# Style in real time: Activation, control, and change 

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## Overview

## The study of style

- Attention paid to speech
- Audience, accommodation, indexicality, identity, persona
- 'very largely supplanted the attention-to-speech explanation'
$\rightarrow$ Focus on social dynamics of styles


## Attention and control

Vernacular as "the language first acquired by the language learner controlled perfectly, and used primarily among intimate friends and family members. Thus every speaker has a vernacular, some quite close to the network standard, some quite remote from it."

- Competing attentional demands are pervasive in interaction
- Divided attention disrupts speech control
- Variable style control observable, esp. in real-time production data Schilling-Estes 2004; Kendall 2009, Hall-Lew et al 2012, Tamminga et al 2016
- Continual signal of biographical information about speaker
- Yet not central to models of monolingual style variation
$\rightarrow$ Cognitive foundation of style variation in interaction


## Overview

## Part I: Examples of variable control in real-time

Is activating or inhibiting certain styles effortful for native speakers?
Do these signals of effort and ease bear any relation to social meaning?

## Part II: Cognitive model of style in interaction

A. Indexicality (social embedding)
B. Dual processing (speech production)
C. Game theory ( $A$ and $B$ in interaction)

Part III: Implications
Micro - Expanded model of style variation
Macro - Rate and direction of change



## Executing later-learned styles can be effortful

- Sociolinguistic interview tasks conflate attention and register
- Experiment: Control register to examine effect of attentional load on control
- Tasks with high and low attentional load
- 12 participants, aged 18-23 (mean 19.5), 3M 9F, London vernacular speakers
- Told to present news reports in formal style, as if presenting news on BBC radio
- Texts contained a number of variables


## Task 1 - Recall news story text

Low load condition
High load condition - Listen to numbers, report first 5 in order
cf. Christodoulides 2016
Task 2 - Read aloud news story text
Low load condition
High load condition - Add numbers throughout, report total
cf. Yin et al 2007
Casual conversation - discussed experiment, bio, attitudes, own repertoire

## EXAMPLE 1

## Effects of higher attentional load

- Dysfluent production
- Greater pause length
- Increased use of glottal replacement: /R/ for /t/
- Increased use of th-fronting: /f/ for / $\theta /$

Reading aloud [low load]
"a low mass cool star located forty light years away from Earth."
Reading aloud [high load]
"of the eight planets only... three are located in the habitable zone"

## Style control

## EXAMPLE 1

## Glottal replacement of /t/

- Inhibition of /R/ across formal speech
- Increase in / $\mathrm{R} / \mathrm{with}$ higher attentional load



## Style control

## EXAMPLE 1

## th-fronting

- Non-significant trend of increased /f/ under high load
- Implicational ordering of /f/ presence by load condition


|  | READING |  | RECALL |  |  | CASUAL |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | low load | high load | low load | high load |  |  |
| Tahira | n | $<\mathrm{n}$ | n < | < n | $<$ | n |
| Anthony | n | $<\mathrm{n}$ | n < | $<$ | < | n |
| Benjami <br> n | n | < n |  | < n | < | n |
| Bruno | n | $<\mathrm{n}$ |  | $<$ | < | y |
| Shefali | n | $<\mathrm{n}$ |  | $<\mathrm{n}$ | $<$ | y |
| Fiona | n | n | n < | $<$ | < | y |
| Iman | n | $<\mathrm{n}$ | n < | $<$ | < | y |
| Zana | n | n | n < | $<$ | < | y |
| Liana | y | n | n < | < n | $<$ | y |
| Sadaf | n | $<\mathrm{n}$ | n < | < y | < | y |
| Saafi | n | $y$ | $y<$ | $<$ | < | y |
| Britney | y | $<\mathrm{y}$ | $\mathrm{n}<$ | < y | $<$ | V |

## Style control

## EXAMPLE 1

## Summary: attentional load affects style control

- Slight shift to vernacular forms under higher load
- Strong subjective difficulty controlling production under high load
[Did the numbers distract you?]
Fiona: "Oh yeah definitely because it affected the way I was telling the story. I found myself going from reporter to like me talking to my friends. I was like yeah like like um yeah kind of thing, you know, using those kind of colloquialisms"
- Attentional load may exert a pervasive, low-level influence on style production
- Past findings: Small effect implies that large effects are register driven



