



**Vilnius
University**

Formal language theory: still relevant in 2024?

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Vilnius University

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Academia Grammaticorum Salensis XXI



**Vilnius
University**

Formal language theory: still relevant in 2024?

Part I

Brief introduction to formal language theory

Setup

[[Formal language] theory]

Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Setup

[[Formal language] theory]

FLT

Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

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Meanwhile, in computer science

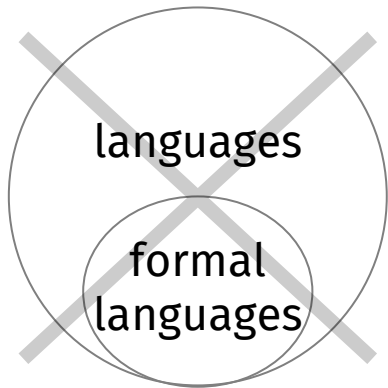
Meanwhile, in psychology

Some prospects

Afterword

Setup

[[Formal language] theory]



FLT

Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

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Meanwhile, in computer science

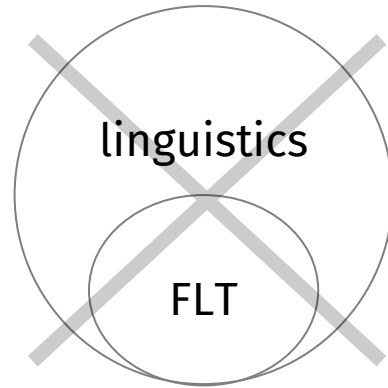
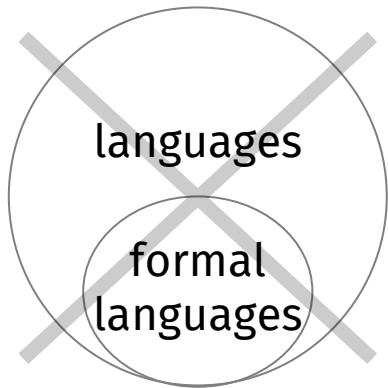
Meanwhile, in psychology

Some prospects

Afterword

Setup

[[Formal language] theory]



FLT

Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

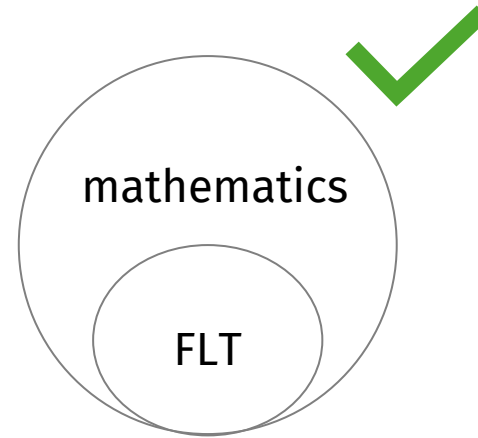
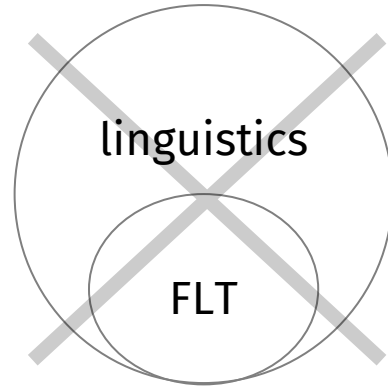
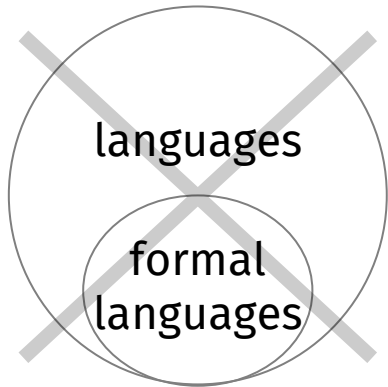
Some prospects

Afterword

Setup

[[Formal language] theory]

FLT



Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

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Meanwhile, in computer science

Meanwhile, in psychology

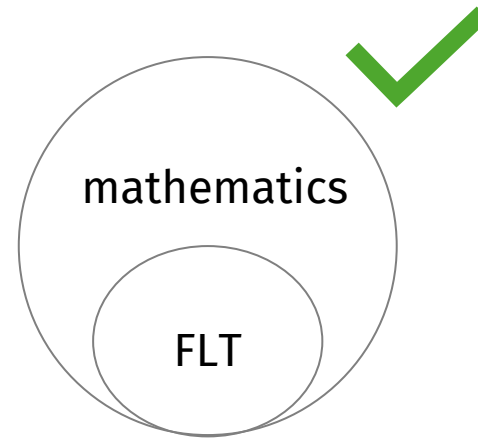
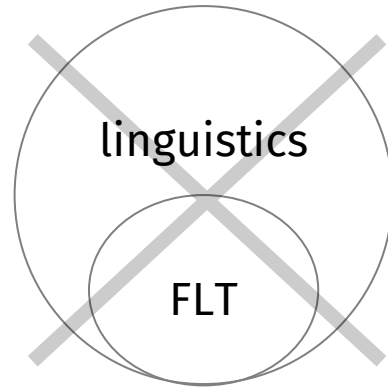
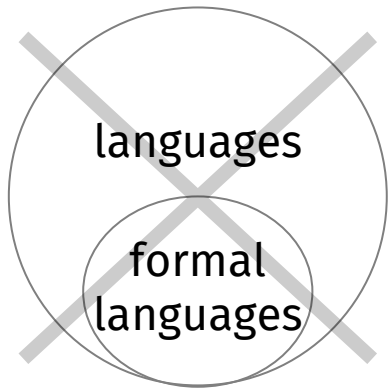
Some prospects

Afterword

Setup

[[Formal language] theory]

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FLT

Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

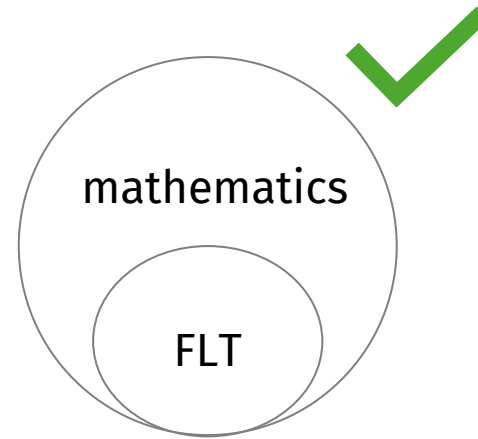
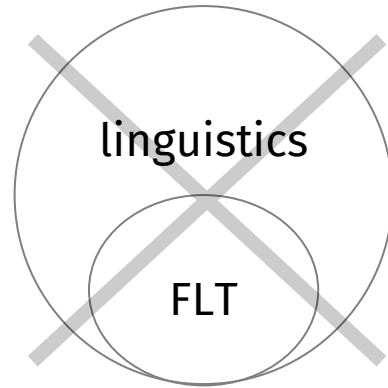
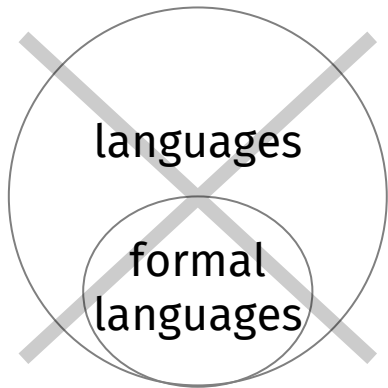
Afterword

Setup

[[Formal language] theory]

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FLT



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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

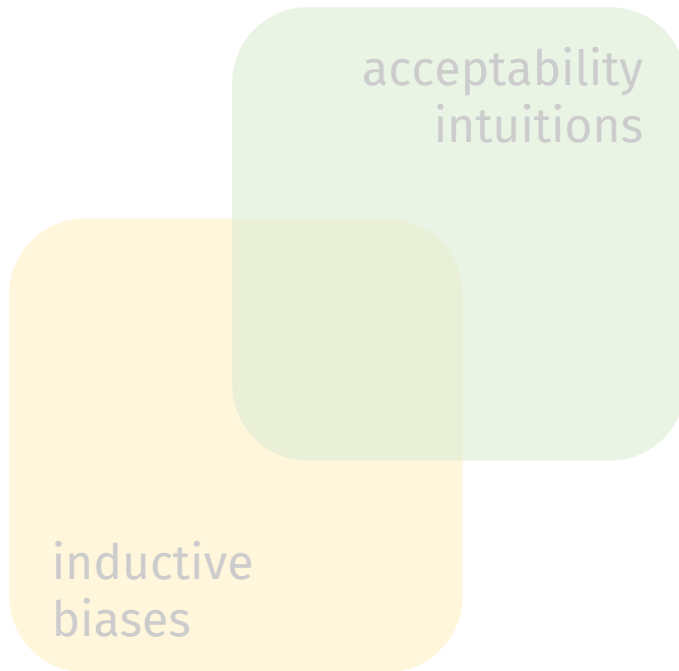
Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

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Outline

Part I. Brief introduction to FLT
Setup

[Where does linguistic FLT fit it?](#)

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

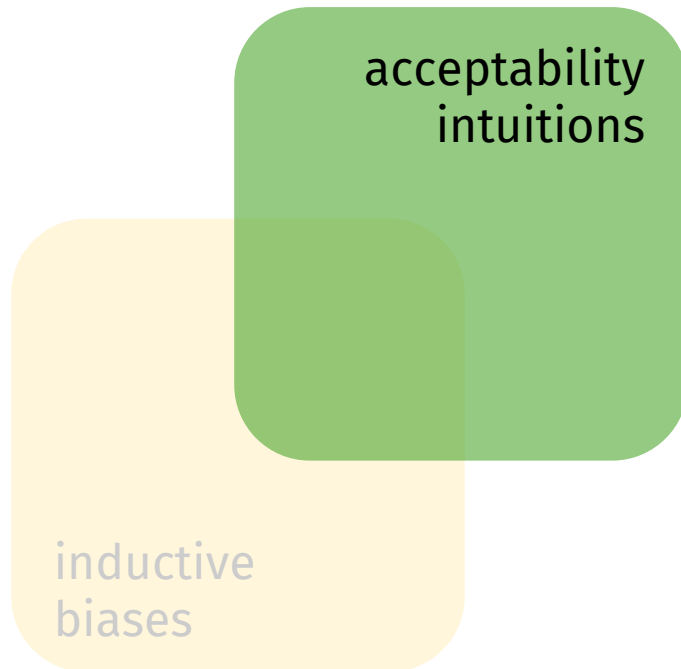
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Meanwhile, in psychology

Some prospects

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Outline

Part I. Brief introduction to FLT
Setup

[Where does linguistic FLT fit it?](#)

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

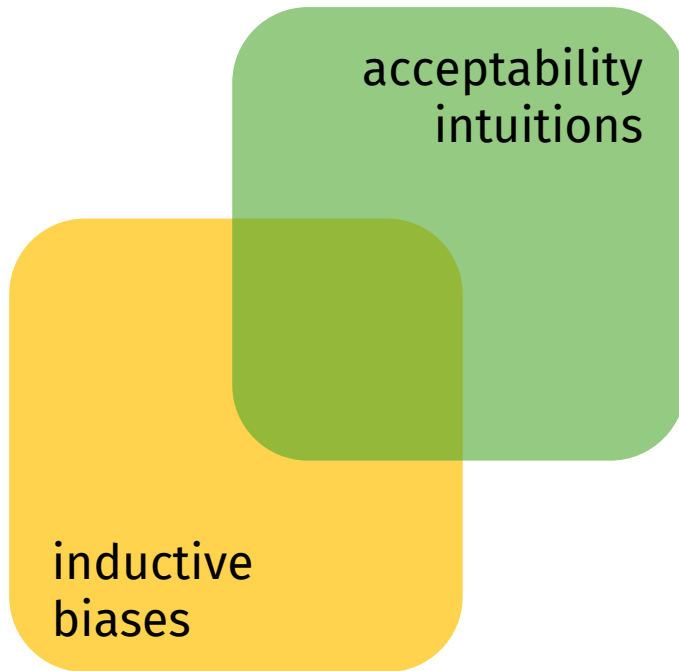
Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

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Outline

Part I. Brief introduction to FLT
Setup

[Where does linguistic FLT fit it?](#)

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

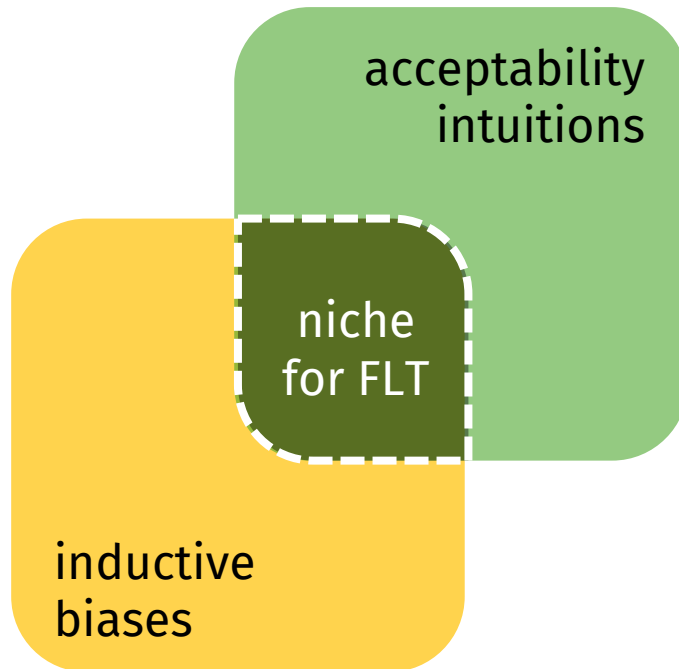
Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

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Outline

Part I. Brief introduction to FLT
Setup

[Where does linguistic FLT fit it?](#)

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

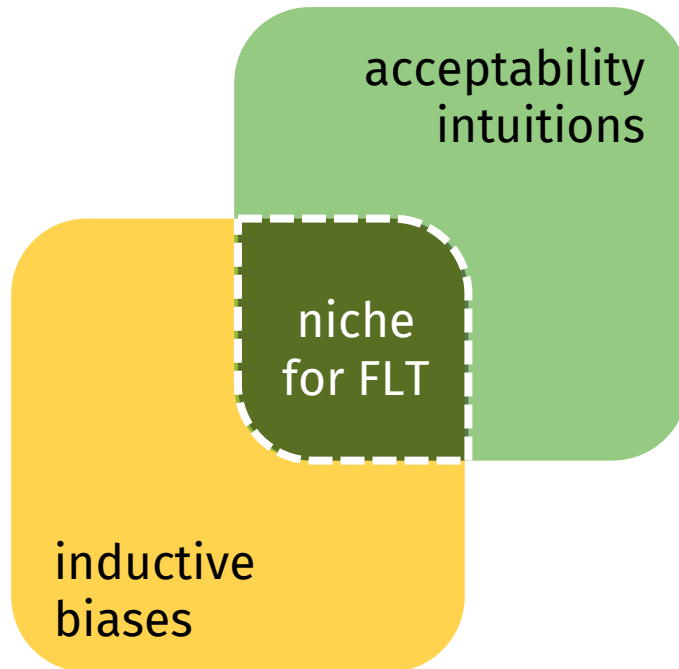
Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

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Outline

Part I. Brief introduction to FLT
Setup

[Where does linguistic FLT fit it?](#)

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

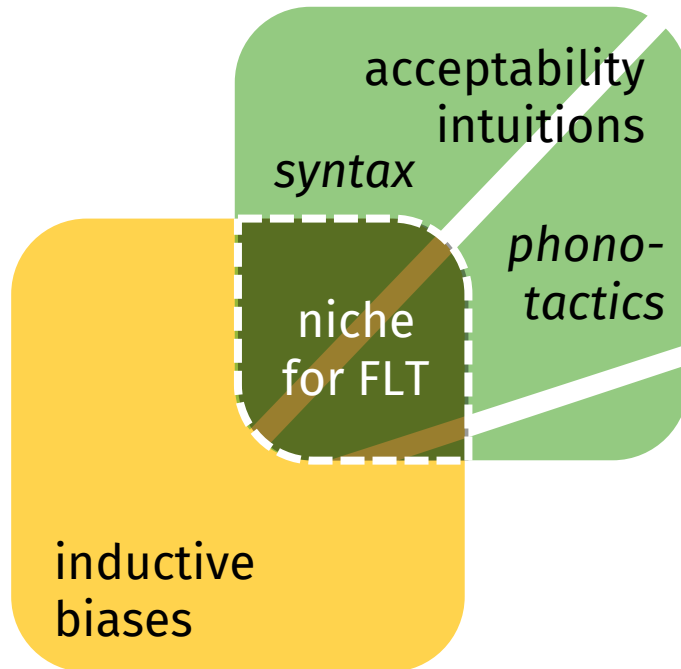
Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

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Outline

Part I. Brief introduction to FLT
Setup

[Where does linguistic FLT fit it?](#)

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

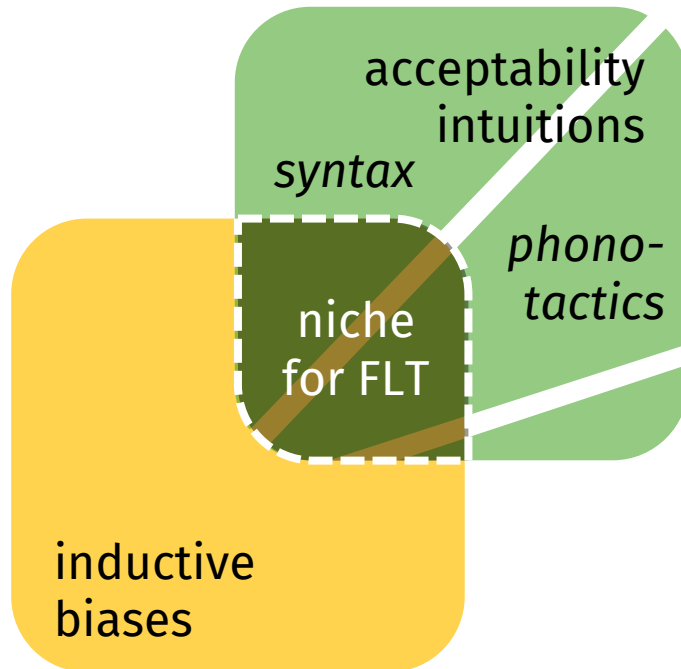
Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

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Outline

Part I. Brief introduction to FLT
Setup

[Where does linguistic FLT fit it?](#)

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

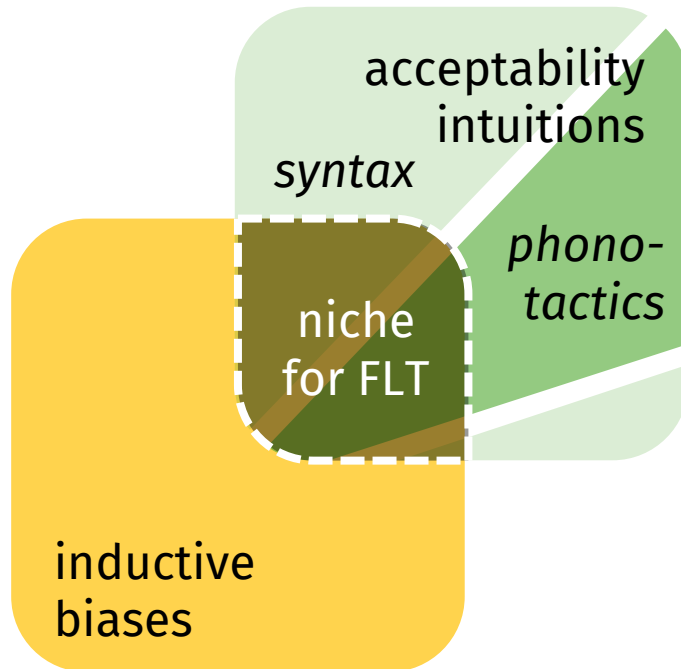
Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

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Outline

Part I. Brief introduction to FLT
Setup

[Where does linguistic FLT fit it?](#)

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

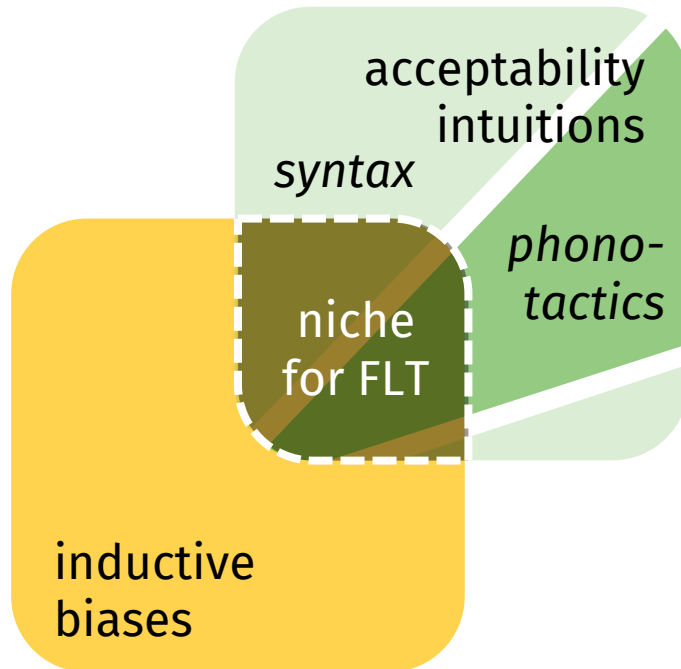
Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

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Outline

Part I. Brief introduction to FLT
Setup

[Where does linguistic FLT fit it?](#)

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

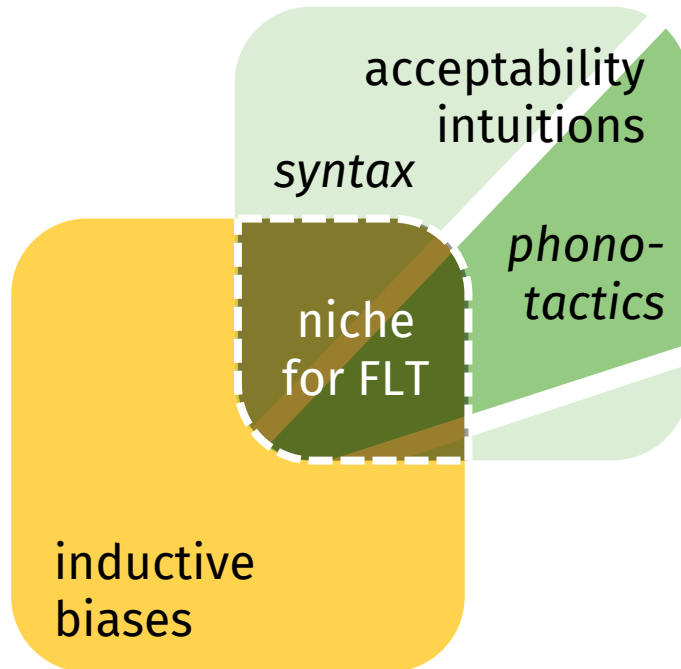
Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Where does linguistic FLT fit in?



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Outline

Part I. Brief introduction to FLT
Setup

[Where does linguistic FLT fit it?](#)

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

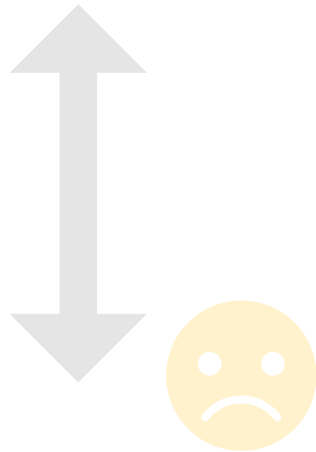
Afterword

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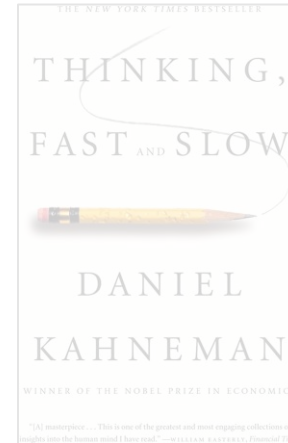
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...that pigeons can also learn, but not the same things as humans can—a different inductive bias!



It is very tempting to perceive this as just a difference in “intelligence”.



The analogy with cognitive biases might help us resist this temptation.

Outline

Part I. Brief introduction to FLT
Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

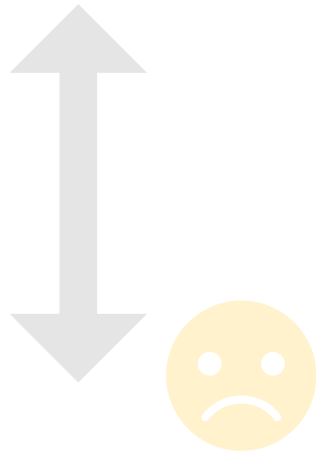
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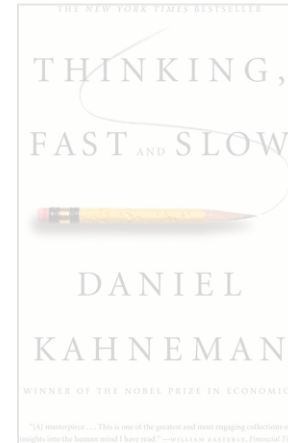
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Outline

Part I. Brief introduction to FLT
Setup

Where does linguistic FLT fit it?

