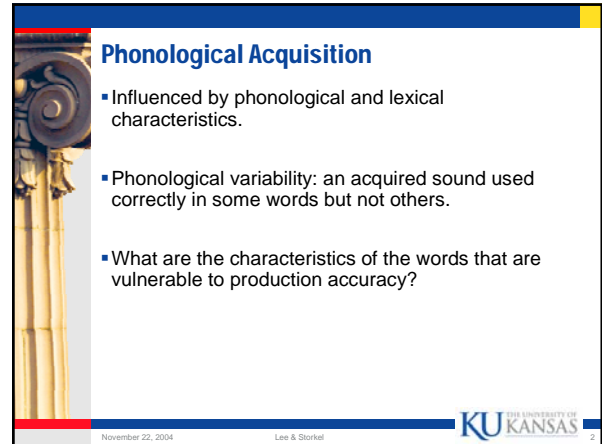


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Phonological and lexical characteristics of sound productions by preschool children

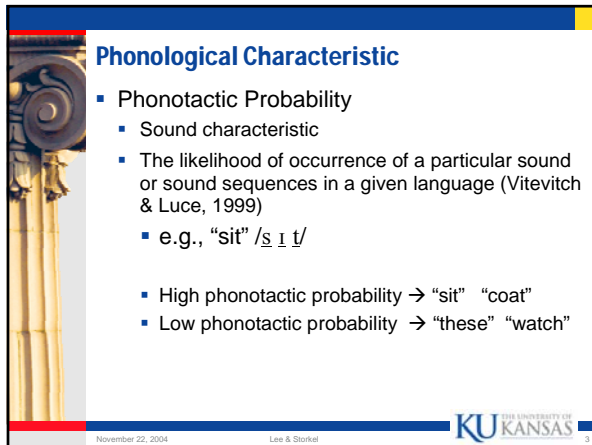
Su Yeon Lee, M.M.E.
Holly L. Storkel, Ph. D



Phonological Acquisition

- Influenced by phonological and lexical characteristics.
- Phonological variability: an acquired sound used correctly in some words but not others.
- What are the characteristics of the words that are vulnerable to production accuracy?

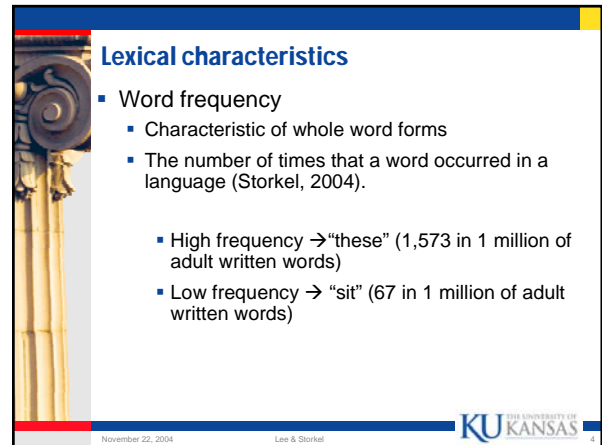
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Phonological Characteristic

- Phonotactic Probability
 - Sound characteristic
 - The likelihood of occurrence of a particular sound or sound sequences in a given language (Vitevitch & Luce, 1999)
 - e.g., “sit” /s i t/
 - High phonotactic probability → “sit” “coat”
 - Low phonotactic probability → “these” “watch”

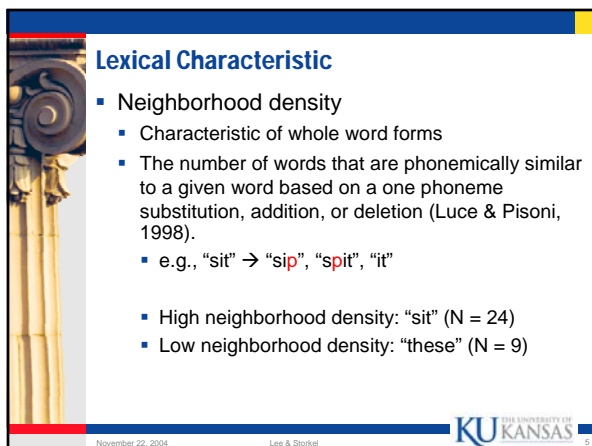
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Lexical characteristics

- Word frequency
 - Characteristic of whole word forms
 - The number of times that a word occurred in a language (Storkel, 2004).
 - High frequency → “these” (1,573 in 1 million of adult written words)
 - Low frequency → “sit” (67 in 1 million of adult written words)

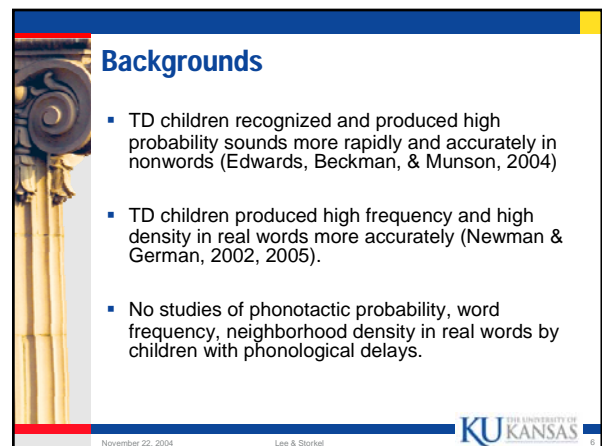
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Lexical Characteristic

