

# Anaphora Project Update

Jasmine Falk

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## 1 Review of Metrics

### 1.1 Parent speech statistics

1. **Parent speech rate:** total number of utterances per minute
2. **Anaphora utterance rate:** number of utterances containing anaphora per minute
3. **Anaphora use ratio:** anaphora utterance rate / parent speech rate
4. **Child-driven anaphora proportion:** proportion of all anaphoric utterances that are child-driven
5. **Visual cue anaphora proportion:** proportion of all anaphoric utterances that are paired with a visual cue

### 1.2 Child resolution accuracy statistics

1. **Anaphora resolution accuracy:** number of utterances that child fixated on correct referent during an utterance containing an anaphoric expression / total number of utterances containing anaphora
2. **One anaphora accuracy:** number of utterances that child fixated on correct referent during an utterance containing a one anaphoric expression / total number of utterances containing one anaphora
3. **Split anaphora accuracy:** number of utterances that child fixated on correct referent during an utterance containing a split anaphoric expression / total number of utterances containing split anaphora
4. **Pronoun accuracy:** number of utterances that child fixated on correct referent during an utterance containing a pronoun / total number of utterances containing pronouns
5. **Verbal cue accuracy:** number of utterances that child fixated on correct referent during an utterance containing an anaphor cued verbally / total number of utterances containing anaphora that were cued verbally
6. **Visual cue accuracy:** number of utterances that child fixated on correct referent during an utterance containing an anaphor cued visually / total number of utterances containing anaphora that were cued visually
7. **Parent-driven anaphora accuracy:** number of utterances that child fixated on correct referent during an utterance containing an anaphor instigated by parent / total number of utterances containing anaphora that were instigated by parent

## 2 Overall descriptive statistics

### 2.1 Parent speech statistics

	mean	stdev	min	max
parent speech rate	15.168	4.721	2.904	23.179
anaphora utterance rate	4.022	2.016	0.000	8.777
anaphora use ratio	0.257	0.095	0.000	0.457
child-driven anaphora prop	0.461	0.245	0.000	0.939
visual cue anaphora prop	0.539	0.219	0.000	1.000

### 2.2 Child resolution accuracy statistics

	mean	stdev	min	max
anaphora resolution accuracy	0.620	0.142	0.250	0.903
one anaphora accuracy	0.445	0.446	0.000	1.000
split anaphora accuracy	0.215	0.250	0.000	1.000
pronoun accuracy	0.626	0.155	0.250	0.893
verbal cue accuracy	0.622	0.170	0.286	1.000
visual cue accuracy	0.664	0.177	0.286	1.000
parent-driven anaphora accuracy	0.607	0.211	0.000	0.850

### 3 Stats for data split by median MCDI score

med = 81

#### 3.1 Below median score

mean score = 41.2

##### 3.1.1 Parent speech statistics

	mean	stdev	min	max
parent speech rate	14.903	4.342	7.503	22.823
anaphora utterance rate	3.541	1.237	1.751	5.105
anaphora use ratio	0.240	0.061	0.125	0.326
child-driven anaphora prop	0.394	0.248	0.081	0.850
visual cue anaphora prop	0.616	0.225	0.286	0.947

##### 3.1.2 Child resolution accuracy statistics

	mean	stdev	min	max
anaphora resolution accuracy	0.588	0.166	0.250	0.903
one anaphora accuracy	0.579	0.485	0.000	1.000
split anaphora accuracy	0.220	0.384	0.000	1.000
pronoun accuracy	0.577	0.175	0.250	0.893
verbal cue accuracy	0.608	0.158	0.333	0.800
visual cue accuracy	0.614	0.183	0.286	0.900
parent-driven anaphora accuracy	0.584	0.150	0.286	0.850

## 3.2 Above median score

mean score = 231.5

### 3.2.1 Parent speech statistics

	mean	stdev	min	max
parent speech rate	17.317	3.781	11.385	23.179
anaphora utterance rate	5.149	2.365	1.368	8.777
anaphora use ratio	0.293	0.109	0.091	0.457
child-driven anaphora prop	0.578	0.208	0.190	0.939
visual cue anaphora prop	0.516	0.216	0.061	1.000

### 3.2.2 Child resolution accuracy statistics

	mean	stdev	min	max
anaphora resolution accuracy	0.658	0.114	0.455	0.871
one anaphora accuracy	0.419	0.444	0.000	1.000
split anaphora accuracy	0.298	0.375	0.000	1.000
pronoun accuracy	0.672	0.122	0.467	0.871
verbal cue accuracy	0.635	0.157	0.348	0.897
visual cue accuracy	0.705	0.152	0.500	1.000
parent-driven anaphora accuracy	0.625	0.250	0.000	1.000

