

When Unmarked Case Matters

Processing Agreement in Hindi

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Formal Approaches to South Asian Languages 7
MIT

The Question:

- ▶ How is agreement processed in a language where **unmarked case** determines verbal agreement?
- ▶ This study: Hindi

When Unmarked
Case Matters

Sakshi Bhatia

Introduction

Processing
Agreement and
Case

Preview: What
about Hindi

Case as the
gateway to
Agreement

The Unmarked
Case Hypothesis
Experiment

Results

Conclusion

Acknowledgements

References

Appendix

Introduction

Processing
Agreement and
Case

Preview: What
about Hindi

Case as the
gateway to
Agreement

The Unmarked
Case Hypothesis
Experiment

Results

Conclusion

Acknowledgements

References

Appendix

- ▶ Even though unmarked case = null-case morphology
- ▶ ...Unmarked case matters for the grammar:
*an unmarked noun can be agreed with, a
case-marked noun can never be agreed with*
- ▶ **Unmarked Case matters for the parser**
- ▶ Testing ground: Agreement Production in Hindi

Processing Agreement

When Unmarked
Case Matters

Sakshi Bhatia

Introduction

Processing
Agreement and
Case

Preview: What
about Hindi

Case as the
gateway to
Agreement

The Unmarked
Case Hypothesis

Experiment

Results

Conclusion

Acknowledgements

References

Appendix

(1) The key to the cabinets were rusty.

- ▶ This sentence has an *agreement error*
 - (2) *The **key** to the cabinets were rusty.
- ▶ Speakers often produce such errors (Bock & Miller, 1991)
- ▶ Comprehenders fail to notice such errors (Wagers et al., 2009)