## Style control

## Cognitive load reduces convergence

- Dyads built identical LEGO ${ }^{\circledR}$ constructions without seeing each other's and with incomplete instructions
- Three levels of task difficulty
- Listeners perceived convergence over time - in the Easy condition
- to a lesser extent in the Medium condition - not in the Hard condition
- Confirmed by amplitude envelope acoustic similarity analyses

$\rightarrow$ Speech convergence is lower when cognitive load higher


## EXAMPLE 3

## Differential inhibition of variables: Switches and leaks

- Intervocalic /?/ and th-fronting suppressed to identical levels in formal style
- What happened when participants switched back to casual?

Diverse descriptions of social meaning

- Both stigmatized

Wells 1982, Altendorf 2003

- th-fronting destigmatizing

Levon \& Fox 2014, Schleef \& Ramsammy 2013

- th-fronting more stigmatized

Kerswill 2003, Holmes-Elliott 2019

## Style control

## EXAMPLE 3

## When shifting back to casual...

/ $\mathrm{Z} /:$ 'Switch' — immediate increase
/f/: ‘Leak' - gradual increase

"But I think the total might be..."
"The numbers were really like offputting. I couldn't think about the story."
Tahira

Style control


## Style control



## Interim summary

## Control and activation

- Later-learned or less practised styles (e.g. formal, accom) may take more effort

Inhibitory control, Green 1998

- Variable inhibitory control across variables
- Moments of high load can 'reveal' what is effortful for a speaker


## For later model

- Add control to speaker design

Le Page \& Tabouret-Keller 1985

- Degrees of automaticity, defaults vs. effortful monitoring


## Interim summary

So what? - Isn't control just a constraint on social meaning?
Example 4 - Social meanings of control

Figure out who you are, and then do it on purpose.


## Social meanings of control

## EXAMPLE 4



## Fareed Zakaria

- Bilectal - 17 yrs Indian English (D1), 35 yrs Americanized style (D2)
- Speech samples - Broadcast interviews in U.S. and in India, similar topics, 20 yrs

Lectal Focusing in Interaction (LFI)

- tracks style-shifts in ongoing interaction
- extract broken into units (major clausal boundaries)
- variants from two recognized lects - AmE vs IndE (avg. 11.6 variants/unit)

```
what matters more than anything else is not all this fancy talk about
multilateralism
    Proportion AmE style = 6/14 (.43)
```


## Social meanings of control

## Variables coded

|  | American | Indian |
| :---: | :---: | :---: |
| GOAT diphthong | OU | 0 |
| FACE diphthong | el | e |
| cot vowel | a | D |
| BATH vowel | æ | a: |
| voiceless inter-dental fricative | $\theta$ | $\underline{t}^{\text {h }}$ |
| word-internal intervocalic /t/ | $r$ | t |
| non-cluster syllable-initial /t/ | $t^{\text {h }}$ | t, t |
| non-cluster syllable-initial /p/ | $p^{h}$ | $p$ |
| non-cluster syllable-initial /k/ | $k^{\text {h }}$ | k |
| voiced inter-dental fricative | す | d |
| pre-consonantal /r/ | 1 | - |
| coda and non-cluster syllable-initial /I/ | $\downarrow$ | \| |

## Social meanings of control

Public panel discussion at Yale University (2003)

because of his inability to forge truly deep er and lasting coalitions er much of that work will not actually be consumated or completed

Interview on Indian TV (2008)

but you as you know they couldn't i mean there's also part of the problem in much of the world, even in south asia is people exaggerate the the power of the united states

## Social meanings of control

## Audience design

- Predicts broadly inverse shifts if audience-driven
- e.g. IndE to Indian audience, $A m E$ to American audience (when persuading)
$\rightarrow$ But symmetry of audience design breaks down upon closer inspection



## Social meanings of control

## Evidence of subtle D1 dominance

Attention Lapses to IndE under diverted attention, regardless of audience
"In anticipation of the clash [where speaker's assertive authority is at stake], the speaker engages in an increased mental effort to win over the hearer's confidence. It is this increased engagement of the speech production mechanism that (potentially) takes its toll on the ability to effectively manage the selection and inhibition mechanism, increasing the likelihood of selection malfunctions."