[Inductive biases](#)

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

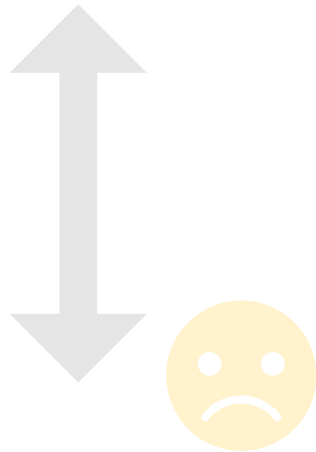
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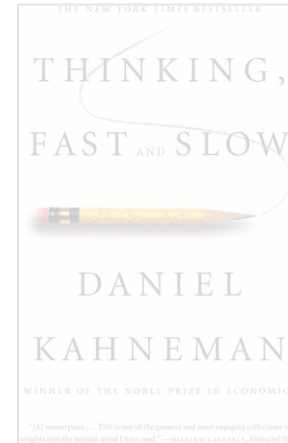
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Part I. Brief introduction to FLT
Setup

Where does linguistic FLT fit it?

[Inductive biases](#)

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

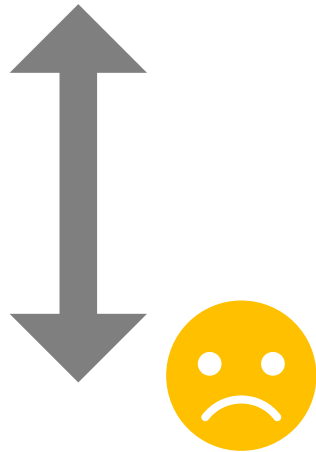
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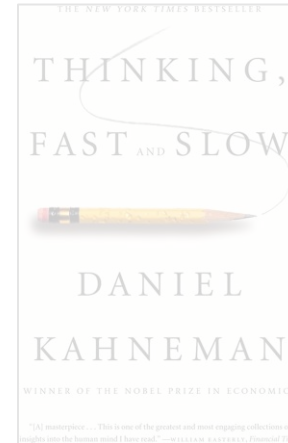
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Outline

Part I. Brief introduction to FLT
Setup

Where does linguistic FLT fit it?

[Inductive biases](#)

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

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The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

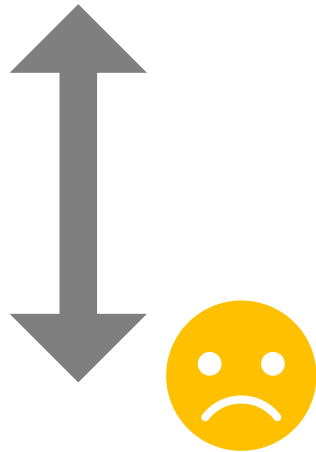
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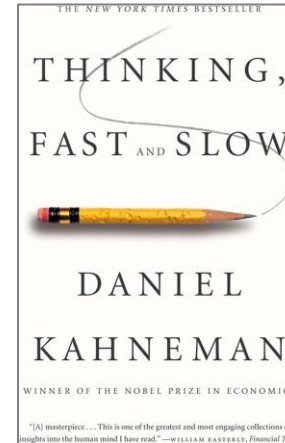
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Part I. Brief introduction to FLT
Setup

Where does linguistic FLT fit it?

[Inductive biases](#)

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Inductive biases 2/2

Would you expect a child to acquire any L1 after you...

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Inductive biases 2/2

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Outline

Part I. Brief introduction to FLT
Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Inductive biases 2/2

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Outline

Part I. Brief introduction to FLT
Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Inductive biases 2/2

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

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Outline

Part I. Brief introduction to FLT
Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Inductive biases 2/2

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Inductive biases 2/2

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Outline

Part I. Brief introduction to FLT
Setup

Where does linguistic FLT fit it?

[Inductive biases](#)

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Inductive biases 2/2

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

[Inductive biases](#)

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Inductive biases 2/2

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

[Inductive biases](#)

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

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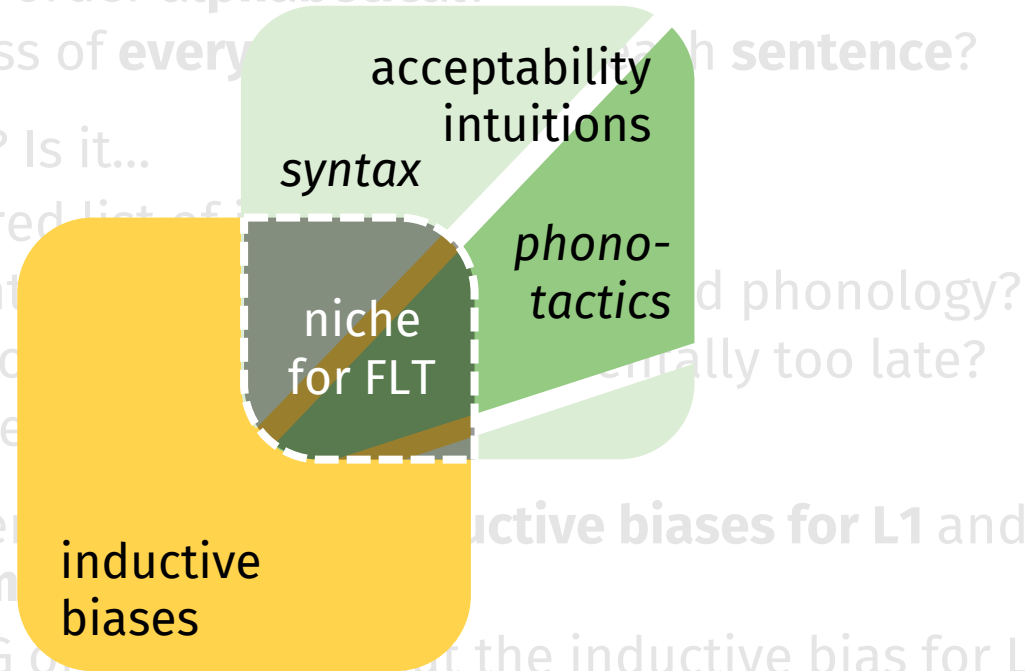
- make its word order **alphabetical**?
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Why or why not? Is it...

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

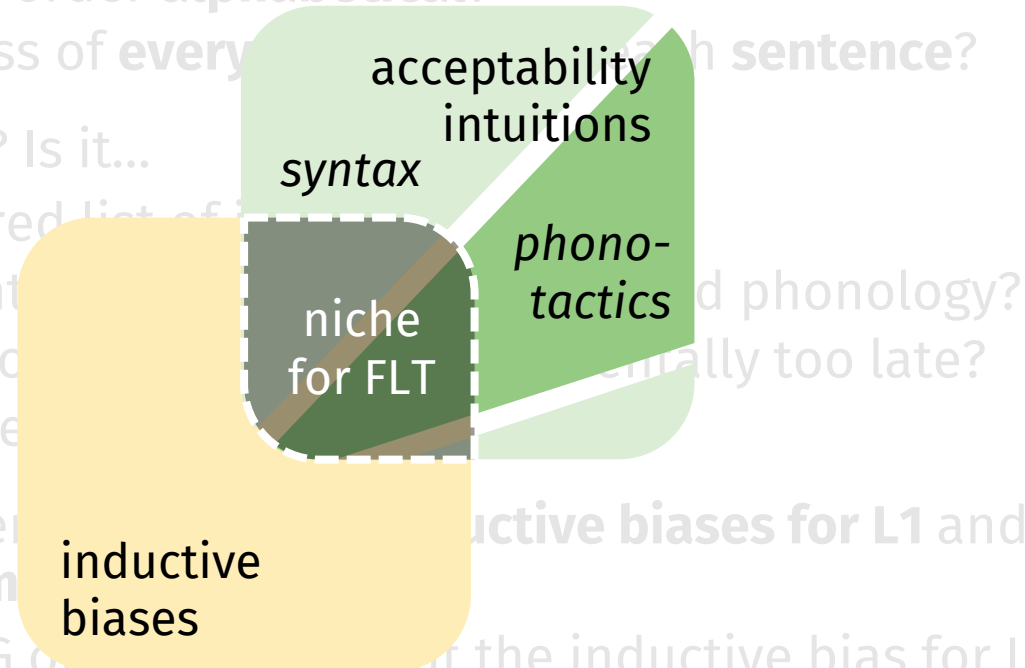
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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

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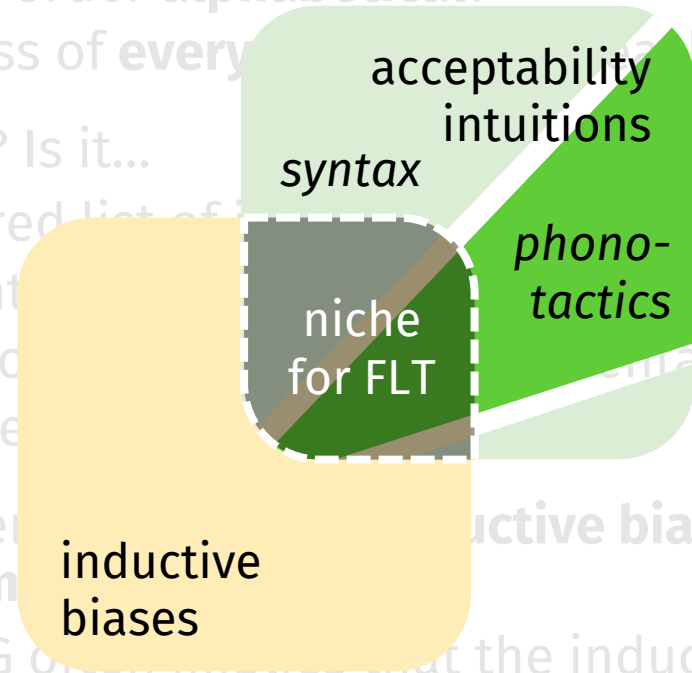
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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

What is phonotactics?

Before 90s: permissible consonant clusters (initial, medial, final)
Today: that, plus vowel (or consonant) harmony
If you do FLT: *especially* vowel (or consonant) harmony
Generally: language-specific notion of what sequences of speech sounds are acceptable (can serve as words)

Examples

No word-initial υ .
No word-initial sp, st, sk .
No word-final b, d, g .
No $rstr$, except morpheme boundaries.
 a, o, u and $\text{æ}, \emptyset, y$ are both fine,
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Outline

Part I. Brief introduction to FLT
Setup

Where does linguistic FLT fit it?
Inductive biases

What is phonotactics?

Fun facts about phonotactics
Linguistic FLT pipeline
Strictly 2-local (SL_2) languages
 SL_2 languages are limited
Regular languages
Some findings of linguistic FLT
The benefits of abstraction

Part II. A history of FLT's relevance

Setup
Chomsky's "Three models"
The long thread
Meanwhile, in linguistics
Meanwhile, in computer science
Meanwhile, in psychology
Some prospects
Afterword

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

[What is phonotactics?](#)

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

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Outline

Part I. Brief introduction to FLT
Setup

Where does linguistic FLT fit it?
Inductive biases

What is phonotactics?

Fun facts about phonotactics
Linguistic FLT pipeline
Strictly 2-local (SL_2) languages
 SL_2 languages are limited
Regular languages
Some findings of linguistic FLT
The benefits of abstraction

Part II. A history of FLT's relevance

Setup
Chomsky's "Three models"
The long thread
Meanwhile, in linguistics
Meanwhile, in computer science
Meanwhile, in psychology
Some prospects
Afterword

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

[What is phonotactics?](#)

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

What is phonotactics?

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Outline

Part I. Brief introduction to FLT
Setup

Where does linguistic FLT fit it?
Inductive biases

[What is phonotactics?](#)

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

[What is phonotactics?](#)

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

[What is phonotactics?](#)

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

[What is phonotactics?](#)

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

[What is phonotactics?](#)

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

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Generally: language-specific notion of what sequences of speech sounds are acceptable (can serve as words)

Examples

No word-initial **v**. (English)
No word-initial **sp, st, sk**. (Spanish)
No word-final **b, d, g**. (very common)
No rstr, except morpheme boundaries.
a, o, u and æ, ø, y are both fine,
but not in the same word.
æ and e are both fine,
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Outline

Part I. Brief introduction to FLT
Setup

Where does linguistic FLT fit it?
Inductive biases

What is phonotactics?

Fun facts about phonotactics
Linguistic FLT pipeline
Strictly 2-local (SL_2) languages
 SL_2 languages are limited
Regular languages
Some findings of linguistic FLT
The benefits of abstraction

Part II. A history of FLT's relevance

Setup
Chomsky's "Three models"
The long thread
Meanwhile, in linguistics
Meanwhile, in computer science
Meanwhile, in psychology
Some prospects
Afterword

What is phonotactics?

Before 90s: permissible consonant clusters (initial, medial, final)
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Outline

Part I. Brief introduction to FLT
Setup

Where does linguistic FLT fit it?
Inductive biases

What is phonotactics?

Fun facts about phonotactics
Linguistic FLT pipeline
Strictly 2-local (SL_2) languages
 SL_2 languages are limited
Regular languages
Some findings of linguistic FLT
The benefits of abstraction

Part II. A history of FLT's relevance

Setup
Chomsky's "Three models"
The long thread
Meanwhile, in linguistics
Meanwhile, in computer science
Meanwhile, in psychology
Some prospects
Afterword

What is phonotactics?

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Outline

Part I. Brief introduction to FLT
Setup

Where does linguistic FLT fit it?
Inductive biases

[What is phonotactics?](#)

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

What is phonotactics?

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Outline

Part I. Brief introduction to FLT
Setup

Where does linguistic FLT fit it?
Inductive biases

What is phonotactics?

Fun facts about phonotactics
Linguistic FLT pipeline
Strictly 2-local (SL_2) languages
 SL_2 languages are limited
Regular languages
Some findings of linguistic FLT
The benefits of abstraction

Part II. A history of FLT's relevance

Setup
Chomsky's "Three models"
The long thread
Meanwhile, in linguistics
Meanwhile, in computer science
Meanwhile, in psychology
Some prospects
Afterword

What is phonotactics?

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Outline

Part I. Brief introduction to FLT
Setup

Where does linguistic FLT fit it?
Inductive biases

What is phonotactics?

Fun facts about phonotactics
Linguistic FLT pipeline
Strictly 2-local (SL_2) languages
 SL_2 languages are limited
Regular languages
Some findings of linguistic FLT
The benefits of abstraction

Part II. A history of FLT's relevance

Setup
Chomsky's "Three models"
The long thread
Meanwhile, in linguistics
Meanwhile, in computer science
Meanwhile, in psychology
Some prospects
Afterword

What is phonotactics?

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Outline

Part I. Brief introduction to FLT
Setup

Where does linguistic FLT fit it?
Inductive biases

[What is phonotactics?](#)

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

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Outline

Part I. Brief introduction to FLT
Setup

Where does linguistic FLT fit it?
Inductive biases

[What is phonotactics?](#)

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

[Fun facts about phonotactics](#)

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Fun facts about phonotactics

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

[Fun facts about phonotactics](#)

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Fun facts about phonotactics

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

[Fun facts about phonotactics](#)

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Fun facts about phonotactics

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

[Fun facts about phonotactics](#)

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Fun facts about phonotactics

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

[Fun facts about phonotactics](#)

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Fun facts about phonotactics

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

[Fun facts about phonotactics](#)

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

[Fun facts about phonotactics](#)

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

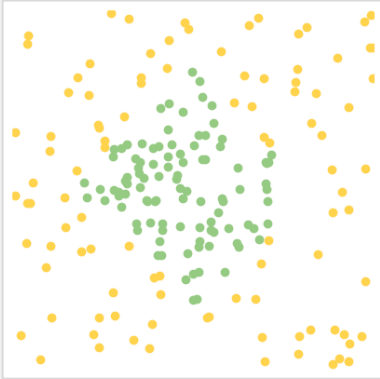
Meanwhile, in psychology

Some prospects

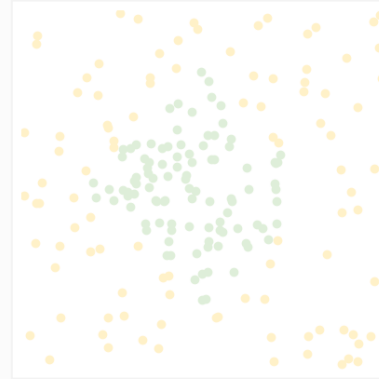
Afterword

Linguistic FLT pipeline

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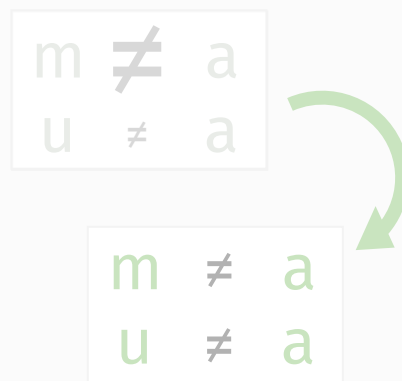
You will now be working with just A and U .

Do **not** enforce an upper bound on the length of the words in A and U .

$a(li)^n ma$

alima
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Outline

Part I. Brief introduction to FLT Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

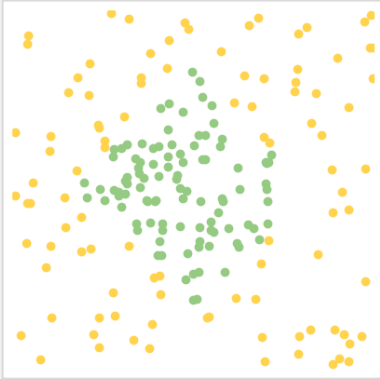
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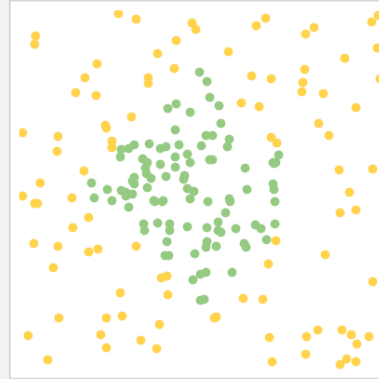
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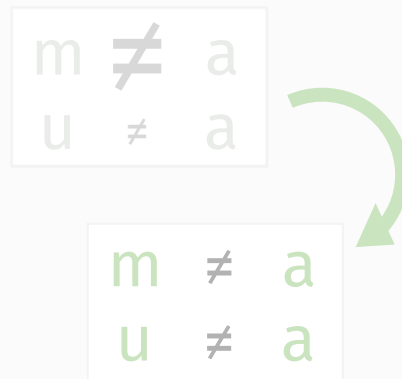
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Part I. Brief introduction to FLT
Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

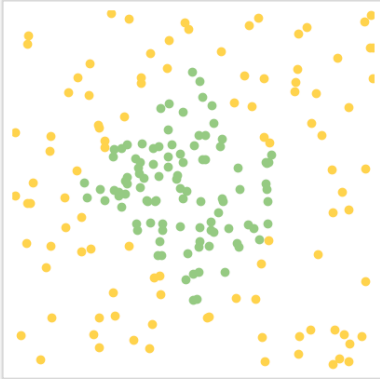
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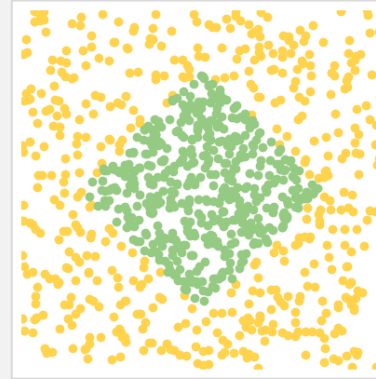
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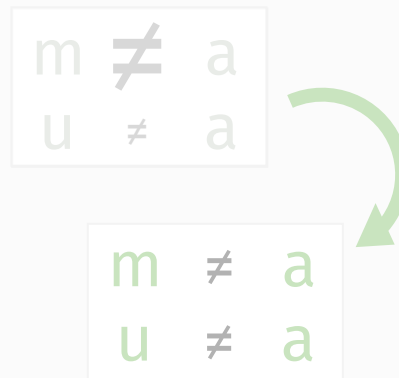
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Setup

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Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

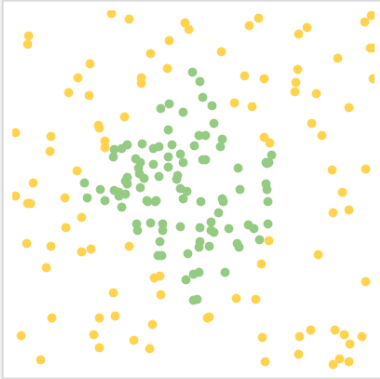
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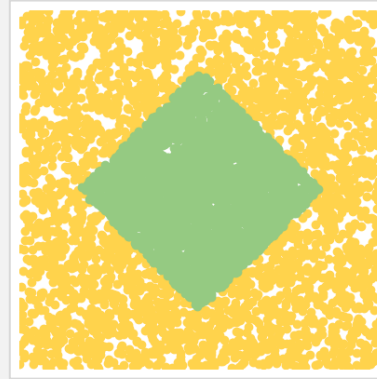
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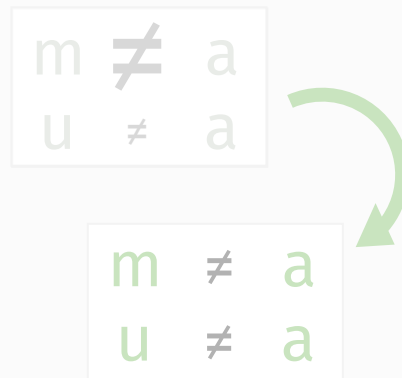
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Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

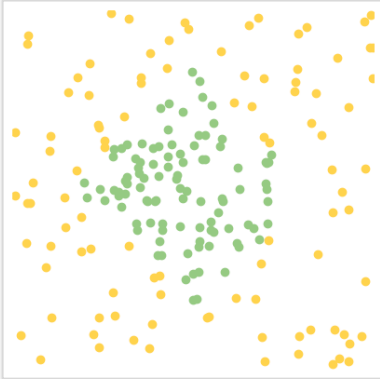
Meanwhile, in psychology

Some prospects

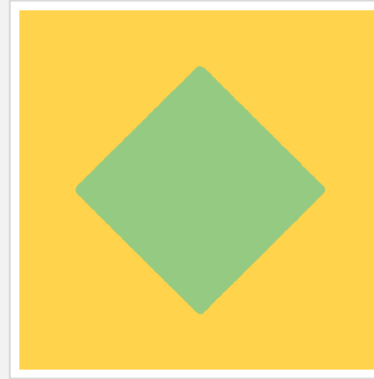
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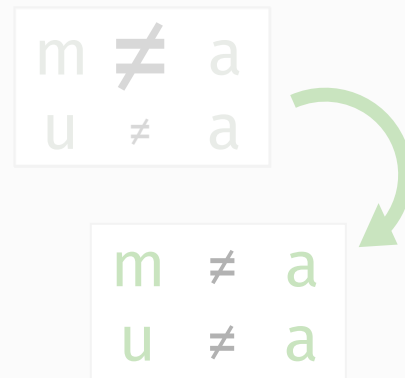
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$a(li)^n ma$

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alililima
⋮

Bear in mind that under FLT, any two different phonemes will be regarded as 100% distinct.



