps onto Labov's (1972) sociolinguistic marker. By testing people's knowledge of linguistic variation in swearing at two different levels of awareness, we provide a holistic account of an as-yet unexplored area of both swearing research and sociolinguistics more generally.

2 | VARIABLE (ING)

To test the effect of pronunciation on social evaluations of swearing, a sociolinguistic variable was chosen that could be applied to a variety of different swearwords. Variable (ING) has been shown to be stable across multiple varieties of English, including British and American English (Houston, 1985; Labov, 2001; Tagliamonte, 2004; Trudgill, 1974). A large body of work has already established the influence of variable (ING) on social evaluation (Campbell-Kibler, 2005; Schleef et al., 2017). More specifically, it has been shown that social evaluations linked to variable (ING) can depend on

the copresence of other socially meaningful linguistic variables (Campbell-Kibler, 2011). For these reasons, variable (ING) was the most logical choice for the current study.

Variable (ING) concerns the alternation between velar and alveolar realizations of the string "-ing." The alternation shows up most frequently in the gerundive and progressive "-ing" morphemes. It is not restricted to these morphemes, however, also showing up in pronouns ending in *-thing* such as *something* and *nothing* (Labov, 2001) and occasionally in other multisyllabic words ending with the "-ing" string, but not in monosyllabic words like sing or thing. Production studies on variable (ING) suggest consistent grammatical and social conditioning. The velar [ɪŋ] variant is more common among noun forms (e.g., *ceiling*) and the alveolar [ɪn] variant is more common among verb forms (e.g., *she's playing*), with other forms somewhere in the middle, such as gerunds (e.g., *she enjoys playing with sand*) (Labov, 2001).

Listeners show an awareness of this distribution across part-of-speech categories when categorizing tokens of variable (ING). In Vaughn and Kendall (2018), participants listened to sentences containing (ING) words, pronounced with one of the two variants, and categorized them via button press as either "-ing" or "-in." Sentences contained (ING) words on a part-of-speech continuum, from the most verb-like forms to the most noun-like forms. Participants were significantly faster to respond to words with the alveolar [ɪn] variant if they had a smaller bias towards the velar [ɪŋ] variant in production (e.g., nouns and pronoun-3; e.g., *anything* or *everything*). They were also least accurate in correctly identifying the alveolar [ɪn] variant on items with the smallest velar [ɪŋ] bias (the pronoun-3 items). The results suggest that listeners made use of bottom-up information from the rest of the word when identifying variable (ING) tokens (Vaughn & Kendall, 2018).

In the UK, the variable's social conditioning is region dependent, as there is a significant North-South divide with respect to variable (ING) production in England. In Northern varieties, there is little social stratification (Tagliamonte, 2004). In Southern varieties, however, there is significant social stratification, with [ɪn] more common in working class speech (Houston, 1985; Schleef, Meyerhoff & Clark, 2011; Trudgill, 1974). Regarding perception, Schleef et al. (2017) explored the social meanings attached to variable (ING) in three different regional accents, namely London, Manchester, and Edinburgh, using listeners from those respective regions. For Londoners listening to London accents and, to a lesser degree, Mancunians listening to Manchester accents, use of the alveolar variant was associated with *-articulate -educated*, *-hard- working*, *-rich, -posh*, *+working-class*, and *+casual*. This contrasted with Edinburgh-based participants listening to Edinburgh accents, for which use of alveolar [ɪn] was associated with *+friendly*, *+down-to-earth*, and *+trendy*.

3 | EXPERIMENT 1: TESTING SOCIAL EXPECTATION

It is widely accepted that social information and linguistic knowledge are retained in memory alongside one another (Foulkes, 2010). The influence of social information on linguistic perception concerns expectation and prediction. If a listener thinks that a speaker belongs to a particular social category (e.g., female), their predictions about their speech will converge towards the speech styles associated with that category. Following exemplar models (Pierrehumbert, 2001), the social information encoded in the memories of linguistic tokens helps listeners identify novel tokens. More specifically, expectations relating to a speaker's identity can influence word processing (see Hay, 2018).

Experiment 1 involved a forced-choice single-word variant categorization task, a variation of the phoneme monitoring task first used by Foss (1969). Categorization of socially meaningful phonemes has been used by Hay et al. (2006) and D'Onofrio (2015), among others. Most relevant is the work of Strand (1999) on the effect of perceived speaker gender on phoneme categorization. Strand's study

used minimal pair consonant-vowel-consonant tokens on a synthesized fricative continuum from /ʃ/ to /s/ (e.g., *shod* to *sod*), with participants required to categorize each token accordingly. Participants were presented with a visual prime of either a male or female face. The prime influenced participants' perceptual boundary between /ʃ/ and /s/. The female face pushed the boundary further towards /s/, while the male face pushed the boundary further towards /ʃ/, in-line with production trends for men and women. Essentially, participants' decisions were informed by their social expectations for how they expect men and women to sound, based on previous experience.

In the current experiment, participants heard a series of swearwords and phonetically matching neutral words and nonwords, all ending with an "-ing" morpheme (e.g., *fucking*, *ducking*, and *nucking*). On each trial, participants were asked to identify whether the word they just heard ended with "-ing" or "-in." Unbeknownst to the participants, the items had been artificially manipulated, such that the variable (ING) tokens came from a nasal continuum from maximally velar to maximally alveolar, with acoustically ambiguous items in the middle.

The prediction was that, on these acoustically ambiguous items, listeners would be biased towards selecting "-in" for swearwords compared to neutral words and nonwords. In general, for neutral words, one would expect a bias for selecting "-ing"; Vaughn and Kendall (2018) observed an overall bias towards "-ing" using a similar procedure, with the authors suggesting that, unlike "-in," "-ing" is always available and is unmarked. In the case of swearwords however, an "-in" bias was predicted.

This prediction was motivated by the fact that swearwords share some of the same socioindexical associations as alveolar [ɪn]. Like alveolar [ɪn], swearwords index informality (Beers Fägersten, 2012; Cavazza & Guidetti, 2014; Stapleton, 2010). Swearing occurs more frequently in unstructured conversations, compared to task-orientated discussions (Bayard & Krishnayya, 2001). Furthermore, in the British National Corpus (BNC), swearing is more frequent in the spoken section than the written section (McEnery, 2004; Love, 2017, 2021).

Second, like alveolar [ɪn], swearwords often have a socioindexical association with working class speech (Cheshire, 1982; Hughes, 1992; Romaine, 1999; Stapleton, 2010). Swearing is often considered to index particularly working-class masculinities (Baruch & Jenkins, 2007; Eckert & McConnell-Ginet, 2013), potentially as a way of avoiding effeminacy (De Klerk, 1997). Swearing has relevance for working-class women too, however, argues Hughes (1992). While women in the middle classes have historically avoided swearing, swearing indexes localized norms of communicating for working-class women (Hughes, 1992).

With regards to social class, the production data on swearing is more mixed. In the 1994 edition of the BNC, swearing was inversely correlated with socioeconomic group, with swearing most frequent among the lowest socioeconomic group (McEnery, 2004). More recent work by Love (2017, 2021) presents a more complicated picture, however. Using a more fine-grained scale of social class used by the Office for National Statistics (2010), with 1 being the highest and 8 being the lowest, Love (2017) finds the highest frequency of swearing in the 4–7 range. In a follow-up article, Love (2021) finds swearing among "working class" and "middle class" speakers to be roughly equal; his collapsing of the five different categories of social class used by McEnery (2004) under these binary labels may be hiding some of the variation, however.

While there is no direct production evidence linking swearing with alveolar [ɪn], largely due to the scarcity of freely available, phonetically transcribed corpora and the relative lack of swearwords in corpora full stop,[1] they are nonetheless stylistically and socioindexically linked. As such, for ambiguous items, in the absence of reliable acoustic evidence pertaining to the variable (ING) token, speakers were predicted to rely on their implicit knowledge of these links to inform their decision. This task was an assessment of what participants *perceive* about language, rather than what they *notice* (Squires, 2016).

3.1 | Methods

3.1.1 | Stimuli

The stimuli for Experiment 1 were monosyllabic swearwords, neutral words and phonotactically licit nonwords combined with the suffix "-ing." Numerous linguists have attempted to provide a definition for swearwords. The majority agree at least on the criteria for swearing provided by Ljung (2010), who suggests that swearing involves taboo concepts, nonliteral meaning, formulaic expressions, and the expression of emotion. Swearwords vary significantly cross-linguistically and even cross-dialectally, however; for example, the use of *bollocks* and *jerk* vary significantly in British and American English, respectively (Dewaele, 2015).