Matras 2011
"Perhaps when she is evaluating something positively, Yael's attention is diverted from maintaining a more target-like accent in English and Hebrew phonology is allowed to have a stronger influence..."

Damari 2011
Speech rate Increases with shifts to IndE
up to r=0.81 in shifts, Bergmann et al. 2015 on bilinguals; Kendall 2009
Lexicon only AmE skewed to content words
p<.001; similar effects in bilinguals, Gollan et al 2014
Admixture AmE style more hybrid than IndE style
Lifespan Declining proportion of AmE over lifespan
$\rightarrow$ all facets of control in real-time execution of style

## Social meanings of control

## Main sites of IndE shifts

- Counter-arguing

- Parentheticals
- Irony

And often, by the way, this happens, when people criticize the West from outside, they are often using a western line.

- Ridicule

We are discussing whether Hillary fifteen years ago did a corkscrew landing on a Bosnian- We are talking about whether McCain uses his wife's plane. Who cares?

- Dismissiveness, skepticism

You know one issue comes up and we get outraged we bash them on the head $\quad \mathcal{\rho}$ )) about it.

- Direct speech + 'frank talk' stance marker

So the only solution, it seems to me, is that you say, okay, let's in some $\quad / \rho)$ ) way or the other subsidize clean energy for you.

- Negative/skeptical stance


## Social meanings of control

## Negative/skeptical stance

## Slower American style

... is five times the total

## Faster Indian style

No I don't think either of the Democrats have an enlightened position on trade.


## Social meanings of control

## Styling 'the real me'

What is "the relation between the more and the less intentional uses of variables"? Eckert 2001

Figure out who you are, and then do it on purpose.
Dolly Parton

- A speaker can exploit their biography (e.g. D1 dominance) in interaction
- Turning off 'control' (accommodation) and displaying the 'real me':

1. D1 is my more 'native' lect than D2, audience can infer this
2. I can shift to D1 with the effect of "Pay attention! This is the real me speaking now."
$\rightarrow$ Lack of accommodation = lack of need for politeness
$\rightarrow$ Use of D1 for stances of personal honesty, realness, frankness
च 'personalisation' in bilingual CS, Gumperz 1976
$\rightarrow$ dismissing, rebutting, skepticism, arguing, asides, irony, teasing, telling it like it is...
cf. Soukup 2009

## Interim summary

## Functions of accent in talk

- Signal social and stance meanings $\rightarrow$ identity what sort of person are you?
- Raw material for management of talk $\rightarrow$ credibility, persuasion
do I buy what you're saying?
- Judgements of whether people are 'being themselves', regardless of accent
- Reactions when people stray too far from their "assumed... real selves"

Coupland et al 1991; Podesva et al 2015, Simard et al 1976

- Speakers use layered repertoire (biographical indexicality) to manage this
- Delink from macro-social meanings - variables also do 'me', not ethnic identity
cf. Eckert 2008

Get to know me, white people, so I can relax and just talk to you like I talk to everybody else. Comedian Adele Givens (in Rickford and Rickford 2000)

## Social model of style

## Social model

Group focus in models of style shifting

- Group identity basis of indexical marking
- Convergence = rapport with addressee

- Divergence = disalignment with addressee

Simple monotonic prediction: convergence for rapport, based on group identity


But we observe divergence for rapport
$\rightarrow$ layered repertoire manages persuasion and credibility, not just identity

## Cognitive model of style

## Socio-cognitive model


A. Indexicality
social embedding
system of social meanings
Ochs 1992, Silverstein 2003, Eckert 2008, 2012
B. Dual systems
speech production
how speakers execute forms in real time
Kahneman 2011, Campbell-Kibler 2016 for perception
C. Game theory interaction
how dyads use $A$ and $B$ in real time
Goffman 1961; Frank \& Goodman 2012; Dror et al 2013; Burnett 2017

