

# A Regression Model for the English Benefactive Alternation

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# Dative Alternation (DA) of the Benefactive

Two constructions:

- Verb – recipient – theme (***NP NP***)  
*I baked him a cake*
- Verb – theme – *for* - recipient (***NP PP***)  
*I baked a cake for him*

# Presentation Overview

- Previous research
- Corpus Material
- Feature Annotation
- Regression Models
- Conclusion

# Previous research

- *Bresnan et al. (2007)*:
  - (DA with *to*; spoken American English)
  - 14 features
  - Regression models with up to 94% correctly predicted.
- *Theijssen (to be submitted)*
  - (DA with *to*; spoken and written British English)
  - Bresnan et al's model for American English still rather accurate for British.
- *De Marneffe et al. (2007)*
  - (DA with *to*; spoken English; children's age: 2-5)
  - Difference between adult and child language in DA: lower number of significant features with child data.

# Present research

Research questions:

- Can we predict the DAB in written adult English based on features for the DA with *to*?
- Can we also predict child written language with the model we find?

# Selection of corpora

## Compile dataset

- Written English
- Adult & child (8-12 years)
- Different genres
- Syntactic annotation and POS tagging preferred

<b>Adult</b>	<b>Child</b>
SUSANNE (130,000)	LUCY (30,000)
ICE-GB (423,700)	LCCPW (78,500)

Total: 662,200 words

# Selection of cases

Select NP PP & NP NP constructions

## 1. Search for NP PP

- Perl scripts adjusted to available annotations
- LCCPW: searched for sentences with *for*

Automatic selection			
ICE-GB	767	LUCY	20
SUSANNE	165	LCCPW	461

# Selection of cases

## 2. Search for NP NP

- Use 58 main verbs of relevant NP PP constructions
- Search within ditransitives

Automatic selection of possible cases			
ICE-GB	30	LUCY	5
SUSANNE	10	LCCPW	819

### Total automatic selection:

- NP PP 1,413
- NP NP 864



# Final selection of cases

1. All cases judged by 3 independent judges
  - Main verb
    - remove: copula / phrasal / passive
  - Recipient & theme
    - remove: postmodifier / lacking / reversed order / fronted / split
  - Remove 'for the purpose of'

# Final selection of cases

1. All cases judged by 3 independent judges
2. Pairwise comparison
3. Discussion and final filtering

**Result: 143 cases**

Adult: 107

Child: 36

Final selection	
ICE-GB	NP NP 23
	NP PP 56
SUSANNE	NP NP 9
	NP PP 19
LUCY	NP NP 5
	NP PP 6
LCCPW	NP NP 7
	NP PP 18
<b>Total</b>	<b>NP NP 44</b>
	<b>NP PP 99</b>

# Feature Annotation

Features after Bresnan *et al.* (2007)

Name
Animacy of recipient
Number of recipient and theme
Concreteness of theme
Definiteness of recipient and theme
Pronominality of recipient and theme
Givenness of recipient and theme
Person of recipient
Semantic verb class
Length difference theme - recipient

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Have the recipient and theme been mentioned in the preceding context?

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Is the recipient local or non-local?

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<b>Semantic verb class</b>
Length difference theme - recipient

Creation of possession;  
Obtaining of possession;  
Keeping of possession;  
Abstract

# Annotation Procedure

- Automatically derived:
  - Verb, theme, and recipient derived automatically (except for LCCPW).
  - Length difference theme - recipient (in all corpora).
- Ten annotators
  - Each case annotated independently by at least 2 annotators
- Unclear cases discussed by annotators
  - Example: ‘... which manages *£1.1 billion* for 23,000 unit holders.’  
(ICE:W2C-012:87:4)
  - Is £1.1 billion *concrete* or *inconcrete*?

# Inter-Annotator Agreement

For each pair of annotators:

If both had the same annotation:

→ Awarded with a score of 1.

If one (or two) expressed doubt:

→ The score was divided by two for each annotator expressing doubt.