Outline

Part I. Brief introduction to FLT
Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

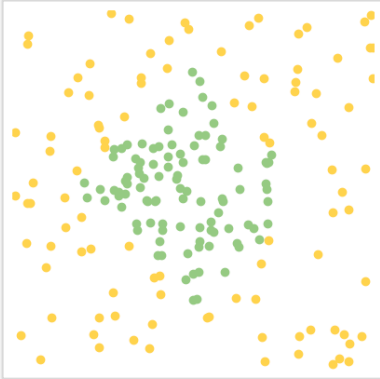
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Some prospects

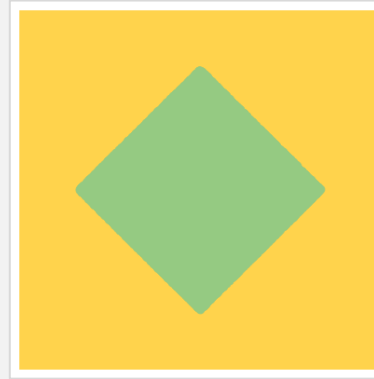
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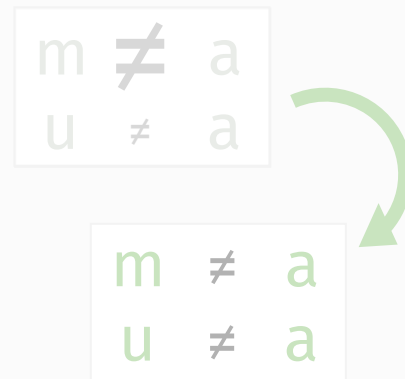
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Outline

Part I. Brief introduction to FLT
Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

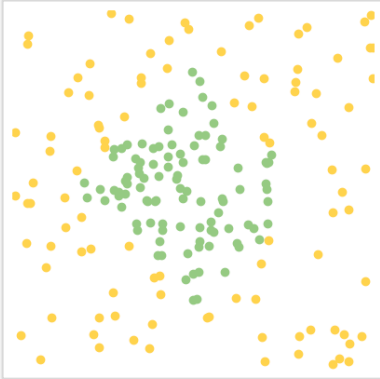
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Some prospects

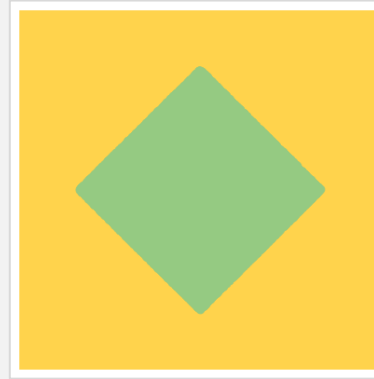
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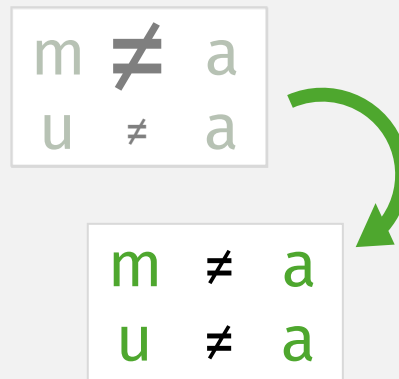
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Outline

Part I. Brief introduction to FLT
Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

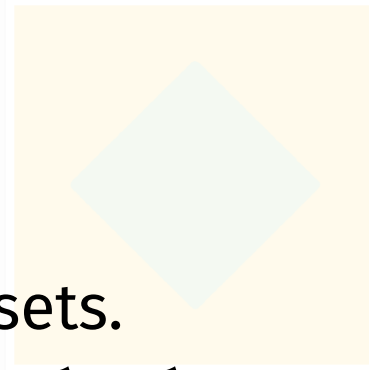
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A , U , A_{obs} and U_{obs} are not just sets.

They are what we will call **formal languages**.

They come in various classes.

Let's take a look at one of them.

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

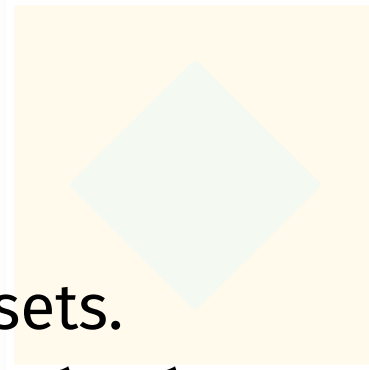
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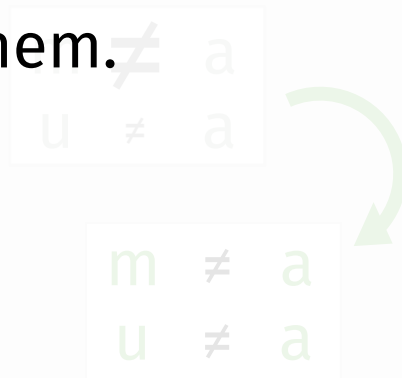
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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

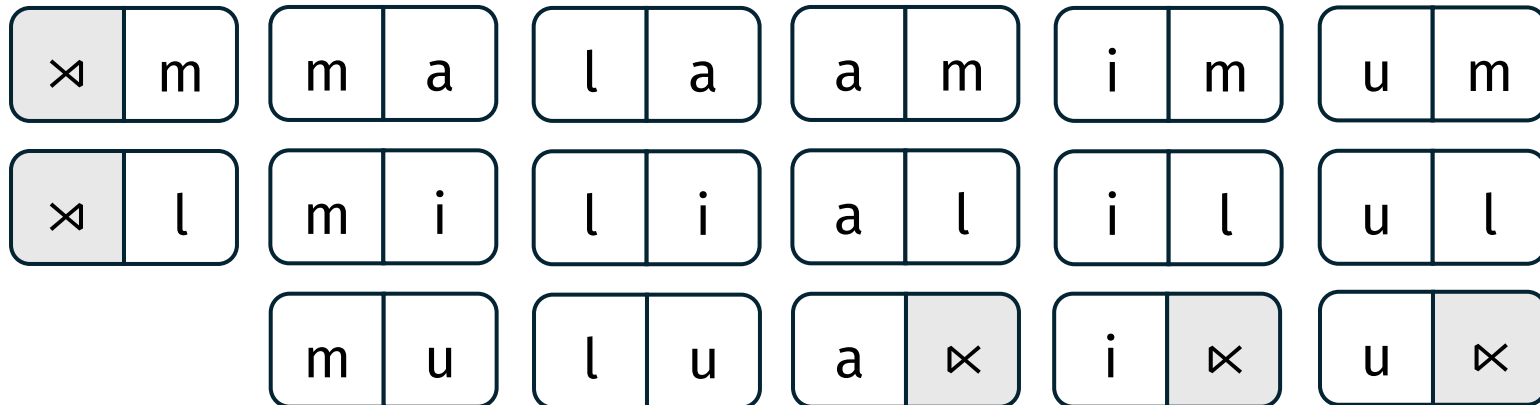
Some prospects

Afterword

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

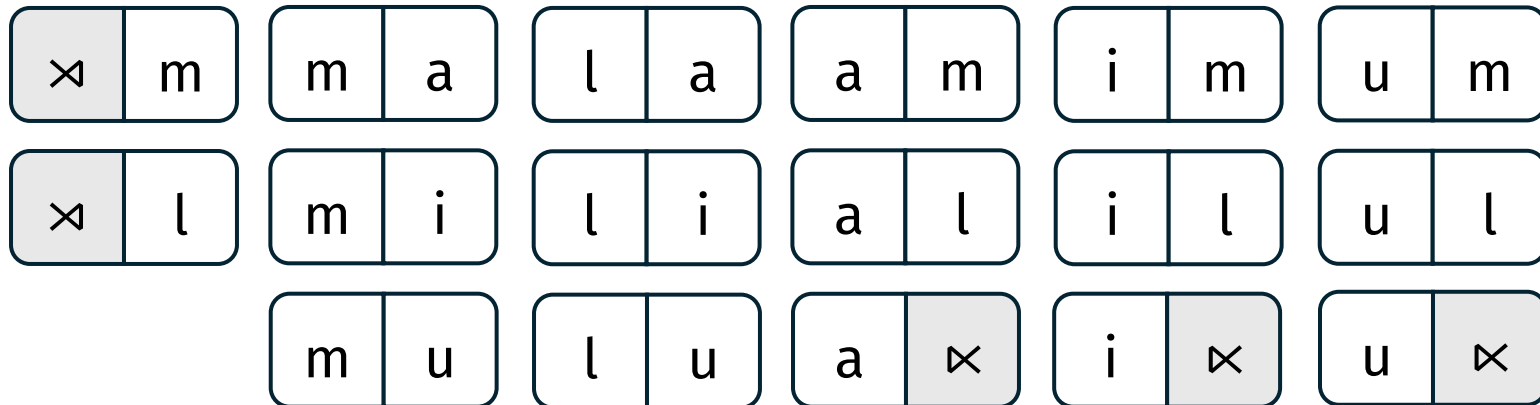
Some prospects

Afterword

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

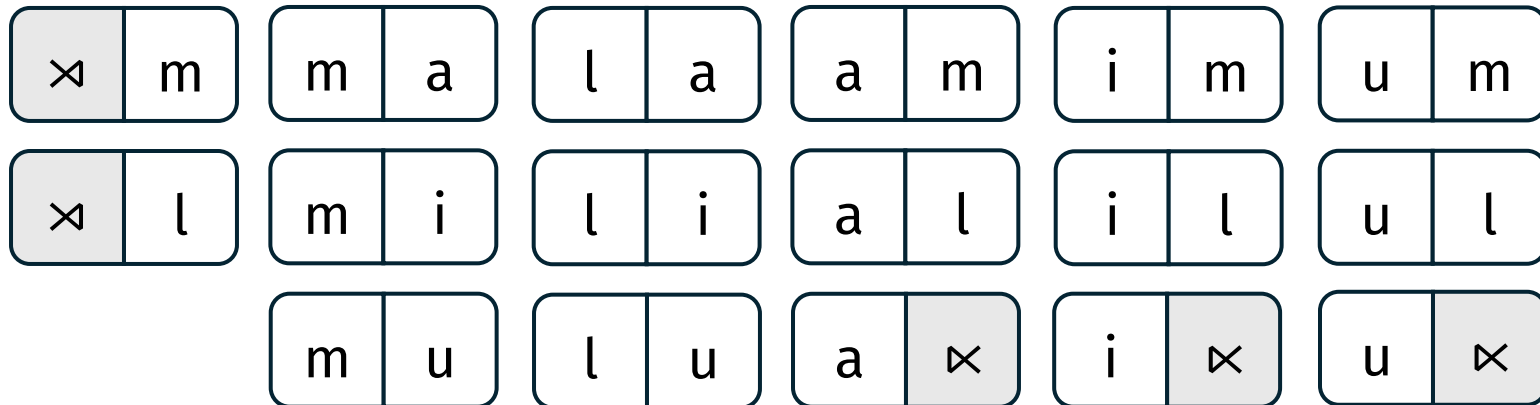
Some prospects

Afterword

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

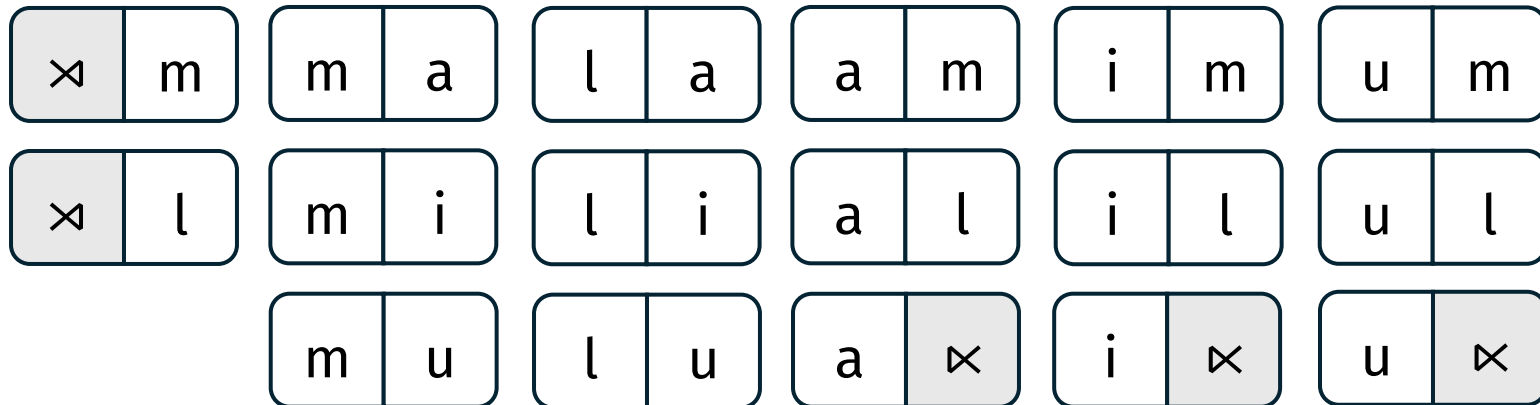
Some prospects

Afterword

Strictly 2-local (SL_2) languages

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

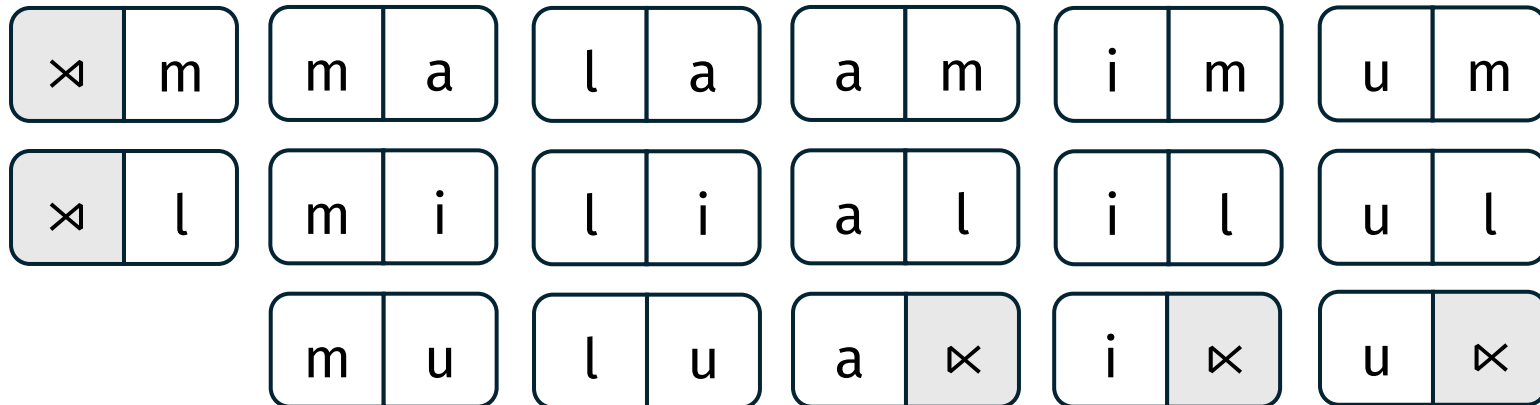
Some prospects

Afterword

Strictly 2-local (SL_2) languages

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

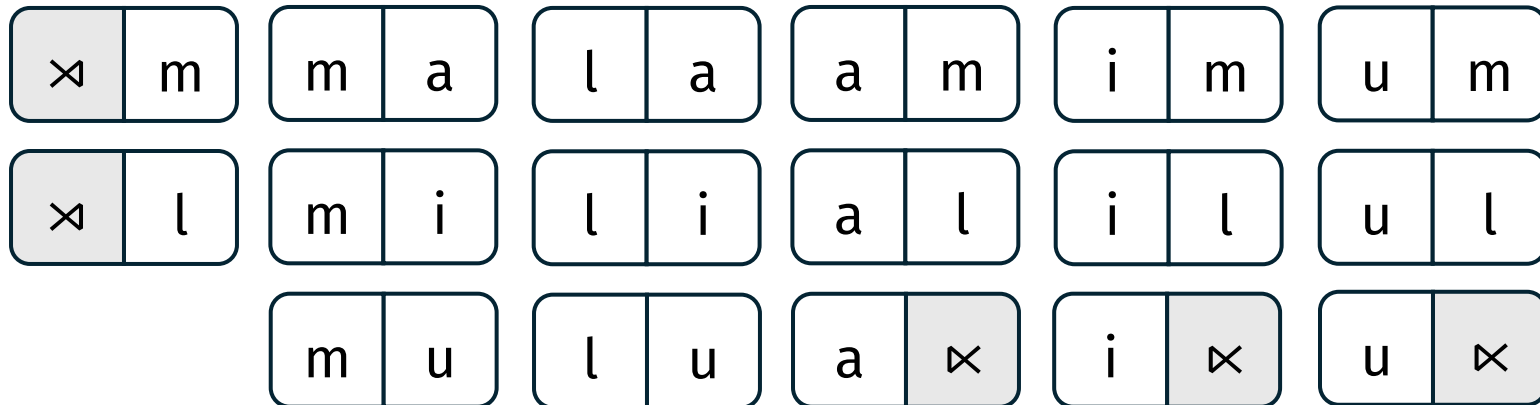
Some prospects

Afterword

Strictly 2-local (SL_2) languages

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

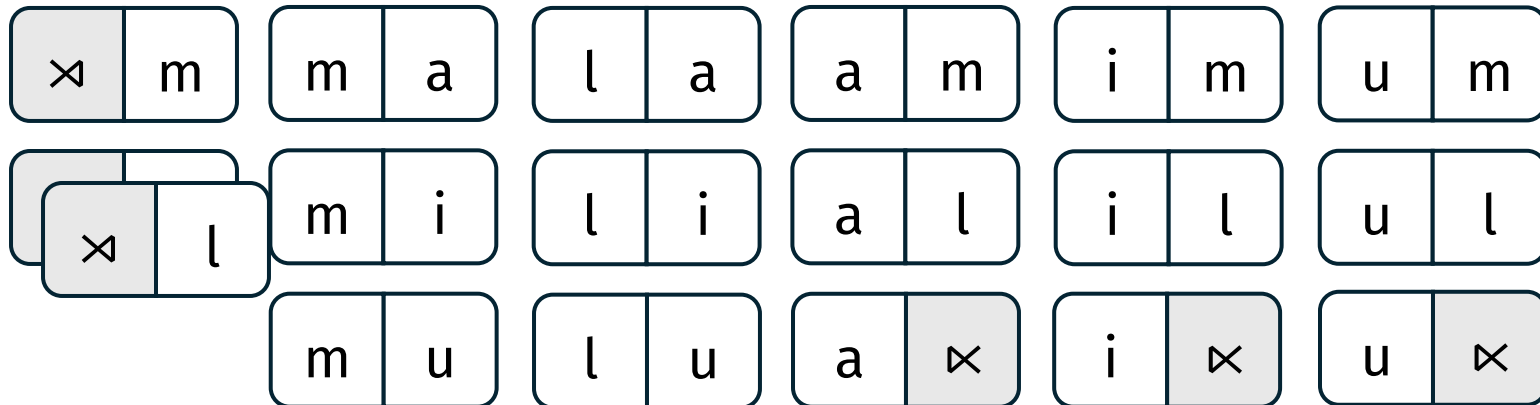
Some prospects

Afterword

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

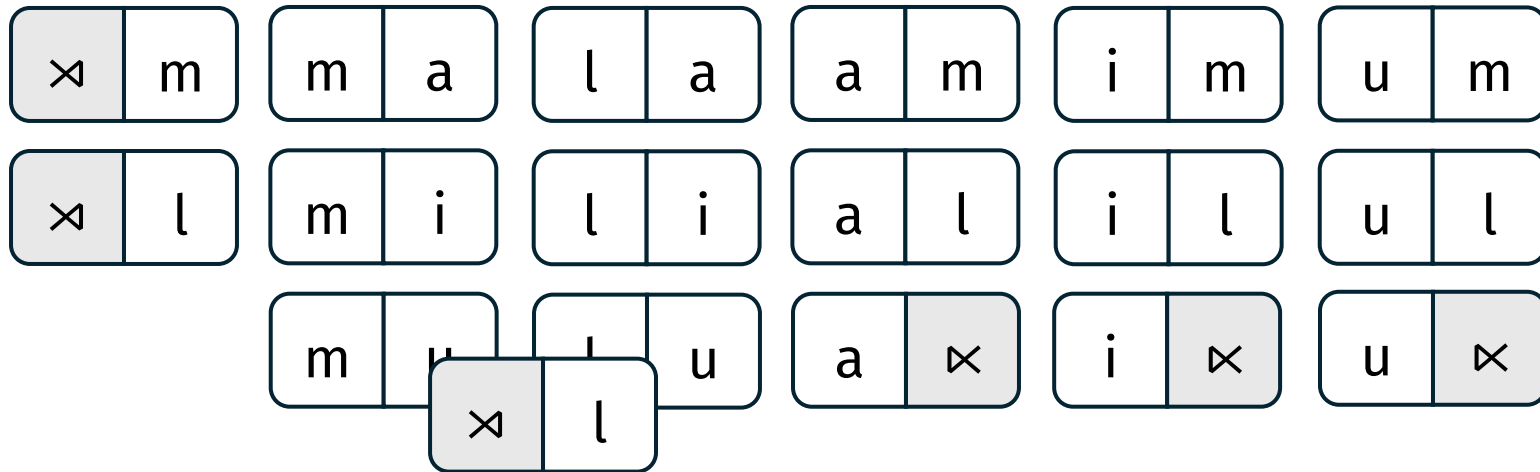
Some prospects

Afterword

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

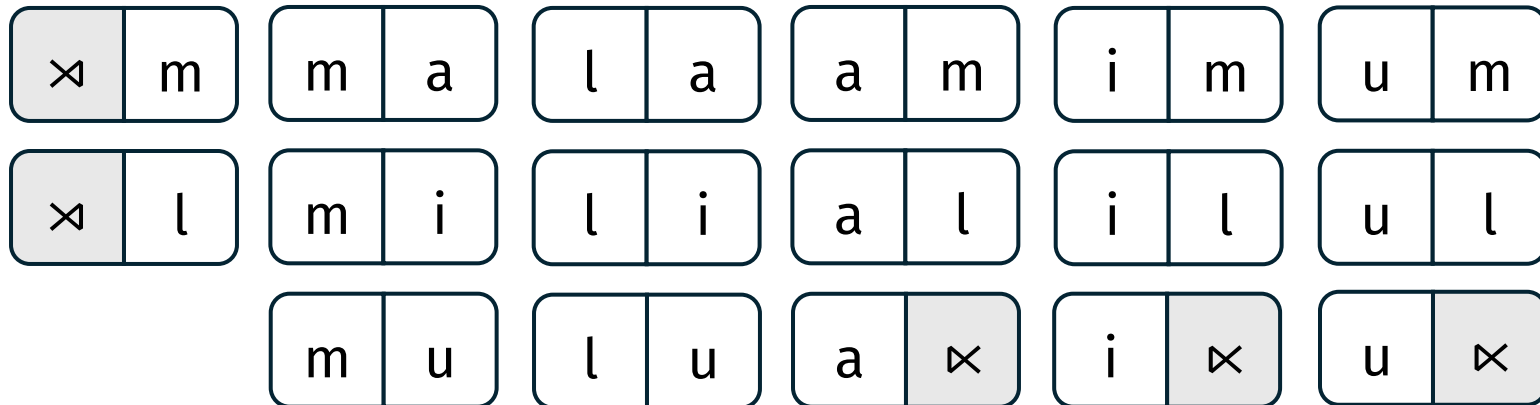
Some prospects

Afterword

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

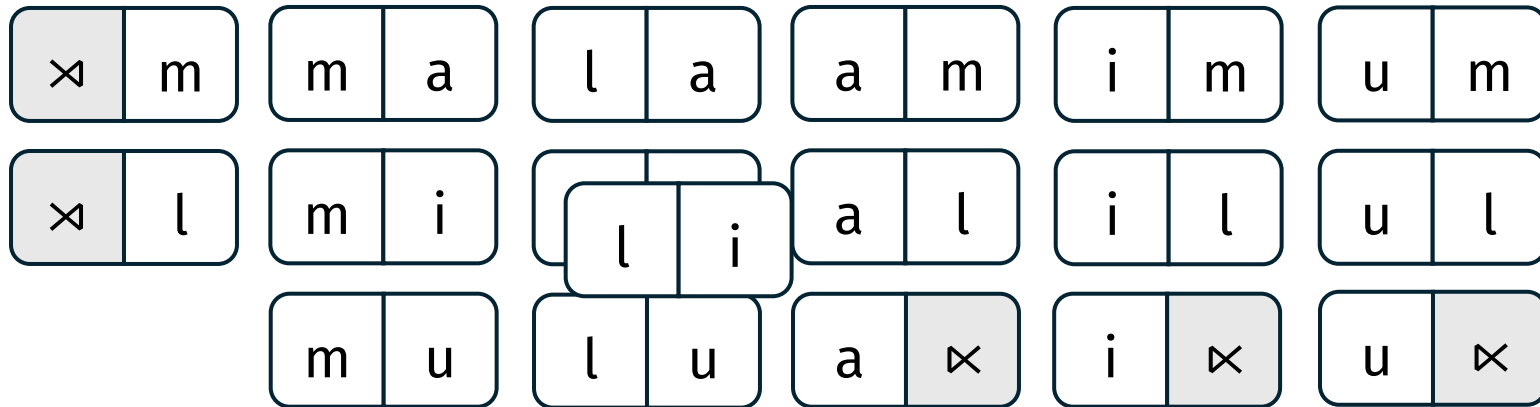
Some prospects

Afterword

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

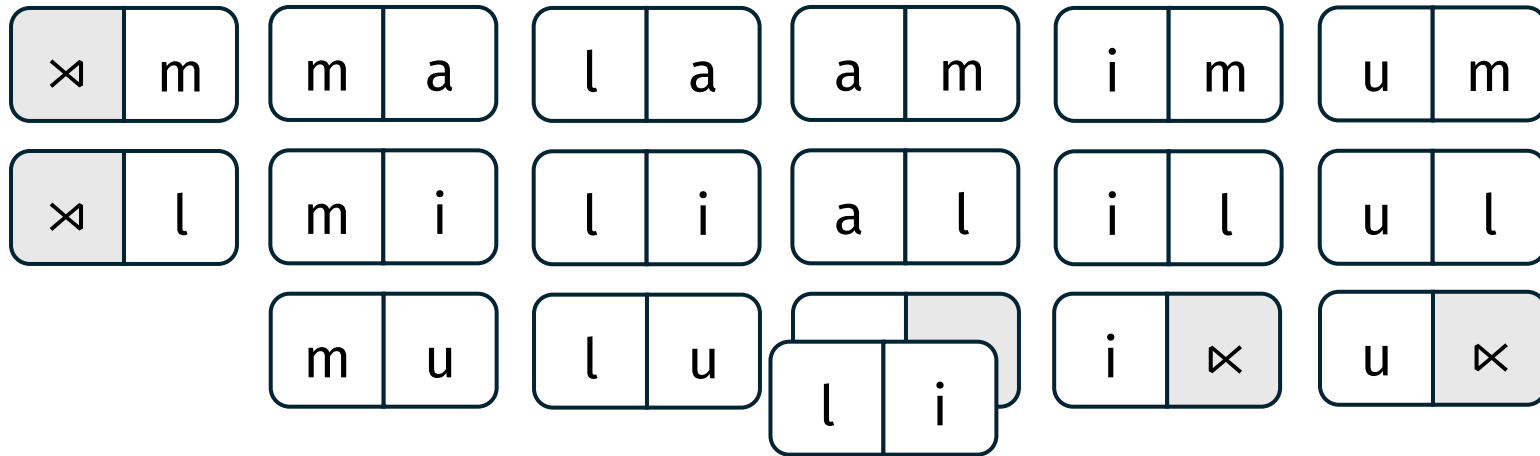
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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