It was therefore important that the choice of swearwords in this study reflected the speech community from which participants were drawn. As participants were speakers of British English, a source of British swearing was required. Following, McEnery (2004) and Love (2017), swearwords were taken from Ofcom's guide to offensive language in British broadcast media (2016). In a normed study of tabooness (Janschewitz, 2008), all nine were well above the upper quartile (1.57). All swearwords also formed licit words when combined with "-ing." All nine swearing items have their own entry in the Oxford English Dictionary (2020) and the Urban Dictionary. The swearing items were as follows: *fucking*, *shitting*, *pissing*, *twatting*, *bitching*, *damning*, *cunting*,[2] *crapping*, and *dicking*.

Neutral words were taken from the UK SUBTLEX database (Van Heuven et al., 2014) and were as follows: *ducking*, *gritting*, *kissing*, *chatting*, *slamming*, *blunting*, *flapping*, and *picking*. Nonwords were taken from the ARC nonword database (Rastle, Harrington & Coltheart, 2002) and were as follows: *nucking*, *plitting*, *tissing*, *yatting*, *vitching*, *framming*, *yunting*, *blapping*, and *zicking*. All items were phonetically matched to the swearwords and the swearing and neutral items were coded for log lexical frequency and part-of-speech dominance (Dom POS) using the UK SUBTLEX database. Valency and arousal measures for the item's stems were taken from Warriner, Kuperman, and Brysbaert (2013). This resulted in nine minimal triplets, totaling 27 test words (see Appendix A).

A white male speaker of Standard Southern British English recorded all items with both velar and alveolar realizations of (ING). Items were recorded in a sound attenuated booth using a Neumann TLM103 microphone via the RME fireface UX audio interface. Recordings were made at a 16 bit, 44.1 kHz sample rate. The recorded stimuli were analyzed in Praat (Boersma, 2019) to check for any acoustic cues from the prenasal vowel. The prenasal /ɪ/ vowel in each item was manually segmented. The midpoint F1 and F2 of the vowel was then automatically extracted using a Praat script. Pairwise *t*-tests in R (R Core Team, 2018) showed no significant difference in midpoint F1 and F2 between the different Item Types (all p values > 0.05), ensuring that word-level response differences would not result from acoustic cues from the prenasal vowel.

For each test item, a nasal continuum was created using the MATLAB program TANDEM-STRAIGHT (Kawahara et al., 2008), a program previously used in sociolinguistic perception studies (e.g., Zheng & Samuel, 2017). The process involved morphing together two whole items. TANDEM-STRAIGHT decomposes the speech signal, extracting from each sound an interference-free spectrogram, an aperiodicity map and a fundamental frequency (F0) trajectory; this process was performed for both the velar and alveolar recordings of each test item (e.g., *fucking* and *fuckin*, *ducking* and *duckin*).

The two sounds in a pair are then loaded into a distance matrix (see Figure 1) to compare their STRAIGHT spectrograms. Frequency anchors are then manually placed along the center line of the matrix to map together meaningful segments of two sounds for example, the beginning and end of each phoneme and significant formant transitions. TANDEM-STRAIGHT then morphs the paired sounds

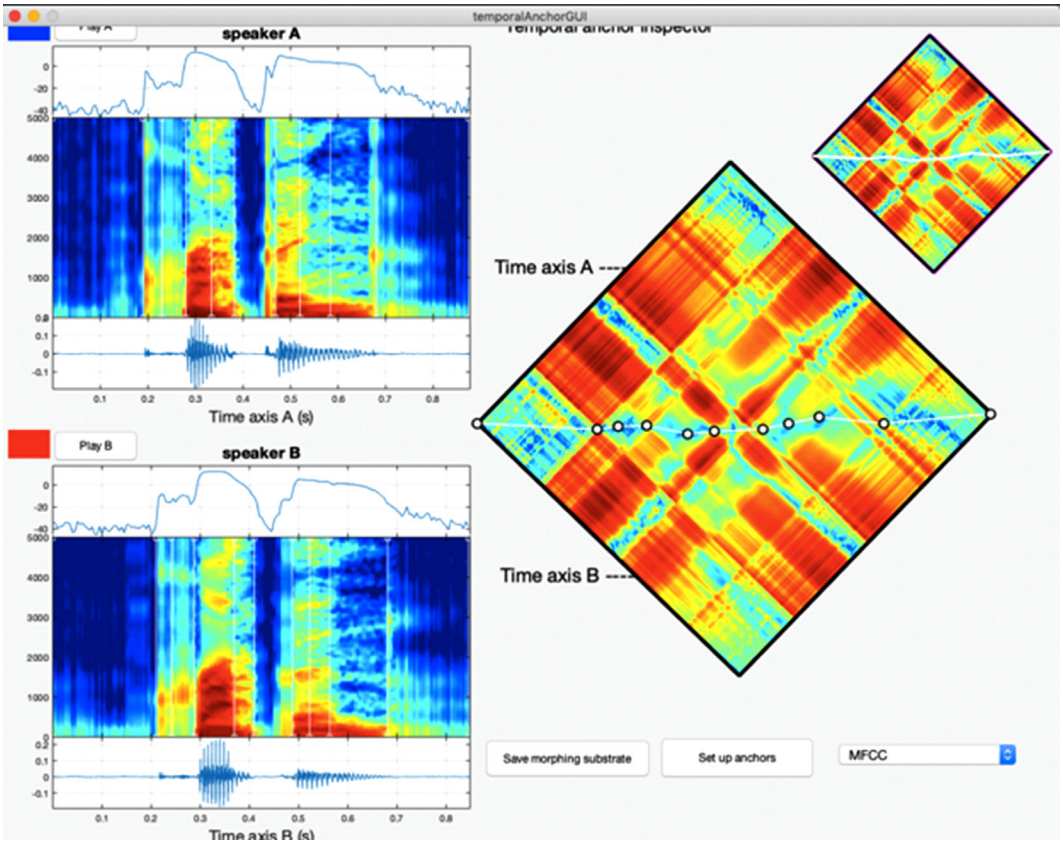

FIGURE 1 TANDEM-STRAIGHT: distance matrix for two sounds

together, generating a continuum of a preselected number of steps (see Kawahara et al., 2009 for more detail). Through this process, all aspects of the word are morphed into a continuum, including the pre-nasal /ɪ/ vowel. For this experiment, seven-step continua were constructed. This process was completed for all 27 test items, generating 189 test stimuli. These were combined with 50 fillers containing a mixture of other neutral words and nonwords also ending in "-ing"; fillers were unambiguously pronounced with either velar [ɪŋ] or alveolar [ɪn]. All stimuli were normalized to 70 db in Praat.

To test for by-group acoustic differences, the nasal continua were normed on a separate set of participants. All 189 test stimuli were manually segmented in Praat to remove the first syllable. For example, the minimal triplet *fucking*, *ducking* and *nucking* became *king*, *king* and *king*, at each of the seven continuum steps. Forty-five participants, paid £0.76 and recruited via Prolific Academic (2019), completed an online variant categorization task following the same procedure as the main task (see Section 3.1.2). On each trial, participants had to select, via keyboard button press, whether the word they heard ended with "-ing" or "-in." Participants completed 52 test trials, including two trials per item. Item and Continuum step were counterbalanced across participants.

Results were analyzed using logistic mixed-effect regression models in R with the *lme4* package (Bates et al., 2015). Response was included as the dependent variable (1 = "-ing," "-in" = 0). Item Type (swear vs. neutral vs. nonword: treatment coded) and Continuum Step (1–7: centered) were included as predictors, with Participant and Word as random intercepts. No significant differences were found between the baseline type (swear) and neutral or nonword types at any step in the nasal continuum (see Appendix B).

