Teasing apart social and cognitive factors in sociolinguistic perception

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GROUP CONCEPT

TRAIT ATTRIBUTES

SOCIAL ROLE
Stereotypes

GROUP CONCEPT

TRAITS ATTRIBUTES

SOCIAL ROLE
• Basis of **majority of person perception** in daily life

*Rather than viewing individuals on the basis of their unique constellations of attributes and proclivities, perceivers prefer instead to furnish categorical (i.e., stereotype-based) conceptions of others* (Macrae & Bodenhausen 2001)

**cognitive misers** (Fiske & Taylor 1984)

**motivated tacticians** (Fiske & Taylor 1991)
Stereotypes

• Basis of **majority of person perception** in daily life

• Language (prominent cue of categorical perception) necessarily influenced by stereotypes

**Segmental Perception**
e.g., Niedzielski (1999) on Canadian Raising
    Strand (2000) on [s/ʃ] phoneme boundary

**Socio-Indexical Perception**
e.g., Campbell-Kibler (2008) on ING in speech of Elizabeth
Levon 2014

Perceptions of sexuality, gender and social class among men in Britain

⇒ Gender and sexuality (femininity and gayness positively correlated)
   e.g., Gaudio 1994; Munson et al 2006; Levon 2006, 2007; Campbell-Kibler 2011

⇒ Sexuality and social class (gayness and social class positively correlated)
   e.g., Keogh 1994; Connell 1995; Mosse 1996 (also Campbell-Kibler 2011; Levon 2011)
Levon 2014

Mean Pitch \(\rightarrow\) gender

correlation between mean F0 and effeminacy
(e.g., Gaudio 1994; Smyth, Jacobs & Rogers 2003; Drager 2010; Campbell-Kibler 2011)

Sibilance \(\rightarrow\) sexuality

correlation between /s/-COG, -(negative) skew and gayness
(e.g., Linville 1998; Munson et al 2006; Munson 2007; Campbell-Kibler 2011; Pharao et al. 2014)

TH-fronting \(\rightarrow\) social class

correlation between labio-dental realisations and working class speech
(e.g., Wells 1982; Kerswill 2003; Robinson 2005; Stuart-Smith & Timmins 2006; Levon & Fox 2014)
Conflicting Stereotypes

- 8 sets of experimental stimuli generated (± pitch, ± sibilance, ± TH-fronting)
- Presented online to 189 respondents
  - Native speakers of British English
  - Ages 18-75 (mean age: 30.1)
  - 134 women, 55 men (71/29)
  - 150 heterosexual, 39 GLB (79/21)
- Respondents rated each sample on eight 6-point Likert scales (status, likeability, gender/sexuality)
- After rating voices, respondents completed Male Roles Attitudes Survey (Pleck, Sonnenstein & Ku 1994) – provides a measure of normative male stereotype endorsement
### Perceived Gender/Sexuality

<table>
<thead>
<tr>
<th>Fixed effects</th>
<th>Estimate</th>
<th>Std. error</th>
<th>$t$ value</th>
<th>$p$ (MCMC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Intercept)</td>
<td>4.065</td>
<td>0.759</td>
<td>5.350</td>
<td>0.000</td>
</tr>
<tr>
<td>Pitch (higher)</td>
<td>−1.716</td>
<td>0.761</td>
<td>−2.253</td>
<td>0.025</td>
</tr>
<tr>
<td>Sibilant (yes)</td>
<td>−1.079</td>
<td>0.710</td>
<td>−1.520</td>
<td>0.130</td>
</tr>
<tr>
<td>Modified MRAS</td>
<td>−0.465</td>
<td>0.217</td>
<td>−2.139</td>
<td>0.033</td>
</tr>
<tr>
<td>Pitch:Sibilant</td>
<td>2.046</td>
<td>1.000</td>
<td>2.046</td>
<td>0.042</td>
</tr>
<tr>
<td>Pitch:MRAS</td>
<td>0.799</td>
<td>0.281</td>
<td>2.844</td>
<td>0.005</td>
</tr>
<tr>
<td>Sibilant:MRAS</td>
<td>0.528</td>
<td>0.260</td>
<td>2.029</td>
<td>0.044</td>
</tr>
<tr>
<td>Pitch:Sibilant:MRAS</td>
<td>−0.911</td>
<td>0.369</td>
<td>−2.470</td>
<td>0.014</td>
</tr>
</tbody>
</table>