- Neighborhood density
 - Characteristic of whole word forms
 - The number of words that are phonemically similar to a given word based on a one phoneme substitution, addition, or deletion (Luce & Pisoni, 1998).
 - e.g., “sit” → “sip”, “spit”, “it”
 - High neighborhood density: “sit” (N = 24)
 - Low neighborhood density: “these” (N = 9)

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Backgrounds

- TD children recognized and produced high probability sounds more rapidly and accurately in nonwords (Edwards, Beckman, & Munson, 2004)
- TD children produced high frequency and high density in real words more accurately (Newman & German, 2002, 2005).
- No studies of phonotactic probability, word frequency, neighborhood density in real words by children with phonological delays.

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Purpose of the study

- To explore influences of phonological and lexical characteristics on sound production by typically developing children and children with phonological delays.

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Participants

- Selected from a larger study
- Examined PD kids with 17 – 45% accuracy on a given sound.
- Identified 9 kids for 6 emerging sounds
 - ð, ʃ, l, dʒ, f, θ
- Matched on accuracy of that sound to a TD child.
- For that sound, examined characteristics of accurate and inaccurate production.

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Participants

	TD (n=9)		PD (n=9)	
	M	S	M	S
Age (months)	44	5.2	58	8.5
GFTA Percentile	39	10.2	9.7	3.7
PPVT-III Percentile	60	14	62	27
EVT Percentile	44	22	62	27

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Measures

- Phonotactic probability, frequency, neighborhood density were computed using an on-line child calculator (Jill, Storkel, & Kieweg, 2008).
- Patterns for accurate and inaccurate production were compared across groups.

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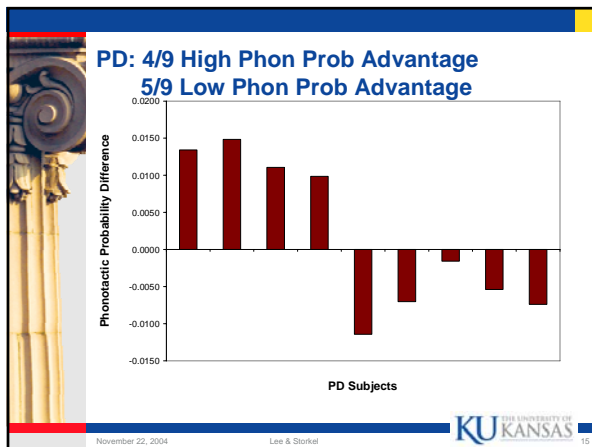
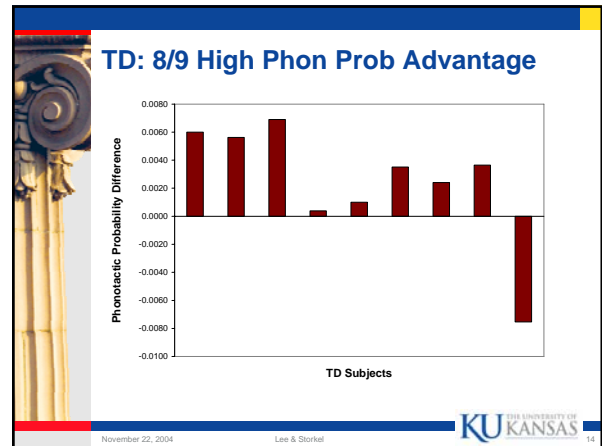
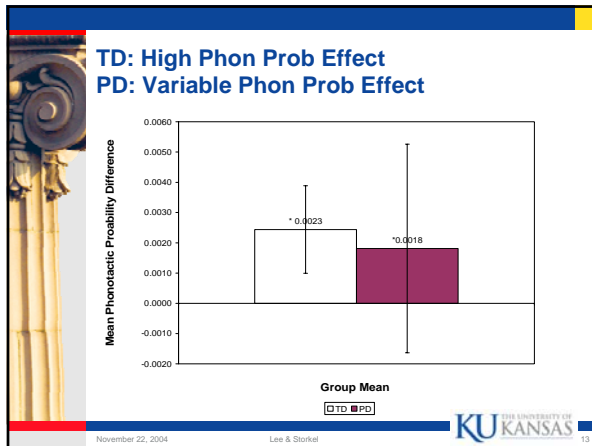
Criteria for interpretation of significance

- Meeting both criteria
 - SEM criterion:** Mean difference between accurate versus inaccurate production greater than SEM (Standard Error of Measurement).
 - Subject criterion:** 5/9 subjects in the group show the same trend (i.e., low or high advantage for accurate production).

