CHAPTER 2

TYPOLOGICAL IMPLICATIONS

2.1 Introduction

The key concept in the PC theory is the interaction between mappings and the notion of a scenario. A scenario, as described in chapter 1, consists of a set of phonological mappings that cohere as a system. Mappings interact in various ways. The key idea is that only by evaluating sets of mappings simultaneously can all the relevant relations between mappings be traced. Otherwise, if mappings were considered in isolation, some valuable insights into the workings of a phonological system would be lost.

Mappings in a scenario are Input-Output. Scenario-inputs are generated by Gen. For a given underlying form, Gen returns scenario-inputs as its value. These are all inputs that can potentially interact. Outputs in a scenario constitute a subset (possibly improper) of the input. There is nothing in the output that is not also in the input. Scenarios in a candidate set contain the same inputs but differ in the set of outputs and/or input-output relations even if outputs are the same. In a tableau, only a subset of mappings from a scenario is represented. In Finnish, these are the interacting processes of shortening and rounding. For a detailed discussion of scenario construction, see chapter 1, section 2.1.

In the remaining part of this chapter I will consider all logically possible scenarios competing with the actual low-vowel-shift scenario in Finnish. These constitute the competition set for the actual scenario. We need to make sure that it is the actual scenario that is chosen over its competitors. It is also important to ensure that every other empirically attested scenario from the set of competitors will be optimal under some constraint ranking, and that unattested scenarios will never win. The remainder of this chapter addresses these three goals.

2.2 Logically Possible Scenarios

Let us first establish the set of logically possible scenarios that belong to the same candidate set as the actual scenario in Finnish. When discussing scenarios, I will consider interacting processes only. In Finnish, those are processes of shortening and rounding. They can be represented by four minimally distinct inputs, /aai/, /ooi/, /ai/, /oi/. The inputs are minimally distinct in vowel length, {/aai/, /ai/}, {/ooi/,/oi/}, and vowel rounding, {/aai/, /ooi/}, {/ai/, /oi/}. All scenarios in a candidate set contain the same inputs.[1]

Two of the four inputs cannot be used as outputs, as they violate high-ranked markedness against tri-moraic syllables. Scenarios with such outputs would lose to any other scenario in a candidate set since they violate high-ranked markedness, and thus will not be considered. Since in a scenario outputs are a subset of the inputs and two of the inputs cannot be used as outputs, there are only two possible outputs in a scenario, [ai] and [oi]. Altogether, there are 16 logically possible scenarios to be considered. These are shown below.[2]

Below is the full set of logically possible scenarios involving the four inputs. Scenarios are labeled according to the types of mappings they contain. Some labels are familiar, others will be explained as we go along. Row one starts with scenarios where

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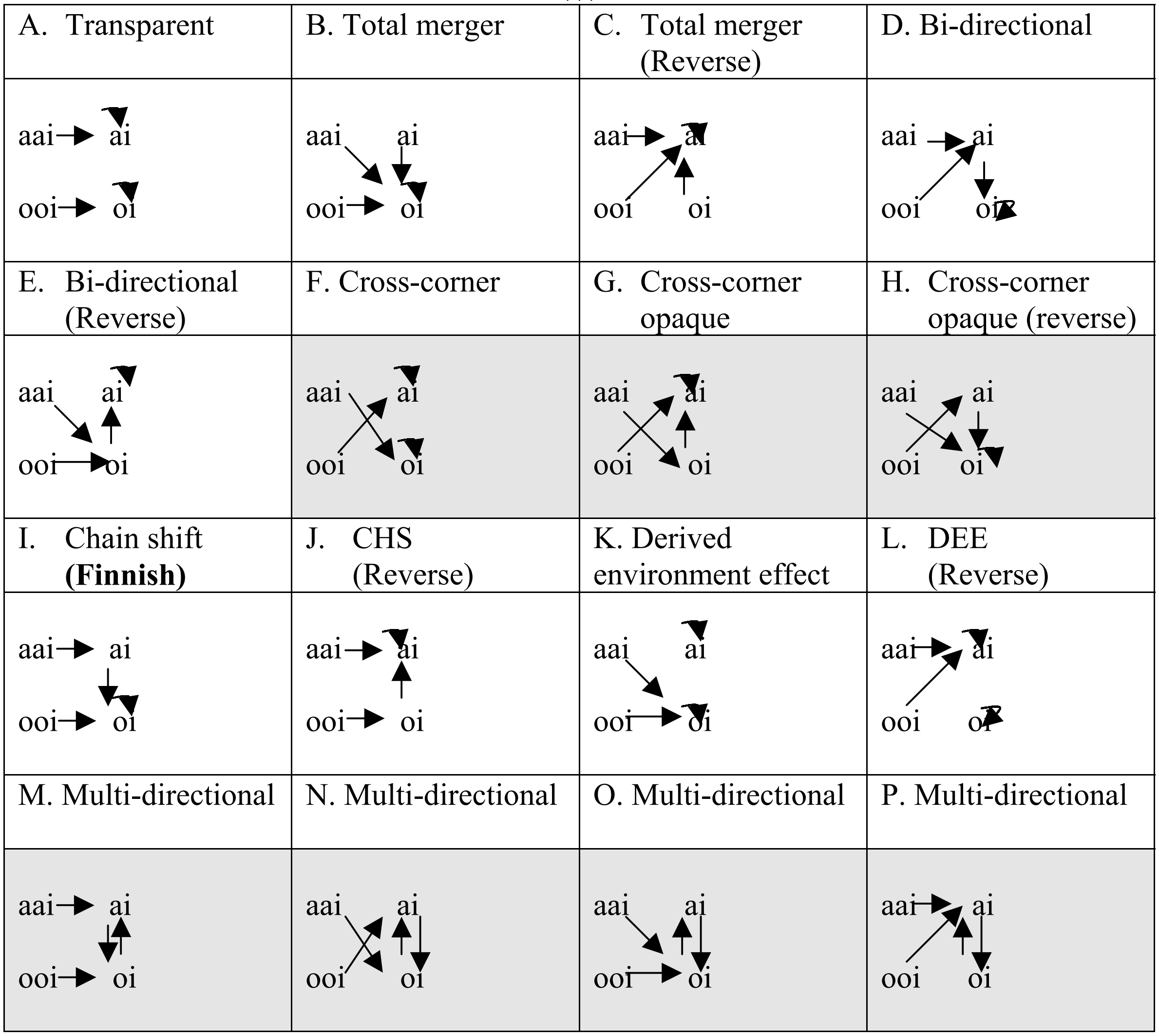
[1] As described in chapter 1, Gen generates more than these four inputs. For an underlying form of length n, the set of scenario inputs contains all forms of length 0…2n+1. But the set of inputs that is ultimately shown in a tableau is a subset of those. In practice, it contains forms that contrast minimally on the arguments of the relevant PC constraints. In Finnish, these are properties of length and rounding, the arguments of PC(long) and PC(round) constraints.