Total N: 567. Random effects: Listener (189); Speaker (3). Log likelihood = $-367.72$

- Both pitch and sibilance affect perceptions of gender/sexuality
- Effect conditioned by MRAS: only holds for more conservative respondents
- Effect of pitch and sibilance is non-additive (either has same effect as both)
TH-fronting affects perceptions of likeability (more “likeable” is negative)
Effect disappears in presence of sibilance
Sibilance and TH-fronting are available as cues for gayness and likeability (respectively).

Sibilance + TH-fronting: likeability percept disappears.

Is “likeability” actively inhibited or passively neglected?

Inhibition (“blocking”)

- Consistent with relevant stereotype (sexuality, social class)
- Consonant with dominant models of person perception (e.g., Macrae, Bodenhausen & Milne 1995; Sinclair & Kunda 1999; Hugenberg & Bodenhausen 2004)
Sibilance and TH-fronting are available as cues for gayness and likeability (respectively).

Sibilance + TH-fronting: likeability percept disappears.

Is “likeability” actively inhibited or passively neglected?

**Neglect**

- Lack of MRAS effect for perceived likeability
- Lack of additive effect of pitch and sibilance for gender/sexuality
Inhibition vs. Neglect

Campbell-Kibler 2009

Speakers by perceived region

- in, not working-class
- ing, not working-class
- in, working-class
- ing, working-class

Anywhere

Southern
Inhibition vs. Neglect

Pharao et al. 2014

Homosexual

[s] [s+]

mean rating

Yes

No

Modern

Street
Inhibition vs. Neglect

Pharao & Maegaard (submitted)
• Numerous examples of features that are indexically operative in certain cases and not in others (*bullet-proofing*; Campbell-Kibler 2009)

• In all cases, appears equally possible to argue for *bullet-proofing* as a result of inhibition or neglect (certain patterns in fact more consistent with neglect)

• Teasing two options apart help us to understand the conditions underlying conditional salience (e.g., social bias or resource allocation)

... the case that active lateral inhibition has been implicated during categorization or stereotype activation has not yet been made ... although results are consistent with a lateral inhibition account, they do not provide strong evidence that potentially competing information is being actively inhibited. Inhibition can be used in a weak sense to describe an empirical outcome (e.g., response times were slowed and thus could be described as inhibited) or in a strong sense to describe the mechanism that led to that outcome (e.g., cognitive processes were actively inhibited and therefore response times were slowed) ... Various mechanisms can be used to account for slowed judgments without invoking lateral inhibition. One such mechanism that could plausibly account for the effects described would be based on allocation of attentional resources.
Negative Priming Paradigm (e.g., Neill 1977; Tipper 1985)

- Paradigm composed of two related tasks (prime and probe), where percept suppressed in prime is the target in probe
- Performance in different prime/probe combinations permits disentangling of active lateral inhibition vs. resource allocation (i.e., neglect) accounts

**RED**       **BLUE**    *(related)*

**BROWN**     **BLUE**     *(unrelated)*

- If active inhibition → slower performance on “related” trials
- If resource allocation → no difference predicted
GOAL: to determine whether the activation of category **GAY MAN** actively inhibits perception of TH-fronting (and associated percepts)

**PRIME TASK**
- MGT-like task with multiply categorizable stimulus (/s/-fronting and TH-fronting)
- Same stimuli as used in Levon 2014
- While listening to stimulus, written prime on-screen:

  How does this listener sound?