### 3.3 Statistical Significance

#### 3.3.1 Parent speech statistics

	Levene's test		<i>t</i> -test	
	<i>F</i>	<i>p</i>	<i>t</i>	<i>p</i>
parent speech rate	0.042	0.839	-1.544	0.135
anaphora utterance rate	6.256	0.019	-2.235	0.037
anaphora use ratio	4.252	0.050	-1.583	0.129
child-driven anaphora prop	0.525	0.476	-2.095	0.046
visual cue anaphora prop	0.487	0.492	1.175	0.251

#### 3.3.2 Child resolution accuracy statistics

	Levene's test		<i>t</i> -test	
	<i>F</i>	<i>p</i>	<i>t</i>	<i>p</i>
anaphora resolution accuracy	1.207	0.282	-1.281	0.212
one anaphora accuracy	0.026	0.873	0.893	0.381
split anaphora accuracy	0.363	0.552	-0.529	0.601
pronoun accuracy	0.762	0.391	-1.636	0.114
verbal cue accuracy	0.066	0.799	-0.438	0.665
visual cue accuracy	0.214	0.648	-1.419	0.168
parent-driven anaphora accuracy	1.101	0.304	-0.518	0.609

## 4 Stats for data split by median age

med = 18.2 months

### 4.1 Below median age

mean age = 16.0 months

#### 4.1.1 Parent speech statistics

	mean	stdev	min	max
parent speech rate	14.836	5.227	2.904	22.823
anaphora utterance rate	3.319	1.461	0.000	5.780
anaphora use ratio	0.219	0.090	0.000	0.348
child-driven anaphora prop	0.476	0.286	0.000	0.939
visual cue anaphora prop	0.558	0.286	0.000	1.000

#### 4.1.2 Child resolution accuracy statistics

	mean	stdev	min	max
anaphora resolution accuracy	0.609	0.163	0.250	0.903
one anaphora accuracy	0.398	0.438	0.000	1.000
split anaphora accuracy	0.180	0.341	0.000	1.000
pronoun accuracy	0.618	0.169	0.250	0.893
verbal cue accuracy	0.606	0.184	0.286	1.000
visual cue accuracy	0.688	0.207	0.286	1.000
parent-driven anaphora accuracy	0.614	0.264	0.000	1.000

## 4.2 Above median age

mean age = 21.2 months

### 4.2.1 Parent speech statistics

	mean	stdev	min	max
parent speech rate	15.501	4.282	7.503	23.179
anaphora utterance rate	4.726	2.278	1.751	8.777
anaphora use ratio	0.295	0.087	0.165	0.457
child-driven anaphora prop	0.446	0.203	0.081	0.839
visual cue anaphora prop	0.521	0.127	0.308	0.722

### 4.2.2 Child resolution accuracy statistics

	mean	stdev	min	max
anaphora resolution accuracy	0.631	0.124	0.444	0.871
one anaphora accuracy	0.488	0.461	0.000	1.000
split anaphora accuracy	0.248	0.360	0.000	1.000
pronoun accuracy	0.633	0.144	0.348	0.871
verbal cue accuracy	0.638	0.160	0.333	0.897
visual cue accuracy	0.641	0.146	0.368	0.909
parent-driven anaphora accuracy	0.600	0.155	0.318	0.846

### 4.3 Statistical Significance

#### 4.3.1 Parent speech statistics

	Levene's test		<i>t</i> -test	
	<i>F</i>	<i>p</i>	<i>t</i>	<i>p</i>
parent speech rate	0.877	0.356	-0.418	0.679
anaphora utterance rate	3.471	0.071	-2.206	0.034
anaphora use ratio	0.004	0.953	-2.543	0.016
child-driven anaphora prop	3.716	0.062	0.356	0.724
visual cue anaphora prop	0.487	0.492	1.175	0.251

#### 4.3.2 Child resolution accuracy statistics

	Levene's test		<i>t</i> -test	
	<i>F</i>	<i>p</i>	<i>t</i>	<i>p</i>
anaphora resolution accuracy	0.473	0.496	-0.464	0.646
one anaphora accuracy	0.953	0.336	-0.589	0.560
split anaphora accuracy	0.334	0.567	-0.578	0.567
pronoun accuracy	0.090	0.766	-0.273	0.786
verbal cue accuracy	0.113	0.739	-0.551	0.585
visual cue accuracy	2.065	0.160	0.785	0.438
parent-driven anaphora accuracy	2.699	0.110	0.192	0.849