## Cognitive model of style

## B. Dual systems

- System 1 and System 2 for judgement and behavior Kahneman 2011
- "One of the main functions of System 2 is to monitor and control thoughts and actions 'suggested' by System 1, allowing some to be expressed directly in behavior and suppressing or modifying others"
- "It is the mark of effortful activities that they interfere with each other", System 2 can be disrupted by increased cognitive load, defaults to System 1
cf. Campbell-Kibler 2016 for perception; L1/L2 declarative-procedural model, Ullman 2001

Layered style repertoires
Yaeger-Dror 1993

## System 1

Default, automated, low cost
Unmonitored styles
More 'native', practised
Overridden by System 2 with effort

## System 2

Effortful, monitored, higher cost
Monitored styles
Harder to sustain
Lapses to System 1 under high load

## Cognitive model of style

## C. Rational Choice - the speaker

## Goffman 1961; Myers-Scotton \& Bolonyai 2001; Frank \& Goodman 2012; Dror et al 2013; Burnett 2017

- Integrates indexicality, speech production pressures, their intersective meanings
- Non-monotonic strategies for persuasion and credibility


## Utility function

Payoff of each strategy given:

- Social value/costs indexical fields, situation, hearer
- Processing value/costs relative effort, cognitive load, internal factors

Convergence positive face
 inauthentic Divergence unfriendly

'perceptual harmony', Grondelaers et al 2016

- Norm-setting in the interaction
- Accrete into reputation/type: Noble Self, Rhetorical Sensitive


## Cognitive model of style

## C. Game Theory - the interaction

## Goffman 1961; Myers-Scotton \& Bolonyai 2001; Frank \& Goodman 2012; Dror et al 2013; Burnett 2017

Optimized outputs feed into cycles of Bayesian inferencing

## Utility function

Payoff of each strategy given:

- Social value/costs indexical fields, situation, hearer
- Processing value/costs relative effort, cognitive load, internal factors


## Updated prior

- Assessment of response
- Adjustment to response



## Implications

## Implications for stability and change at community level?

## Vernacular stability

- UC/WC speakers routine use of 'own' forms $\rightarrow$ dialect stability
- Prestige/non-prestige forms used for same indexical functions
- Limited medium/long-term convergence despite short-term convergence

Sonderegger et al 2017


## Implications

## Implications for stability and change at community level?

## Direction of change

- Real-time reveals indexical differences despite similar overall rates
- Shift from in-talk identity marker (older Gen2) to indicator (younger Gen2)
- Accounts for long-term retention of exogenous forms in a diasporic community




## Conclusions

## What the real time signal reveals

- All repertoires are layered and 'truncated'
- Real time ease and effort = tiny cues to biographical organization of repertoire
- Feed into how we are construed (Levon 2018) and shape our social presence


## A socio-cognitive model of style

- Incorporates role of accent in rhetoric, persuasion, and managing talk
- Accounts for complex dyadic procedures in accommodation
- Change often induced by dyads, not individuals
- Models monolinguals and bilinguals in parallel
- Incorporates style into wider models in cognitive science


# Thank you! 

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## Appendix: Bilingual-monolingual continuum

Two languages
e.g. L1 Somali - L2 English

Two dialects
e.g. Cypriot Greek - Standard Modern Greek (also Arabic varieties, German varieties)

## Cognitive state

- Diffs in language dominance
- Greater inhibitory control for L1 $\rightarrow$
- slower L2 speech rate
- greater L2 disfluency
- interference from L1
- Non-linguistic cognitive advantage due to inhibitory control
- L2 sensitive to attention/cog load effects


## Cognitive state

- Dialect dominance
- Greater inhibitory control
- Non-linguistic cognitive advantage due to inhibitory control
(Oschwald et al. 2018; Antoniou et al. 2016)

Two styles?
e.g. vernacular - standard

## Cognitive state

- Dominance?
- Inhibitory control to execute style?
- slower D2 speech rate?
- 'interference' from D1?
- D2 sensitive to cognitive load effects?


## Appendix: Example 1 details

## SAMPLE RECALL TEXT

A valuable bracelet has been found after being lost for 5 years.
The bracelet is made of gold and emeralds.

It belongs to a secondary school student who lives in Brighton.

The girl inherited the bracelet from her grandmother.

The first time she wore it, she went shopping in London and lost it.

Other shoppers helped her look for it but they failed to find it.
The girl even posted a notice offering a reward.