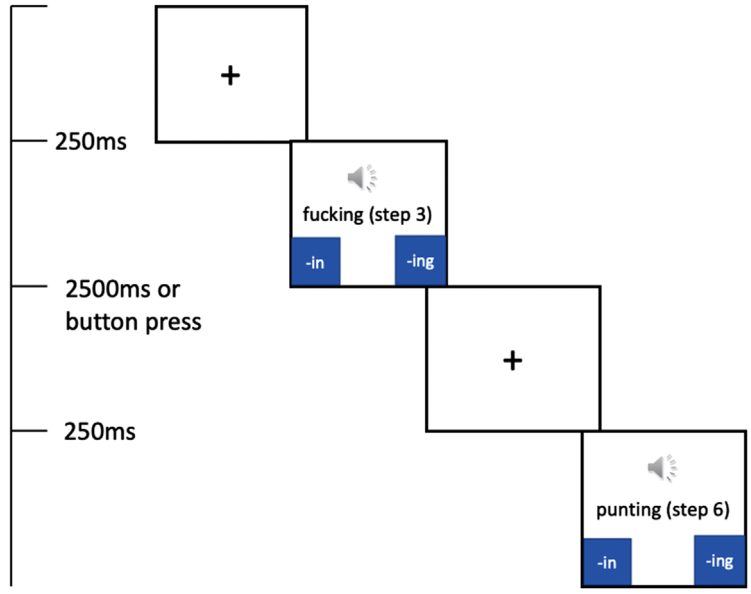

FIGURE 2 Experimental procedure

3.1.2 | Procedure

The experiment was hosted on Gorilla Anwyl-Irvine et al. (2018). Participants first completed a headphone check (Woods et al., 2017) to ensure concentration. The check involves a 3-AFC "Which tone is quietest" task with 200 Hz pure tones played in anti-phase across the stereo channels. Participants were then told they would be hearing words ending with "-ing." The instructions stated that "there are two ways of pronouncing words that end with '-ing'. One way is to pronounce the full sound e.g., *taking*. Another way is to only pronounce the '-in' sound e.g., *takin*." Participants used the arrow keys on their keyboard to select either "-ing" or "-in," with order randomized between participants. Participants completed eight practice trials on unambiguous neutral items. Participants had 2500 ms to complete each trial before the next trial started. Between each trial was a 250-ms fixation cross. Practice trials had a pass mark of 7, with two attempts, after which unsuccessful participants were automatically rejected.

In the test phase, participants completed 77 trials (27 test trials, 50 fillers). The 189 test stimuli were divided into seven lists, counterbalanced for item and continuum step using a Williams Latin square; as such, each list contained exactly one trial for each item. Participants were equally distributed among these lists. The test phase lasted a maximum of 3.2 min. Figure 2 illustrates the procedure for two example trials. Participants completed a demographic questionnaire eliciting their age, gender, highest level of education, sexual orientation, and yearly household income.

3.1.3 | Participants

Four hundred fifty-six British English speakers were recruited via Prolific Academic (2019). Fifty-seven participants were rejected for failing the headphone check and 19 participants were rejected for

TABLE 1 Model summary—Response ~ Continuum Step * Item Type + Prestep + Participant Gender + (1|Participant) + (1|word)

	Response		
Predictors	**Std. Beta**	**Statistic**	***p* Value**
(Intercept)	0.46	2.88	**0.017**
Continuum step	−1.20	−43.71	**<0.001**
Item-type: nonword	−0.74	−3.34	**0.001**
Item type: neutral word	−0.54	−2.45	**0.014**
Prestep	0.04	1.50	0.134
Gender: male	0.01	0.15	**0.883**
Gender: other	0.90	2.83	**0.005**
$N_{\text{ParticipantID}}$	380		
N_{Word}	27		
Observations	10,012		

Bold signifies a *p*-value of less than 0.05.

failing practice trials, leaving 385 participants ($F = 211$, $M = 170$, Other = 4[3]) for statistical analysis. Participants were paid £0.55.

3.2 | Results

Incomplete trials ($n = 400$) and responses below 500 ms ($n = 39$) were discarded. Four participants were excluded for being timed-out on over 25% of trials. One participant was excluded for selecting the same button for all 80 trials. Within Item Type, swearwords received the most "-ing" responses (58%), followed by neutral words (50.7%) and nonwords (46.1%).

Logistic mixed effect regression models were run in R using the *lme4* package, with "-ing" versus "-in" as the categorical dependent variable ("-ing" = 1, "-in" = 0). Item Type (swear, neutral word, nonword), Dominant Part-of-Speech (Dom POS) (Van Heuven et al., 2014), Participant Gender, Participant Level of Education, and Participant Sexuality were categorical predictors. Dom POS was sum coded, with the other categorical predictors all treatment coded. Continuum Step (1–7: centered), Duration (in milliseconds), Preceding Continuum Step (1–7), Log Frequency (Van Heuven et al., 2014), Stem Arousal and Stem Valency (Warriner et al., 2013), Participant Age and Participant Income were included as continuous predictors. Random intercepts were included for Participant and Word. Random slopes for Continuum Step over Participant and over Word were initially included but were removed as these prevented models from converging.

The model reported in Table 1 excludes variables that did not significantly improve model fit based on chi-square comparisons of the sums of the squares of the residuals. There were significant main effects for Continuum Step ($\beta = -1.2$, $p < 0.001$), Item Type: Nonword ($\beta = -0.74$, $p < 0.01$), Item Type: Neutral Word ($\beta = -0.54$, $p < 0.05$) and Participant Gender: Other[4] ($\beta = 0.9$, $p < 0.01$).

Figure 3 plots the mean probability of a listener selecting "-ing" for each Item Type at each step in the nasal continuum. Error bars display the standard error multiplied by 2. As the continuum steps increase along the *x*-axis, the items are becoming increasingly alveolar. At the center of the continuum, while neutral and nonword items appear to be at chance, swearwords show a significant trend towards "-ing," both on this graph and in the model.

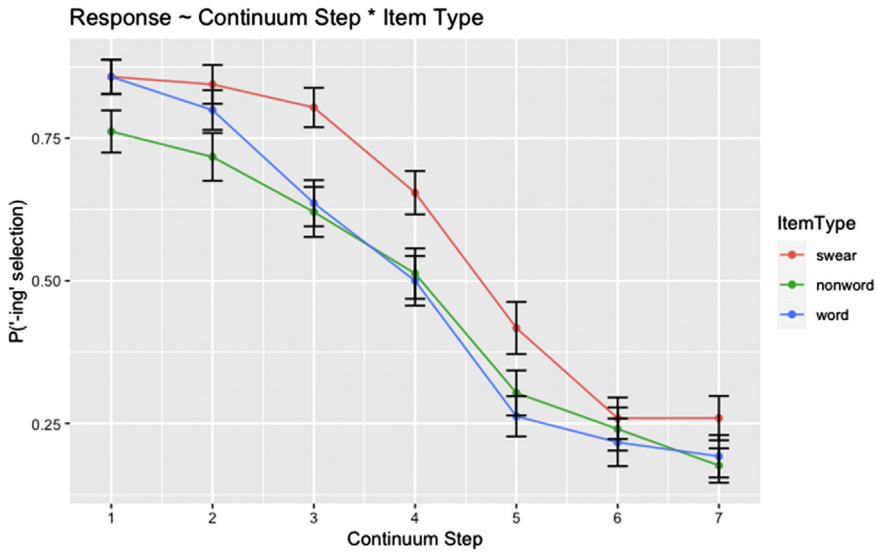

FIGURE 3 Mean probability of "-ing" selection ~ Continuum Step + Item Type

TABLE 2 Model summary——RT ~ Item Type + Continuum Step + (1|Participant) + (1|word)

	Response		
Predictors	**Std. Beta**	**Statistic**	***p* Value**
(Intercept)	0.10	1.36	0.175
Item-type: nonword	−0.06	−0.67	0.502
Item type: neutral word	−0.21	−2.28	**0.023**
Continuum step	0.03	−3.30	**0.001**
$N_{\text{ParticipantID}}$	380		
N_{Word}	27		
Observations	10,012		

Bold signifies a *p*-value of less than 0.05.

3.2.1 | Reaction time data

Further exploratory analysis was conducted using the reaction time data collected on each trial. Linear mixed effects models were constructed in R using the *lme4* package, with Reaction Time (RT) in milliseconds (centered) as the dependent variable. Item Type (Swearword as baseline, treatment coded) and Continuum Step (centered) were included as predictors, with random intercepts for Participant and Word. Random slopes were again included originally but removed due to issues with model convergence. The model summary is provided in Table 2.

There was a significant main effect for Item Type: Neutral Word ($\beta = -0.21$, $p = 0.023$), such that, compared to swearwords, responses to neutral words were significantly faster; there was no significant difference in reaction time between swearwords and nonwords. There was also a significant main effect for Continuum Step ($\beta = -0.03$, $p = 0.001$), such that, as the continuum step increased (i.e., became more alveolar), reaction times also increased.

