Sympathy (continued and ended)

1. Summary:
   There are over and under-generation problems with Sympathy. One of the clearest one is the following, involving undergeneration: Sympathy cannot express opaque orders among allophonic processes.

2. German (Ito and Mester 2002)

ç in complementary distribution with x dorsal fric -> [+back]/ [+back, -cons]_

	After [+back]	After others[1] and elsewhere
ç		manche [mançə], solche [zolçə], Pech [peç], ich [iç], möchte [møçtə], Bücher [byçər], Charisma [çarisma], chtonisch [çtoniʃ]
x	Tuche [tuxə], Bach [bax], doch [dox], auch [aux], mochte [moxtə]	

ʁ in complementary distribution with ʁ̞ [son, -lateral, -nas, -syll] -> ʁ̞ / in coda

	In onset	In coda
ʁ	Rat [ʁɑt], rot [ʁot], Rätsel [ʁɛtsəl]	
ʁ̞		wir [viʁ̞], werden [vɛʁ̞dən], Uhr [uʁ̞]

3. Alternations

Scharr-en [ʃɑʁən]	Scharr	[ʃɑʁ̞]	'dig'
moch-t-e [moxtə]	möch-t-e	[møçtə]	'wish, want, like to'

These establish that the ʁ and ʁ̞, on the one hand, and x vs. ç, on the other, are not only in complementary distribution but also that *one becomes the other*, in contexts where it is impermissible. Simple complementary distribution doesn't tell us this.

4. ʁ -lenition **counterfeeds-in-context** ç-backing: first analyzed in rule terms, assuming /ç/ and /ʁ/

	fürchten [fyʁ̞çtən]	Bach [bax]
UR	[fyʁçtən]	[baç]
ç-backing		[bax]
ʁ –lenition	[fyʁ̞çtən]	

Aside: Segments conditioning x-backing are [-front,-cons] (Ito & Mester 2002). Then [ʁ̞] resulting from lenition should trigger the x-process, but for the opacity effect: it's as non-front as [ɑ] and a glide, thus [-cons]. But perhaps x-triggers must be [+syllabic], or, alternatively, perhaps [ʁ̞] is central while x-triggers have to be [+back]: then we should not expect lenited R to trigger backing. In that case the interaction is non-opaque.

There is a broader moral here. The overt data is ambiguous and leaves multiple analyses open: some of these analyses may be opaque but not all are. Suppose learners overcome the inherent ambiguity in the data and converge on a shared solution. If they do, that's because they understand the nature of the process (e.g. *why* backing is triggered V's and not C's) in a way that makes it possible to predict the full list of trigger and context segments from some essential property of it, which makes it unnecessary to rely on fragmentary data. Then, if we establish that learners do this, that's what linguists should strive for too.

In this case the question is whether they analyse the alternations they're exposed to in terms of classificatory features or in terms of articulatory gestures: what quality should a segment have in order to turn ç to x?

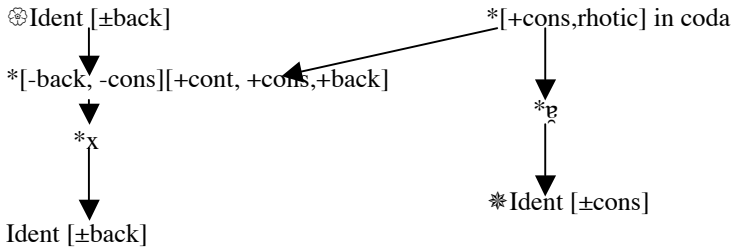
5. ʁ -lenition and ç-backing: basic OT analysis

[1] No ç occurs after non-coronal or non-sonorant C's in German within a single morpheme. The rule of ç-backing is blocked across morpheme boundaries (hence *Kuh-chen* 'cow-DIM' is [ku:çən], not [ku:xən]): this makes it impossible to determine what allophone of the dorsal fricative will occur after non-coronal or non-sonorant C's.

*[+cons, rhotic] in coda >> *x >> Ident [±cons]
*[-back, -cons][+cont, +cons, +back] >> *ʁ̞ >> Ident [±back]

Ignoring RoB issues, an analysis is possible for opaque items like *fürchten*, as follows:

fyʁçtən		❁Ident back	*[+cons,rhotic] in coda	*[-back, -cons] [+cont, +cons,+back]	❋Ident [±cons]
a	❁ fyʁçtən		*!		
b	☞ fyʁ̞çtən			*	*
c	fyʁ̞xtən	*!			*



Now we consider RoB and observe that ❋Ident [±cons] works only if all instances of R are [+cons] in UR. That can't be under RoB: the rhotic emerges as [+cons] and [-cons] entirely as a function of context. Therefore the UR of German [ʁ] should be free to contain either [-cons] or [+cons] values: the right constraint hierarchy will distribute these correctly in context. But if [ʁ] is allowed to be either [+cons] or [-cons] in UR, a lexical entry like /fyʁ̞çtən /, with coda /ʁ̞/ cannot be excluded. Such an item will predict the wrong [x] allophone:

fyʁ̞çtən		❁Ident back	*[+cons,rhotic] in coda	*[-back, -cons] [+cont, +cons,+back]	❋Ident [±cons]
a	☹ fyʁ̞çtən			*!	
b	❁☞ fyʁ̞xtən				
c	fyʁçtən		*!		*

One can also derive fyʁ̞xtən from UR /fyʁ̞xtən/

/fyʁ̞xtən/		❁Ident back	*[+cons,rhotic] in coda	*[-back, -cons] [+cont, +cons,+back]	❋Ident [±cons]
a	☹ fyʁ̞çtən			*!	
b	❁☞ fyʁ̞xtən				
c	fyʁçtən		*!		*

6. One conservative solution: grant the modest increase in serialism involved in setting up *one* intermediate derivational step between the Rich Base and the surface form.

Rich Base (universal) —H1→ UR's of the language —H2→ SR's of the language

H1 and H2 are distinct constraint hierarchies. How they differ is open to argument but one option, if we seek to establish an UR alphabet of segments, is to eliminate from H1 all but rankings of the form M >>F where M is a context free markedness constraint and F is the corresponding faithfulness. So H1 looks like this in German (act:

Then H2 contains all the rankings established in (5). These work now because the pass through H1 has eliminated some forbidden segments, like x and ʁ̃, from the input to H2.

The option considered by Ito and Mester has the same flavor but allows H-switches at several other junctures and a less constrained difference between H_1 and H_2. Likewise for possibilities in Stratal OT.