Relative Acceptability: Wagers et al. 2009

When Unmarked Case Matters

Sakshi Bhatia

Introduction

Processing Agreement and Case

Preview: What about Hindi

Case as the gateway to Agreement

The Unmarked Case Hypothesis

Experiment

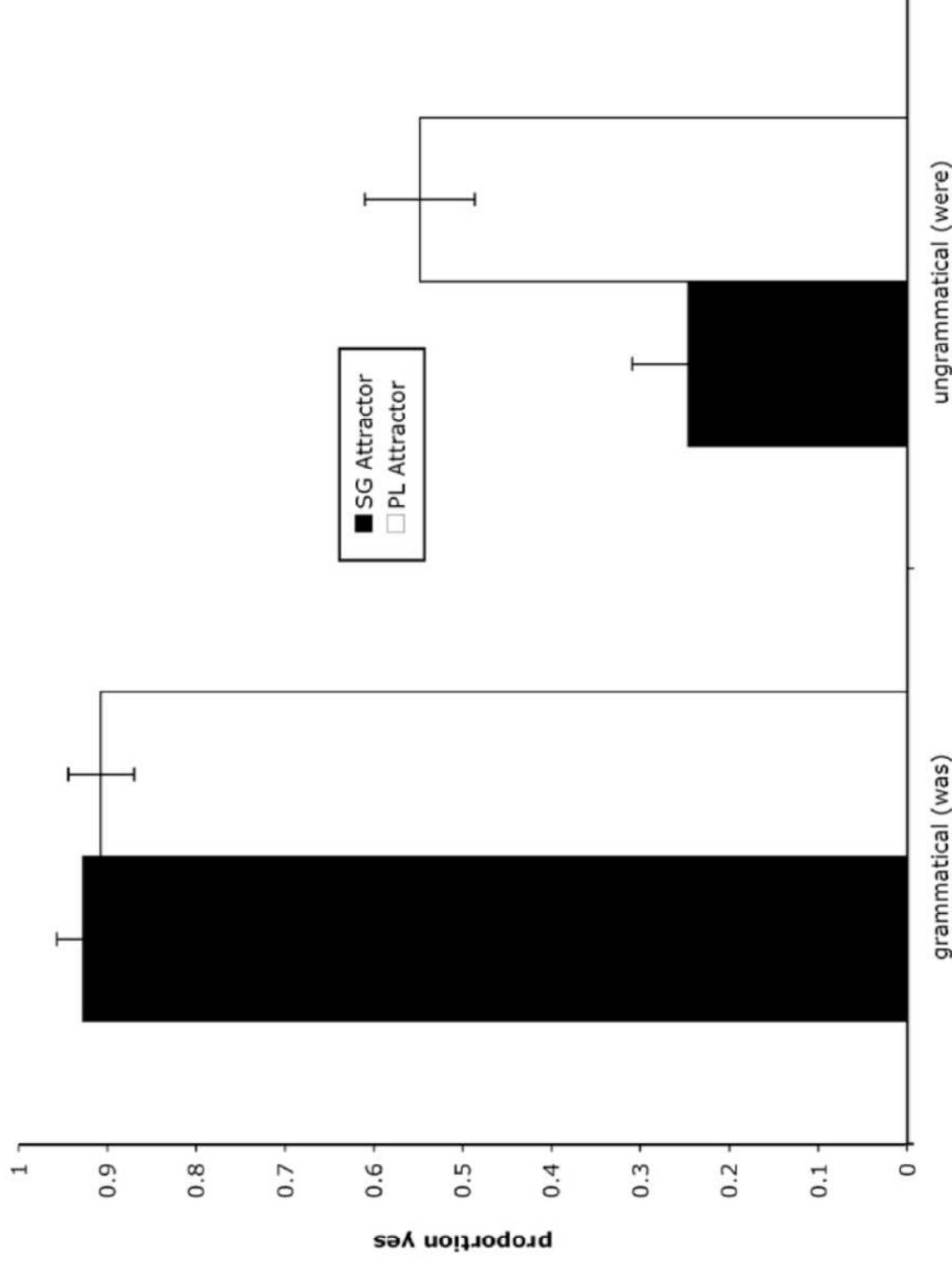
Results

Conclusion

Acknowledgements

References

Appendix



The key to the cabinet(s) **was** rusty.

The key to the cabinet(s) **were** rusty.

Agreement Attraction

- (3) *The **key** to the cabinets were rusty.
- ▶ Judged *relatively acceptable*
 - ▶ ...even though the verb bears erroneous features
 - ▶ Why?
 - ▶ cabinets = ATTRACTOR
 - ▶ cabinets and **key** mismatch in features
- (4) *The **key** to the cabinets were rusty.

Grammatically illicit items can interfere with agreement processes

The role of Case: Production in Slovak

Badecker & Kuminiak (2007)

- ▶ Sentence fragments where features and case forms of the head noun (=grammatical agreement controller) and the attractor were manipulated
- ▶ The task: produce a complete sentence using the sentence fragment as the subject.
- ▶ Some nouns are ambiguous between nominative and accusative

The role of Case: Evidence from Slovak

AMBIGUOUS MATCH

- (5) **Trest** za zlocin...
Punishment.M.AMBIG for crime.M.AMBIG
'The punishment for the crime...'

UNAMBIGUOUS MISMATCH

- (6) **Trest** za vrazdu...
Punishment.M.AMBIG for murder.F.ACC
'The punishment for the murder...'

AMBIGUOUS MISMATCH → ERROR PRONE

- (7) **Trest** za kradez...
Punishment.M.AMBIG for theft.F.AMBIG
'The punishment for the theft...'

So far...

- ▶ Languages where accessibility for agreement is based on grammatical function (subjecthood) (Bobaljik, 2008)
- ▶ In these *subject agreement* languages
- ▶ ...Agreement computation can be prone to interference
- ▶ Some languages: interference arises due to phi features
- ▶ Other languages: interference arises due to a combination of features and case

A property that sets Hindi apart:

- ▶ Accessibility for agreement is contingent on being unmarked for case (Bobaljik 2008, Bhatt 2005 a.o.)

The Question

- ▶ How is agreement processed in a language where **unmarked case** determines verbal agreement?
- ▶ In a manner that is *sensitive to unmarked case*

When Unmarked
Case Matters

Sakshi Bhatia

Introduction

Processing
Agreement and
Case

Preview: What
about Hindi

Case as the
gateway to
Agreement

The Unmarked
Case Hypothesis
Experiment

Results

Conclusion

Acknowledgements

References

Appendix

- ▶ **The Unmarked Case Hypothesis:**
an unmarked attractor noun would interfere with the processing of agreement to a greater degree than an overtly case marked noun.
- ▶ **The results:**
Agreement processing becomes more error prone in a configuration with an unmarked attractor noun
- ▶ This points to the parser's *sensitivity to grammaticized unmarked categories.*

The Agreement Generalization

- ▶ Agreement Generalization:
Verbal agreement is with the most prominent argument that is unmarked for case (Bhatt 2005, Anand & Nevins 2006, Bobaljik 2008).
- ▶ Subjects or Objects may be controllers of agreement.
- ▶ Distinctions for person, number and gender.