3.3 | Interim discussion

Contrary to the experimental hypothesis, swearwords did not bias listeners to hear alveolar [ɪn] when the (ING) token was ambiguous. Listeners were instead more likely to hear the velar [ɪŋ] variant for swearwords compared with their neutral counterparts. This was also true for swearwords compared with nonwords (to an even greater extent).

Facilitation of the velar variant for swearwords is unexpected. This effect would suggest a socioindexical association between swearwords and velar [ɪŋ]. One possible explanation for this finding is that swearwords and velar [ɪŋ] share an association with careful and effortful speech. While swearwords do index informality, this may not be the casual/relaxed informality indexed by alveolar [ɪn]; it may be that swearwords reflect a more performative and controlled informality. Furthermore, swearwords often function to create verbal emphasis (Stapleton, 2003, 2010). Swearwords may therefore be associated with the velar variant because this is the variant typically used in speech styles where there is more "attention paid to speech" (Labov, 1972).

There is an alternative cognitive explanation of the findings. Swearwords take up increased attentional resources compared to neutral words, as occurs in tasks where participant concentration is on a nonlinguistic stimulus, including modified Stroop tasks. In Stroop tasks, for example, participants are presented with individual words on a screen. They are required to identify the color of the writing, ignoring the content of the word. Performance in such tasks is significantly slower for swearwords than neutral words (Eilola & Havelka, 2011; MacKay et al., 2004). A similar effect was shown in the auditory domain for voice identification in French by Bertels et al. (2011). In each of these examples, the additional attentional resources required to process swearwords impeded the performance of another cognitive task.

In a similar vein, it is possible that, on swearing items, participant attention was drawn away from the variable (ING) token towards the taboo stem. With their ability to focus on the critical sound impaired, participants may have defaulted to the most likely option overall: velar [ɪŋ]. An overall bias for the velar variant was also found by Vaughn and Kendall (2018). This explanation receives some support from the reaction time data showing that participants were significantly slower to respond to swearing items than neutral items.

While both explanations are plausible, further work is required to isolate the exact cause of the effect. In the absence of positive evidence for either explanation, we can only conclude the following: rather than having a bias towards alveolar [ɪn] as predicted, swearwords increased the chance of the word being heard as velar [ɪŋ].

4 | EXPERIMENT 2: TESTING SOCIAL EVALUATION

We now present Experiment 2, a matched-guise task (Lambert, Hodgson, Gardner & Fillenbaum, 1960) using a mixture of swearwords and neutral words ending with "-ing." The results of Experiment 1 suggest that, in isolation, listeners tended towards the velar [ɪŋ] variant for swearwords. Experiment 2 extends this to the use of swearwords in full sentences. This task is aimed at testing whether listeners *notice* the relationship when conducting the conscious process of social evaluation. If they do, this would suggest that listeners' internal representation of the relationship has social significance.

The conditions of Experiment 2 more closely matched those of real life. Rarely do individuals hear swearwords ending in "-ing"y' spoken in isolation; exclamations of *fuck!* or *shit!* are perhaps more common. People are much more likely to encounter *fucking*, *shitting* and *pissing* as used in

full sentences. Presenting words in isolation also removes potentially relevant information that might guide listener expectation, such as syntactic category (Vaughn & Kendall, 2018).

4.1 | Methods

Experiment 2 used a matched-guise task. Participants listened to a short narrative recorded by four speakers. The passage contained a mixture of swearwords and neutral words ending with "-ing." The speakers were recorded using both the velar and alveolar realizations of variable (ING). The recordings were then artificially manipulated in Praat (Boersma, 2019) to create four experimental conditions: fully velar (*All-ing*), fully alveolar (*All-in*), only swearwords as velar (*Swear-ing*), and only neutral words as velar (*Swear-in*). Participants heard multiple speakers in multiple conditions, rating each speaker on a series of Likert scales depicting traits shown to be sensitive to variable (ING) in previous perception studies. Experiment 2 had the following hypotheses:

1. Recordings in the *All-ing* condition will be rated higher on the test scales *articulate*, *hard-working, posh, rich*, and *educated* and lower on the test scales *working class* and *casual* than recordings in the *All-in* condition.
2. Responses for recordings in the *Swear-in* condition will approximate responses for recordings in the *All-ing* condition, but responses for recordings in the *Swear-ing* condition will not.

Hypothesis 1 follows from the results found in Schleef et al. (2017) for British English. If the alveolar [ɪn] variant is socioindexically associated with traits linked to for example, lower social status, then recordings that are saturated with that variant (*All-in*) should be rated higher for those traits and lower for traits with the inverse association. The null hypothesis was that there would be no statistically significant difference between *All-ing* and *All-in*.

Hypothesis 2 follows from the results of Experiment 1. If the effects identified in Experiment 1 hold in full sentences, we would expect a tendency towards the velar [ɪŋ] variant for swearwords. For neutral words, we would not expect such a tendency—neutral words were roughly at chance in the middle of the nasal continuum in Experiment 1 (see Figure 3). This was expected to have different consequences for the *Swear-ing* and *Swear-in* guises.

For the *Swear-in* guises, in which the swearwords had the alveolar [ɪn] variant, it was expected that participants would hear these as the velar [ɪŋ] variant instead due to the expected effect in that direction for swearwords. The neutral words, which had the velar [ɪŋ] variant, would be unaffected by this effect. All of the critical words in the *Swear-in* guises would therefore be heard as velar tokens of variable (ING). As such, responses to those guises should be similar to the guises in which all the critical words really do have velar tokens of variable (ING), namely the *All-ing* guises.

The same was not expected to occur for the *Swear-ing* guises. As the swearwords in these guises already had the velar [ɪŋ] variant, the expected [ɪŋ] tendency for swearwords should not have made a difference. The neutral words, which had the alveolar [In] variant, would be unaffected by the tendency. Listeners should therefore have heard the *Swear-ing* guises as 50% [ɪŋ] and 50% [ɪn]. As such, the availability of alveolar [ɪn] tokens should elicit different responses to the *All-ing* guises. The null hypothesis in this case was that both responses to the *Swear-in* and *Swear-ing* guises would be significantly different to those to the *All-ing* guises, as both had 50% of each variant.

4.1.1 | Stimuli

The passage was taken from a previous study on sociolinguistic perception in the UK using speakers from a similar area (Levon & Fox, 2014). The passage recounts a mildly dramatic episode (someone falling down the stairs in a London underground station). The original version was edited for the current study to include an equal number of swearing and nonswearing words ending in variable (ING). Although Experiment 1 used 9 swearwords, not all of these appear equally as frequently in naturally occurring speech. As such, two instances of *fucking* and *shitting* and one instance of *dicking* were included in the passage. The neutral (ING) words were all verbs, except for the first *fucking* which was a modifier. The swearing and neutral (ING) words were ordered alternately throughout the passage (see (1)).

> (1) So last Thursday I was walking down the steps to the tube and there were these two guys on the other side. One of them kept dicking around, and then he slipped and all of a sudden, he was falling backwards. And for like three seconds he was just sort of balanced there, and I thought he'd pull himself up. But then he tipped even further back and just fucking tumbled down the stairs and landed on the floor, his head right on the tiles. He seemed alright at first, but then blood started streaming from his head. The guy's mate just stood there and looked at him like "are you shitting me?." For a minute it didn't look like he was breathing. I shouted at him to call an ambulance, and they came pretty soon but the guy was shitting himself. He turned out to be alright - he just had a big cut on the side of his head from hitting the tiles. Serves him right for fucking around on the stairs.

Four speakers of Standard Southern British English were recorded reading the passage aloud. The four speakers were from the same geographical area—Kent—and attended the same school. Due to limitations on face-to-face research during the COVID-19 pandemic, the four speakers recorded themselves in their own homes using headphones with a built-in microphone directly into their mobile phones using voice recording apps while sat in a quiet room on their own. Each speaker first recorded the passage once through with no directions on pronunciation. Participants then rerecorded the passage twice more, first with exclusively velar [ɪŋ] realizations and then with exclusively alveolar [ɪn] realizations. Read speech was chosen over spontaneous speech to allow for control which (ING) words were included. While read speech has the disadvantage of being less authentic, work by Tamminga (2017) using variable (ING) suggests that matched guise tasks using both speech styles can produce the same results, validating the use of read speech in sociolinguistic perception research.

