# **Competing models for Mazatec Dialect Intelligibility Networks**

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# **1. Introduction: from raw data to complexity processing**

We'll address three basic questions here:

Can Mutual Intelligibility (MI) be considered as a case of *epigenetic complexity*?

How does it differ from *phylogenetic* and *ontogenetic complexity* (cf. O'Sullivan, David, 2004) – i.e. diachronic and

typological complexity?

To what extent does MI highlight ethnohistory and historical patterns of interaction in a dialect continuum (cf. Gudschinsky 1958a-b, Kirk 1966)?

In other words, how representative of the evolution of *communal aggregates* can MIN (Mutual Intelligibility Networks) be?

To answer these questions, we'll use visualizing tools such as GraphStream (http://graphstream-project.org/).

(1) The Mazatec diasystem: dialects and subdialects

### Highlands complex:

-Central Highlands (Huautla de Jiménez, Santa Maria Jiotes, San Miguel Huehuetlán)<sup>4</sup> -Northwestern Highlands:

- Central Northwestern Highlands (San Pedro Ocopetatillo, San Jeronimo Tecoatl, San Lucas Zoquiapam, Santa Cruz Acatepec, San Antonio Eloxochitlán)
- Peripheral Northwestern Highlands (San Lorenzo Cuaunecuiltitla, Santa Ana Ateixtlahuaca, San Francisco Huehuetlán)

### Lowlands complex:

-Eastern Lowlands (San Miguel Soyaltepec) -Central Lowlands (San Pedro Ixcatlán) -Piedmont (Ayautla, San Felipe Jalapa de Diaz, Santo Domingo)



GraphStream results projected on a geodesic map: Maximalist and minimalist models

**T** = 65: « If we stick to small groups, maybe we'll understand better » Model, With three town dialects still intertwinned: Ix (Lowlands), Ja (Midlands) and Hu (Central Highlands)



**T** = 74: the « Split on your own if we cannot quite understand you well » Model Jalapa (Ja) versus the rest of the network



**Periphery**: -Western Cordillera: Mazatlán Villa de Flores -Cuicatlán Canyon: Chiquihuitlán.

## oriental

# 2. Data and state of the art: the Mazatec Dialect Network

Mazatec: an Oto-Manguean (Popolocan) language spoken in the North-Eastern fringe of the state of Oaxaca in Southern Mexico

Lenguas indígenas de México < 10% 10% - 30% 30% - 30% 50% - 70% 70% - 90% 2 90%





Mazatec makes up a vertical archipelago (Murra 1956, 1984; Nichols 2004), with intricate ecological diversity over Highlands (Alta Mazateca), Midlands (Media) and Lowlands (*Baja* Mazateca) Mazatec communal aggregates The Mazatec area: topography





T = 86: the « More people should go on their own, if they cannot make themselves understood » Model: Jalapa, Ayautla & Soyaltepec versus the rest of the network



**T** = 88: the « More people would go astray, if not comprehensible » Model Main town dialects now emerge from the rest of the network Huautla still stands as central, while the Northwestern dialect still clings to the Highlands' central cluster



Kirk's matric of MI, Mazatec (1970) 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 1 Hu 100 100 49 71 2 Ch 99 100 22 93 24 35 56 93 96 17 7 Mz 96 44 8 In| 95 ---------9 Ix 85 79 73 100 42 39 82 26 100 10 Ay 83 11 Oc 91 55 100 68 31 33 i 94 27 12 An 85 13 Zq 80 100 46 95 100 100 61 29 15 Te 85 32 16 Lo 87 93 100 17 Zc 78 55 18 St 83 **92** 87 45 19 Hn 74 85 100 30 86 88 87 100 44 22 Ja 77 53 100 30 10 100 65 37 48 21 39 23 Cq 39

# 3. GraphStream applied to Kirk's MI matrix

The « Everyone more or less understands everyone » Model

## **Localities surveyed by Paul Livingston Kirk (1970)**

Huautla de Jiménez (#1 Hu), Santa María Chilchotla (#2 Ch), San Jose Tenango (#3 Tg), San Mateo Eloxochitlán (#4 Mt), Santa Maria Asunción (#5 As), San Miguel Huautepec (#6 Mg), San Cristobal, Mazatlán Villa de Flores (#7 Mz), San Jose In-dependencia (#8 In), San Pedro Ixcatlán (#9 Ix), San Bartolome Ayautla (#10 Ay), San Pedro Ocopetatillo (#11 Oc), San Antonio Eloxochitlan (#12 An), San Lucas Zoquiapam (#13 Zq), Santa Cruz Acatepec (#14 Ac), San Jer6nimo Tecoatl (#15 Te), San Lorenzo Cuaunecuiltitla (#16 Lo), Zacatepec de Bravo (#17 Zc), Santa Ana Ateixtlahuaca (#18 St), San Francisco Huehuetlán (#19 Hn), Mazatzongo de Guerrero (#20 Ms), San Miguel Soyaltepec (#21 So), San Felipe Jalapa de Diaz (#22 Ja), San Juan Chiquihuitlán (#23 Cq).

> An « isoglottic » approach: Casad, Eugene 1974 : 163-167: clustering of Kirk's data



the « Shibboleth or Now let's see who can really understand each other and who doesn't » Mod All town dialects show up as autonomous units Huautla is still central, and the Northwest dialect splits in subdialects

**T = 89** 

<u>∎</u>t = 88



**T** = 97: the « Everyone understands everyone (nearly) perfectly in this neighborhood » Model Mazatlán splits from the Central Highlands network while recent peripheral subdialects, such as Independencia & Matzasongo, move astray from the central bulk of the MIN





**GraphStream applied to Kirk's MI matrix: T = 17** Main dialect centers appear, while overall MIN cohesion still holds on.



**GraphStream applied to Kirk's MI matrix: T=40** « Guess which dialect is the one nobody really understands? » Model Chiquihuitlan as an opaque dialect to the rest of the network



Figure 4. The Mazatec Network

**GraphStream applied to Kirk's MI matrix: T = 56** Inner diversification of an innovative NorthWestern Highlands dialect tropism towards the **Central Highland dialect. (Huautla)** 



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**T** = 100: the « Who actually understands everyone 100%, folks ? » Model Only the optimally intelligible (sub)varieties appear here, i.e. the only optimally intelligible (sub)varieties appear: the Central Highlands' and the Northwestern Highlands' segments.



## 4. Conclusion

This vizualization technique (through GraphStream) highlights the intricate structure of Kirk's MI matrix. It fits well with the Vertical Archipelago Model, showing several circles of MI, from uphill (the Central and Northwestern Highlands) to downhill (the Midlands and Lowlands). The most phylogenetically recent dialects split last in this scalar representation. In other words, phylogenetic and epigenetic complexity - intended as MI networks - tend to converge to some extent..