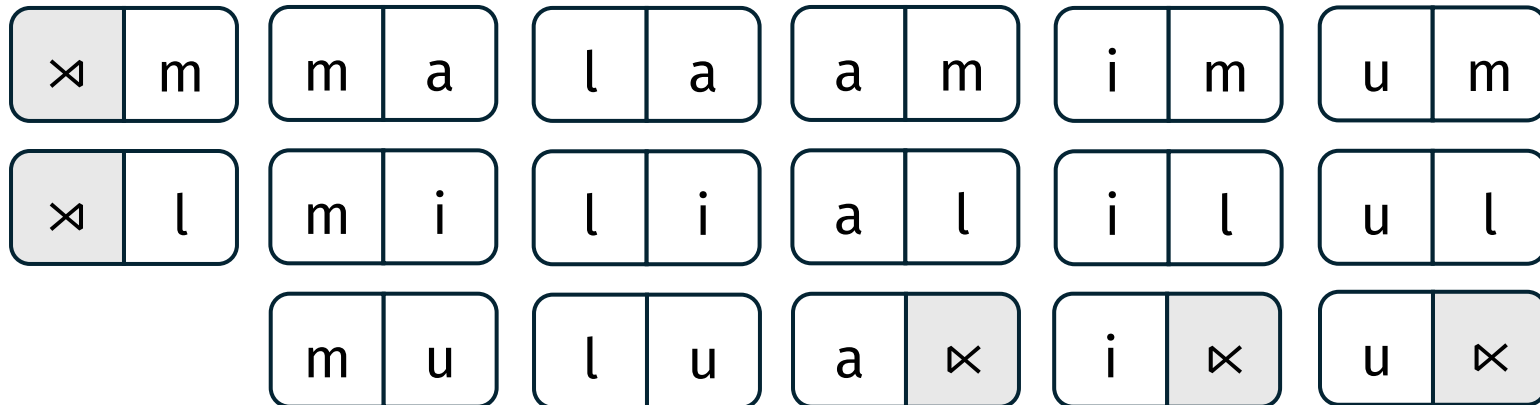
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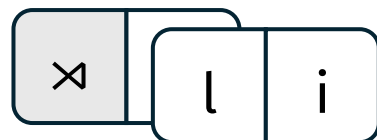
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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

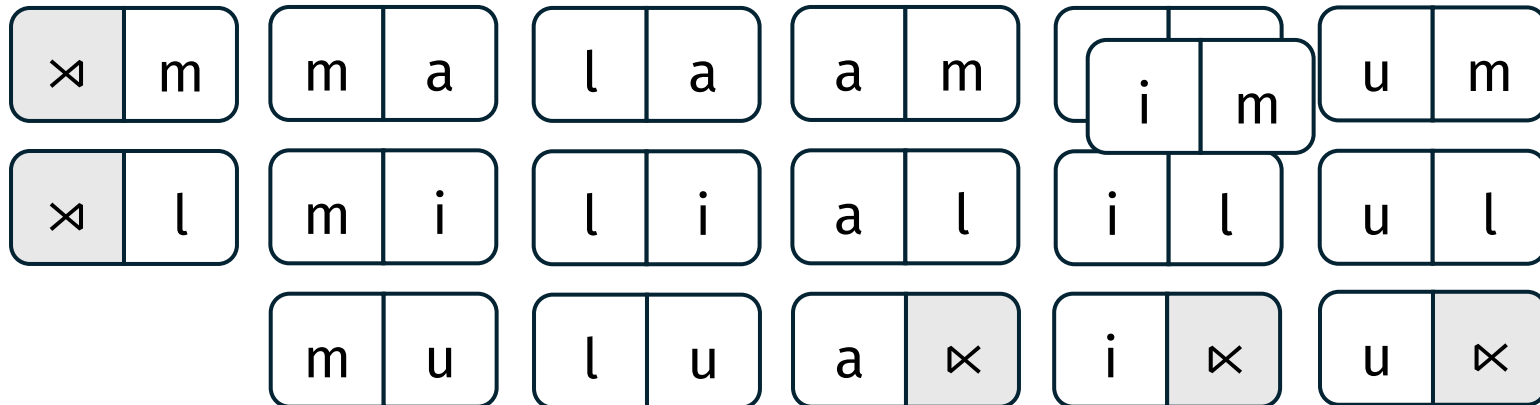
Some prospects

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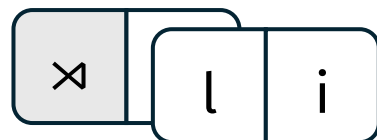
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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

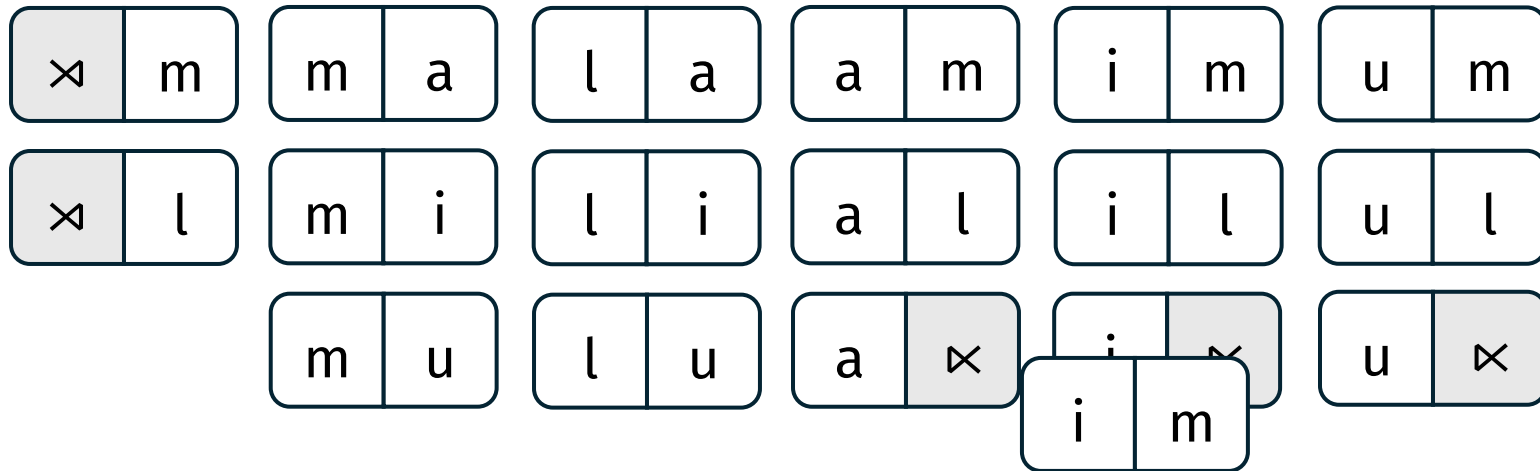
Some prospects

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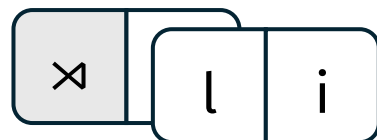
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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

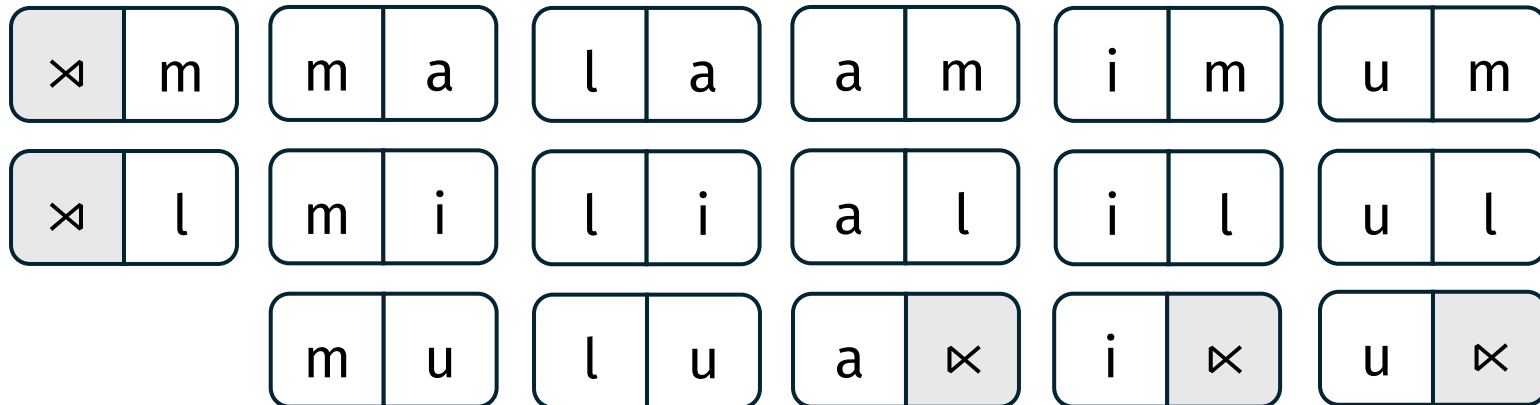
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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

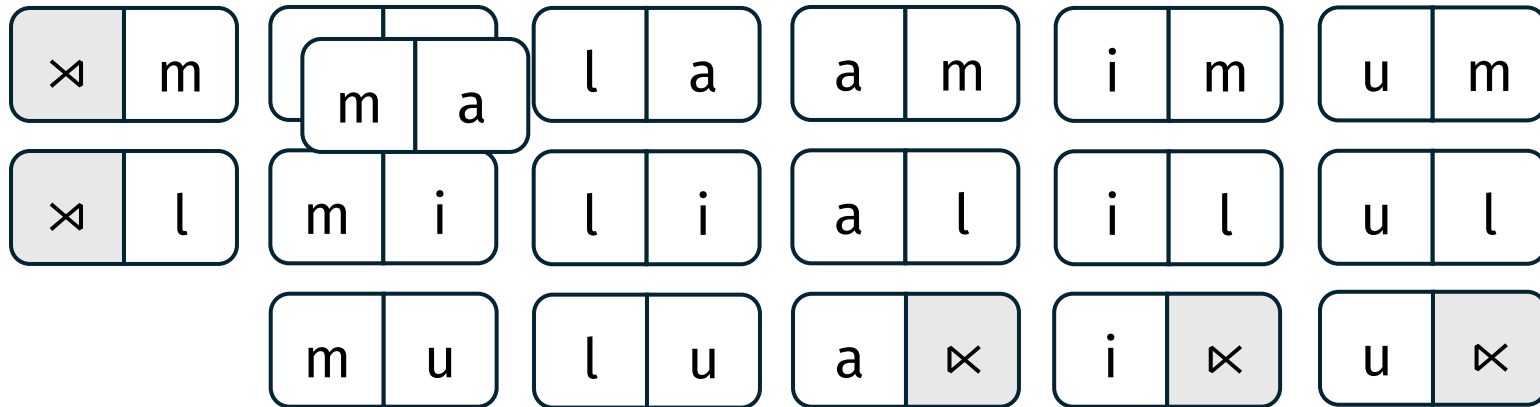
Some prospects

Afterword

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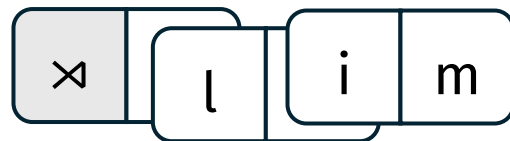
Consonants: m, l
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lima

Is **umu** well-formed?

alam



Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

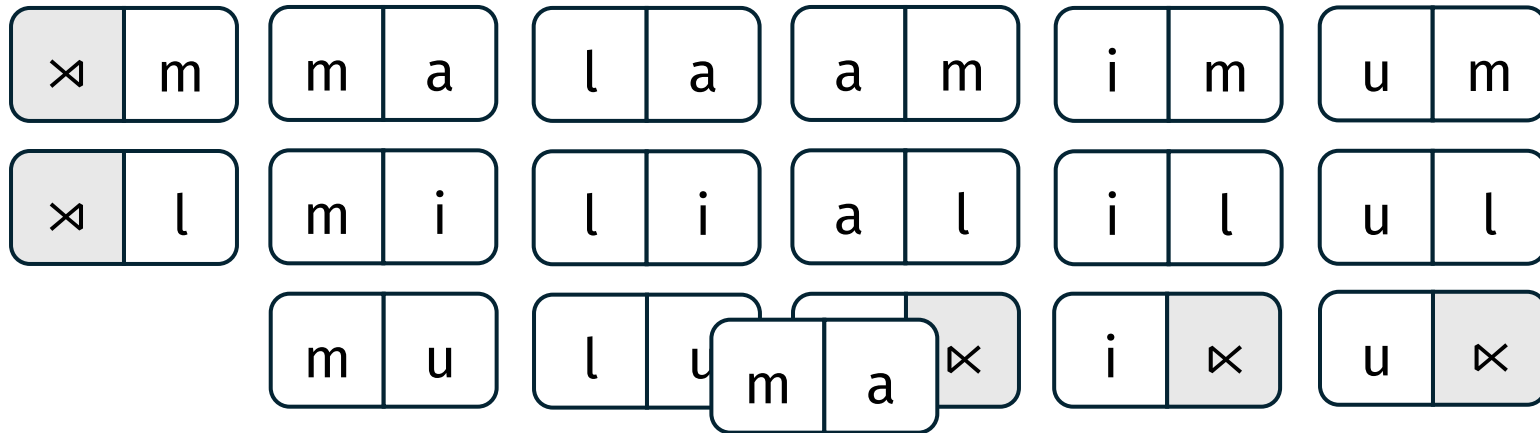
Some prospects

Afterword

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

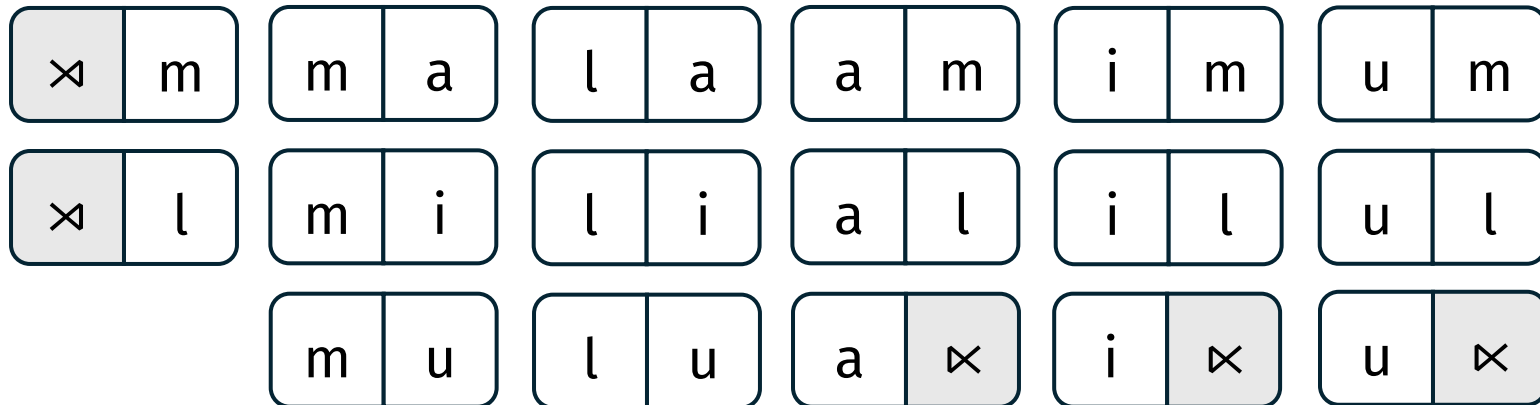
Some prospects

Afterword

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

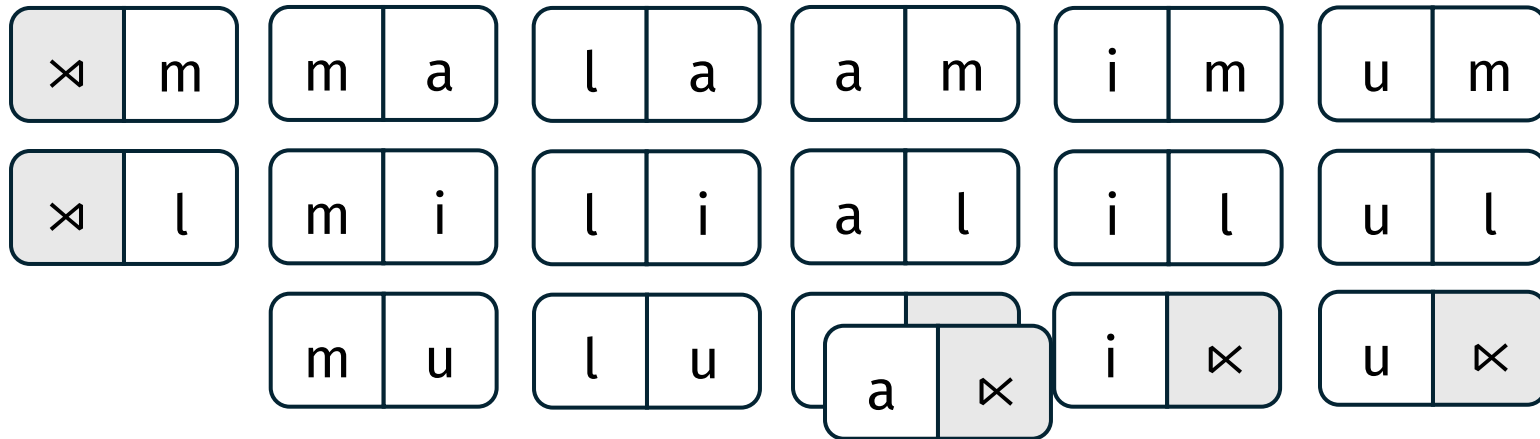
Some prospects

Afterword

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

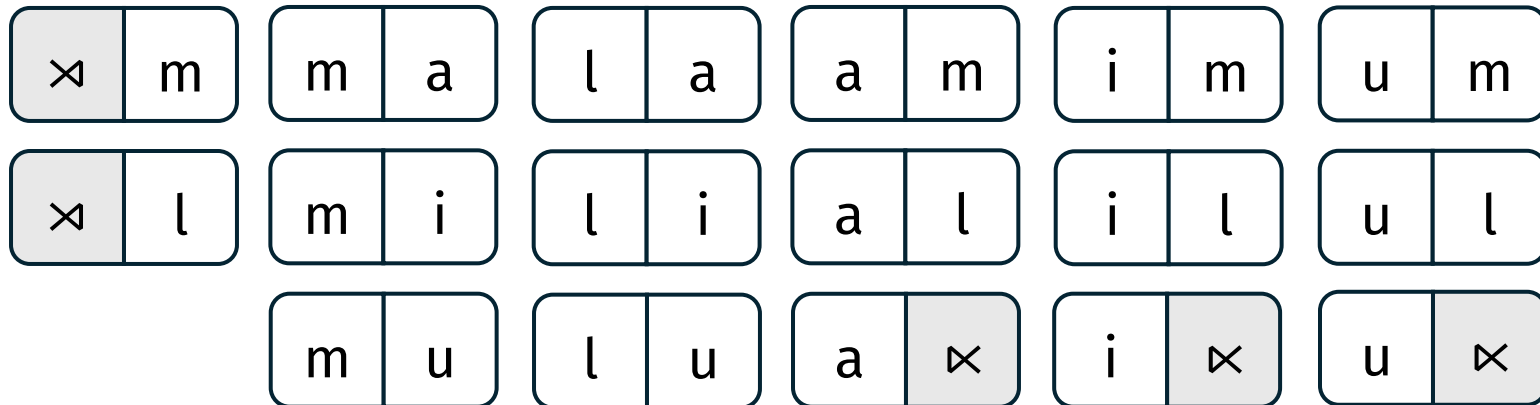
Some prospects

Afterword

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

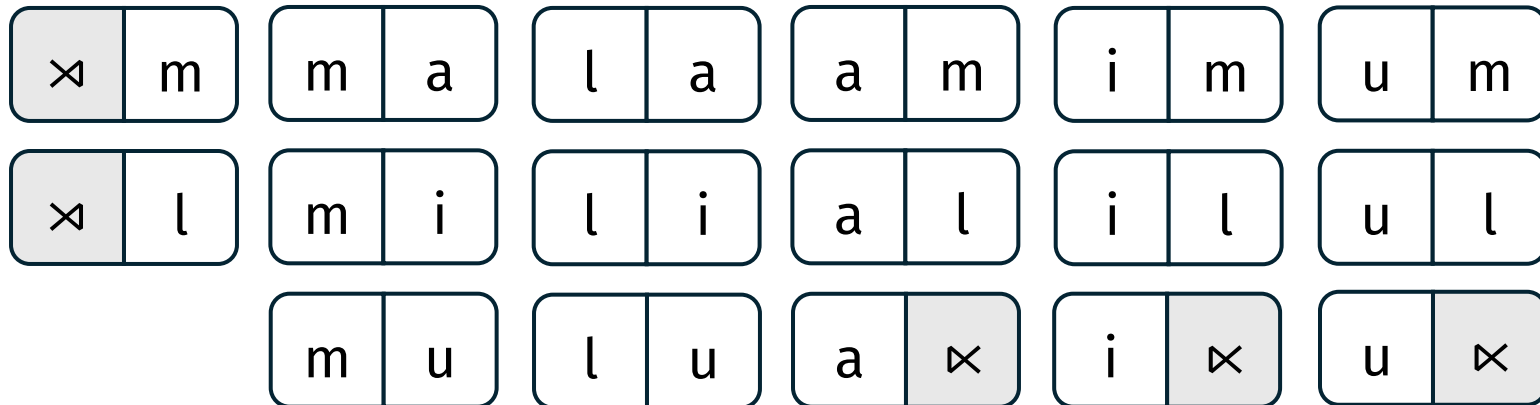
Some prospects

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

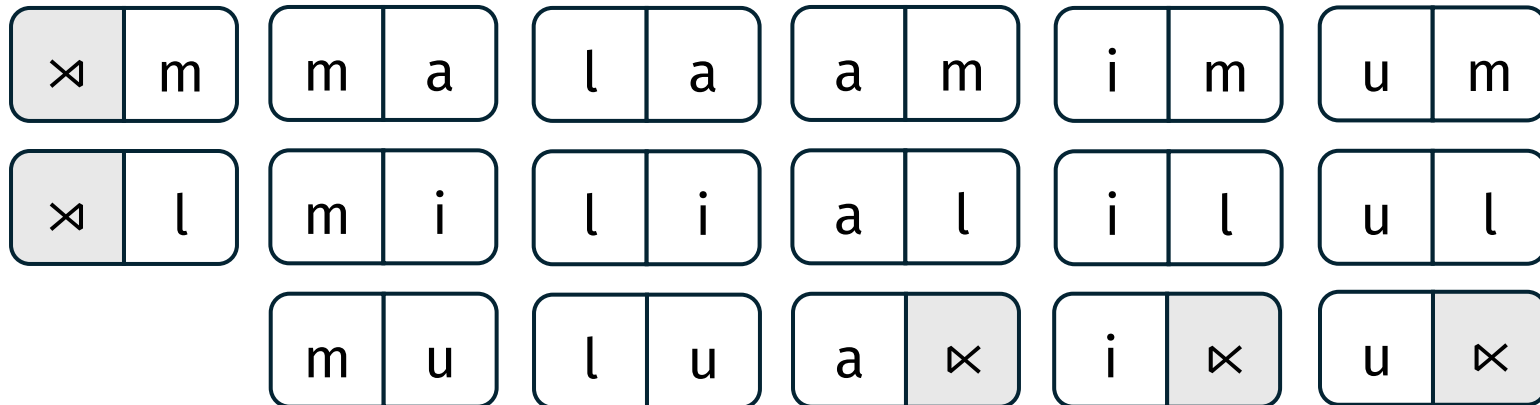
Some prospects

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

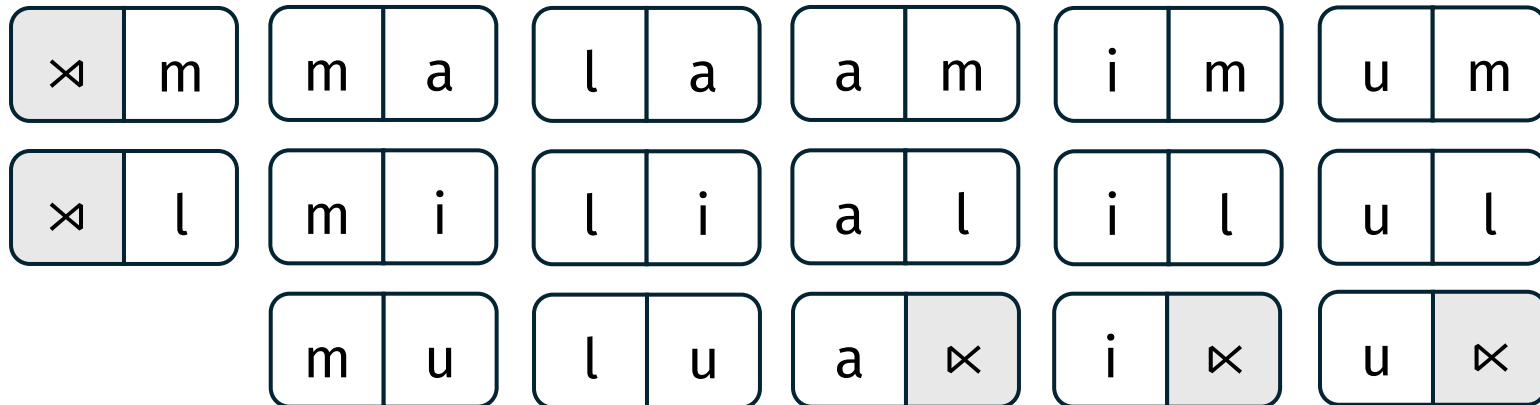
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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