Recordings of each speaker were manually manipulated in Praat (Boersma, 2019), creating four test recordings per speaker, with the original "naturally read" recording used as the base. For the first test recording, the *All-ing* guise, all of the speakers' carefully articulated velar [ɪŋ] tokens were copy and pasted into the base recording, following the approach of Campbell-Kibler (2005). For all recordings, the copied-in tokens included the preceding consonant, for example, the [kɪŋ] segment in *fucking*. The second test recording, the *All-in* guise, followed the same process, but using the carefully articulated alveolar [ɪn] tokens. For the third test recording, the *Swear-ing* guise, velar [ɪŋ] tokens were copied in for swearing (ING) words and alveolar [ɪn] tokens were copied in for neutral (ING) words. For the fourth test recording, the *Swear-in* guise, alveolar [ɪn] tokens were copied in for swearing (ING) words and velar [ɪŋ] tokens were copied in for neutral (ING) words. A key for the test recordings is included in Table 3.

These manipulations resulted in a total of sixteen test recordings, with four recordings per speaker and four recordings per condition. These recordings were divided into four test blocks. Each test block

TABLE 3 Variable (ING) Experiment 2——Test recording key

Recording	Swearing words	Neutral words
All-ing	Velar	Velar
All-in	Alveolar	Alveolar
Swear-ing	Velar	Alveolar
Swear-in	Alveolar	Velar

contained exactly one recording per speaker and one recording per condition. For example, one test block contained *All-ing* for speaker 2, *All-in* for speaker 3, *Swear-ing* for speaker 4, and *Swear-in* for speaker 1. Each recording was scaled for intensity to 70 db in Praat.

The Likert scales were based on the results of previous work on perceptions of variable (ING). In Schleef et al. (2017), (ING) variation was shown to influence perceptions of scales of *articulate*, *hard-working*, *posh*, *rich*, *working class*, *casual*, and *educated* for speakers with London accents. These scales were therefore included in the current task. In addition, two distractor scales were chosen, namely *tall* and *attractive*. All scales were from 1 to 8, with the main scale label (e.g., *articulate*) at the end closest to 8 and it is antonym (e.g., *inarticulate*) at the opposite end.

4.1.2 | Procedure

This task was constructed using Qualtrics. Participants were instructed that they would hear eight speakers telling a story. They were instructed to listen to each clip in full, before evaluating the speaker on a series of scales. Participants were randomly assigned two of the four test blocks, meaning that each participant heard exactly two recordings per speaker and two recordings per condition. A subset of eight recordings was chosen, rather than the full 16, in order to avoid participant exhaustion at hearing the same passage read so repeatedly. Participants were presented two recordings per speaker, rather than one, to increase the statistical power of the experiment.

The order and assignment of the blocks was randomized and counterbalanced between participants. The order of trials within each block was randomized between participants but kept constant between blocks within each participant; if a participant heard speaker 1 first in their first block, they heard speaker 1 first in their second block. There was no break between blocks, with all eight recordings presented to participants as eight distinct speakers.

On each trial, participants were presented with 9 scales (7 test, 2 distractor). The order of scales was randomized between trials. Participants also completed a basic demographic survey eliciting their gender, age, yearly household income, UK location of birth and self-defined social class. In a separate survey, participants were asked how frequently they swore and how frequently they thought swearing was appropriate (from Never (1) to Very Frequently (5)). They were then asked to state the extent to which they agreed with statements associating swearwords with particular social stereotypes[5] (from Completely Agree (1) to Completely Disagree (5)).

4.1.3 | Participants

Two hundred speakers (100 female, 100 male) of British English were recruited via Prolific Academic (2019). They were paid £1.20 for their participation.

4.2 | Results

Results were analyzed using linear mixed effect regression models which were constructed in R using the *lme4* package. Responses for eight participants were removed from the analysis for failing catch trials. Separate models were constructed for each response scale. In each, the response scale (1–8) was included as the continuous dependent variable. The full models in each case had the treatment-coded categorical predictors Condition (*All-ing, All-in, Swear-ing, Swear-in*), Participant Gender and Participant UK Location (e.g., South of England, Scotland, etc.) and the continuous predictors Participant Age and Participant Income. Participant Education was recoded as the categorical variable University (yes, no: sum coded). Participant Social Class, originally a 5-level ordinal variable, was recoded as a categorical variable to include only *Working Class* and *Middle Class* as factor levels (sum-coded). Participant responses to questions and statements in the swearing survey, with responses from 1 to 5, were included as continuous predictors. Random intercepts were included in all models for Participant (ProlificID) and Speaker. Random slopes for Condition over Speaker were initially included, but these prevented models from converging.

From the full models, variables that did not significantly improve model fit based on chi-square comparisons of the sums of the squares of the residuals were removed. For all scales except for *articulate* and *working class*, only Condition significantly improved model fit. For *articulate*, the model was significantly improved by responses to the statement "Swearing is more common among less articulate people" (Swearing = LAP). For *working class*, the model was significantly improved by including Participant Social Class. Where multiple variables improved model fit, interactions between these variables were also tested; no interactions improved model fit for any scale. Observations for three participants are missing for the *working class* model due to missing data for the Social Class survey question.

Table 4 summarizes the results for the scales *articulate*, *rich*, *working class*, and *educated*, on which the expected effects were found. All reported effects for Condition are comparisons between the baseline level—the All-ing guise—and the level specified in that effect. For example, a reported main effect for Condition: All-in ($B = 0.2$, $p < 0.05$) would suggest an estimated difference between the All-in and All-ing guises of 0.2 on the particular scale (i.e., the estimate for All-in is 0.2 greater than the estimate for All-ing) to a significance level of below 0.05. We expected that, for a particular scale, the value for B in the All-in and Swear-ing conditions would be negative, with p values smaller than 0.05, without the same being true for the Swear-in condition; this would suggest that listeners tended towards treating alveolar [ɪn] tokens on swearwords like velar [ɪŋ] tokens, as they did in Experiment 1.

For *articulate*, there were significant main effects for Condition: All-in ($B = -0.24$, $p < 0.01$), Condition: Swear-ing ($B = -0.22$, $p < 0.01$) and Swearing = LAP ($B = -0.12$, $p < 0.05$). For *rich*, there were significant main effects for Condition: All-in ($B = -0.32$, $p < 0.001$) and Condition: Swear-ing ($B = -0.17$, $p < 0.05$). For *working class*, there were significant main effects for Condition: All-in ($B = 0.32$, $p < 0.01$), Condition: Swear-ing ($B = 0.29$, $p < 0.01$) and Social Class: Middle ($B = -0.4$, $p < 0.001$). For *educated*, there were significant main effects for Condition: All-in ($B = -0.28$, $p < 0.001$) and Condition: Swear-ing ($B = -0.22$, $p < 0.01$). On these four scales, there were no significant effects for Condition: Swear-in.

Figure 4 plots the mean response for each condition on each of the four response scales for which significant effects were found. Error bars represent two times the standard error. Conditions are ordered such that *All-ing* and *All-in* are at either ends of the plots.

Table 5 summarizes the results for the scales *hard-working, casual*, and *posh*. There were no significant main effects for *hard-working* or *casual*. For *posh*, there were significant main effects for Condition: All-in ($B = -0.41$, $p < 0.001$), Condition: Swear-ing ($B = -0.27$, $p = 0.005$) and Condition: Swear-in ($B = -0.22$, $p = 0.025$).

TABLE 4 Model summaries for articulate, rich, working class, and educated—Response ~ Condition + Swearing = LAP + Social Class + (1|Participant) + (1|Speaker)

	Articulate			Rich			Working class			Educated		
Predictors	**Est.**	**Statistic**	***p* Value**	**Est.**	**Statistic**	***p* Value**	**Est.**	**Statistic**	***p* Value**	**Est.**	**Statistic**	***p* Value**
(Intercept)	5.42	17.75	**<0.001**	4.74	14.76	**<0.001**	4.08	12.00	**<0.001**	5.47	17.79	**<0.001**
Condition: Swear-in	−0.10	−1.17	0.243	−0.07	−0.85	−0.394	0.18	1.77	0.077	−0.12	−1.57	0.117
Condition: Swear-ing	−0.22	−2.62	**0.009**	−0.17	−2.09	**0.037**	0.28	2.84	**0.005**	−0.22	−2.75	**0.006**
Condition: All-in	0.24	−2.89	**0.004**	−0.32	−4.00	**<0.001**	0.31	3.13	**0.002**	−0.28	−3.52	**<0.001**
$N_{\text{Participants}}$	192			192			192			192		
N_{Speakers}	4			4			4			4		
Observations	1536			1536			1536			1536		

Bold signifies a *p*-value of less than 0.05.