Introduction

Processing
Agreement and
Case

Preview: What
about Hindi

Case as the
gateway to
Agreement

The Unmarked
Case Hypothesis

Experiment

Results

Conclusion

Acknowledgements

References

Appendix

Agree with the subject if it is unmarked for case

(8) **laRkii**-Ø kitaab-Ø jaldi-se paRhegii
girl.F book.F quickly read.fut.F
'The girl will read the book quickly.'

(9) **laRkaa**-Ø kitaab-Ø jaldi-se paRhegaa
boy.M book.F quickly read.fut.M
'The boy will read the book quickly.'

The Unmarked Case Hypothesis

Interference in agreement processing should be greater in configurations where an attractor noun is unmarked for case compared to when the noun is overtly case marked.

When Unmarked
Case Matters

Sakshi Bhatia

Introduction

Processing
Agreement and
Case

Preview: What
about Hindi

Case as the
gateway to
Agreement

The Unmarked
Case Hypothesis

Experiment

Results

Conclusion

Acknowledgements

References

Appendix

- ▶ Unsurprising if lack of clarity → Longer response times
- ▶ Quite possible that the effect of feature mismatch is most noticeable with unmarked case

Item Template

(17) $\text{SubjMatrix} \quad V_{\text{Matrix}} \quad C \quad \text{Subj Obj AdvP} \dots$
 $+K \quad \text{PFV.DEF}$

When Unmarked
Case Matters

Sakshi Bhatia

Introduction

Processing
Agreement and
Case

Preview: What
about Hindi

Case as the
gateway to
Agreement

The Unmarked
Case Hypothesis

Experiment

Results

Conclusion

Acknowledgements

References

Appendix

When Unmarked Case Matters

Sakshi Bhatia

Introduction

Processing
Agreement and
Case

Preview: What
about Hindi

Case as the
gateway to
Agreement

The Unmarked
Case Hypothesis

Experiment

Results

Conclusion

Acknowledgements

References

Appendix

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When Unmarked Case Matters

Sakshi Bhatia

Introduction

Processing
Agreement and
Case

Preview: What
about Hindi

Case as the
gateway to
Agreement

The Unmarked
Case Hypothesis

Experiment

Results

Conclusion

Acknowledgements

References

Appendix

रवि

When Unmarked Case Matters

Sakshi Bhatia

Introduction

Processing
Agreement and
Case

Preview: What
about Hindi

Case as the
gateway to
Agreement

The Unmarked
Case Hypothesis

Experiment

Results

Conclusion

Acknowledgements

References

Appendix

16



Introduction

Processing
Agreement and
Case

Preview: What
about Hindi

Case as the
gateway to
Agreement

The Unmarked
Case Hypothesis

Experiment

Results

Conclusion

Acknowledgements

References

Appendix

सोचा

When Unmarked Case Matters

Sakshi Bhatia

Introduction

Processing
Agreement and
Case

Preview: What
about Hindi

Case as the
gateway to
Agreement

The Unmarked
Case Hypothesis

Experiment

Results

Conclusion

Acknowledgements

References

Appendix

कि

When Unmarked Case Matters

Sakshi Bhatia

Introduction

Processing
Agreement and
Case

Preview: What
about Hindi

Case as the
gateway to
Agreement

The Unmarked
Case Hypothesis

Experiment

Results

Conclusion

Acknowledgements

References

Appendix

लड़का

Introduction

Processing
Agreement and
Case

Preview: What
about Hindi

Case as the
gateway to
Agreement

The Unmarked
Case Hypothesis

Experiment

Results

Conclusion

Acknowledgements

References

Appendix

किताब

When Unmarked Case Matters

Sakshi Bhatia

Introduction

Processing
Agreement and
Case

Preview: What
about Hindi

Case as the
gateway to
Agreement

The Unmarked
Case Hypothesis

Experiment

Results

Conclusion

Acknowledgements

References

Appendix

जल्दी

When Unmarked Case Matters

Sakshi Bhatia

Introduction

Processing
Agreement and
Case

Preview: What
about Hindi

Case as the
gateway to
Agreement

The Unmarked
Case Hypothesis

Experiment

Results

Conclusion

Acknowledgements

References

Appendix

स

When Unmarked Case Matters

Sakshi Bhatia

Introduction

Processing
Agreement and
Case

Preview: What
about Hindi

Case as the
gateway to
Agreement

The Unmarked
Case Hypothesis

Experiment

Results

Conclusion

Acknowledgements

References

Appendix

पढ़ेगा

पढ़ेगी

रवि ने सोचा कि लड़का किताब जल्दी से

पढ़ेगी

पढ़ेगा

UNMARKED MISMATCH (-K,-M)

(18) ravii-ne socaa ki laRkaa-Ø kitaab-Ø

Ravi-ERG thought that boy.M book.F

jaldii-se {paRhegii / paRhegaa}

quickness-INST read.FUT.F read.FUT.M

Ravi thought that the **boy**_M {will read_F / **will read**_M} the book_F quickly.