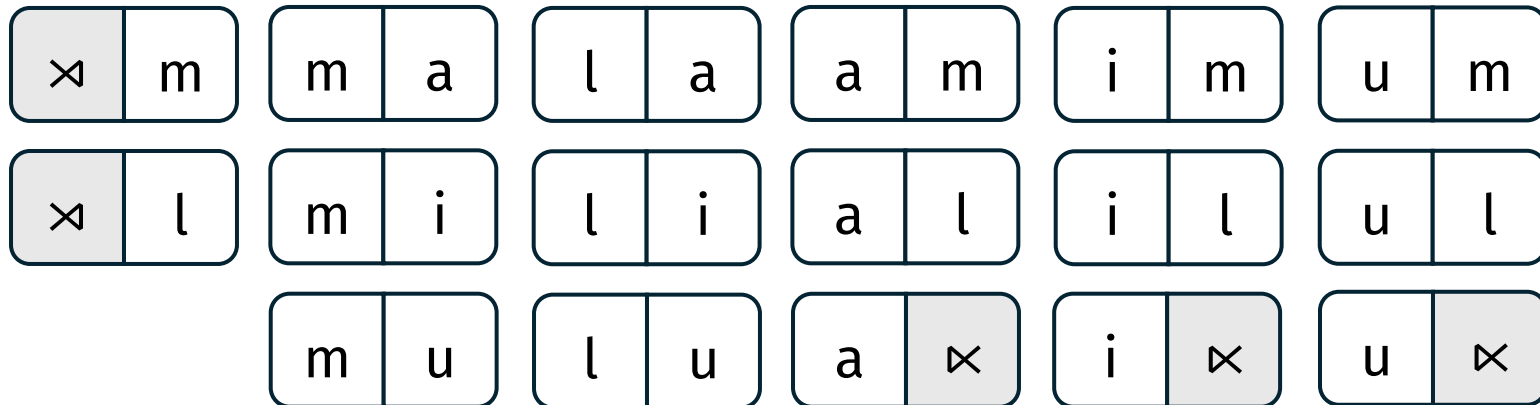
Some prospects

Afterword

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

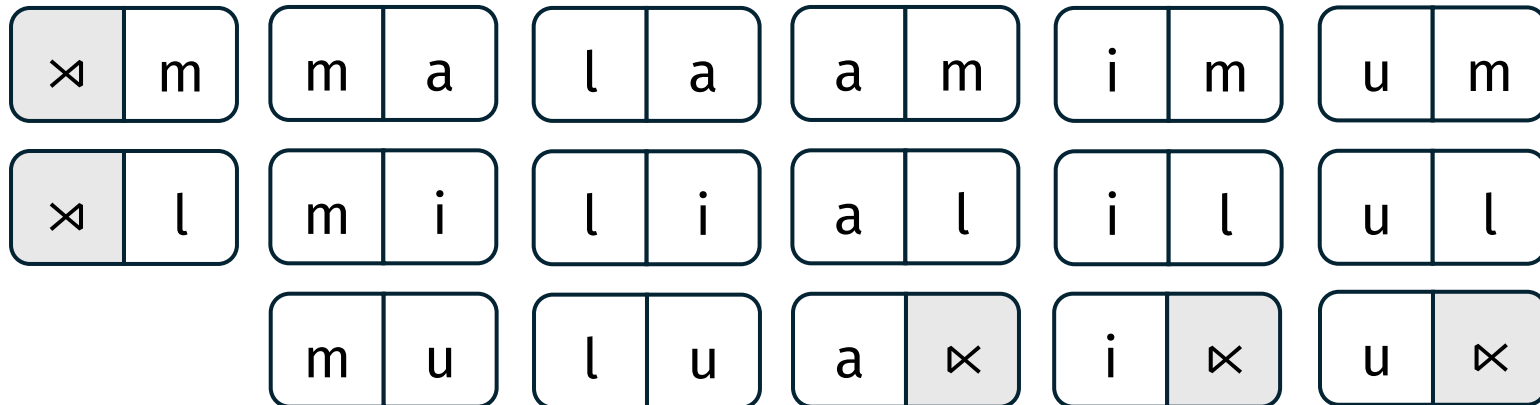
Some prospects

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

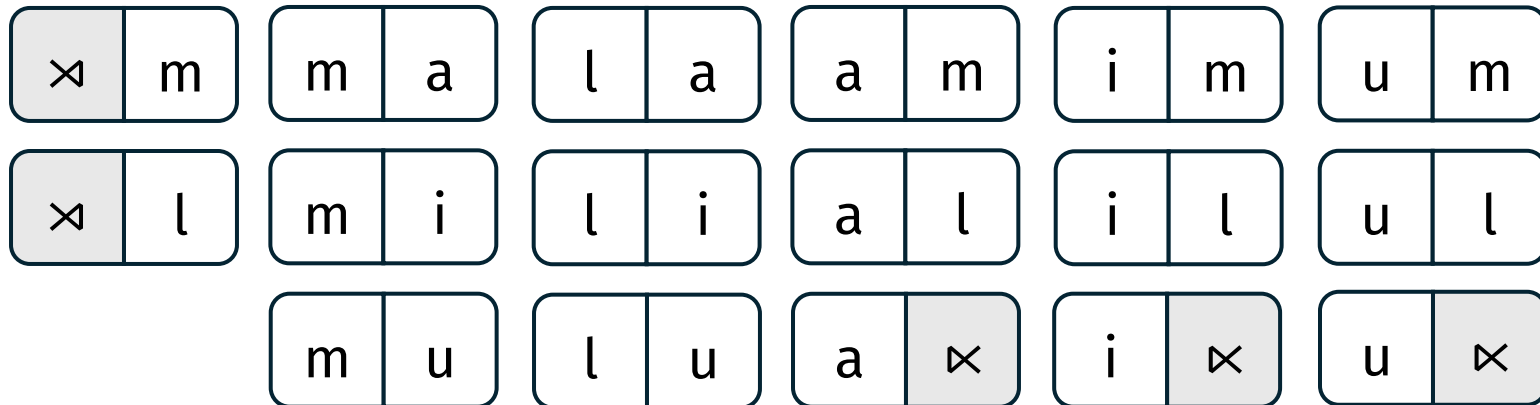
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How do we build on SL₂ to make it “smarter”?

- Put 3 phonemes on one domino, instead of 2 → SL₃
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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL₂) languages

SL₂ languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

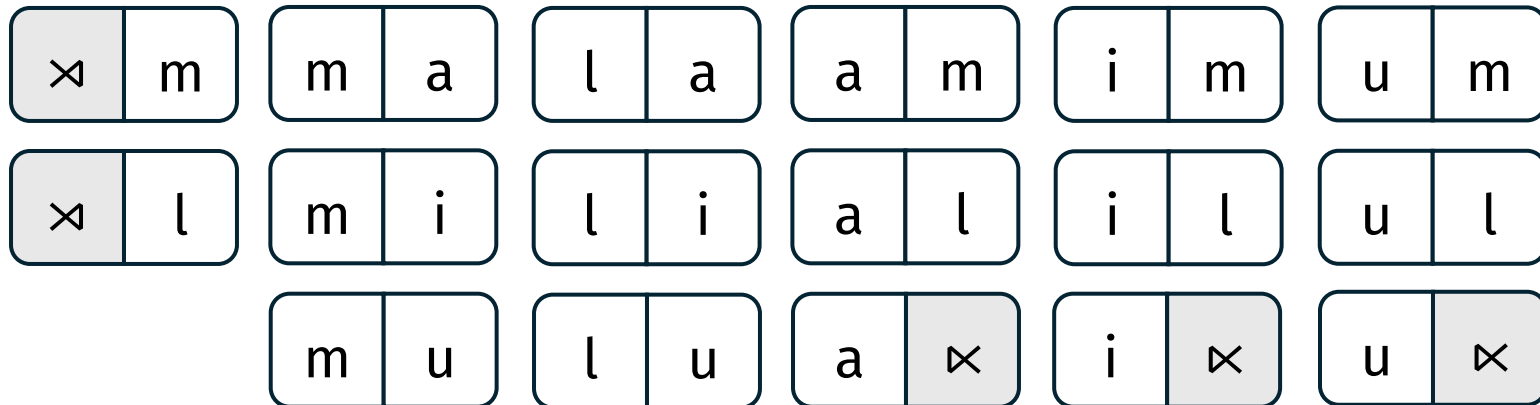
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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL₂) languages

SL₂ languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

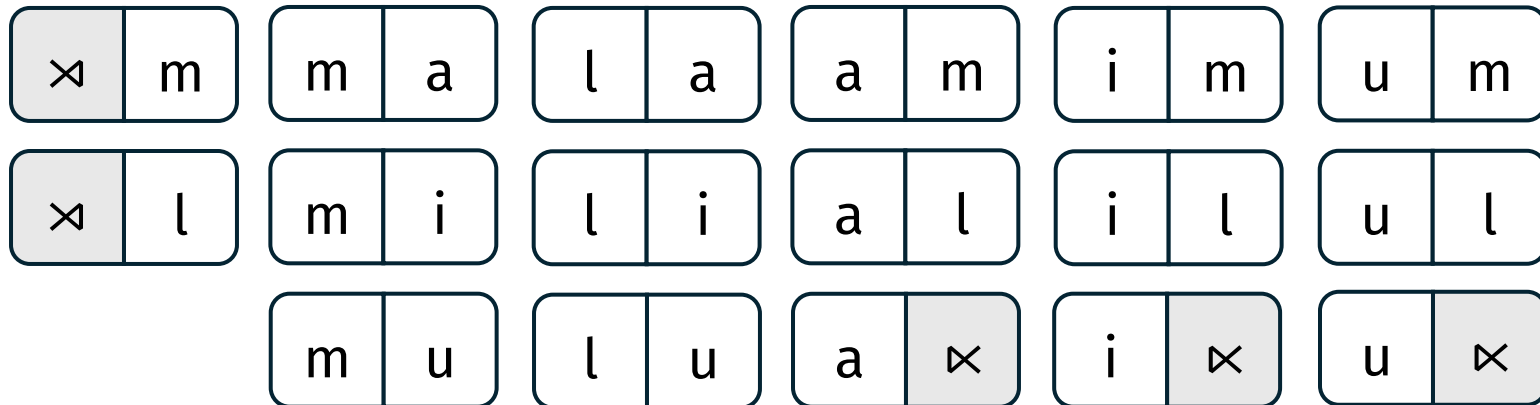
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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL₂) languages

SL₂ languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

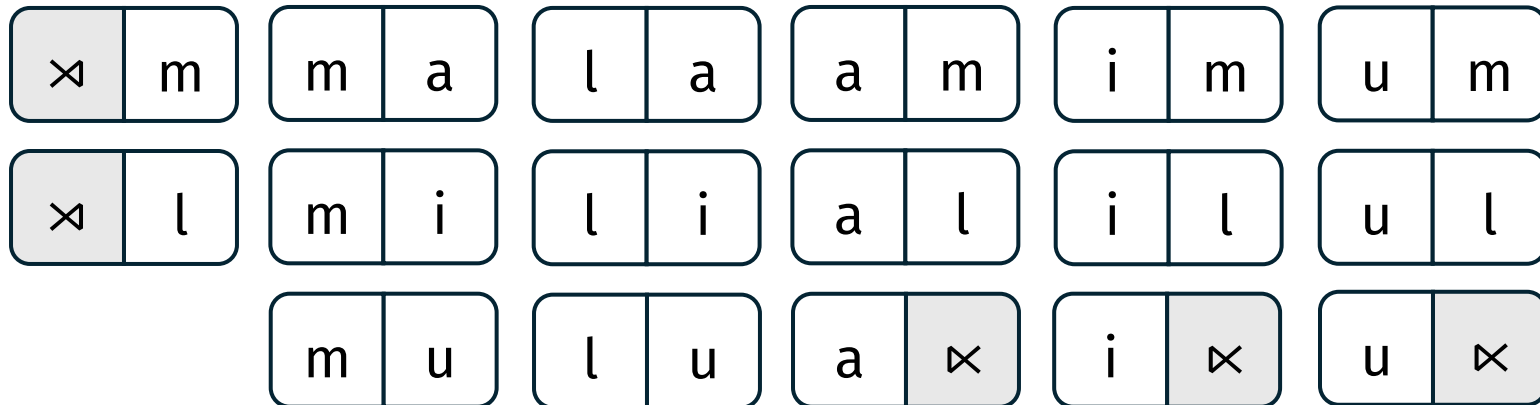
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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL₂) languages

SL₂ languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

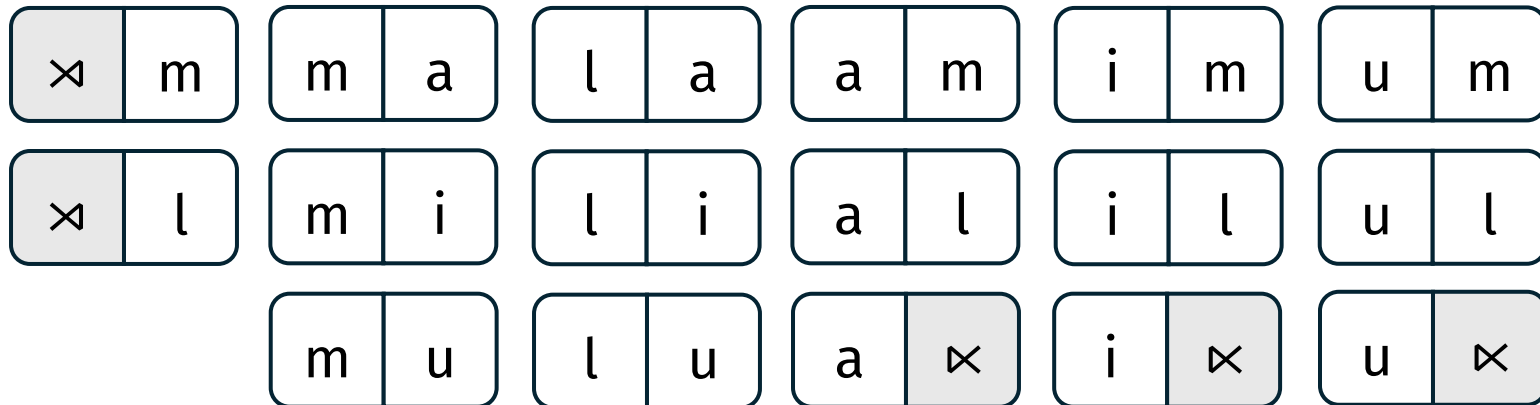
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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL₂) languages

SL₂ languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

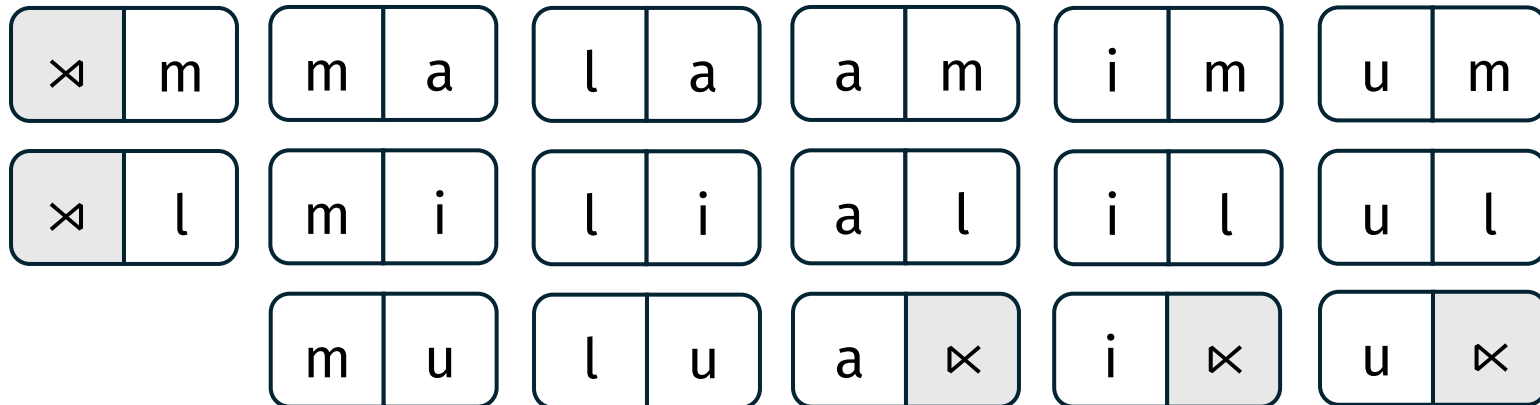
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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL₂) languages

SL₂ languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

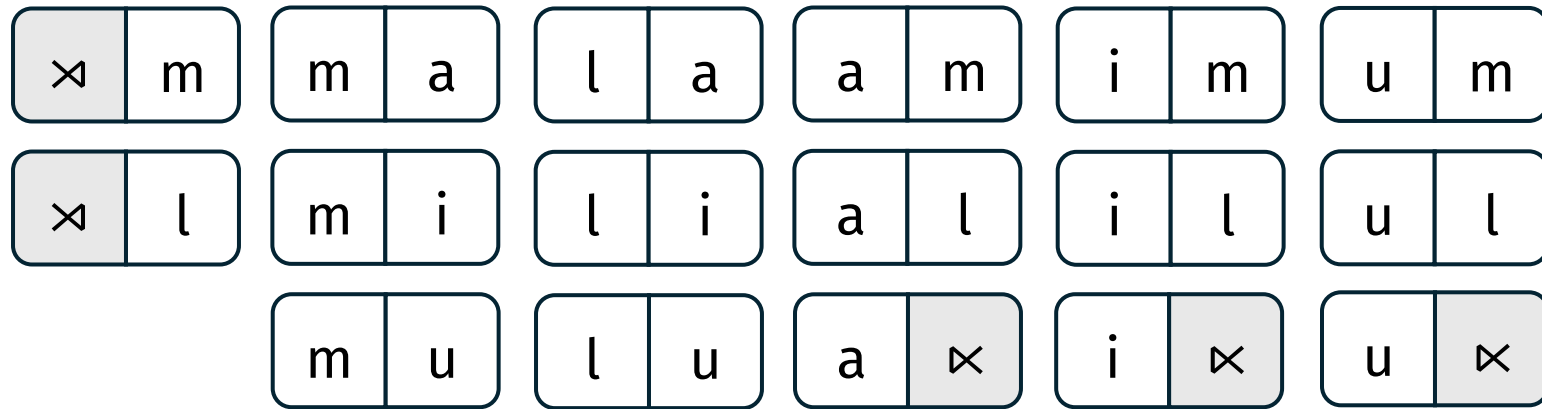
Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

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Regular languages are SL_2 languages **plus** a set of letter-to-letter replacements (like $l \rightarrow m$) that applies after arranging the “dominoes”.

These replacements constitute the homomorphism.

The harmony essentially divides all words into i-words and u-words.

If only we could have two separate SL_2 languages for i-words and u-words, with their own set of dominoes!

Sadly, we would not be able to mix them into one pile...

Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

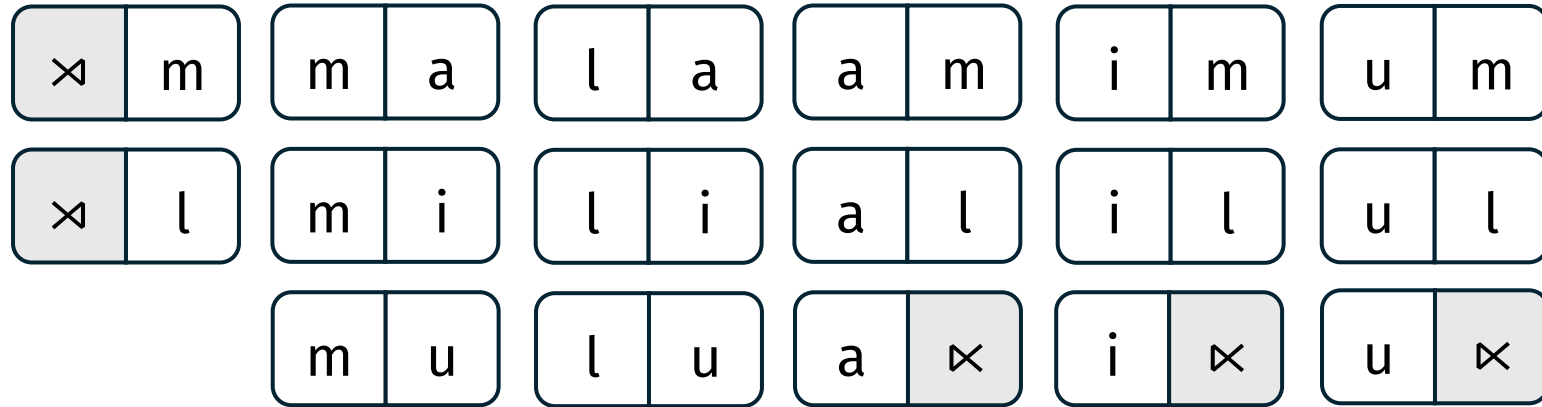
Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

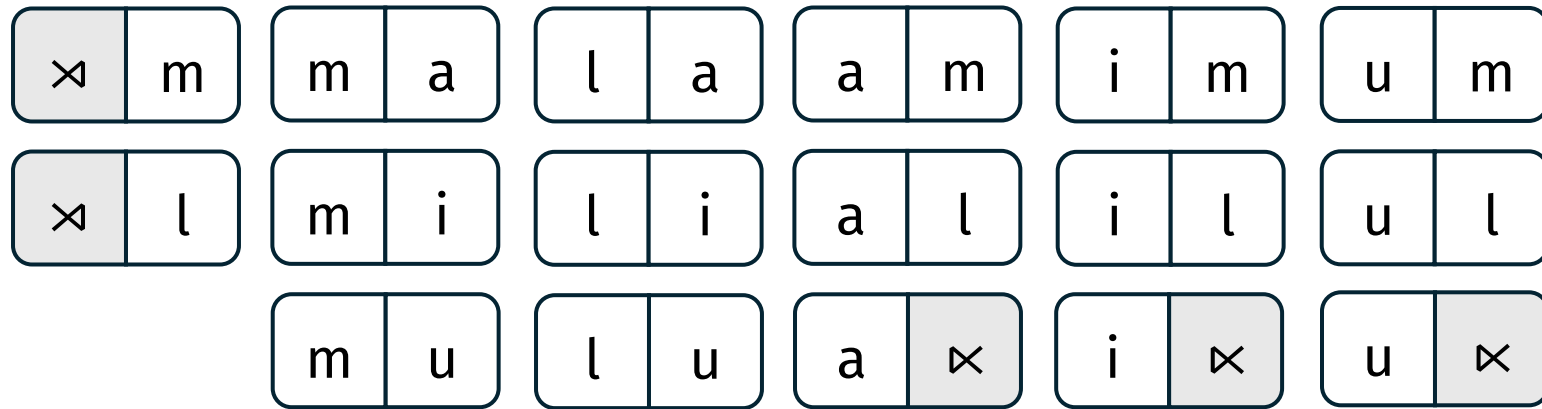
Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