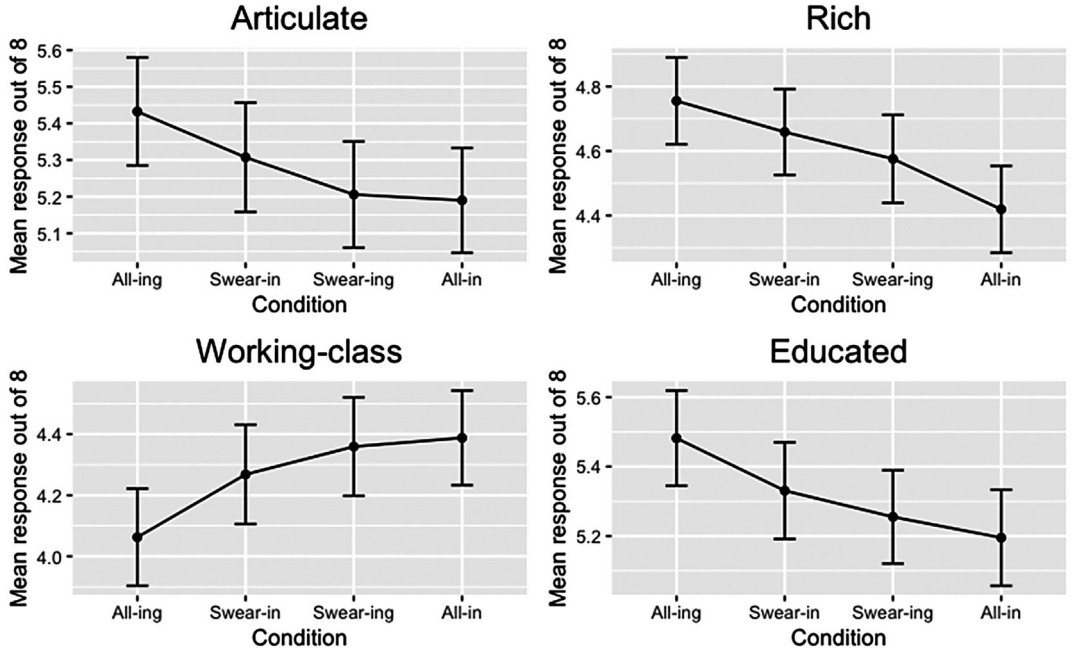

FIGURE 4 Mean responses for the scales articulate, rich, working class, and educated by condition. *All-ing* = 100% velar, *All-in* = 100% alveolar, *Swear-ing* = swearwords are velar, *Swear-in* = neutral words are velar

TABLE 5 Model summaries for posh, hard-working, and casual——Response ~ Condition + (1|Participant) + (1|Speaker)

	Hard-working			Casual			Posh		
Predictors	**Est.**	**Statistic**	***p* Value**	**Est.**	**Statistic**	***p* Value**	**Est.**	**Statistic**	***p* Value**
(Intercept)	4.92	29.19	**<0.001**	5.07	13.98	**<0.001**	4.88	11.77	**<0.001**
Condition: Swear-in	−0.03	−0.43	0.668	0.16	1.52	0.128	−0.41	−4.24	**<0.001**
Condition: Swear-ing	−0.02	−0.31	0.759	0.20	1.85	0.064	−0.27	−2.84	**0.005**
Condition: All-in	0.03	0.43	0.669	0.08	0.77	0.438	−0.22	−2.24	**0.025**
$N_{\text{Participants}}$	192			192			192		
N_{Speakers}	4			4			4		
Observations	1536			1536			1536		

5 | DISCUSSION AND CONCLUSIONS

These results provide some support for both experimental hypotheses. Support for Hypothesis 1 is provided by the significant main effects found on five different scales, namely *articulate, rich, working class, educated* and *posh*, for Condition: All-in. These effects trend in the expected direction. On each scale, the guise saturated with the alveolar variant (*All-in*) was rated as significantly less articulate, rich, posh, and educated, and significantly more working-class than the guise saturated with the velar variant,

that is, the *All-ing* guise. This replicates the finding of Schleef et al. (2017) that, in a London accent, variable (ING) can influence how speakers are socially evaluated on social class- and education-related scales. Unlike Schleef et al., variable (ING) had no effect on the scales *hard-working* or *casual*.

Support for Hypothesis 2 is provided on four of the scales, namely *articulate*, *rich*, *working class*, and *educated*. On each scale there was a significant main effect for Condition: Swear-ing but no significant main effect for Condition: Swear-in. Compared to the velar-saturated *All-ing* guises, the *Swear-ing* guises were considered less articulate, rich, and educated and more working-class. The same was not true for the *Swear-in* guises, which were not rated significantly differently from velar-saturated guise. The similarity between responses to the *All-ing* and *Swear-in* guises is not absolute, as illustrated in Figure 4, suggesting that the effect is not as strong for all swearwords and/or for all participants; rather, this reflects a more general trend in the data. Notably, support was not provided on the scales *hard-working, casual*, or *posh*.

The results of Experiment 1 had suggested that listeners *perceive* the relationship between swearwords and variable (ING), such that swearwords led listeners to expect the velar [ɪŋ] variant when they were presented in isolation. The results of Experiment 2 further suggest that participants *notice* the relationship when conducting social evaluation of the speaker, with the same effect occurring when they were embedded in full sentences, which in turn influenced the social information they extracted from the speech signal to inform their judgments about the speaker.

As with Experiment 1, the nature of the mechanism causing the tendency towards hearing [ɪŋ] for swearwords in Experiment 2 is unclear without further research, with the same two competing explanations posited in Section 3.3 being plausible. On the one hand, if the effect is the result of a genuine socioindexical or register-based association between swearing and velar [ɪŋ], then this would suggest that listeners' perceptions of sociolinguistic variants are sensitive to such association even in contexts where their attention is not explicitly directed towards those variants. On the other hand, if the result reflects the result reflects the increased attentional resources required to process swearwords, thus resulting in listeners using only the uninhibited (ING) tokens to guide their evaluations of the speakers, this would suggest that, even after frequent exposure to swearwords, both within the same speaker and across multiple speakers, they are still sufficiently cognitively salient so as to affect listeners' abilities to attend to other linguistic sources of social meaning.

Each of these explanations is rather speculative however, so we will remain neutral on the issue. The results nonetheless have consequences for research on swearing and research on sociolinguistic perception more generally. First, regarding swearing research, the opening section of this article highlighted the lack of research on language-internal factors conditioning perceptions of swearing. The following question was posed: Are all pronunciations of a swearword perceived the same?

The expectation was that forms like [fʌkɪŋ] and [fʌkɪn] would activate different social meanings; this had been shown to be true for neutral words (Campbell-Kibler, 2005; Schleef et al., 2017), but had not yet been extended to swearwords, which convey their own social meanings independent of how they are pronounced. In reality, rather than the presence of a particular (ING) variant affecting how the swearword was perceived, the presence of a swearword, rather than a neutral word, affected how an (ING) variant was perceived. This, in turn, can affect the potential for a variant of (ING) to activate particular social meanings.

As well as affecting how speakers are socially evaluated (Cavazza & Guidetti, 2014; DeFrank & Kahlbaugh, 2019), swearwords are sufficiently socially salient to also affect the perception of other sources of social meaning in a word. This could also be true for other aspects of a word's pronunciation. For example, just as variation in the duration of the /ʌ/ vowel in *fuck* correlates with different intended pragmatic meanings (Gold & McIntyre, 2016), we might also expect other forms of socially meaningful variation in vowel production to be perceived differently in swearwords compared to neutral words;

the same could be true of perceptions of nonstandard syntax containing swearwords. The current study therefore motivates further research into swearing that moves beyond the binary comparison of either swearing or not swearing.

Regarding research into sociolinguistic perception more generally, the results of this study shed further light on the complex nature of the sociolinguistic variable. As discussed in Section 2 and citations therein, variable (ING) has been studied extensively in sociolinguistics. It has been suggested that the alveolar [ɪn] variant activates social meanings related to lower intelligence, speakers in lower socioeconomic groups, and more casual speech in both the USA (Campbell-Kibler, 2005) and the UK (Schleef et al., 2017). The results of the current study suggest that is not necessarily the case when the variant is attached to swearwords, however.