Introduction

Processing
Agreement and
Case

Preview: What
about Hindi

Case as the
gateway to
Agreement

The Unmarked
Case Hypothesis

Experiment

Results

Conclusion

Acknowledgements

References

Appendix

Prediction

- ▶ More errors in the Unmarked Case conditions than in the Marked Case conditions

When Unmarked Case Matters

Sakshi Bhatia

Introduction

Processing Agreement and Case

Preview: What about Hindi

Case as the gateway to Agreement

The Unmarked Case Hypothesis

Experiment

Results

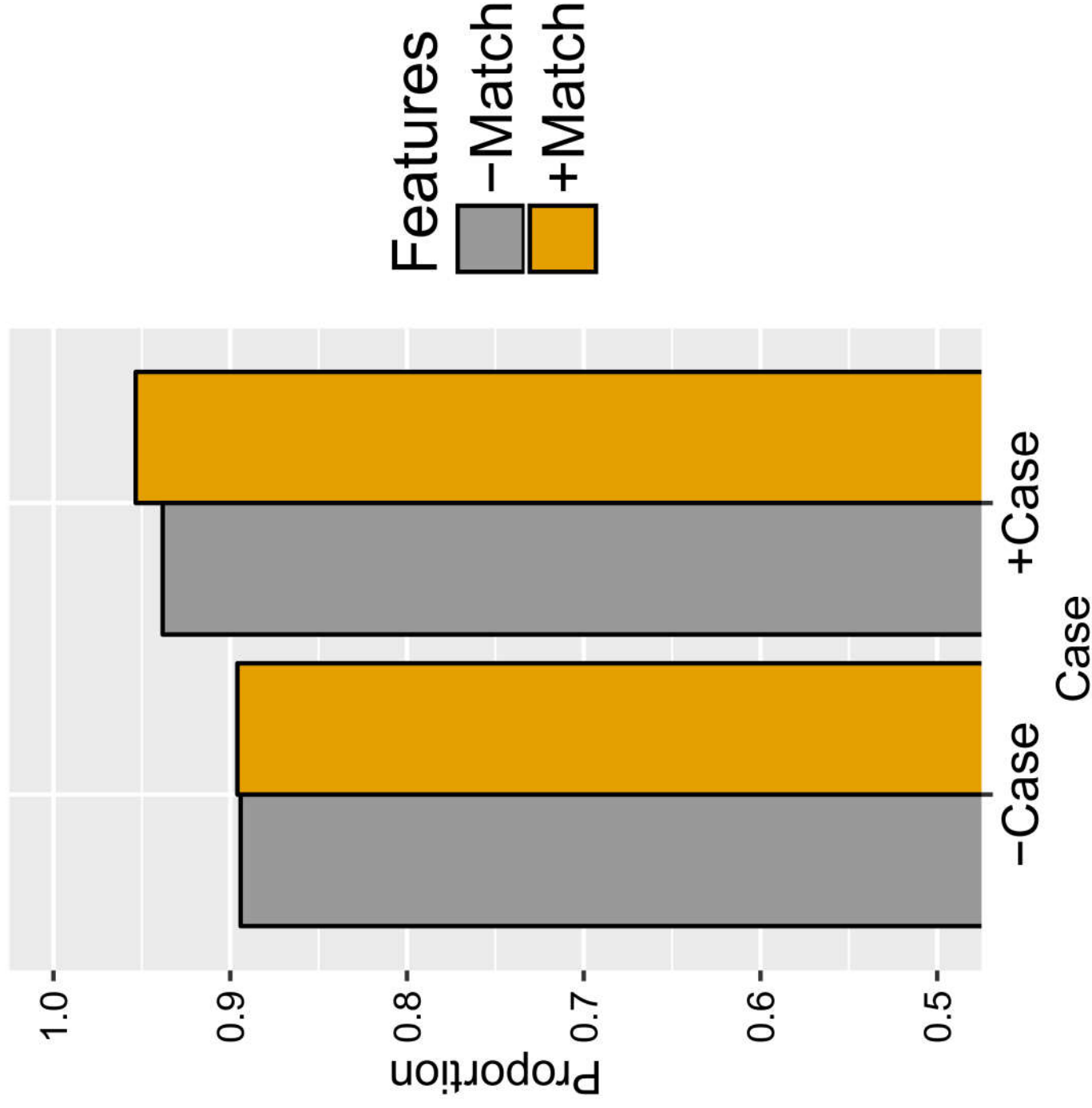
Conclusion

Acknowledgements

References

Appendix

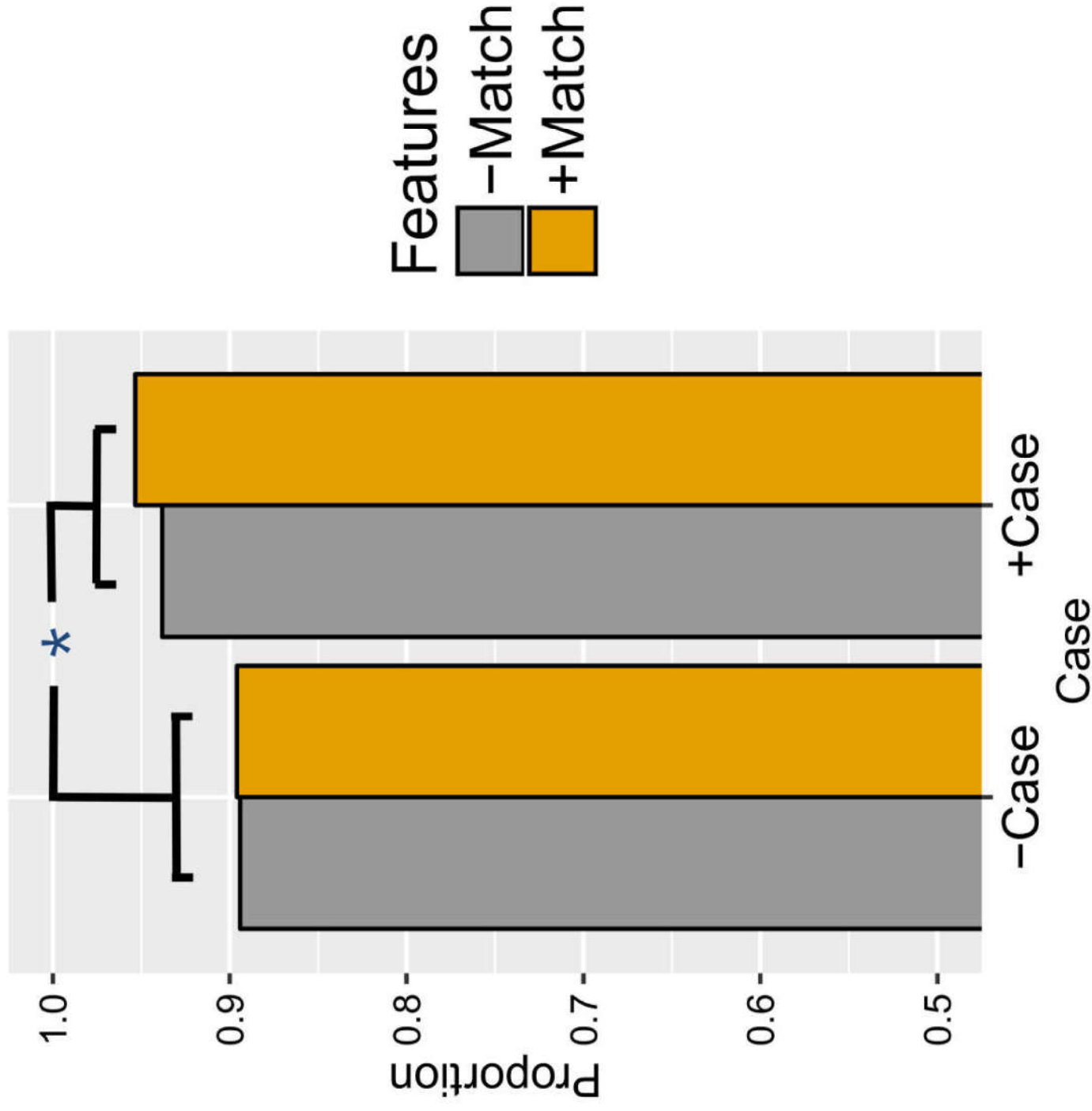
Proportion of Correct Responses



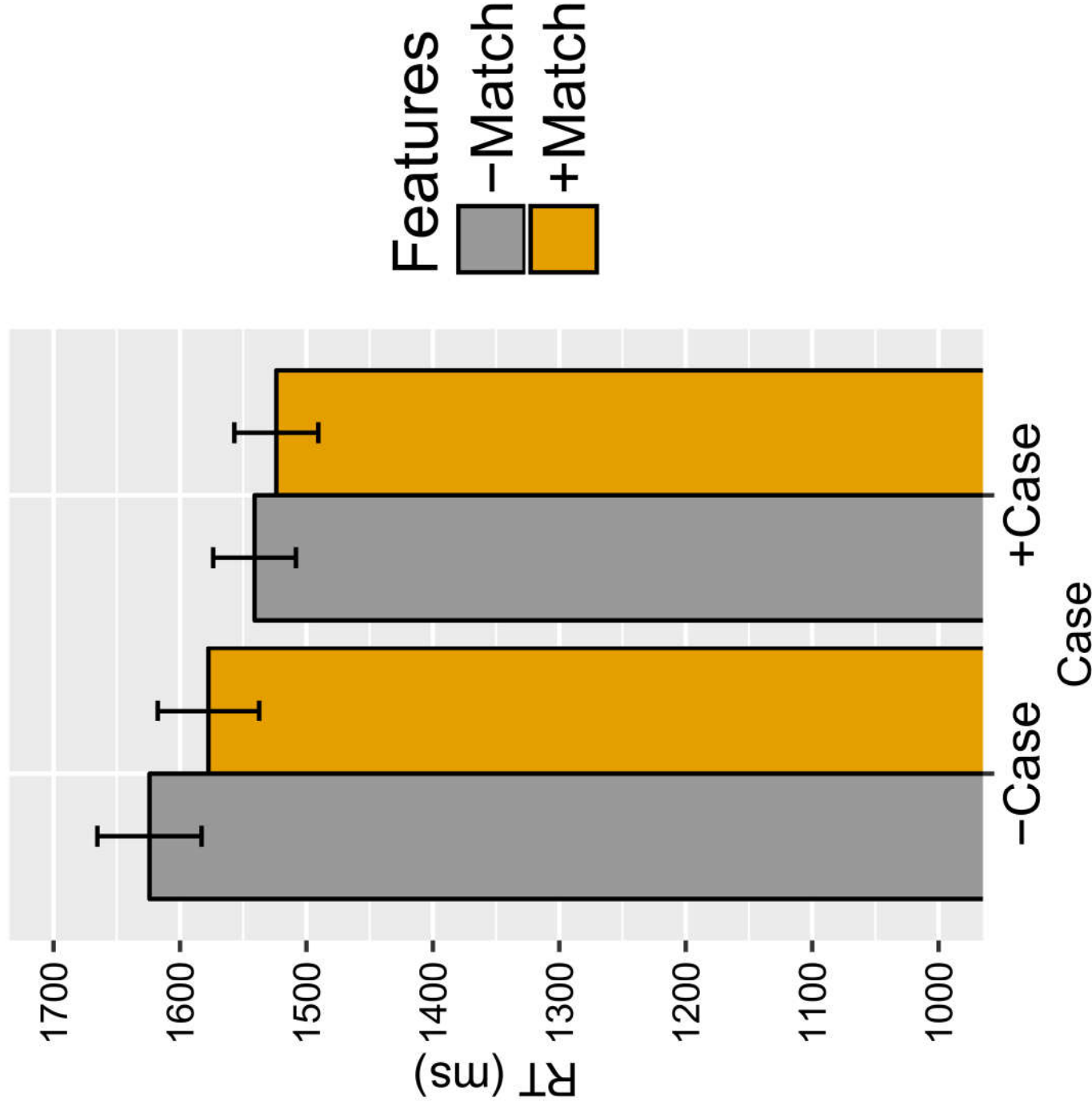
Features

- Match
- +Match

Proportion of Correct Responses



RTs for Correct Trials



Summary

| | Proportion data | Response Times |
|---------------|-----------------|----------------|
| Case | Yes | Trend |
| Features | No | No |
| Case:Features | No | No |

Conclusion

- ▶ The human sentence processor exhibits sensitivity to *unmarked material* which has been *grammaticalized* to be a deterministic cue for a syntactic dependency in a language.

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