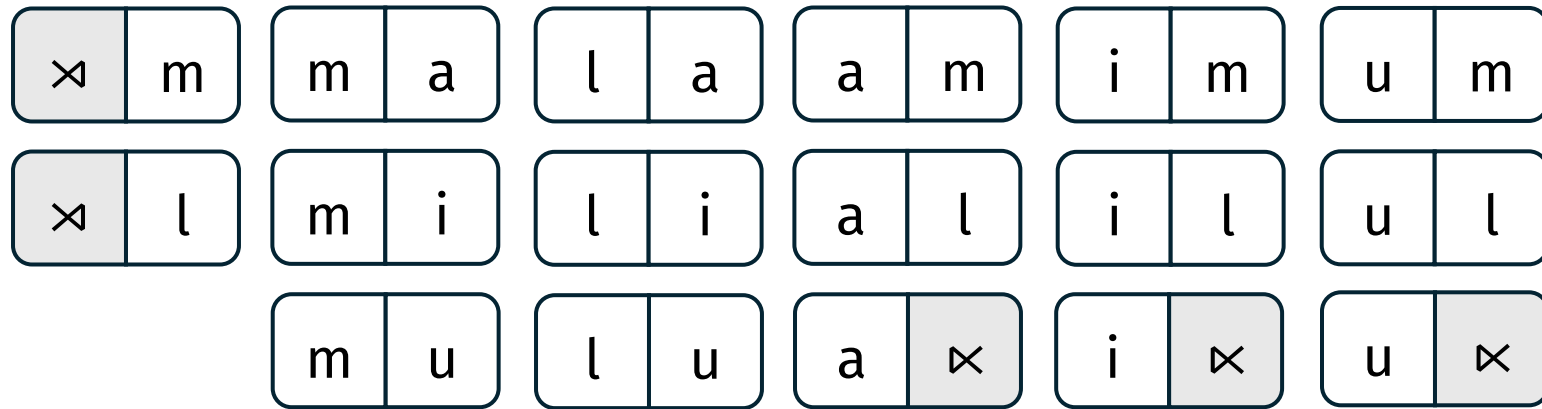
Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

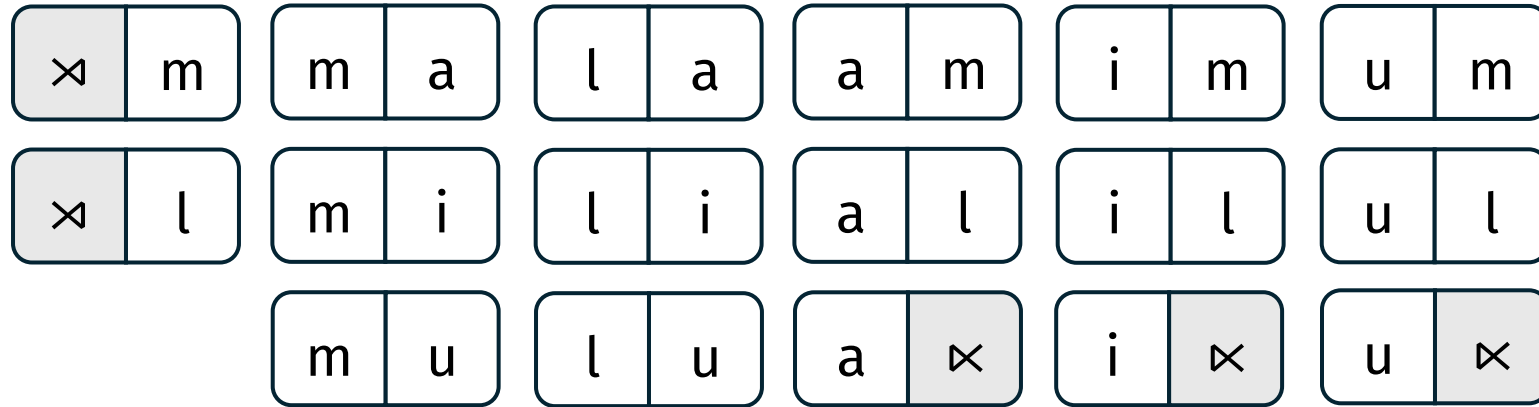
Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

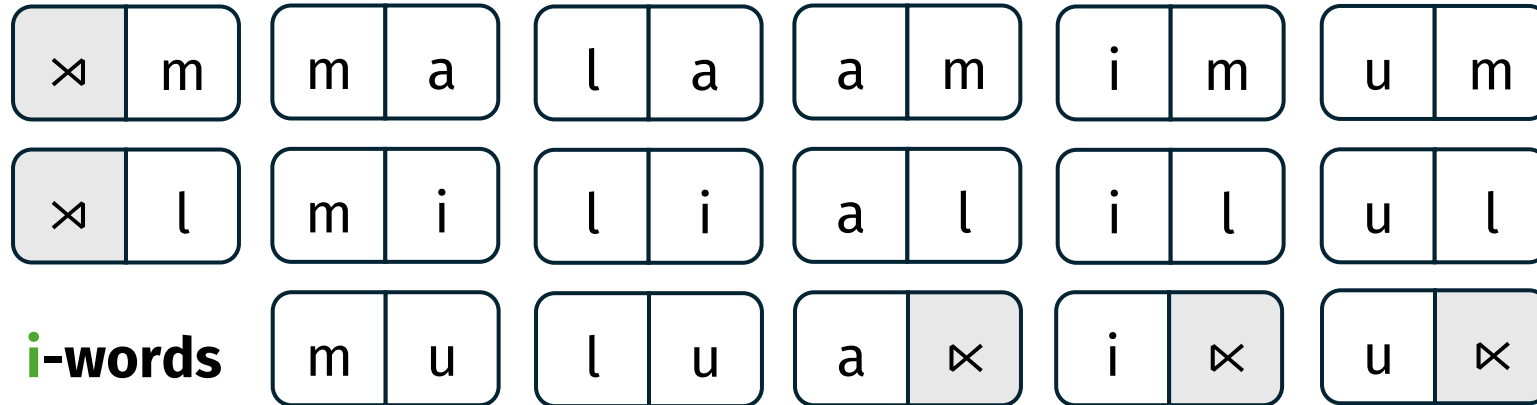
Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Regular languages 1/2



Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

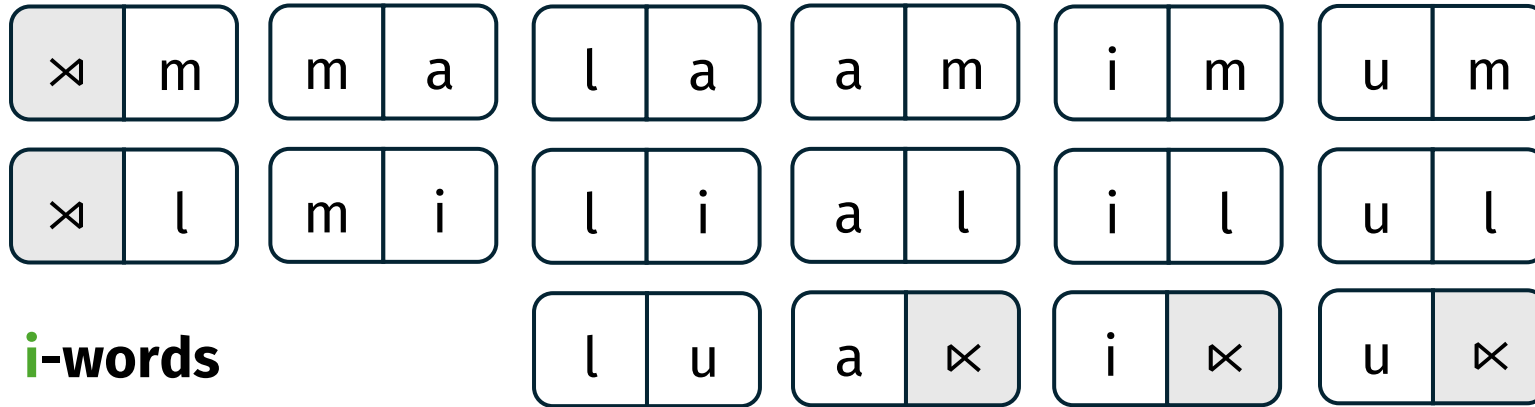
Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Regular languages 1/2



Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

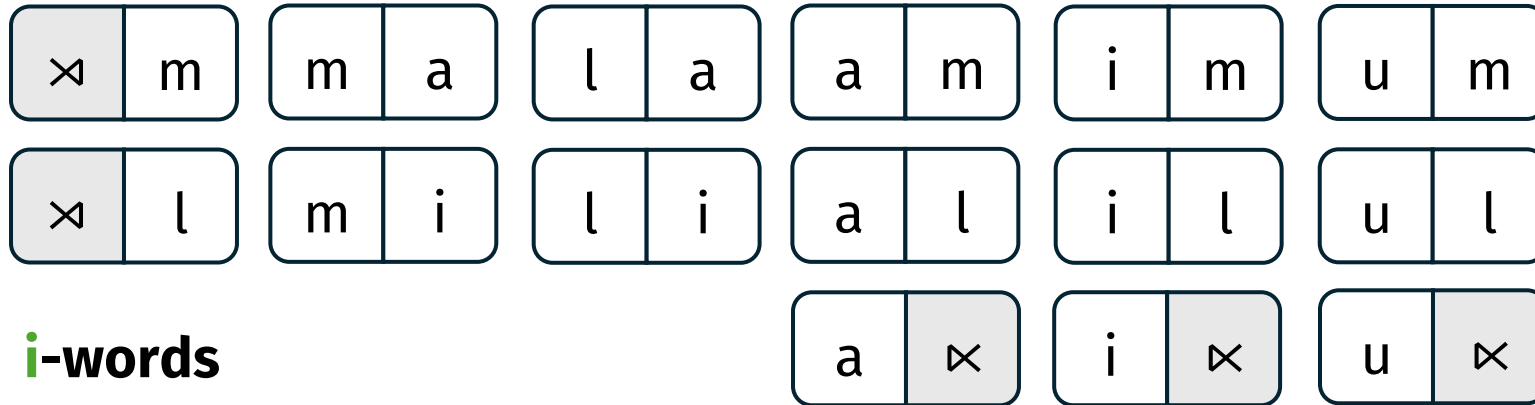
Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Regular languages 1/2



i-words

Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

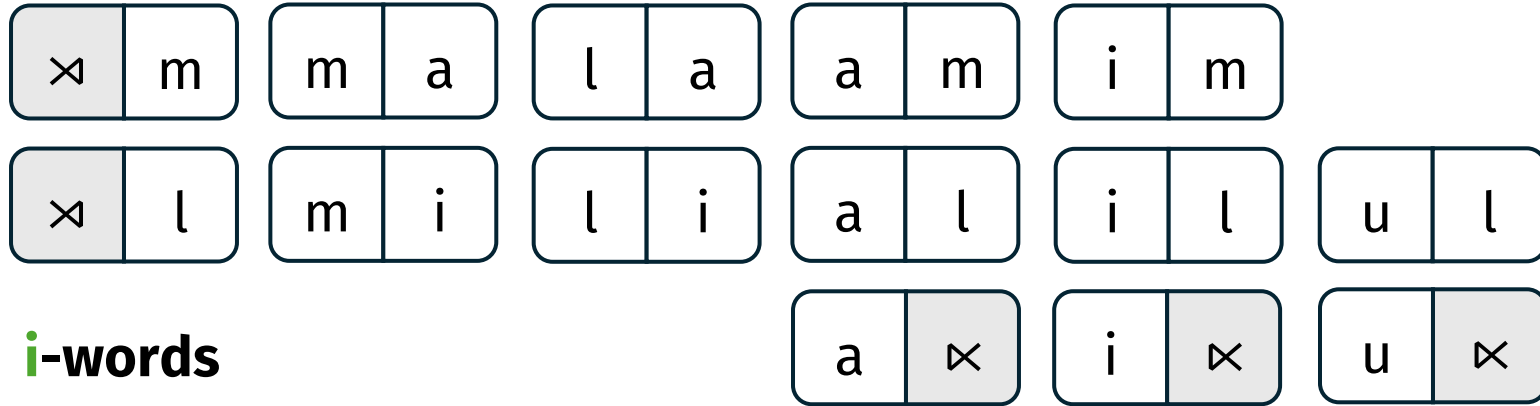
Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Regular languages 1/2



Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

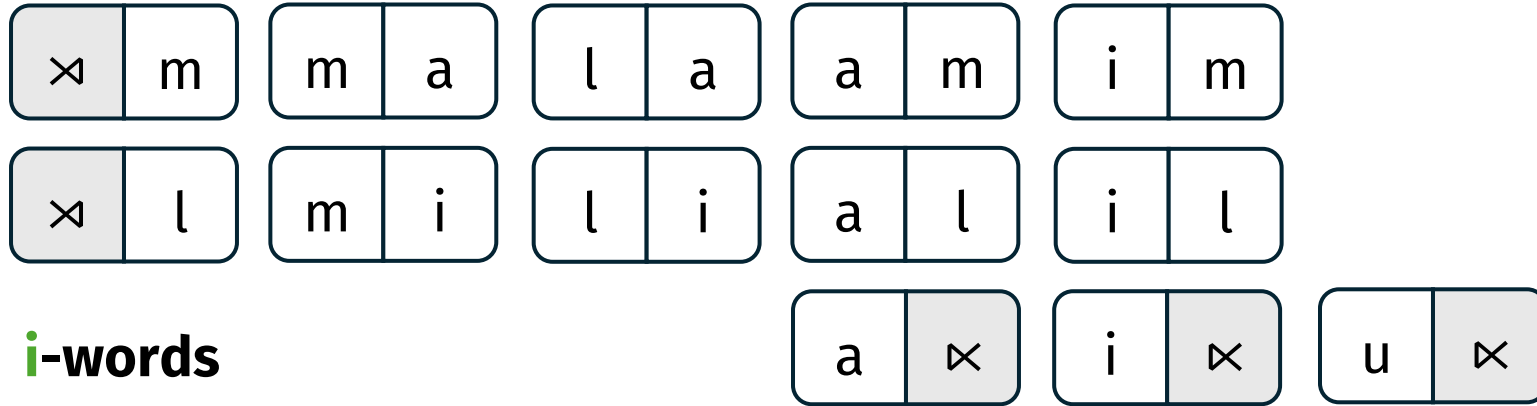
Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Regular languages 1/2



Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

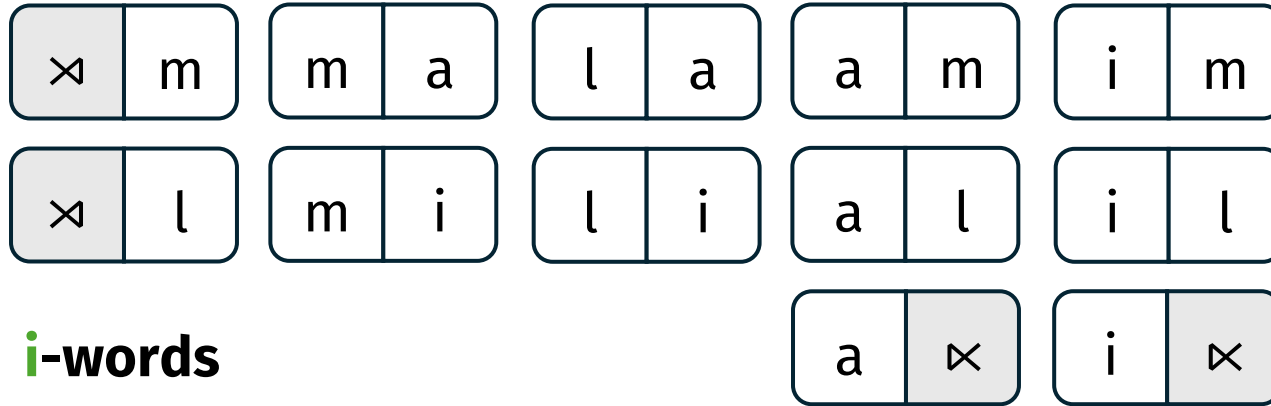
Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Regular languages 1/2



i-words

Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Regular languages 1/2

×	m	m	a	l	a	a	m	i	m
---	---	---	---	---	---	---	---	---	---

×	l	m	i	l	i	a	l	i	l
---	---	---	---	---	---	---	---	---	---

i-words

a	×	i	×
---	---	---	---

×	m	m	a	l	a	a	m	i	m	u	m
---	---	---	---	---	---	---	---	---	---	---	---

×	l	m	i	l	i	a	l	i	l	u	l
---	---	---	---	---	---	---	---	---	---	---	---

u-words

m	u	l	u	a	×	i	×	u	×
---	---	---	---	---	---	---	---	---	---

Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Regular languages 1/2

×	m	m	a	l	a	a	m	i	m
---	---	---	---	---	---	---	---	---	---

×	l	m	i	l	i	a	l	i	l
---	---	---	---	---	---	---	---	---	---

i-words

a	×	i	×
---	---	---	---

×	m	m	a	l	a	a	m	i	m	u	m
---	---	---	---	---	---	---	---	---	---	---	---

×	l			l	i	a	l	i	l	u	l
---	---	--	--	---	---	---	---	---	---	---	---

u-words

m	u	l	u	a	×	i	×	u	×
---	---	---	---	---	---	---	---	---	---

Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Regular languages 1/2

×	m	m	a	l	a	a	m	i	m
---	---	---	---	---	---	---	---	---	---

×	l	m	i	l	i	a	l	i	l
---	---	---	---	---	---	---	---	---	---

i-words

a	×	i	×
---	---	---	---

×	m	m	a	l	a	a	m	i	m	u	m
---	---	---	---	---	---	---	---	---	---	---	---

×	l					a	l	i	l	u	l
---	---	--	--	--	--	---	---	---	---	---	---

u-words

m	u	l	u	a	×	i	×	u	×
---	---	---	---	---	---	---	---	---	---

Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

[Regular languages](#)

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Regular languages 1/2

×	m	m	a	l	a	a	m	i	m
---	---	---	---	---	---	---	---	---	---

×	l	m	i	l	i	a	l	i	l
---	---	---	---	---	---	---	---	---	---

i-words

a	×	i	×
---	---	---	---

×	m	m	a	l	a	a	m	u	m
---	---	---	---	---	---	---	---	---	---

×	l					a	l	i	l	u	l
---	---	--	--	--	--	---	---	---	---	---	---

u-words

m	u	l	u	a	×	i	×	u	×
---	---	---	---	---	---	---	---	---	---

Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

[Regular languages](#)

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Regular languages 1/2

×	m	m	a	l	a	a	m	i	m
---	---	---	---	---	---	---	---	---	---

×	l	m	i	l	i	a	l	i	l
---	---	---	---	---	---	---	---	---	---

i-words

a	×	i	×
---	---	---	---

×	m	m	a	l	a	a	m	u	m
---	---	---	---	---	---	---	---	---	---

×	l					a	l	u	l
---	---	--	--	--	--	---	---	---	---

u-words

m	u	l	u	a	×	i	×	u	×
---	---	---	---	---	---	---	---	---	---

Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

[Regular languages](#)

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Regular languages 1/2

⊗	m	m	a	l	a	a	m	i	m
---	---	---	---	---	---	---	---	---	---

⊗	l	m	i	l	i	a	l	i	l
---	---	---	---	---	---	---	---	---	---

i-words

a	⊗	i	⊗
---	---	---	---

⊗	m	m	a	l	a	a	m
---	---	---	---	---	---	---	---

⊗	l					a	l
---	---	--	--	--	--	---	---

u-words

m	u	l	u	a	⊗
---	---	---	---	---	---

u	m
---	---

u	l
---	---

u	⊗
---	---

Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Regular languages 1/2

⊗	m	m	a	l	a	a	m	i	m
---	---	---	---	---	---	---	---	---	---

⊗	l	m	i	l	i	a	l	i	l
---	---	---	---	---	---	---	---	---	---

i-words

a	⊗	i	⊗
---	---	---	---

⊗	M	m	a	l	a	a	m
---	---	---	---	---	---	---	---

⊗	l					a	l
---	---	--	--	--	--	---	---

u-words

m	u	l	u	a	⊗
---	---	---	---	---	---

u	m
---	---

u	l
---	---

u	⊗
---	---

Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Regular languages 1/2

⊗	m	m	a	l	a	a	m	i	m
---	---	---	---	---	---	---	---	---	---

⊗	l	m	i	l	i	a	l	i	l
---	---	---	---	---	---	---	---	---	---

i-words

a	⊗	i	⊗
---	---	---	---

⊗	M	m	a	l	a	a	m
---	---	---	---	---	---	---	---

⊗	L					a	l
---	---	--	--	--	--	---	---

u-words

m	u	l	u	a	⊗
---	---	---	---	---	---

u	m
---	---

u	l
---	---

u	⊗
---	---

Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

[Regular languages](#)

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Regular languages 1/2

⊗	m	m	a	l	a	a	m	i	m
---	---	---	---	---	---	---	---	---	---

⊗	l	m	i	l	i	a	l	i	l
---	---	---	---	---	---	---	---	---	---

i-words

a	⊗	i	⊗
---	---	---	---

⊗	M	M	a	l	a	a	m
---	---	---	---	---	---	---	---

⊗	L					a	l
---	---	--	--	--	--	---	---

u-words

m	u	l	u	a	⊗
---	---	---	---	---	---

u	m
---	---

u	l
---	---

u	⊗
---	---

Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

[Regular languages](#)

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Regular languages 1/2

⊗	m	m	a	l	a	a	m	i	m
---	---	---	---	---	---	---	---	---	---

⊗	l	m	i	l	i	a	l	i	l
---	---	---	---	---	---	---	---	---	---

i-words

a	⊗	i	⊗
---	---	---	---

⊗	M	M	A	l	a	a	m
---	---	---	---	---	---	---	---

⊗	L					a	l
---	---	--	--	--	--	---	---

u-words

m	u	l	u	a	⊗
---	---	---	---	---	---

u	m
---	---

u	l
---	---

u	⊗
---	---

Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Regular languages 1/2

⊗	m	m	a	l	a	a	m	i	m
---	---	---	---	---	---	---	---	---	---

⊗	l	m	i	l	i	a	l	i	l
---	---	---	---	---	---	---	---	---	---

i-words

a	⊗	i	⊗
---	---	---	---

⊗	M	M	A	l	a	a	m
---	---	---	---	---	---	---	---

⊗	L					a	l
---	---	--	--	--	--	---	---

u-words

M	u	l	u	a	⊗
---	---	---	---	---	---

u	m
---	---

u	l
---	---

u	⊗
---	---

Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Regular languages 1/2

×	m	m	a	l	a	a	m	i	m
---	---	---	---	---	---	---	---	---	---

×	l	m	i	l	i	a	l	i	l
---	---	---	---	---	---	---	---	---	---

i-words

a	×	i	×
---	---	---	---

×	M	M	A	L	a	a	m
---	---	---	---	---	---	---	---

×	L					a	l
---	---	--	--	--	--	---	---

u-words

M	u	l	u	a	×
---	---	---	---	---	---

u	m
---	---

u	l
---	---

u	×
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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Regular languages 1/2

⊗	m	m	a	l	a	a	m	i	m
---	---	---	---	---	---	---	---	---	---

⊗	l	m	i	l	i	a	l	i	l
---	---	---	---	---	---	---	---	---	---

i-words

a	⊗	i	⊗
---	---	---	---

⊗	M	M	A	L	A	a	m	u	m
---	---	---	---	---	---	---	---	---	---

⊗	L					a	l	u	l
---	---	--	--	--	--	---	---	---	---

u-words

M	u	l	u	a	⊗	u	⊗
---	---	---	---	---	---	---	---

Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Regular languages 1/2

⊗	m	m	a	l	a	a	m	i	m
---	---	---	---	---	---	---	---	---	---

⊗	l	m	i	l	i	a	l	i	l
---	---	---	---	---	---	---	---	---	---

i-words

a	⊗	i	⊗
---	---	---	---

⊗	M	M	A	L	A	a	m
---	---	---	---	---	---	---	---

⊗	L					a	l
---	---	--	--	--	--	---	---

u-words

M	u	L	u	a	⊗
---	---	---	---	---	---

u	m
---	---

u	l
---	---

u	⊗
---	---

Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Regular languages 1/2

⊗	m	m	a	l	a	a	m	i	m
---	---	---	---	---	---	---	---	---	---

⊗	l	m	i	l	i	a	l	i	l
---	---	---	---	---	---	---	---	---	---

i-words

a	⊗	i	⊗
---	---	---	---

⊗	M	M	A	L	A	A	m
---	---	---	---	---	---	---	---

⊗	L					a	l
---	---	--	--	--	--	---	---

u-words

M	u	L	u	a	⊗
---	---	---	---	---	---

u	m
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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Regular languages 1/2