Social evaluations of a particular sociolinguistic variable depend not just on that individual use of the variable, but also on previous patterns of that variable's usage (Bender, 2007). For example, a recent matched-guise study by Vaughn (2021) on variable (ING) suggests that the typical grammatical category of a word ending with the alveolar [ɪn] variant can affect the perceived professionalism of a speaker; when the overall rate of [ɪn] was low, there was a bigger social penalty when alveolar [ɪn] appeared on words that were typically nouns than on those that were typically verbs. Use of [ɪn] on nouns is less frequent (Labov, 2001; see also Forrest, 2017) and therefore more marked. This internal linguistic constraint then affects the social meanings that are associated with the individual usage.

The current study suggests that the presence of a swearword may have a similar effect, although this is less directly linked to patterns of usage than grammatical category. On neutral words, the alveolar [ɪn] variant is more likely to activate the social meanings one would expect of that variant than if it attached to swearwords. By some mechanism, the alveolar variant is more noticeable on neutral words. This, combined with the findings of Vaughn (2021), suggests that word-level information affects the activation of social meaning by variable (ING). The current study therefore motivates further work into the role of such information in the perception of sociolinguistic variation more broadly.

Finally, this study further motivates the need for an integrated model of sociolinguistic cognition, with language and social processing occurring in parallel, rather than having an independent model of grammar that feeds into the social system (Campbell-Kibler, 2016). People have a linguistic knowledge of swearwords - they have an understanding of the criteria that make up a swearword (see e.g., Ljung, 2010) in order to differentiate them from neutral words, including the pragmatic functions of, for example, expressing emotion or verbal emphasis, and their knowledge of swearing consists of all their previous experiences of it. People also have a social knowledge of swearwords. They know why particular topics are societally taboo and they have an expectation of the types of people who are more likely to swear than others and the situations in which swearing is most likely to occur. People's previous experiences include both the linguistic aspects (e.g., the specific word, its pronunciation, and the other words around it) and the social aspects (e.g., the speaker and the setting) of the swearword they heard.

Swearwords are an area of language in which the social is always present and for which an integrated model of sociolinguistic cognition is a must. What makes swearwords taboo is societally dictated. Their deployment in conversation is socially motivated—with the exception of people with certain neurodevelopmental disorders, one always has the choice not to swear, but people do so to achieve particular social goals. They are perhaps the best example of stylistic choice that speakers make in order to place themselves in the social landscape, which is the focus of much third wave variationist research (Eckert, 2012). Swearwords are socially salient to the extent that they can affect how other linguistic sources of social information are perceived, which can make them central to a person's speech style. Effective models of communication must therefore account for swearwords and their potential

not only for their own meaning-making, but also for their potential to influence the emergence of social meaning in the context of broader speech styles.

ACKNOWLEDGMENTS

We would like to thank Monica Heller, Natalie Schilling, Virginia Zavala, Marie Maegaard, the three anonymous reviewers, members of the Queen Mary Experimental Linguistics Forum and audiences at Experiments in Linguistic Meaning (ELM) 2020 and the Manchester Forum in Linguistics 2021 for their contributions to this work. This research was conducted using funding from the London Interdisciplinary Social Science Doctoral Training Partnership. Further funding for the use of Gorilla was provided via Gorilla Experiment Builder courtesy of Gorilla Grants 2019. We would also like to thank the four speakers that recorded stimuli for Experiment 2.

ORCID

Matthew Hunt https://orcid.org/0000-0001-6599-7727

ENDNOTES

[1] Some evidence does exist in the form of Bailey's (2015) work on the use of variable (ING) on Twitter, in which both swearwords and swearing euphemisms were more likely than other words to be written with the "-in" ending than the "-ing" ending. The online nature of the sample and the lack of comparability with speech limits the utility of this evidence, however.

[2] We note that although cunting does not have a Dom POS or SUBTLEX Log Freq value, it is nonetheless attested elsewhere. For example, it has entries in both the Oxford English Dictionary and the online Urban Dictionary.

[3] These four participants consisted of two nonbinary, one trans and one genderqueer participant. For statistical purposes, they have been grouped together under Other. The authors acknowledge that this is not ideal but is preferable for the purpose of testing for differences between participants with normative and non-normative genders.

[4] This effect only represents four participants. As such, it will not be discussed further.

[5] The statements were as follows: (1) Swearing is more common among men. (2) Swearing is more common among working class people. (3) Swearing is more common among less articulate people. (4) Swearing is more common among younger people.

REFERENCES

Anwyl-Irvine, A., Massonnié, J., Flitton, A., Kirkham, N., & Evershed, J. (2018). *Gorilla in our midst: An online behavioral experiment builder*. Behavior Research Methods.

Bailey, G. (2015). *Orthographic reflections of (ING): A Twitter-based corpus study*. Retrieved from http://www.users.york.ac.uk/gb1055/research/2015mFiLabstract.pdf (Manchester Forum in Linguistics, University of Manchester, 6th November)

Baruch, Y., & Jenkins, S. (2007). Swearing at work and permissive leadership culture: When anti-social becomes social and incivility is acceptable. *Leadership & Organization Development Journal*, *28*(6), 492–507.

Bates, D., Mächler, M., Bolker, B., & Walker, S. (2015). Fitting linear mixed-effects models using lme4. *Journal of Statistical Software*, *67*(1), 1–48. doi: 10.18637/jss.v067.i01

Bayard, D., & Krishnayya, S. (2001). Gender, expletive use, and context: Male and female expletive use in structured and unstructured conversation among New Zealand university students. *Women and Language*, *24*(1), 1.

Beers Fägersten, K. (2012). *Who's swearing now?: The social aspects of conversational swearing*. Cambridge Scholars Publishing.

Bender, E. M. (2007). Socially meaningful syntactic variation in sign-based grammar. *English Language & Linguistics*, *11*(2), 347–381.

Bertels, J., Kolinsky, R., Pietrons, E., & Morais, J. (2011). Long-lasting attentional influence of negative and taboo words in an auditory variant of the emotional Stroop task. *Emotion*, *11*(1), 29.

Boersma, P. (2019). *Praat: doing phonetics by computer*. http://www.praat.org/

Campbell-Kibler, K. (2005). Listener perceptions of sociolinguistic variables: The case of (ING) *(Unpublished doctoral dissertation)*. Citeseer.

Campbell-Kibler, K. (2011). Intersecting variables and perceived sexual orientation in men. *American Speech*, *86*(1), 52–68.

Campbell-Kibler, K. (2016). Towards a cognitively realistic model of meaningful sociolinguistic variation. *Awareness and Control in Sociolinguistic Research*, 123–151.

Cavazza, N., & Guidetti, M. (2014). Swearing in political discourse: why vulgarity works. *Journal of Language and Social Psychology*, *33*(5), 537–547.

Cheshire, J. (1982). Variation in an English dialect: A sociolinguistic study. *Cambridge Studies in Linguistics London*, 37.

DeFrank, M., & Kahlbaugh, P. (2019). Language choice matters: When profanity affects how people are judged. *Journal of Language and Social Psychology*, *38*(1), 126–141.

De Klerk, V. (1997). The role of expletives in the construction of masculinity. *Language and Masculinity*, 144–158.

Dewaele, J.-M. (2015). British 'Bollocks' versus American 'Jerk': Do native British English speakers swear more, or differently, compared to American English speakers? *Applied Linguistics Review*, *6*(3), 309–339.

D'Onofrio, A. (2015). Persona-based information shapes linguistic perception: Valley Girls and California vowels. *Journal of Sociolinguistics*, *19*(2), 241–256.

Eckert, P. (2000). *Language variation as social practice: The linguistic construction of identity in Belten High*. Wiley-Blackwell.

Eckert, P. (2008). Variation and the indexical field. *Journal of Sociolinguistics*, *12*(4), 453–476.

Eckert, P. (2012). Three waves of variation study: The emergence of meaning in the study of sociolinguistic variation. *Annual Review of Anthropology*, *41*, 87–100.

Eckert, P., & McConnell-Ginet, S. (2013). *Language and gender*. Cambridge University Press.

Eilola, T. M., & Havelka, J. (2011). Behavioural and physiological responses to the emotional and taboo Stroop tasks in native and non-native speakers of English. *International Journal of Bilingualism*, *15*(3), 353–369.

Forrest, J. (2017). The dynamic interaction between lexical and contextual frequency: A case study of (ING). *Language Variation and Change*, *29*(2), 129–156.

