

Developing speech recognition materials suitable for non-native speakers

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Problems with existing material sets

- Too difficult for lower proficiency NN participants
- Small set sizes – limits number of experimental conditions
- No control of contextual constraint

So developed this new set of materials

- Suitable for B1 level NN participants
- 439 sentence triplets => 1318 sentences in total
- 3 conditions with varying contextual constraint

Vocabulary: PET exam¹
Syntax: B1 level of CEFR²

Sentence Structure and Conditions

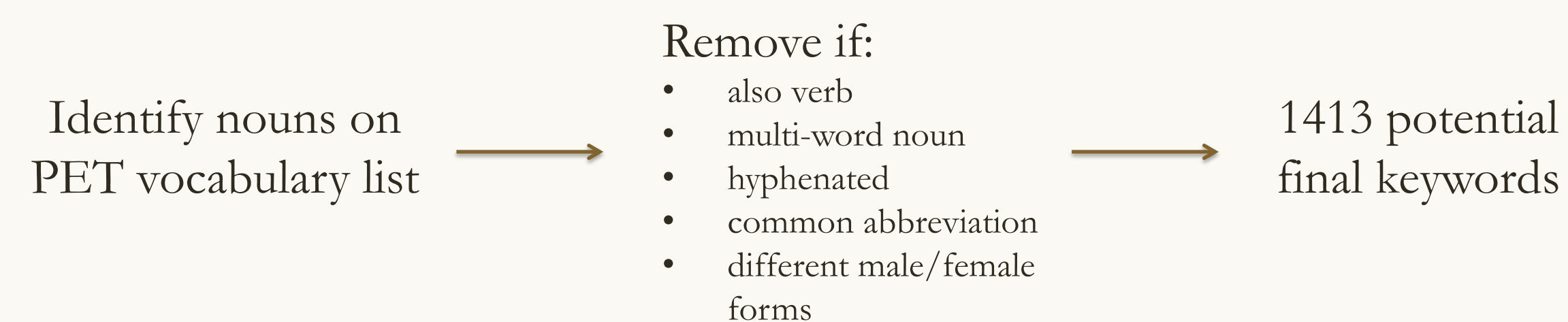
	Sentence context	Final Keyword	Example
Type A	Highly constrained	Highly predictable	The dolphins are swimming in the sea.
Type B	Weakly constrained	Neutral	The children are playing in the sea.
Type C	Highly constrained	Anomalous	The dolphins are swimming in the road.

Pointer words
establish contextual constraint
Types A & C ≠ Type B

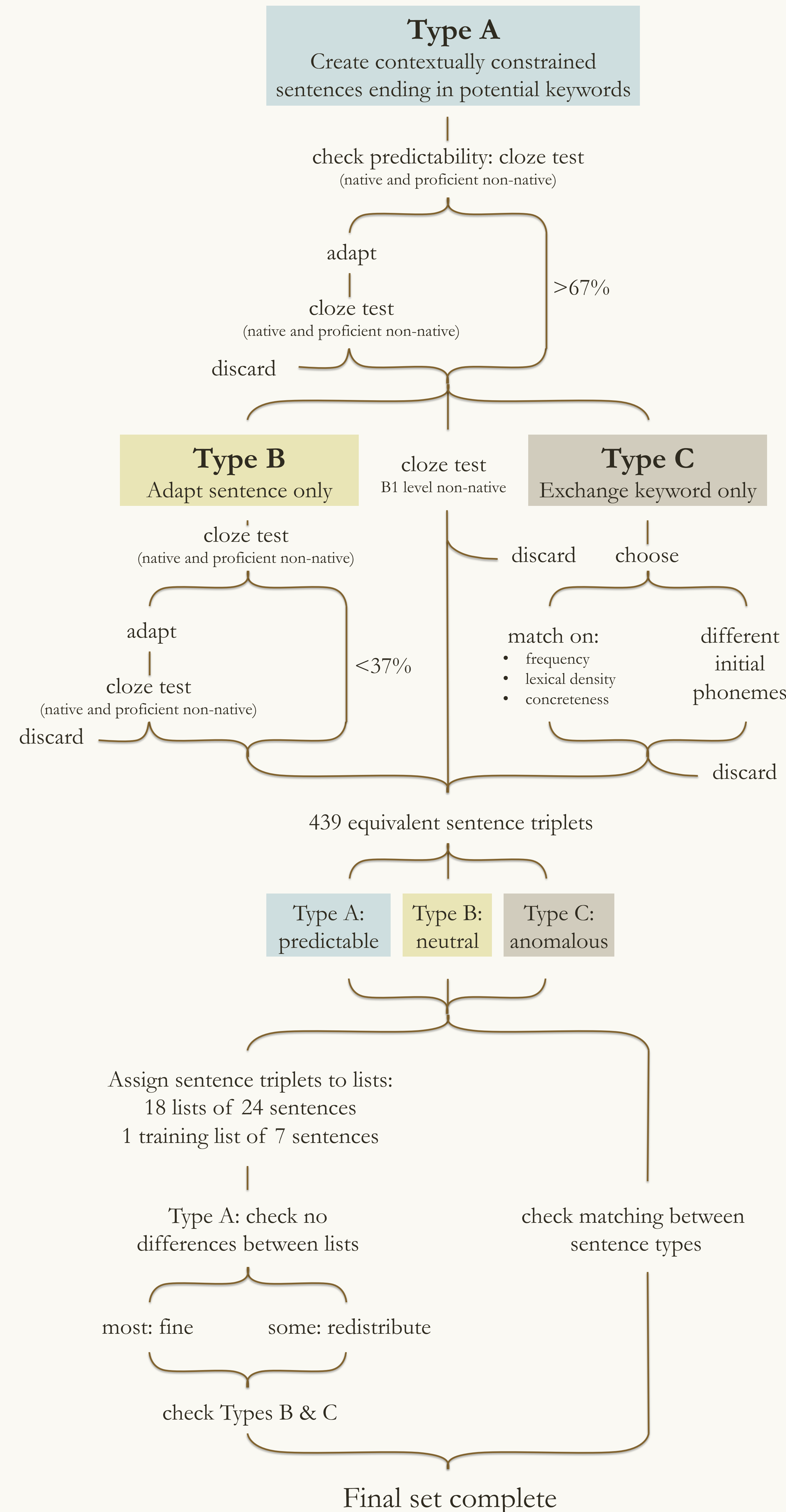
Final Keywords
vary in level of predictability
Types A & B ≠ Type C