On Thursday, 5 years later, the owner found the bracelet behind his display shelf.

He was able to locate the girl's old notice.

She was delighted to receive his call!

She offered to pay the reward price but the owner refused to take it.

## SAMPLE READ TEXT

At the Royal Society today, astronomers reported discovering a record 8 planets orbiting a single star, all much like the Earth in size.

The researchers told the audience that each planet is able to support liquid water, so they think that each planet may be able to support life too.

This is more true for 3 of the planets than the others.

The compact system of planets orbits Trappist-1, a low-mass cool star located 40 light years away from Earth.

|  | Read <br> Text I | Read <br> Text Il | Recall <br> Text 1 | Recall <br> Text 2 |
| :--- | :---: | :---: | :---: | :---: |
| /t/:_\# | 12 | 12 | 11 | 13 |
| /t/: V_V | 5 | 5 | 5 | 6 |
| /I/-vocal: _\# | 4 | 6 | 6 | 6 |
| /I/-vocal: _C | 1 | 0 | 6 | 8 |
| th-fronting | 4 | 5 | 5 | 5 |
| TH-fronting | 2 | 2 | $(2$ coda) |  |
| $(2$ coda) | 1 | $(2$ coda) $)$ <br> PRICE vowel | 5 | 5 |
| GOAT vowel | 2 | 4 | 8 | 6 |
| FACE vowel | 5 | 4 | 8 | 7 |

## Appendix: Example 1 details

## Materials

- 2 reading scripts:
- Same topic, science focus (formality)
- 80 words in 4 sentences
- 2 recall scripts:
- Narratives with clear end point
- Positive with a mild surprise element
- Formal lexicon, similar themes
- 119-138 words in 11 sentences
- Low Ns due to load task, but similar lexical forms across speakers


## Variables

- Type I: shared across Londoners
- Type II: Distinct vernacular settings

|  | Read <br> Text I | Read <br> Text II | Recall <br> Text 1 | Recall <br> Text 2 |
| :--- | :---: | :---: | :---: | :---: |
| /t/: _\# | 12 | 12 | 11 | 13 |
| /t/: V_V | 5 | 5 | 5 | 6 |
| /I/-vocal:_\# | 4 | 6 | 6 | 6 |
| I/-vocal:_C | 1 | 0 | 6 | 8 |
| th-fronting | 4 | 5 | 5 | 5 |
| TH-fronting | 2 | 2 | 1 | 1 |
| PRICE vowel | 5 | 5 | 8 | 6 |
| GOAT vowel | 2 | 4 | 8 | 7 |
| FACE vowel | 5 | 4 | 8 | 13 |

## Appendix: Example 1 details

## Coding for glottal replacement

(Fabricius 2002; Hughes, Trudgill, \& Watt 2005; Straw \& Patrick 2007; Schleef 2013)

- pre-C > pre-P > pre-V
- coded but comparable rates
- major distinction: word-final, V_V word-medial
- ambiguous and flapped tokens omitted
- oral and elided stops incuded
- types capped at 10


## Coding for th-fronting

(Kerswill 2003; Clark \& Trousdale 2009; Schleef \& Ramsammy 2013)

- included coda and onset
- only voiceless reported (voiced examined ;Ns too low)
- excluded following /th/ environments

| Read Text 1 | Read Text 2 |
| :--- | :--- |
| society | society |
| reported | reported |
| eight planets | eight planets |
| planets | planets |
| that each | that is |
| planet is | planet is |
| located | located |
| forty | forty |
| planets | planets |
| planet may | planet is |
| planets than | possibility |
| support life |  |
| orbits |  |
| support liquid |  |
| that each |  |
| light years |  |

## Appendix: Example 1 details

## Load design effective?: Reading task

## Load design effective?: Recall task

- Unanimous self-report
- Several indications of increased load

- Complex, e.g. increase variability in rate (Christodoulides 2016)

| RECALL TASK |  | Unfilled pauses <br> (>250ms) | Repetitions <br> (incl. filled pauses) | Words <br> (excl. repetitions) | Duration |
| :--- | :--- | :--- | :--- | :--- | :--- |
| BRITNEY | Low load (TEXT 1) | 16.83 | 5 | 90 | 43.30 |
|  | High load (TEXT 2) | $\mathbf{1 9 . 4 1}$ | $\mathbf{1 4}$ | $\mathbf{1 1 3}$ | $\mathbf{5 2 . 8 2}$ |
| ANTHONY | Low load (TEXT 2) | 15.92 | 20 | 86 | 47.38 |
|  | High load (TEXT 1) | $\mathbf{1 6 . 0 2}$ | $\mathbf{4 0}$ | $\mathbf{1 1 1}$ | $\mathbf{6 1 . 7 0}$ |