  **Gay**

  **Working-class**

  **Old**
**GOAL:** to determine whether the activation of category **GAY MAN** actively inhibits perception of TH-fronting (and associated percepts)

**PROBE TASK**
- Adaptation of Generalized Phoneme Monitoring task (Frauenfelder & Segui 1989) - **variant monitoring** of TH-fronting:
  - 56 extracts from same recording in **prime** task
  - 28 extracts contain TH-fronting contexts (14 [f], 14 [θ]), 28 fillers
  - Half of 56 extracts contain (fronted) /s/, half contain no /s/
  - All extracts 3-5 syllables long (average length: 3.79 syllables)
  - Mix of stressed and unstressed syllables; mix of word position
Negative Priming Task

- Task built in PsychoPy and presented to respondents in sound-attenuated room over headphones

- During task:
  
  - PRIME [speaker (x), prime (a)] -> PROBE [speaker (x)]
  - PRIME [speaker (y), prime (b)] -> PROBE [speaker (y)]
  - PRIME [speaker (z), prime (c)] -> PROBE [speaker (z)]
Negative Priming Task

- Task built in PsychoPy and presented to respondents in sound-attenuated room over headphones
- During task: 3 blocks of prime + probe, each speaker and each prime once without replacement (order randomised)
- 168 probe trials per respondents, 56 per condition/speaker (order randomised)
- Entire task: 15 minutes
- To date: 23 respondents (3 discarded) = 20 usable response sets
PREDICTIONS

Active Lateral Inhibition
• Respondents will be “better” at identifying instances of TH-fronting when probe trials preceded by Working-class prime than when preceded by Age prime (control)
• Respondents will be “worse” at identifying instances of TH-fronting when probe trials preceded by Gay prime than when preceded by Age prime (control)

Resource Allocation
• No differences predicted between three priming conditions
PREDICTIONS

“Better” versus “Worse” identification:

- **Sensitivity** analysis: how well do respondents separate signal from noise

<table>
<thead>
<tr>
<th>TH-fronting: YES</th>
<th>TH-fronting: NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Response: <strong>YES</strong></td>
<td>HIT</td>
</tr>
<tr>
<td>Response: <strong>NO</strong></td>
<td>MISS</td>
</tr>
</tbody>
</table>

- **Latency** analysis: how quickly do respondents make their choices
Mixed-effects binomial regression (with probit link) in R (glmer)

- **Dependent**: Response (YES or NO)
- **Fixed effects**: Reality (YES or NO)
  Prime (GAY, WC, AGE)
  TH-environment (YES or NO)
  (fronted) /s/ present (YES or NO)
  + all two- and three-way interactions
- **Random effects**: (1|Speaker)
  (1|Participant)
  (1|Trial)
## Sensitivity

<table>
<thead>
<tr>
<th>Fixed Effects</th>
<th>Estimate</th>
<th>Std. Error</th>
<th>z value</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Intercept)</td>
<td>-1.629</td>
<td>0.118</td>
<td>-13.779</td>
<td>0.000</td>
</tr>
<tr>
<td>Prime (AGE)</td>
<td>0.290</td>
<td>0.118</td>
<td>2.454</td>
<td>0.014</td>
</tr>
<tr>
<td>Prime (WC)</td>
<td>0.237</td>
<td>0.117</td>
<td>2.030</td>
<td>0.042</td>
</tr>
<tr>
<td>Reality (YES)</td>
<td>0.841</td>
<td>0.110</td>
<td>7.635</td>
<td>0.000</td>
</tr>
<tr>
<td>TH_env (YES)</td>
<td>1.182</td>
<td>0.119</td>
<td>9.968</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Total N = 3360. Groups: Respondent (20); Trials per respondent (168); Speaker (3). Log likelihood = -1523.3.
Sensitivity