Keywords	Sentence	Pointer words
1-5 syllables	6-10 words 6-16 syllables	2-3 per sentence

Selecting potential final keywords



Stages in Development

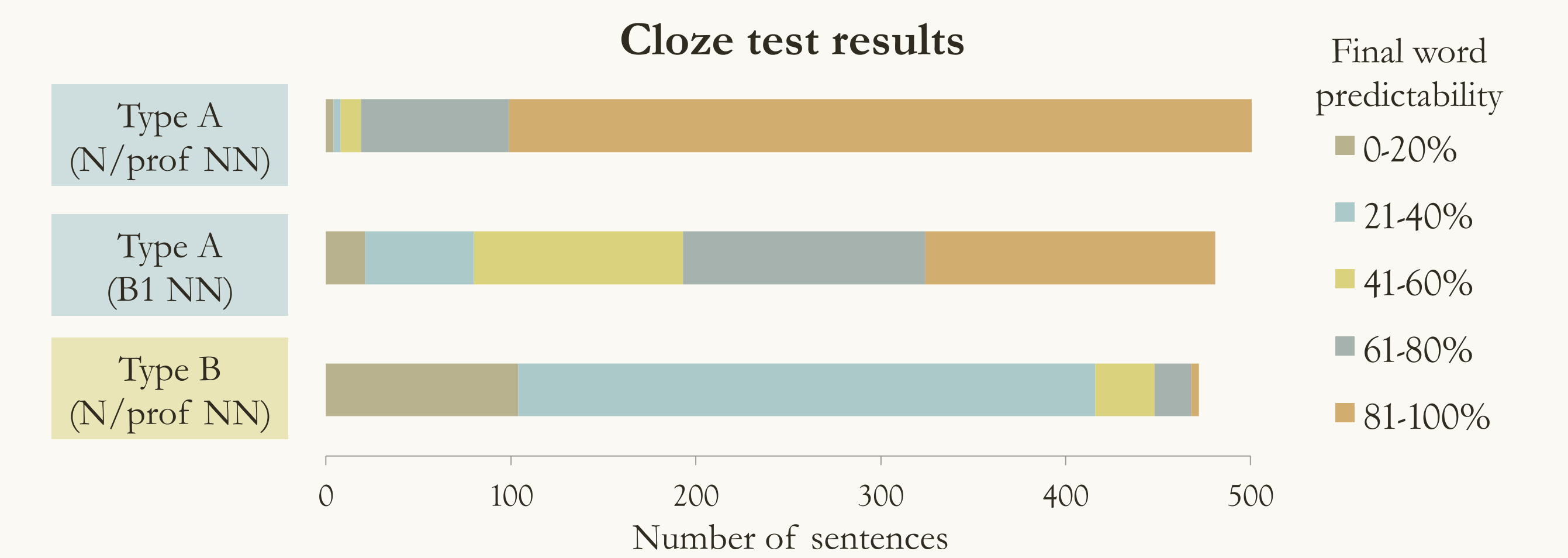


Keyword predictability : Cloze test

{ The dolphins are swimming in the _____ }

- Predictability of final word = how often word is chosen to complete sentence (as % of total responses)
- Sentences with keyword predictability above/below thresholds^{3,4} discarded

	Final Keyword	Predictability
Type A	Highly predictable	>67%
Type B	Neutral	<37% (<44%)
Type C	Anomalous	Assumed 0%



Ensuring matching across types and lists

Type	Keyword properties Types A & B vs. Type C			n.s.	Type	Sentence properties Types A & C vs. Type B			n.s.
	A	B	C			A	C	B	
Syllable count	1.78 (0.84)	1.78 (0.84)	1.78 (0.85)	n.s.	Syllable count	10.19 (1.15)	10.15 (1.66)	10.15 (1.66)	n.s.
Lexical Frequency (SUBTLEX ⁵)	3.14 (0.61)	3.14 (0.61)	3.12 (0.61)	n.s.	Word count	7.51 (1.15)	7.40 (1.037)	7.40 (1.037)	n.s.
Phonological Neighbourhood Density (CLEARPOND ⁶)	12.58 (13.92)	12.55 (13.82)	12.55 (13.82)	n.s.	Pointer word count (per sentence)	2.50 (0.50)	2.46 (0.50)	2.46 (0.50)	n.s.
Phonological Levenshtein Distance ⁷	1.90 (0.87)	1.86 (0.89)	1.86 (0.89)	n.s.	Pointer word count* (across whole set)	1100 (623 unique)	1087 (425 unique)	1087 (425 unique)	-
Concreteness (MRC ⁸)	539.45 (86.82)	492.19 (106.97)	492.19 (106.97)	p<.001	Pointer word frequency (across whole set)	1.79 (1.69)	2.56 (3.57)	2.56 (3.57)	P<.001

mean (s.d.), except *

Smaller list properties
Within sentence types, all lists equivalent on average keyword and sentence properties after minor redistribution of sentences between 4 lists due to word count differences

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