⊗	m	m	a	l	a	a	m	i	m
---	---	---	---	---	---	---	---	---	---

⊗	l	m	i	l	i	a	l	i	l
---	---	---	---	---	---	---	---	---	---

i-words

a	⊗	i	⊗
---	---	---	---

⊗	M	M	A	L	A	A	M
---	---	---	---	---	---	---	---

⊗	L					a	l
---	---	--	--	--	--	---	---

u-words

M	u	L	u	a	⊗
---	---	---	---	---	---

u	m
---	---

u	l
---	---

u	⊗
---	---

Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Regular languages 1/2

×	m	m	a	l	a	a	m	i	m
---	---	---	---	---	---	---	---	---	---

×	l	m	i	l	i	a	l	i	l
---	---	---	---	---	---	---	---	---	---

i-words

a	×	i	×
---	---	---	---

×	M	M	A	L	A	A	M
---	---	---	---	---	---	---	---

×	L					A	l
---	---	--	--	--	--	---	---

u-words

M	u	L	u	a	×
---	---	---	---	---	---

u	m
---	---

u	l
---	---

u	×
---	---

Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Regular languages 1/2

⊗	m	m	a	l	a	a	m	i	m
---	---	---	---	---	---	---	---	---	---

⊗	l	m	i	l	i	a	l	i	l
---	---	---	---	---	---	---	---	---	---

i-words

a	⊗	i	⊗
---	---	---	---

⊗	M	M	A	L	A	A	M
---	---	---	---	---	---	---	---

⊗	L					A	L
---	---	--	--	--	--	---	---

u-words

M	u	L	u	a	⊗
---	---	---	---	---	---

u	m
---	---

u	l
---	---

u	⊗
---	---

Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Regular languages 1/2

×	m	m	a	l	a	a	m	i	m
---	---	---	---	---	---	---	---	---	---

×	l	m	i	l	i	a	l	i	l
---	---	---	---	---	---	---	---	---	---

i-words

a	×	i	×
---	---	---	---

×	M	M	A	L	A	A	M
---	---	---	---	---	---	---	---

×	L					A	L
---	---	--	--	--	--	---	---

u-words

M	u	L	u	A	×
---	---	---	---	---	---

u	m
---	---

u	l
---	---

u	×
---	---

Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Regular languages 1/2

×	m	m	a	l	a	a	m	i	m
---	---	---	---	---	---	---	---	---	---

×	l	m	i	l	i	a	l	i	l
---	---	---	---	---	---	---	---	---	---

i-words

a	×	i	×
---	---	---	---

×	M	M	A	L	A	A	M
---	---	---	---	---	---	---	---

×	L					A	L
---	---	--	--	--	--	---	---

u-words

M	u	L	u	A	×
---	---	---	---	---	---

u	M
---	---

u	l
---	---

u	×
---	---

Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Regular languages 1/2

×	m	m	a	l	a	a	m	i	m
---	---	---	---	---	---	---	---	---	---

×	l	m	i	l	i	a	l	i	l
---	---	---	---	---	---	---	---	---	---

i-words

a	×	i	×
---	---	---	---

×	M	M	A	L	A	A	M	u	M
---	---	---	---	---	---	---	---	---	---

×	L					A	L	u	L
---	---	--	--	--	--	---	---	---	---

u-words

M	u	L	u	A	×	u	×
---	---	---	---	---	---	---	---

Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

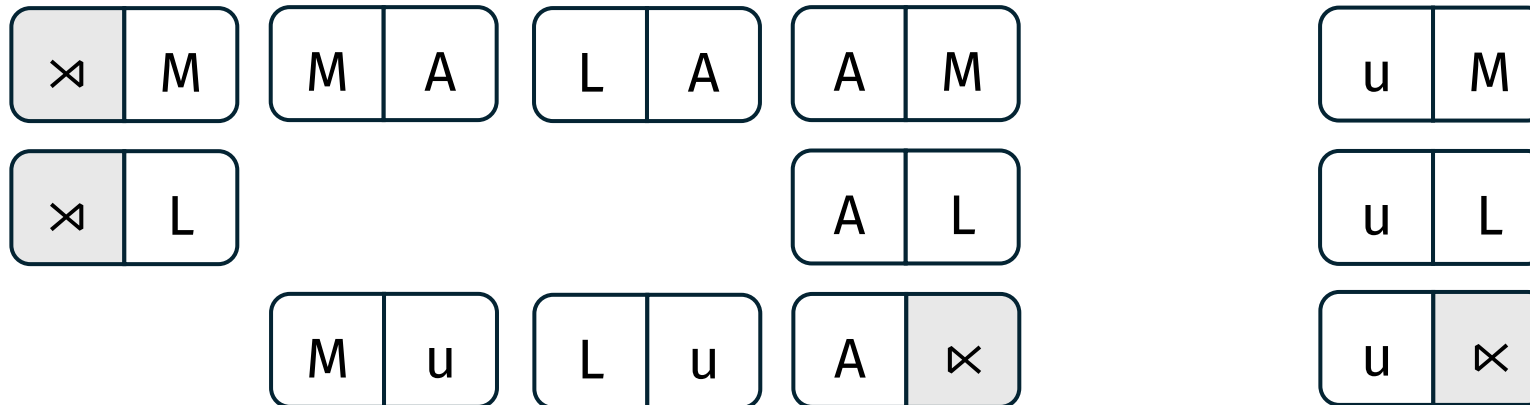
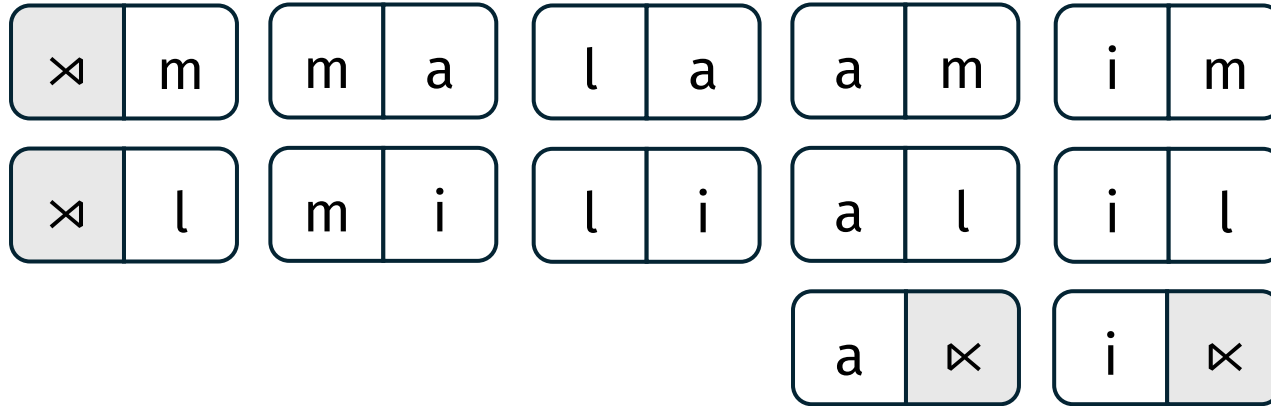
Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Regular languages 1/2



Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

[Regular languages](#)

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

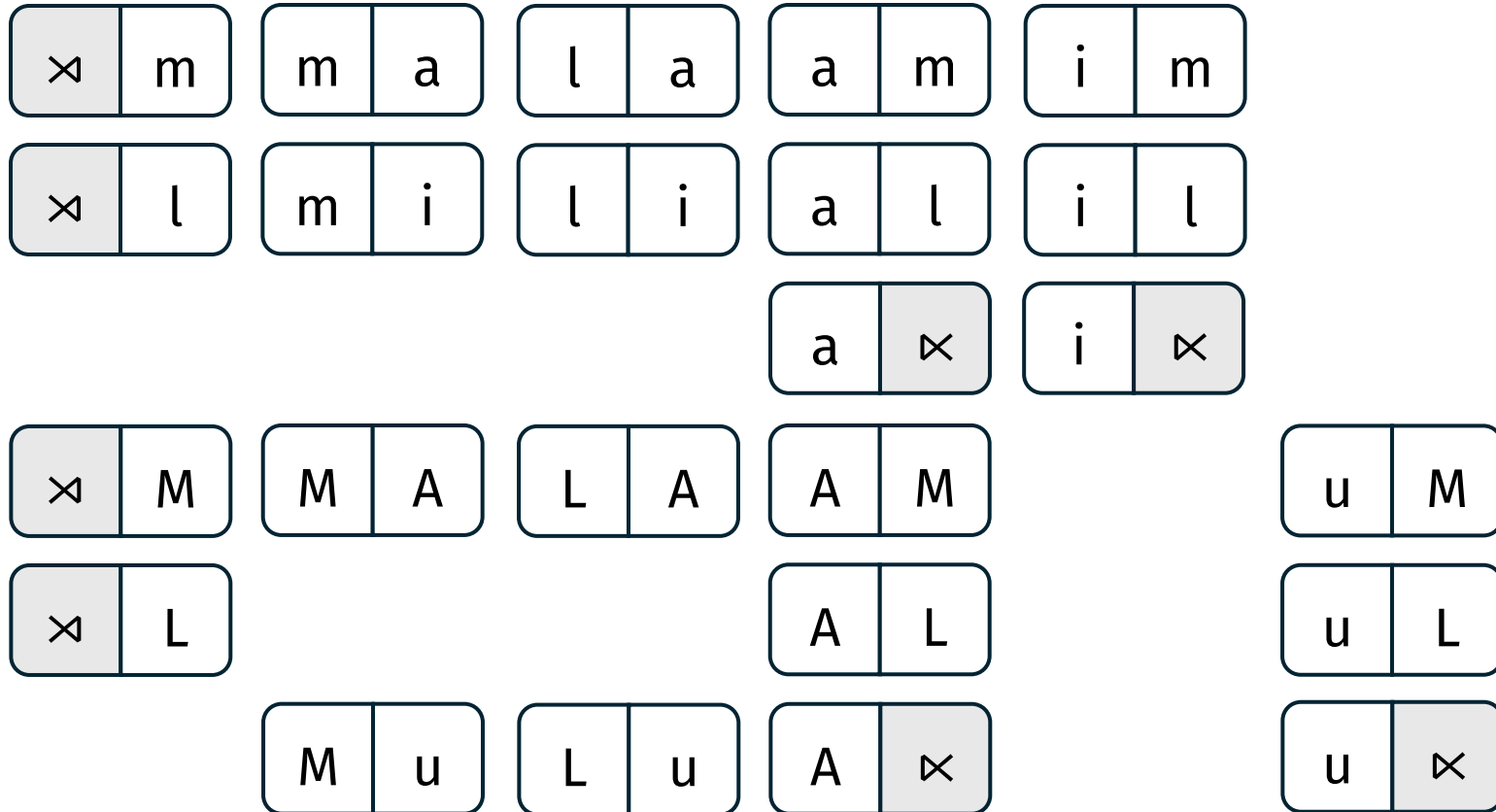
Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Regular languages 1/2



Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

[Regular languages](#)

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

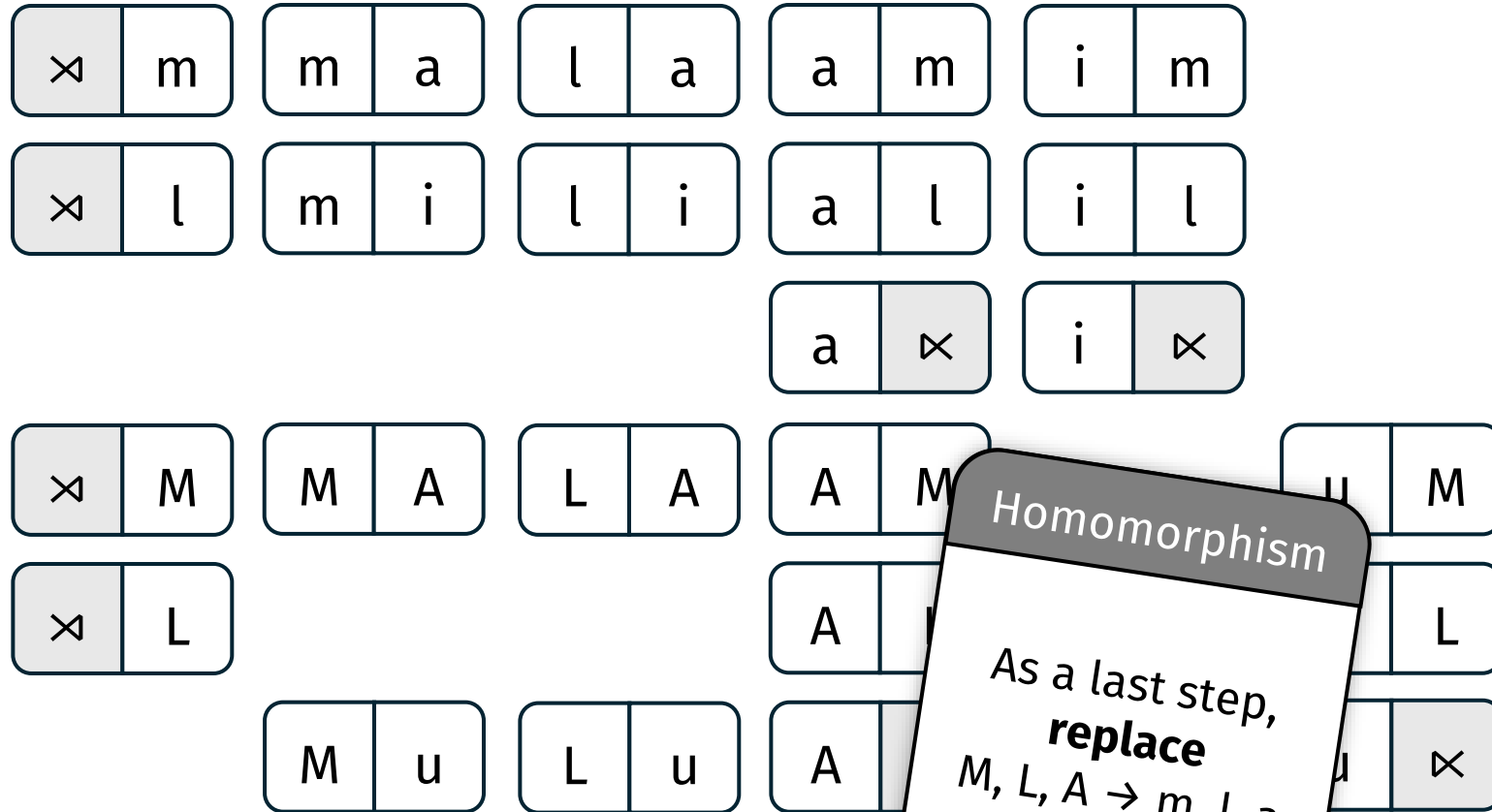
Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Regular languages 1/2



Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Regular languages 2/2

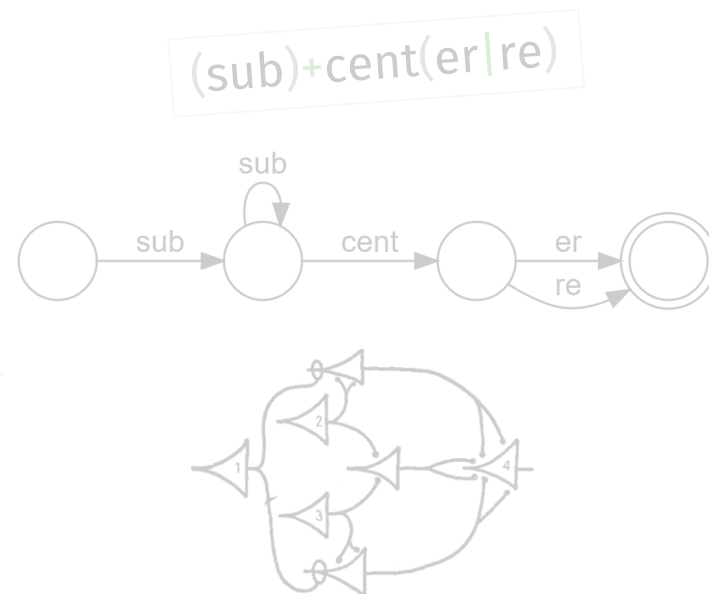
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Importantly, there are **other ways** that also achieve the same goal:

- regular expressions,
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Therefore, when any psychological reality is claimed for a class of formal languages, **do not** confuse it for a reality claim about the devices for defining the class.



Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Regular languages 2/2

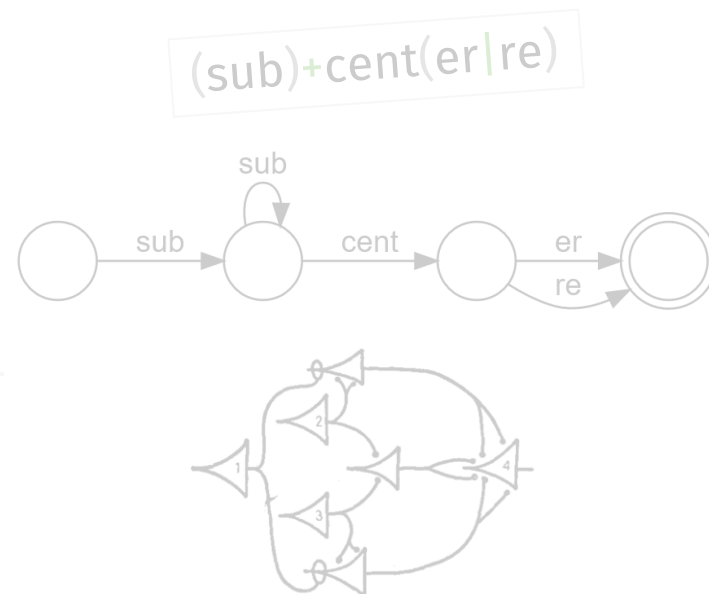
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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Regular languages 2/2

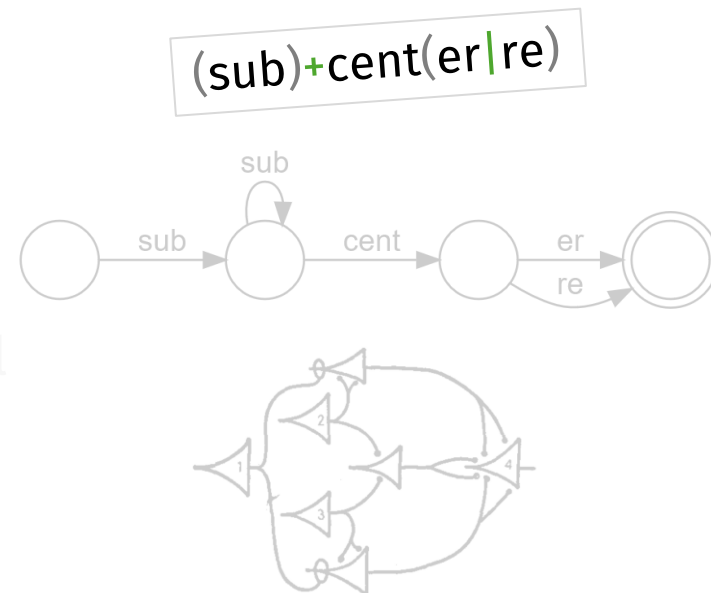
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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

[Regular languages](#)

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Regular languages 2/2

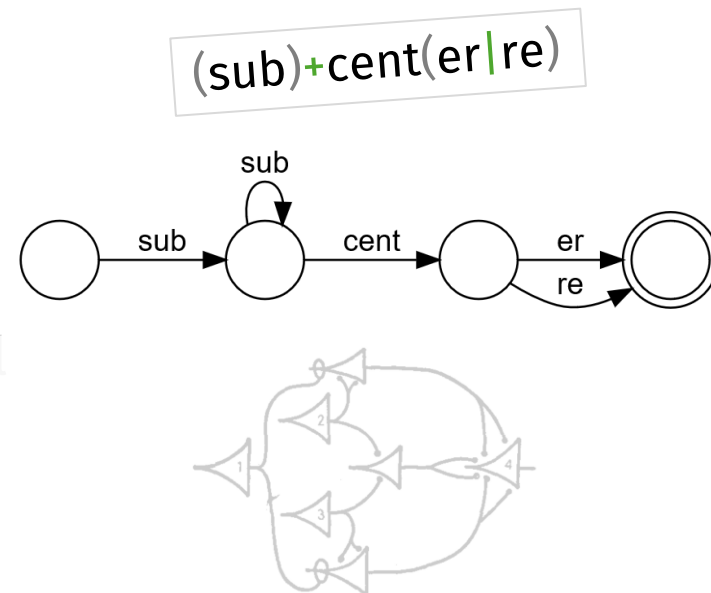
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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

[Regular languages](#)

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Regular languages 2/2

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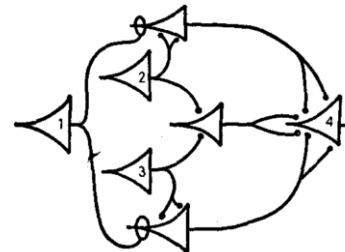
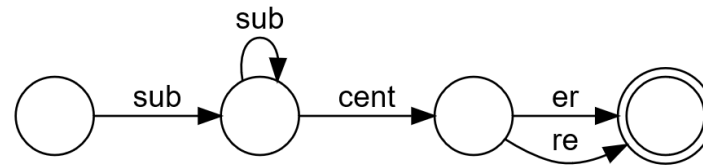
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(sub)+cent(er|re)



Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

[Regular languages](#)

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Regular languages 2/2

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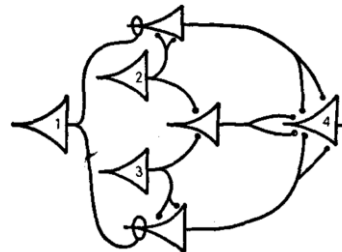
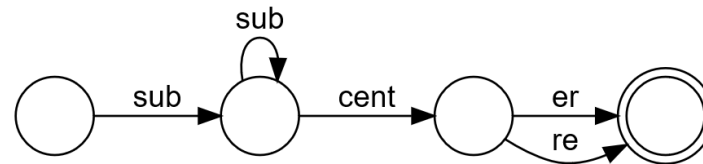
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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

[Regular languages](#)

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Regular languages 2/2

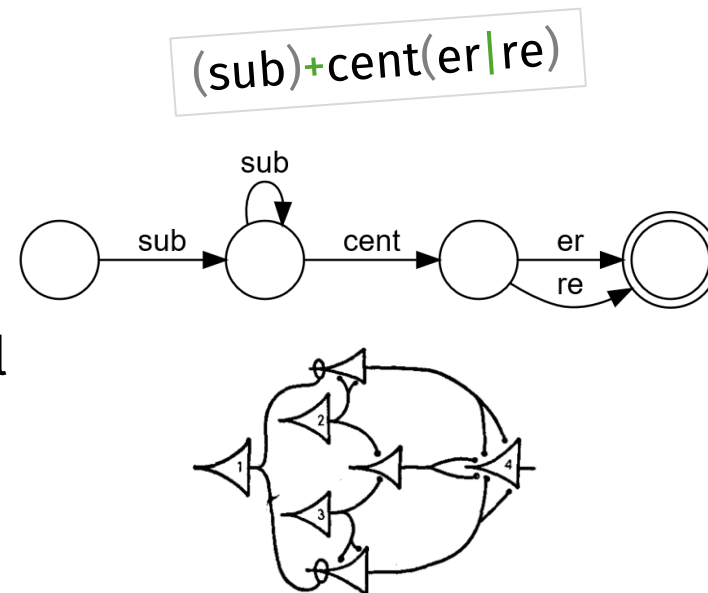
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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

[Regular languages](#)

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

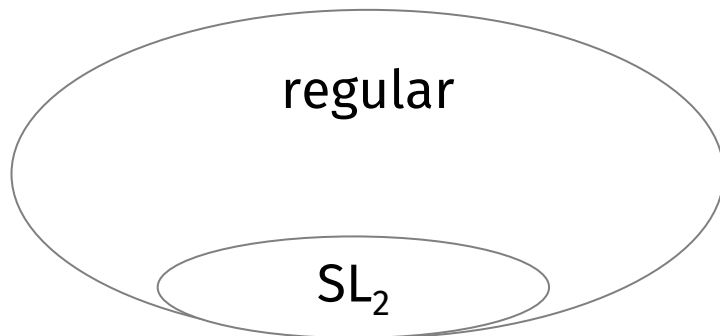
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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

[Some findings of linguistic FLT](#)

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

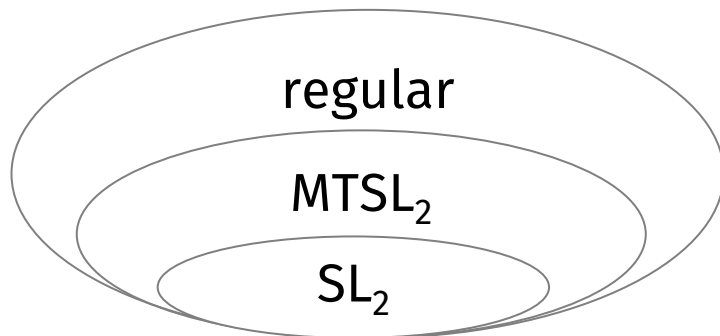
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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