Response

Prime

Gay
Age
WC
Respondents sensitive to the presence of TH-fronting in the dataset
  - Significant effect of reality
  - Overall “hit”-rate of 68%; overall “false alarm”-rate of 12%; d'-value: 1.71

Respondents sensitive to variable context (e.g., variant monitoring)
  - Significant effect of TH-environment

Initial evidence for active lateral inhibition
  - Respondents less likely to respond that TH-fronting is present after GAY prime is presented (as compared to AGE prime)
  - Does not effect overall accuracy/sensitivity (independence of Reality effect)
  - No parallel facilitation effect for WC primes
Latency

- Mixed-effects linear regression with in R (lmer)
- 1680 total instances of [θ/f] in dataset (50% [θ], 50% [f])
- 813 “yes” responses (in reality: 532 [f], 281 [θ])

- **Dependent:** RT after “yes” in TH-environment

- **Fixed effects:** Reality (YES or NO)
  Prime (GAY, WC, AGE)
  (fronted) /s/ present (YES or NO)
  + all two- and three-way interactions

- **Random effects:** (1|Speaker)
  (1|Participant)
## Fixed Effects

<table>
<thead>
<tr>
<th></th>
<th>Estimate</th>
<th>Std. Error</th>
<th>t value</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Intercept)</td>
<td>0.806</td>
<td>0.027</td>
<td>30.427</td>
<td>0.000</td>
</tr>
<tr>
<td>Prime (AGE)</td>
<td>-0.026</td>
<td>0.028</td>
<td>-0.955</td>
<td>0.339</td>
</tr>
<tr>
<td>Prime (WC)</td>
<td>-0.030</td>
<td>0.027</td>
<td>-0.955</td>
<td>0.339</td>
</tr>
<tr>
<td>Reality (YES)</td>
<td>-0.035</td>
<td>0.023</td>
<td>-1.711</td>
<td>0.089</td>
</tr>
<tr>
<td>/s/ present (YES)</td>
<td>0.068</td>
<td>0.022</td>
<td>2.989</td>
<td>0.003</td>
</tr>
</tbody>
</table>

Total N = 813. Groups: Respondent (20); Speaker (3). Log likelihood = -225.79
Respondents generally slow to determine whether TH-fronting is present (mean RT: 795msec)

Respondents are marginally faster when TH-fronting is in fact present

Respondents are significantly slower when fronted /s/ is present

No difference in reaction times across primes

⇒ No support for active lateral inhibition in latency analysis
PREDICTIONS

Active Lateral Inhibition
- Respondents will be “better” at identifying instances of TH-fronting when probe trials preceded by Working-class prime than when preceded by Age prime (control)
- Respondents will be “worse” at identifying instances of TH-fronting when probe trials preceded by Gay prime than when preceded by Age prime (control)

Resource Allocation
- No differences predicted between three priming conditions

Summary

Not supported
Partially supported
Partially supported
Summary

- Overall effect whereby respondents are **less likely** to claim that TH-fronting is present after presentation of **GAY** prime (sensitivity).
- When do claim TH-fronting is present, **no difference** in how quickly they come to that decision (latency).
- Potential support for notion of existence of active lateral inhibition in social cognition, but **preceding** (or parallel to) **linguistic processing**.

**BUT**
- Small (pilot) sample.
- Difficulty comparing sensitivity results to latency results.
- Potential confounds/constraining factors (especially for latency).
Overall effect whereby respondents are less likely to claim that TH-fronting is present after presentation of GAY prime (sensitivity).

When do claim TH-fronting is present, no difference in how quickly they come to that decision (latency).

Potential support for notion of existence of active lateral inhibition in social cognition, but preceding (or parallel to) linguistic processing.

Nevertheless – question of “social” versus “cognitive” causes of perceptual patterns is not a trivial one; need more work on how these different forces interact in sociolinguistic processing.
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