

## PA3.2 – Probing the Systematicity of Early Mappings

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### I. The form-meaning mismatch

- Mappings between word forms and word meanings are typically assumed to be arbitrary [1], e.g., German *Baum*, English *tree*, French *arbre* → **1:0 mismatch**
- Recent cross-linguistic evidence suggests that **systematic form-meaning mappings** in the adult lexicon are more pervasive than expected [2]
- Systematic form-meaning mappings are learned earlier in development and may scaffold acquisition by aiding category formation [3]
- Problem:** The extent and nature of systematicity in the early lexicon and its influence on early word learning are still unclear, with previous studies reporting facilitatory [4], inhibitory [5], as well as null [6] effects

**Research question:** Is there a bootstrapping role for form-meaning systematicity in early word learning?

#### Empirical questions:

- Is there cross-linguistic evidence for systematic form-meaning mappings in the early lexicon?
- What is the nature of these systematic mappings?
- How does systematicity relate to age of acquisition?
- Are children sensitive to systematic form-meaning mappings in the words they already know?
- Can they exploit them to learn novel words?
- Does the role of systematicity change with age?

### II. Hypotheses and methodology

Across languages, the early lexicon is systematic such that words with similar meanings tend to have similar forms

→ Measuring the correlation between word-form and word-meaning similarity for 27 diverse languages, using lexical acquisition data from Wordbank

Across languages, more systematic words are acquired earlier in development than less systematic words

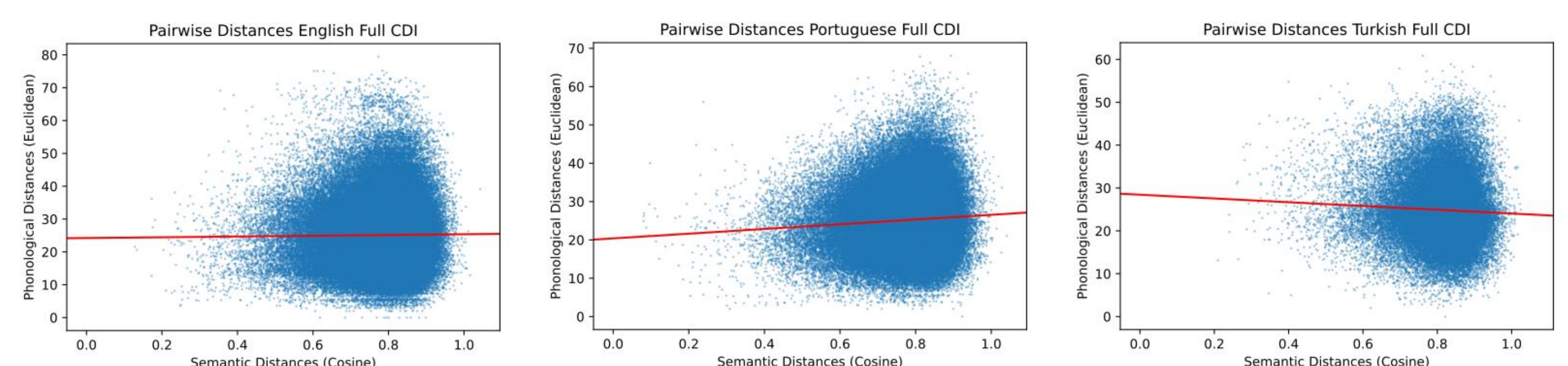
→ Modeling age of acquisition as a function of by-word systematicity based on Wordbank data

Words whose form and meaning is similar to many words in the child's lexicon are learned more easily

→ Testing learning and retention of systematically related naturalistic stimuli in 12-to-36-month-old children through eye-tracking and EEG studies

### III. Preliminary results and discussion

Language	Full Dataset			Content Words			Nouns		
	<i>N</i>	<i>r</i>	<i>p</i>	<i>N</i>	<i>r</i>	<i>p</i>	<i>N</i>	<i>r</i>	<i>p</i>
English (American)	612	0.011	0.504	529	-0.019	0.290	355	-0.018	0.470
Norwegian	660	-0.027	0.118	543	-0.071	<0.001	375	-0.119	<0.001
Danish	338	-0.007	0.752	227	-0.057	0.029	188	-0.084	0.011
Portuguese	546	0.058	<0.001	477	0.064	<0.001	334	0.033	0.189
Turkish	338	-0.049	0.020	298	-0.072	0.004	220	-0.066	0.039
Dutch	615	-0.032	0.090	537	-0.054	0.009	364	-0.079	0.002



- Most early lexicons are **arbitrary** rather than systematic
- Systematicity effects may be an artefact of typology and morphology (e.g., noun class marking)
- Systematicity seems to be limited to morphosyntactic rather than semantic categories
- Significance of correlation may be affected by outliers and skewed distribution of semantic distances
- But:** Despite lack of lexicon-wide systematicity effects, there may still be **systematic local clusters** of words which are privileged in acquisition

### IV. Consequences and follow-up questions

- Crucial link between systematicity and iconicity: iconicity may help explain patterns of systematicity – when words are iconic, they are more likely to be related both phonologically and semantically to other words [9]
- Iconicity may be privileged in early development [7] and evolution – communication systems begin with iconic representations that become less iconic over time [8]

- Are highly iconic words acquired earlier than less iconic words?
- How iconic are the symbols and gestures that children create under communicative pressure, e.g., when forced to communicate with one another in an 'alien' language?
- Are there differences in the acquisition and processing of iconic words early in the development?

- Collaboration with PA1 examining ideophones in spoken and sign languages → insights from sign language particularly powerful here given especially pronounced effects in sign language