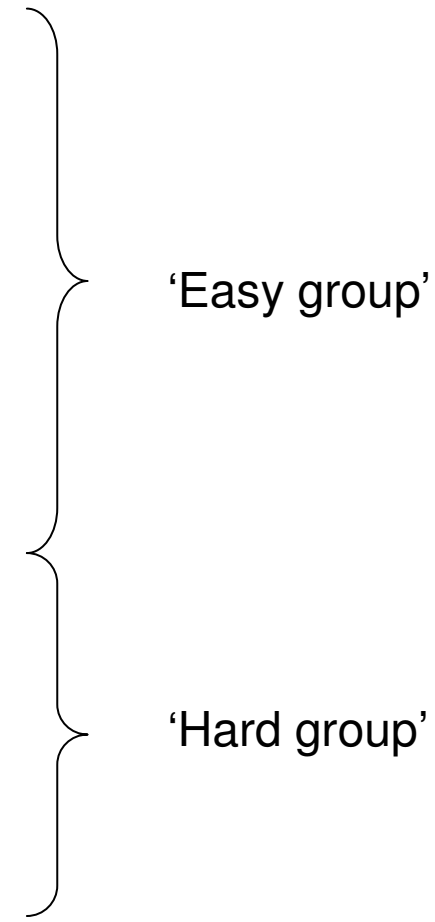
Resulting in the following scores:

Feature Name	Kappa
Number of recipient	0.92
Animacy of recipient	0.87
Person of recipient	0.86
Pronominality of recipient	0.80
Definiteness of theme	0.78
Definiteness of recipient	0.74
Number of theme	0.71
Concreteness of theme	<b>0.55</b>
Givenness of recipient	<b>0.55</b>
Semantic verb class	<b>0.48</b>
Pronominality of theme	<b>0.39</b>
Givenness of theme	<b>0.32</b>



# Clarity of the Features

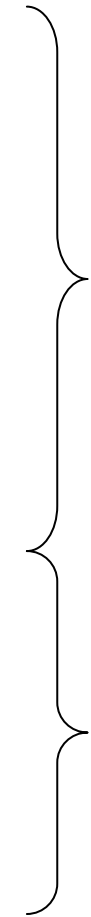
Feature Name	Kappa with consensus	Clarity Estimate
Person of Recipient	0.93	8.63
Number of Recipient	0.93	8.06
Animacy of Recipient	0.92	7.94
Pronominality of Recipient	0.87	7.88
Definiteness of Theme	0.84	8.06
Number of Theme	0.84	8.06
Definiteness of Recipient	0.81	8.06
Givenness of Recipient	0.72	<b>5.69</b>
Concreteness of Theme	<b>0.61</b>	<b>6.00</b>
Pronominality of Theme	<b>0.34</b>	7.88
Semantic verb class	<b>0.33</b>	<b>4.81</b>
Givenness of Theme	<b>0.33</b>	<b>5.67</b>



↳ 1: Very unclear -- 10: Very clear

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 'Easy group'  
 'Hard group'

↳ 1: Very unclear -- 10: Very clear

# Logistic Regression Modelling

- Investigate simultaneous influence of multiple features
  - Which features influence choice for dative alternation with *for*?
  - Predict this choice on the basis of feature values

# Logistic Regression Modelling

- Optimal adult model  
→ Model fit
- Best-scoring model  
→ Prediction accuracy adults
- Test optimal adult model on child data  
→ Prediction accuracy children

# Quality

Model fit and prediction accuracy adults

Total number of data instances	Majority Baseline	Model fit	Prediction Accuracy
107	70.1%	86.9%	79.6%

(Prediction accuracy significantly higher than majority baseline)

Prediction accuracy children

Total number of data instances	Majority Baseline	Prediction Accuracy
36	66.7%	80.6%

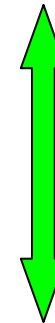
(Prediction accuracy *not* significantly higher than majority baseline)

# Feature importance

Five significant effects:

Variable	Coefficient	<i>P</i> -value
Intercept	8.1	0.0044
Length Difference (th-rec)	-2.3	0.0042
Number Theme = singular	-2.6	0.0093
Semantic Verb Class = obtain	-2.8	0.0443
Givenness Theme = nongiven	-3.0	0.0447

P(NP PP)



P(NP NP)

# Error analysis

Explanations for model failure:

<b>Error class</b>	<b>Adult</b>	<b>Child</b>
Unmodelled aspects		
Expression with fixed word order	4	1
Order bias for specific verb sense	3	
Focus	2	2
Arguably not a benefactive case	2	
Unexplained	3	4

# Conclusion

- Modelling the dative alternation with 'for'
  - written English of adults
    - outperforms baseline, significantly
    - same influences as found by Bresnan, fewer significant
  - written English of children (8-12 years)
    - apparently covered well by adult model
    - not significantly better than baseline (36 cases only)



# Conclusion

- Research within a Course
  - insufficient time
    - to process enough data for significance
    - for proper annotation training
  - good project training
    - planning and methodology
    - coping with adversity

Thanks for your attention

Questions?