Towards a unified taxonomy of dual interactions
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Dept. of Linguistics 50th Anniversary Celebration, October 12, 2013

Abstract: not all interactions are equal

- In dual interactions, more than one effect is observed between two rules/ processes
- No current theory on which dual interactions may be possible or must be impossible; framework-specific differences
- I propose three terminological parameters to create a unified taxonomy:
  - Bidirectional vs. selfish (whether each process has one effect on the other or whether one single process has two simultaneous effects on the other),
  - Inter- vs. intra-type (whether a transparent or opaque process may interact the other kind or not)
  - α- vs. β-transformation (whether a feeding (or counterfeeding) type may interact with a bleeding (or counterbleeding) type or not).
- Rule-based serialism excels at deriving bidirectional interactions while OT-CC better models selfish interactions.
- Selfish α-transformations and bidirectional intra-type transformations are predicted not to exist.

Background: single-place interactions

- Rule-based serialism and OT-CC enforce ordered application among rules or processes. Intermediate forms play a role in derivations.

(1) Four primary interactions

Given two rules (A and B), such that A precedes B,

a. Feeding: A creates additional inputs to B.

b. Bleeding: A eliminates potential inputs to B.

c. Counterfeeding: B creates additional inputs to A.

d. Counterbleeding: B eliminates potential inputs to A.

The challenge: multiple rule interactions

- A's having a relationship to B says nothing about B's relationship to A
- One rule may have more than one interaction with the other at the same time: DUAL INTERACTIONS (must involve only two rules/processes).

(2) Documented types of dual interactions:

a. Fed counterfeeding (e.g. Kavitskaya & Staroverov 2010): A feeds B, B counterfeeds A.

b. Fed counterbleeding (Baković 2011): A feeds B, B counterbleeds A.

c. Bled counterbleeding (Koutsoudas et al. 1974): A bleeds B, B counterbleeds A.

d. Hybrid opacity (Dow 2013): B counterbleeds *and* counterfeeds A.

e. Hybrid transparency: A feeds *and* bleeds B.

- Standard OT-CC fails to derive (2a) and likely (2b, c). Both rule-based serialism and OT-CC can derive (2d, e) without problem.
- New types can be generated in OT-CC which rule ordering can't derive.

Generating new types of dual interactions

(3) Bleeding-and-counterfeeding

/mgV/ → [ŋgV]   **/mg/ → [m]**   **/mgt/ → [mt]**

/mgV/		*VOC	*MaxC -THEN- ID[place]	AGREE	MaxC	ID[place]	ID[place] ← MaxC
a.	<mgV> Ø			*!			
b. ☞	<mgV, ŋgV> ID[place]					*	
/mg/							
c.	<mg> Ø	*!		*			
d.	<mg, ŋg> ID[place]	*!				*	
e.	<mg, ŋg, ŋ> ID[place], MaxC				*	*!	
f. ☞	<mg, m> MaxC				*		*
/mgt/							
g.	<mgt> Ø	*!		*			
h.	<mgt, ŋgt> ID[place]	*!				*	
i.	<mgt, ŋgt, ŋt> ID[place], MaxC			*	*	*!	
j.	<mgt, ŋgt, ŋt, nt> ID[place], MaxC, ID[place]		*!		*	**	
k. ☞	<mgt, mt> MaxC			*	*		*
l.	<mgt, mt, nt> MaxC, ID[place]		*!		*	*	*

Deletion simultaneously removes and provides potential inputs to assimilation (bleeding and counterfeeding).

(4) Counterbleeding-and-feeding

/mgV/ → [ŋgV]   **/mg/ → [ŋ]**   **/mgt/ → [nt]**

/mgV/		*VOC	AGREE	MaxC	PREC(ID[place], MaxC)	ID[place]
a.	<mgV> Ø		*!			
b. ☞	<mgV, ŋgV> ID[place]					*
/mg/						
c.	<mg> Ø	*!	*			
d.	<mg, ŋg> ID[place]	*!				*
e. ☞	<mg, ŋg, ŋ> ID[place], MaxC			*		*
f.	<mg, m> MaxC			*	*!	
/mgt/						
g.	<mgt> Ø	*!	*			
h.	<mgt, ŋgt> ID[place]	*!				*
i.	<mgt, ŋgt, ŋt> ID[place], MaxC		*!	*		*
j. ☞	<mgt, ŋgt, ŋt, nt> ID[place], MaxC, ID[place]			*	*	**
k.	<mgt, mt> MaxC		*!	*	*	
l.	<mgt, mt, nt> MaxC, ID[place]			*	**!	*

Deletion removes the motivation for the application of assimilation and provides additional input for assimilation to re-apply—which it does.

The solution: classifying parameters

Bidirectional vs. selfish
- **Bidirectional**: Each process has one effect on the other.
- **Selfish**: One process has two effects on the other.

Inter- vs. intra-type
- **Inter-type**: An opaque process interacts with a transparent process, or vice-versa.
- **Intra-type**: An opaque process interacts with an opaque process, or transparent with transparent.

α- vs. β-transformation
- **α-transformation**: A feeding or counterfeeding process interacts with a feeding or counterfeeding process, or (counter)bleeding with (counter)bleeding.
- **β-transformation**: A feeding or counterfeeding process interacts with a bleeding or counterbleeding process, or vice-versa.

(5)

	Type	*Classification*	*Rule-based?*	*OT-CC?*
a.	Fed counterfeeding	Bidirectional inter-type α-transformation	Yes	No
b.	Fed counterbleeding	Bidirectional inter-type β-transformation	Yes	No?
c.	Bled counterbleeding	Bidirectional inter-type α-transformation	Yes	No?
d.	Bleeding-and-counterfeeding	Selfish inter-type β-transformation	No	Yes*
e.	Counterbleeding-and-feeding	Selfish inter-type β-transformation	No	Yes
f.	Counterbleeding-and-counterfeeding	Selfish intra-type β-transformation	Yes	Yes
g.	Bleeding-and-feeding	Selfish intra-type β-transformation	Yes	Yes

Important gaps suggesting impossible types:

Selfish α-transformations
- Selfish inter-type α-transformation, e.g. P feeds and counterfeeds Q
- Selfish intra-type α-transformation, e.g. P feeds and feeds Q

Bidirectional intra-type transformations
- Bidirectional intra-type α-transformation, e.g. P feeds Q, Q feeds P
- Bidirectional intra-type β-transformation, e.g. P feeds Q, Q bleeds P

Further directions and conclusions

- No difference predicted between transparent and opaque permutations of intra-type transformations, or for permutations of inter-type transformations (e.g. if bleeding-and-counterfeeding is allowed, feeding-and-counterbleeding would be as well).
- A revision of these parameters may be required if we do find such differences.
- More work needs to be done on different types of rules/processes (e.g. suprasegmental, harmony, etc.) and different input types.

- This system should elucidate hidden trends concerning rule interaction in general.
- Disparity between rule ordering and OT-CC: the two embody serialism in crucially different ways.
- Depending on what must or must not exist, this system can provide arguments for or against one of these frameworks.