Foss, D. J. (1969). Decision processes during sentence comprehension: Effects of lexical item difficulty and position upon decision times. *Journal of Verbal Learning and Verbal Behavior*, *8*(4), 457–462.

Foulkes, P. (2010). Exploring social-indexical knowledge: A long past but a short history. *Laboratory Phonology*, *1*(1), 5–39.

Gold, E., & McIntyre, D. (2016). What the f***: An acoustic-pragmatic analysis of meaning in The Wire. *The Journal of the Acoustical Society of America*, *140*(4), 3228–3228.

Hay, J. (2018). Sociophonetics: The role of words, the role of context, and the role of words in context. *Topics in Cognitive Science*, *10*(4), 696–706.

Hay, J., Warren, P., & Drager, K. (2006). Factors influencing speech perception in the context of a merger- in-progress. *Journal of Phonetics*, *34*(4), 458–484.

Houston, A. C. (1985). *Continuity and change in English morphology: The variable (ING)*.

Hughes, S. E. (1992). Expletives of lower working-class women. *Language in Society*, *21*(2), 291–303.

Jacobi, L. L. (2014). Perceptions of profanity: How race, gender, and expletive choice affect perceived offensiveness. *North American Journal of Psychology*, *16*(2), .

Janschewitz, K. (2008). Taboo, emotionally valenced, and emotionally neutral word norms. *Behavior Research Methods*, *40*(4), 1065–1074.

Jay, T. (2009). The utility and ubiquity of taboo words. *Perspectives on Psychological Science*, *4*(2), 153–161.

Jay, T., & Janschewitz, K. (2008). The pragmatics of swearing. *Journal of Politeness Research. Language, Behaviour, Culture*, *4*(2), 267–288.

Kawahara, H., Morise, M., Takahashi, T., Nisimura, R., Irino, T., & Banno, H. (2008). Tandem-straight: A temporally stable power spectral representation for periodic signals and applications to interference- free spectrum, f0, and aperiodicity estimation. In 2008 IEEE International Conference on Acoustics, Speech and Signal Processing (pp. 3933–3936).

Kawahara, H., Nisimura, R., Irino, T., Morise, M., Takahashi, T., & Banno, H. (2009). Temporally variable multi-aspect auditory morphing enabling extrapolation without objective and perceptual breakdown. In 2009 IEEE international conference on acoustics, speech and signal processing (pp. 3905–3908).

Labov, W. (1972). *Sociolinguistic patterns (No. 4)*. University of Pennsylvania Press.

Labov, W. (2001). *Principles of linguistic change volume 2: Social factors*. Language in Society, 29.

Lambert, W. E., Hodgson, R. C., Gardner, R. C., & Fillenbaum, S. (1960). Evaluational reactions to spoken languages. *The Journal of Abnormal and Social Psychology*, *60*(1), 44.

Levon, E. (2014). Categories, stereotypes, and the linguistic perception of sexuality. *Language in Society*, *43*(5), 539–566.

Levon, E., & Fox, S. (2014). Social salience and the sociolinguistic monitor: A case study of ING and TH-fronting in Britain. *Journal of English Linguistics*, *42*(3), 185–217.

Ljung, M. (2010). *Swearing: A cross-cultural linguistic study*. Springer.

Love, R. (2017). Bad language revisited: swearing in the spoken BNC2014. In Corpus linguistics 2017 conference. University of Birmingham.

Love, R. (2021). Swearing in informal spoken English: 1990s–2010s. *Text & Talk*, *41*(5-6), 739–762.

MacKay, D. G., Shafto, M., Taylor, J. K., Marian, D. E., Abrams, L., & Dyer, J. R. (2004). Relations between emotion, memory, and attention: Evidence from taboo Stroop, lexical decision, and immediate memory tasks. *Memory & Cognition*, *32*(3), 474–488.

McEnery, T. (2004). Swearing in English: Bad language, purity and power from 1586 to the present. Routledge.

Ofcom (Office of Communications). (2016). *Attitudes to potentially offensive language and gestures on TV and radio: Quick reference guide*. London: Ipsos MORI Social Research Institute. Retrieved from https://www.ofcom.org.uk/research-and-data/tv-radio-and-on-demand/tv-research/offensive-language-2016

ONS (Office for National Statistics). (2010). *National statistics socio-economic classification (NS-SEC) coding tool*. Retrieved from http://www.neighbourhood.statistics.gov.uk/HTMLDocs/dev3/ONS_NSSEC_discovery

Oxford English Dictionary. (2020). Oxford University Press.

Pharao, N., Maegaard, M., Møller, J. S., & Kristiansen, T. (2014). Indexical meanings of [s+] among Copenhagen youth: Social perception of a phonetic variant in different prosodic contexts. *Language in Society*, 1–31.

Pierrehumbert, J. B. (2001). Exemplar dynamics: Word frequency, lenition and contrast. *Typological Studies in Language*, *45*, 137–158.

Prolific Academic. (2019). Prolific.

R Core Team. (2018). *R: A language and environment for statistical computing [Computer software manual]*. Vienna, Austria. Retrieved from https://www.R-project.org/

Rastle, K., Harrington, J., & Coltheart, M. (2002). 358,534 nonwords: The ARC nonword database. *The Quarterly Journal of Experimental Psychology Section A*, *55*(4), 1339–1362.

Romaine, S. (1999). *Communicating gender*. Psychology Press.

Schleef, E., Flynn, N., & Barras, W. (2017). Regional diversity in social perceptions of (ING). *Language Variation and Change*, *29*(1), 29–56.

Schleef, E., Meyerhoff, M., & Clark, L. (2011). Teenagers' acquisition of variation: A comparison of locally- born and migrant teens' realisation of English (ING) in Edinburgh and London. *English World-Wide*, *32*(2), 206–236.

Schmidt, R. W. (1990). The role of consciousness in second language learning. *Applied Linguistics*, *11*(2), 129–158.

Squires, L. (2016). Processing grammatical differences: Perceiving versus noticing. *Awareness and Control in Sociolinguistic Research*, 80–103.

Stapleton, K. (2003). Gender and swearing: A community practice. *Women and Language*, *26*(2), 22.

Stapleton, K. (2010). 12. Swearing. *Interpersonal Pragmatics*, *6*, 289.

Strand, E. A. (1999). Uncovering the role of gender stereotypes in speech perception. *Journal of Language and Social Psychology*, *18*(1), 86–100.

Tagliamonte, S. (2004). Someth[in]'s go[ing] on!: Variable ING at ground zero. *Language Variation in Europe: Papers from ICLAVE*, *2*, 390–403.

Tamminga, M. (2017). Matched guise effects can be robust to speech style. *The Journal of the Acoustical Society of America*, *142*(1), EL18–EL23.

Trudgill, P. (1974). *The social differentiation of English in Norwich (Vol. 13)*. CUP Archive.

Van Heuven, W. J., Mandera, P., Keuleers, E., & Brysbaert, M. (2014). SUBTLEX-UK: A new and improved word frequency database for British English. *The Quarterly Journal of Experimental Psychology*, *67*(6), 1176–1190.

Vaughn, C. (2021). *Internal constrains and the sociolinguistic monitor*. Retrieved from https://nors.ku.dk/english/calendar/2021/5th-variation-and-language-processing-conference/(5th Variation and Language Processing Conference)

Vaughn, C., & Kendall, T. (2018). Listener sensitivity to probabilistic conditioning of sociolinguistic variables: The case of (ING). *Journal of Memory and Language*, *103*, 58–73.

Warriner, A. B., Kuperman, V., & Brysbaert, M. (2013). Norms of valence, arousal, and dominance for 13,915 English lemmas. *Behavior Research Methods*, *45*(4), 1191–1207.

Woods, K. J., Siegel, M. H., Traer, J., & McDermott, J. H. (2017). Headphone screening to facilitate web-based auditory experiments. Attention, *Perception, & Psychophysics*, *79*(7), 2064–2072.

Zheng, Y., & Samuel, A. G. (2017). Does seeing an Asian face make speech sound more accented? Attention, *Perception, & Psychophysics*, *79*(6), 1841–1859.

SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

How to cite this article: Hunt, M., Cotter, C., Pearson, H., & Stockall, L. (2023). Swear(ING) ain't play(ING): The interaction of taboo language and the sociolinguistic variable. *Journal of Sociolinguistics*, *27,* 136–158. https://doi.org/10.1111/josl.12588