[2] In case of deletion, the output with deletion is also part of the input set (see chapter 5).

rounding applies transparently: (i) there is either no rounding (scenario A), or (ii) rounding or lowering applies to all forms subject to it (scenarios B, C). The next two cells present bi-directional scenarios - those involve both rounding and lowering each. Opaque scenarios, chain shift and derived environment effect, are represented in row three. Row four shows scenarios that involve movement in various directions, thus called multi-directional. Scenarios called reverse constitute a mirror image of an immediately preceding scenario. Unattested scenarios are shaded. (Bi-directional scenarios and the derived-environment effect are discussed separately in section 2.3.)

(1) Full typology (given top-ranked $*\sigma_{\mu\mu\mu}$)



The actual scenario in Finnish is the chain-shift scenario, scenario I (row three). A competing transparent scenario with no rounding is shown in A (top left).

This is a significantly large number of scenarios to be evaluated. However, some of the scenarios are unattested. These are the shaded scenarios. In OT, to ensure that a mapping is unattested, it must be the case that there exists no constraint ranking under which a mapping would win. Such mapping is then harmonically bounded by its competitors. The same is true for scenarios in the PC theory. As will be shown below, given the inventory of constraints in the PC theory (*Eval* of PC), some of the scenarios will never come out optimal, regardless of the constraint ranking.

2.3 Harmonic Bounding

Let us start by determining the set of scenarios that can never come out optimal regardless of the constraint ranking, called harmonically bounded scenarios. Scenarios that are left after harmonic bounding are predicted to win in some language (under some constraint ranking).

Harmonic bounding is illustrated in the following tableau. Harmonically bounded scenarios are shaded. The following tableau contains every constraint of the PC Theory that is relevant in the evaluation process.[3] Scenarios in the candidate set correspond to the ones shown in (1). For reasons of space, I do not draw out each of the scenarios in the tableau. (For diagrams see (1).) Violation marks of constraints will be explained as we go along. See section 2.5 for discussion. The two stages of Eval, stage one with PC and markedness, and stage two with faithfulness, are separated with a double line.

3 There is a relational PC constraint not considered here, PC_{REL}(long). This constraint is satisfied vacuously by each candidate scenario since none of them has a length contrast in the output (see (30), chapter 1 for a definition).

(2) Harmonic bounding

	$*\sigma_{\mu\mu\mu}$	PC_{REL} (rd)	PC_{OUT} (long)	PC_{IN} (long)	PC_{OUT} (rd)	PC_{IN} (rd)	*ai	*oi	(-rd)-Faith	(+rd)-Faith
A. Transparent			**	**			**	**	*	*
B. Total merger			*	****	*	****		****		****
C. Total merger (reverse)			*	****	*	****	****		****	
D. Bi-directional		*			**	**	**	**	***	*
E. Bi-directional (reverse)		*			**	**	**	**	*	***
F. Cross-corner			**	**	**	**	**	**	**	**
G. Cross-corner			*	**	*	**	***	*	***	**
H. Cross-corner			*	**	*	**	*	***	**	***
I. CHS			*	**	*	**	*	***	*	**
J. CHS (reverse)			*	**	*	**	***	*	**	*
K. DEE			*	**	*	**	*	***		***
L. DEE (reverse)			*	**	*	**	***	*	***	
M. Multi-directional			**	**	**	**	**	**	**	**
N. Multi-directional			**	**			**	**	***	***
O. Multi-directional			*	**	*	**	*	***	*	****
P. Multi-directional			*	**	*	**	***	*	****	*