## Appendix: Example 1 details

## Presence of formal style

## Tahira:

"It kinda felt like a interview. Kind of, because when I'm in an interview I have like a conscious thought in my mind like 'oh no, you need to sound formal make sure you don't mispronounce the t's."

## Strong subjective experience of shifting away from formal style under high load

## Fiona:

[Did the numbers distract you?]
"Oh yeah definitely because it affected the way I was telling the story. I found myself going from reporter to like me talking to my friends. I was like yeah like like um yeah kind of thing, you know, using those kind of colloquialisms"

## Anthony:

[Did you feel like you were being quite formal relative to your range?]
"Mostly. I think I was probably most formal in the last one [reading task, low load]. Because, I don't know, I think I was more relaxed. It was quite stressful there, just before that."

## Appendix: Example 1 details




## Appendix: Example 1 details



## Appendix: Example 4 details

## Proportion AmE across US and Indian contexts

| Sample recording | Type | Topics | Proportion AmE in sample segment |
| :---: | :---: | :---: | :---: |
| U.S. AUDIENCES |  |  |  |
| CT Forum 2003 | public panel discussion, recorded for online and DVD use ( 120 mins ) | U.S. foreign policy | 80\% |
| Charlie Rose 2008 | individual interview, recorded for broadcast (PBS; 56 mins) | International politics | 61\% |
| Charlie Rose 2010 | as above ( 25 mins ) | U.S. and international politics | 63\% |
| INDIAN AUDIENCES |  |  |  |
| Express Adda 2012 | public panel discussion, recorded for online use ( 1.25 hrs ) | International politics | 21\% |
| Walk the Talk 2004 | individual interview, recorded for broadcast (NDTV; 22 mins) | Islam in India and in the world | 11\% |
| Walk the Talk 2008 | as above ( 21 mins ) | U.S. foreign policy; international politics | 16\% |

## Appendix: Example 4 details

## Diverted attention - More IndE

## Indian interview

4 Is it really the end of the world? Is it- no. 5 I think it's something- they could be contained they could be deterred. Er- it would keep themyou know
6 They would pay enormous costs
7 and I think it's important to maintain those costs
8 Because I think they should realise they're making a choice
9 about whether or not they want to be you know a proper modern power


## U.S. interview

3 A Chinese businessman speaks English so he can participate in our economy he can swim in our sea as it were...
[INT: I don't know if $I$ agree with that...]
6 And- and- and- I say in the book the people who get this new world best
7 are actually America's multinationals, because they are living it.
8 And they learned it early because it was a question of survive, adapt or die.
9 Right. Now -- and I think you're absolutely right. GE, by the way, is a perfect example of the transformation.


## Appendix: Example 4 details

## Speech rate - Faster in IndE shifts

## Countering doubt



## Parentheticals

Counter-positioning


- IndE surfaces with divided attention and faster speech rate
$r=0.13$, up to 0.81
- Default code

Hincks 2008; Bergmann et al. 2015;
Kendall 2009

## Implications for stability and change at community level?

## Extent of change

In contact situations, transmission influenced by style acquisition

## Asymmetric style control

- Short stretches
- Speech rate effects
- Inexact form and conditioning
- Attentional effects
- Favoured in content words


## Example

- Mandeep's British English (Rampton 2013)


## Advanced style control

- Sustained stretches
- Speech rate effects
- Competent form and conditioning
- Attentional effects
- Favoured in content words

Balanced style control

- Sustained stretches
- Few speech rate effects
- Accurate form and conditioning
- Few attentional effects
- Prevalent in content and function words


## Example

- Zakaria's American English (present study)

Example

- Anwar's British and Indian English
(Sharma \& Rampton 2015)