[Some findings of linguistic FLT](#)

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

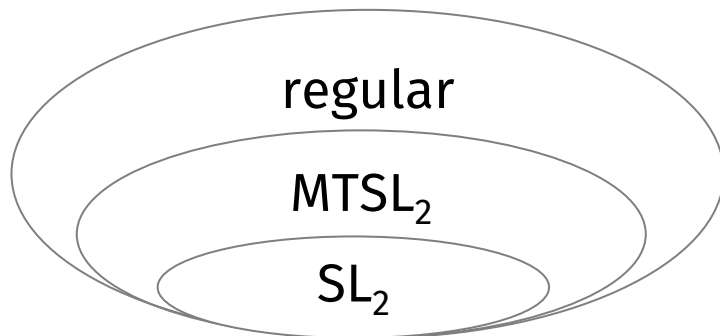
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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

[Some findings of linguistic FLT](#)

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

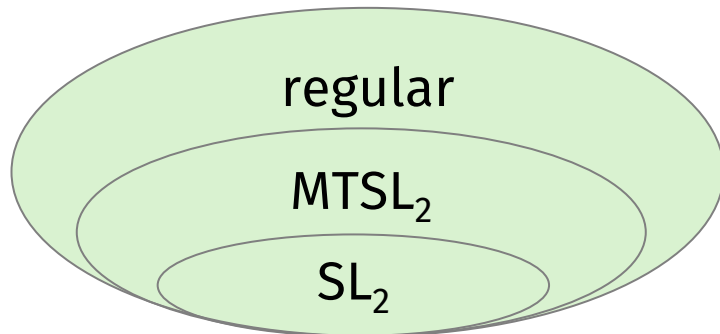
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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

[Some findings of linguistic FLT](#)

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

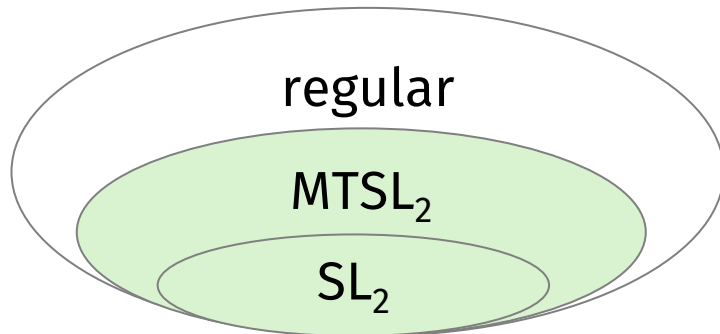
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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL₂) languages

SL₂ languages are limited

Regular languages

[Some findings of linguistic FLT](#)

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

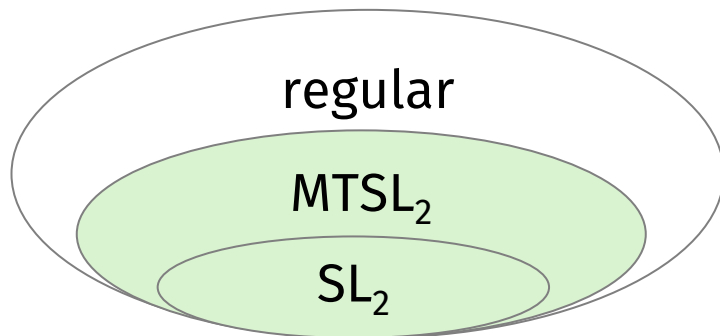
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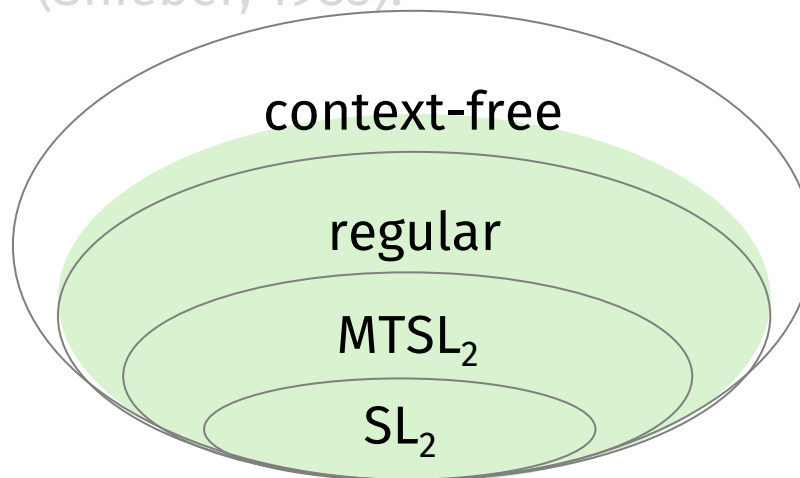
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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL₂) languages

SL₂ languages are limited

Regular languages

[Some findings of linguistic FLT](#)

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

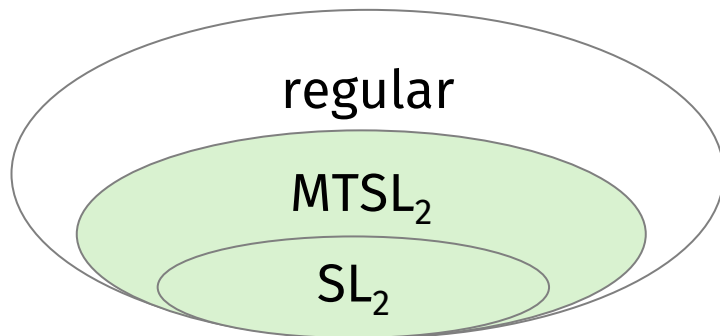
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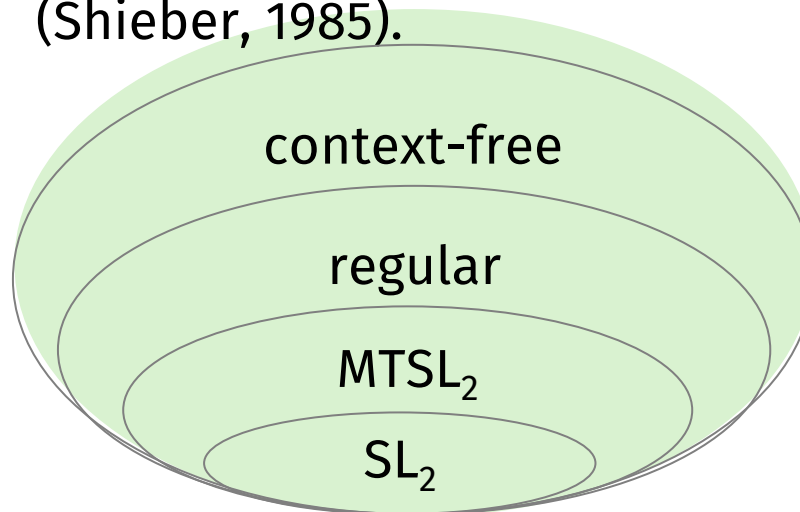
All known harmony patterns, except a few, are multiple tier-based strictly 2-local (MTSL₂) (Aksënova et al., 2022).



Syntax:

Syntax is supra-regular (Chomsky, 1956).

Syntax is supra-context-free (Shieber, 1985).



Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL₂) languages

SL₂ languages are limited

Regular languages

[Some findings of linguistic FLT](#)

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

The benefits of abstraction

As you see, the empirical reach of linguistic FLT is severely limited. Besides (the structure of) acceptability, it can barely work on anything else.

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However, this is also an advantage.

FLT treats

$L_1 = \{\text{aba, abc}\}$

no differently than

$L_2 = \{\text{cats chase cats, cats chase dogs}\}.$

It is one of the few methods that can meaningfully aim to **compare**

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

The benefits of abstraction

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

The benefits of abstraction

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

The benefits of abstraction

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

The benefits of abstraction

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

The benefits of abstraction

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

The benefits of abstraction

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

The benefits of abstraction

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- sequential patterns in language to sequential patterns in music,
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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

The benefits of abstraction

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- phonological patterns to syntactic patterns,
- sequential patterns in language to sequential patterns in music,
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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

The benefits of abstraction

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- sequential patterns in language to sequential patterns in music,
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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword



**Vilnius
University**

Formal language theory: still relevant in 2024?

Part II

A history of FLT's relevance

Setup

Linguistics and FLT have been interacting since Chomsky (1956).
That makes close to 70 years already.

What motivated the interaction in the beginning?

What motivates it now?

Apparently, it is not the same thing.

The driving force might even have changed more than once.

For someone starting out with a linguistic FLT thesis, this has been an important question.

This part of the presentation is an effort to answer it.

In a way, it is a literature review, but a very informal one.

Outline

Part I. Brief introduction to FLT
Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Setup

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Outline

Part I. Brief introduction to FLT
Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Setup

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Setup

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Outline

Part I. Brief introduction to FLT
Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Setup

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What motivates it now?

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Setup

Linguistics and FLT have been interacting since Chomsky (1956).

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What motivated the interaction in the beginning?

What motivates it now?

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Outline

Part I. Brief introduction to FLT
Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Setup

Linguistics and FLT have been interacting since Chomsky (1956).

That makes close to 70 years already.

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What motivates it now?

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Outline

Part I. Brief introduction to FLT
Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Chomsky's "Three models"

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It is also one of the first publications by Chomsky. The generative enterprise (as we know it today) is not there yet.

The paper explores syntactic acceptability (grammaticality), attempting to fit it into three formal language classes:



However, this view is anachronistic. Actually, Chomsky discusses classes of defining devices, not of formal languages themselves:



Chomsky (1956) argues that **1'** is inadequate, and so is **2'**, concluding that a more powerful device is necessary, such as **3'**.

Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Chomsky's "Three models"

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Chomsky's "Three models"

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Chomsky's "Three models"

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1 **2** **3**
regular \subset context-free \subset recursively enumerable
(Peters & Ritchie, 1973)

However, this view is anachronistic. Actually, Chomsky discusses classes of defining devices, not of formal languages themselves:

1' **2'** **3'**
finite automata \subset phrase structure grammars \subset transformational grammars

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Chomsky's "Three models"

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Chomsky's "Three models"

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Chomsky's "Three models"

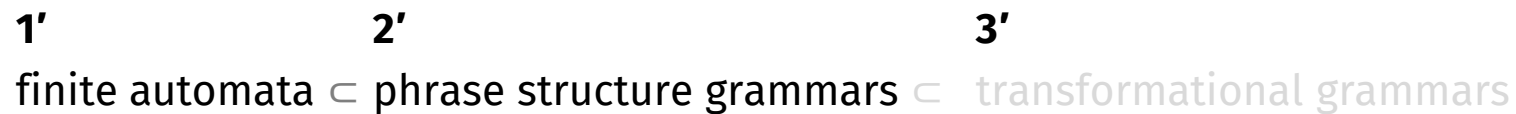
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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

[Chomsky's "Three models"](#)

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Chomsky's "Three models"

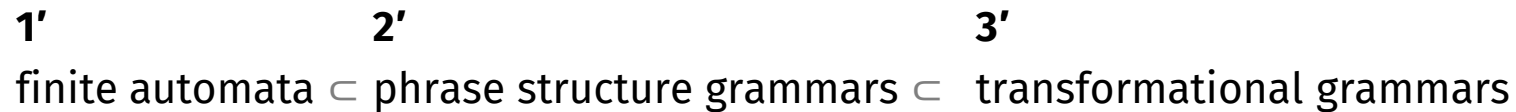
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Setup

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Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

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The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

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Some prospects

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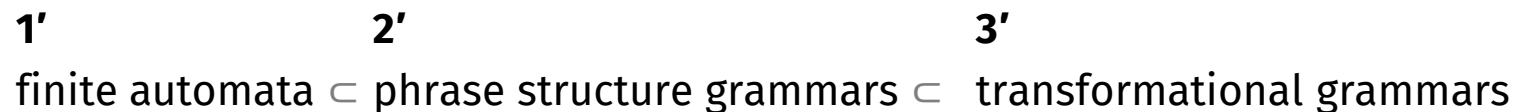
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What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

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Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

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Abstract

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1. Introduction

There are two central problems in the descriptive study of language. One primary concern of the linguist is to discover simple and "revealing" grammars for natural languages. At the same time, by studying the properties of such successful grammars and clarifying the basic conceptions that underlie them, he hopes to arrive at a general theory of linguistic structure. We shall examine certain features of these related inquiries.

The grammar of a language can be viewed as a theory of the structure of this language. Any scientific theory is based on a certain finite set of observations and, by establishing general laws stated in terms of certain hypothetical constructs, it attempts to account for these

observations, to show how they are interrelated, and to predict an indefinite number of new phenomena. A mathematical theory has the additional property that predictions follow rigorously from the body of theory. Similarly, a grammar is based on a finite number of observed sentences (the linguist's corpus) and it "projects" this set to an infinite set of grammatical sentences by establishing general "laws" (grammatical rules) framed in terms of such hypothetical constructs as the particular phonemes, words, phrases, and so on, of the language under analysis. A properly formulated grammar should determine unambiguously the set of grammatical sentences.

General linguistic theory can be viewed as a metatheory which is concerned with the problem of how to choose such a grammar in the case of each particular language on the basis of a finite corpus of sentences. In particular, it will consider and attempt to explicate the relation between the set of grammatical sentences and the set of observed sentences. In other words, linguistic theory attempts to explain the ability of a speaker to produce and understand new sentences, and to reject as ungrammatical other new sequences, on the basis of his limited linguistic experience.

Suppose that for many languages there are certain clear cases of grammatical sentences and certain clear cases of ungrammatical sequences, e.g., (1) and (2), respectively, in English.

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In this case, we can test the adequacy of a proposed linguistic theory by determining, for each language, whether or not the clear cases are handled properly by the grammars constructed in accordance with this theory. For example, if a large corpus of English does not happen to contain either (1) or (2), we ask whether the grammar that is determined for this corpus will project the corpus to include (1) and exclude (2). Even though such clear cases may provide only a weak test of adequacy for the grammar of a given language taken in isolation, they provide a very strong test for any general linguistic theory and for the set of grammars to which it leads, since we insist that in the case of each language the clear cases be handled properly in a fixed and predetermined manner. We can take certain steps towards the construction of an operational characterization of "grammatical sentence" that will provide us with the clear cases required to set the task of linguistics significantly.

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

[The long thread](#)

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

The long thread

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Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

[The long thread](#)

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

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Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

[The long thread](#)

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

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Inductive biases

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Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

[The long thread](#)

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

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Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

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Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

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[The long thread](#)

Meanwhile, in linguistics

Meanwhile, in computer science

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Linguistic FLT pipeline

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SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

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[The long thread](#)

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

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The benefits of abstraction

Part II. A history of FLT's relevance

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[The long thread](#)

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Firstly, Chomsky's argument for the inadequacy of phrase structure grammars (**2'**) is seen as incomplete. Additionally, it does not imply the inadequacy of context-free languages (**2**). A long discussion unfolds in an effort to provide a better argument (cf. Postal, 1962; Zwicky, 1963; Huybregts, 1976; Shieber, 1985).

Secondly, the original version of transformational grammar (**3'**) is found to be too large a leap from **2** and **2'**. The properties that make **2** attractive for explaining learning and even parsing (Peters & Ritchie, 1973) are lost along the way. Therefore, a more restrictive extension of **2** is sought (cf. Joshi, 1985).

Patching up *Three models* seems to have kept linguistic FLT alive for a long time.

Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

[The long thread](#)

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

The long thread

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

[The long thread](#)

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Meanwhile, in linguistics

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Arguments for the poverty of stimulus argue for the necessity of a domain-specific inductive bias (Pullum & Scholz, 2002). The notion of Universal Grammar (UG) first shows up in this context.

The domain-specificity assumption for UG seems to weaken over time (cf. Hauser et al., 2002; Nowak et al., 2002).

After the turn of the millennium, FLT establishes a new productive relationship with phonology, especially phonotactics (cf. Hayes & Wilson, 2008; Heinz, 2007).

Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

[Meanwhile, in linguistics](#)

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Meanwhile, in linguistics

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

[Meanwhile, in linguistics](#)

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Meanwhile, in linguistics

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

[Meanwhile, in linguistics](#)

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Meanwhile, in linguistics

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

[Meanwhile, in linguistics](#)

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

Afterword

Meanwhile, in computer science

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Language technology. Initially, Chomsky’s mathematical approach to linguistics, including FLT, was seen as holding promise for language technology. While some tools from FLT were commonplace in language technology until 2010s, they were rapidly displaced by artificial neural networks (ANNs) ever since. Completing the circle, FLT is now used to study the inductive bias of various ANNs.

Linguistics as a stakeholder. Following the “long thread” that unraveled from *Three models*, mathematical research in FLT continued as usual, but now, mathematicians would sometimes cite linguistics as a field that could benefit from their research.

Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

[Meanwhile, in computer science](#)

Meanwhile, in psychology

Some prospects

Afterword

Meanwhile, in computer science

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

[Meanwhile, in computer science](#)

Meanwhile, in psychology

Some prospects

Afterword

Meanwhile, in computer science

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

[Meanwhile, in computer science](#)

Meanwhile, in psychology

Some prospects

Afterword

Meanwhile, in psychology

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Artificial grammar learning (AGL). In the same decade, George Miller (1967) initiates *Project Grammmarama*, which grows into the experimental design known as AGL. Miller investigates humans’ capacity to notice patterns in sequences of stimuli. Miller had co-authored some FLT papers with Chomsky. Millerian AGL is essentially “experimental FLT”. Unfortunately, this bond between the research programs breaks when Miller himself retires from *Project Grammmarama*. Further AGL work is largely uninformed by FLT (Fitch et al., 2012).

AGL and FLT meet again. The bond is renewed in the 2000s, when Fitch & Hauser (2004) conduct the first AGL experiment on cotton-top tamarin monkeys (*Saguinus oedipus*), which is also FLT-informed. Many animal AGL×FLT studies follow (ten Cate & Okanoya, 2012).

Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

[Meanwhile, in psychology](#)

Some prospects

Afterword

Meanwhile, in psychology

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

[Meanwhile, in psychology](#)

Some prospects

Afterword

Meanwhile, in psychology

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

[Meanwhile, in psychology](#)

Some prospects

Afterword

Some prospects

Cross-domain comparison might finally give us an empirical answer to the question: how domain-specific is human linguistic cognition?

Also, should it turn out to be in the negative, linguistic cognition would become a valid proxy for many other things cognitive — and the scope of FLT would expand automatically.

The Super Linguistics research program (Patel-Grosz et al., 2023) is headed towards this direction.

Cross-species comparison might enrich our understanding of the evolution of language.

Large language models (LLMs), such as the GPTs, also have an inductive bias to be studied. Not only technologically useful, this effort is also similar to using animal models for indirectly studying human cognition.

The lack of a functional explanation for acceptability intuitions, revealed in a very pressing form, for instance, by Gil (2017), adds onto the relevance of any research related to acceptability, including linguistic FLT.

Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

[Some prospects](#)

Afterword

Some prospects

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

[Some prospects](#)

Afterword

Some prospects

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

[Some prospects](#)

Afterword

Some prospects

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

[Some prospects](#)

Afterword

Some prospects

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

[Some prospects](#)

Afterword

Some prospects

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT's relevance

Setup

Chomsky's "Three models"

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

[Some prospects](#)

Afterword

Afterword

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It is no wonder that many things came as a surprise to me. To you, they need not. I also suspect that many of these aspects also recur in the histories of some other long-standing scientific discussions.

- I focused on relevance, but relevance is not always declared in the papers. The relevance of the “long thread” of responses to Chomsky (1956) might have been largely unquestioned due to the very fact that they were responses to Chomsky (1956).
- It almost seems that without some first-person perspectives from then-active researchers, such a review will never be complete.
- Or, for most practical purposes, I could focus on the achievements instead, and ignore the shifts in relevance 😊.
- Apparently, in the 50s, there were some truly rapid and sweeping changes in the landscape of the sciences of the mind.
- Alternatively, perhaps psychology and neuroscience just move at a faster pace than linguistics, and they always have, for as long as all three have coexisted?

Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

[Afterword](#)

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Outline

Part I. Brief introduction to FLT
Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

[Afterword](#)

Afterword

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Outline

Part I. Brief introduction to FLT

Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

Meanwhile, in psychology

Some prospects

[Afterword](#)

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Part I. Brief introduction to FLT
Setup

Where does linguistic FLT fit it?

Inductive biases

What is phonotactics?

Fun facts about phonotactics

Linguistic FLT pipeline

Strictly 2-local (SL_2) languages

SL_2 languages are limited

Regular languages

Some findings of linguistic FLT

The benefits of abstraction

Part II. A history of FLT’s relevance

Setup

Chomsky’s “Three models”

The long thread

Meanwhile, in linguistics

Meanwhile, in computer science

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[Afterword](#)

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Part II. A history of FLT’s relevance

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Thank you!

References 1/3

- Aksënova, A., Rawski, J., Graf, T., & Heinz, J. (2020). The computational power of harmony. *Oxford Handbook of Vowel Harmony*, Oxford University Press, under review.
- Altan, A., Kaya, U., & Hohenberger, A. (2016). Sensitivity of Turkish infants to vowel harmony in stem-suffix sequences: preference shift from familiarity to novelty. In *Proceedings of the 40th Boston University Conference on Language Development*.
- Chomsky, N. (1956). Three models for the description of language. *IRE Transactions on information theory*, 2(3), 113-124.
- Chomsky, N. (2014). *Aspects of the Theory of Syntax* (No. 11). MIT press.
- Chomsky, N. (1980). Rules and Representations.
- Fitch, W. T., Friederici, A. D., & Hagoort, P. (2012). Pattern perception and computational complexity: introduction to the special issue. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 367(1598), 1925-1932.
- Fitch, W. T., & Hauser, M. D. (2004). Computational constraints on syntactic processing in a nonhuman primate. *Science*, 303(5656), 377-380.
- Gil, D. (2017). Isolating-monocategorial-associational language. In *Handbook of categorization in cognitive science* (pp. 471-510). Elsevier.
- Hauser, M. D., Chomsky, N., & Fitch, W. T. (2002). The faculty of language: what is it, who has it, and how did it evolve?. *science*, 298(5598), 1569-1579.

References 2/3

- Hayes, B., & Wilson, C. (2008). A maximum entropy model of phonotactics and phonotactic learning. *Linguistic inquiry*, 39(3), 379-440.
- Heinz, J. N. (2007). *Inductive learning of phonotactic patterns*. University of California, Los Angeles.
- Huybregts, R. (1976). Overlapping dependencies in Dutch. *Utrecht Working Papers in Linguistics*, 1, 24-65.
- Joshi, A. K. (1985). Tree adjoining grammars: How much context-sensitivity is required to provide reasonable structural descriptions?.
- Kaplan, R. M., & Kay, M. (1994). Regular models of phonological rule systems. *Computational linguistics*, 20(3), 331-378.
- Medvedev, Yu. T. (1964). On the class of events representable in a finite automaton. In E. F. Moore, editor, *Sequential Machines*, 215-227. Addison-Wesley.
- Miller, G. A. (1967). Project Grammmarama. *Psychology of communication*. New York: Basic Books.
- Nowak, M. A., Komarova, N. L., & Niyogi, P. (2002). Computational and evolutionary aspects of language. *Nature*, 417(6889), 611-617.
- Patel-Grosz, P., Mascarenhas, S., Chemla, E., & Schlenker, P. (2023). Super Linguistics: an introduction. *Linguistics and Philosophy*, 46(4), 627-692.
- Peters Jr, P. S., & Ritchie, R. W. (1973). On the generative power of transformational grammars. *Information sciences*, 6, 49-83.

References 3/3

- Postal, P. M. (1962). On the limitations of context-free phrase-structure description. *Research Laboratory of Electronics (Quarterly Progress Report, Massachusetts Institute of Technology)*, 64, 231.
- Pullum, G. K., & Scholz, B. C. (2002). Empirical assessment of stimulus poverty arguments. *The linguistic review*, 19(1-2), 9-50.
- Reber, Arthur S. (1993). *Implicit learning and tacit knowledge: An essay on the cognitive unconscious*. Oxford University Press.
- Shieber, S. M. (1985). Evidence against the context-freeness of natural language. In *The Formal complexity of natural language* (pp. 320-334). Dordrecht: Springer Netherlands.
- Sundara, M., Zhou, Z. L., Breiss, C., Katsuda, H., & Steffman, J. (2022). Infants' developing sensitivity to native language phonotactics: a meta-analysis. *Cognition*, 221, 104993.
- ten Cate, C., & Okanoya, K. (2012). Revisiting the syntactic abilities of non-human animals: natural vocalizations and artificial grammar learning. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 367(1598), 1984-1994.
- Vaden, K.I., Halpin, H.R., Hickok, G.S. (2009). Irvine Phonotactic Online Dictionary, Version 2.0. [Data file]. Available from <http://www.iphod.com>.
- Zwicky, A. (1963). Some languages that are not context-free, *Quarterly Progress report of the Research Laboratory of Electronics, MIT*, 70, 290-293.