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RESULT: Phonotactic Probability

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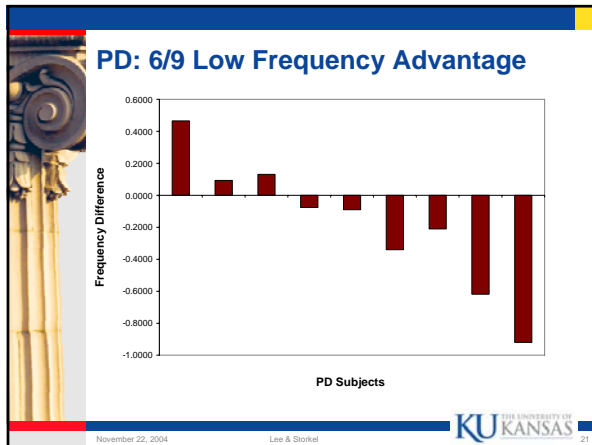
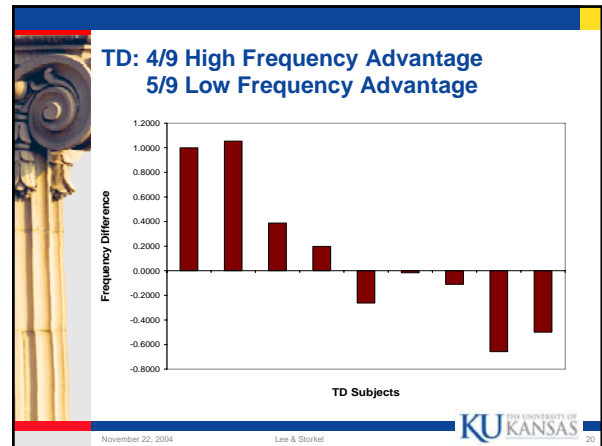
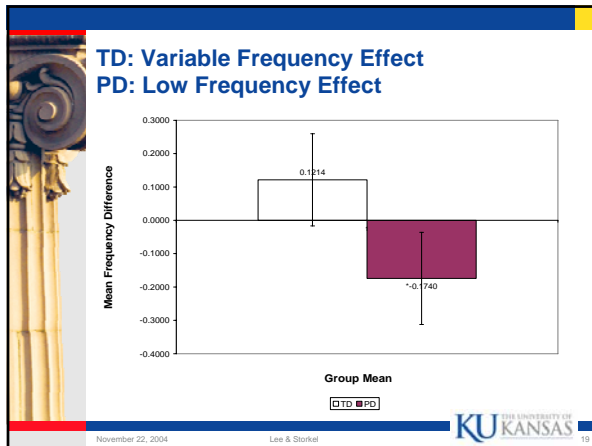


- ### Discussion: Phonotactic Probability
- High phonotactic probability effect in TD
 - Consistent with the previous studies in nonword repetition tasks (Edwards, Beckamn, & Munson, 2004; Munson, Edwards, & Beckman, 2005).
 - Attributed to the predictability of phonological sequence and frequency (Storkel & Rogers, 2000).
 - Facilitate the creation of association between a new lexical representation and the newly acquired phonological representation.
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- ### Discussion: Phonotactic Probability
- Variability in phon prob effect in PD
 - 1/2 group performs similar to TD. (High effect)
 - Attributed to the predictability of phonological sequence and frequency (Storkel & Rogers, 2000).
 - 1/2 group shows opposite effect. (Low effect)
 - Attributed to uniqueness of sound sequences in low phonotactic probability words.
 - May imply their difficulty distinguishing common sound sequence words from other similar forms.
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RESULT: Frequency

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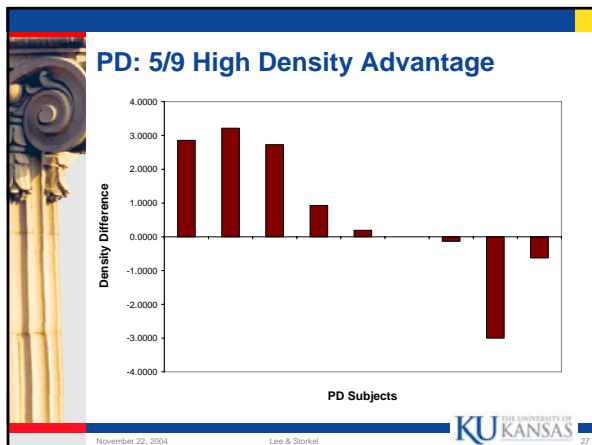
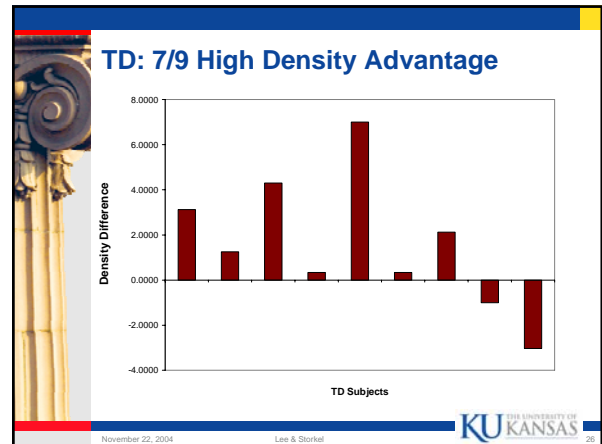
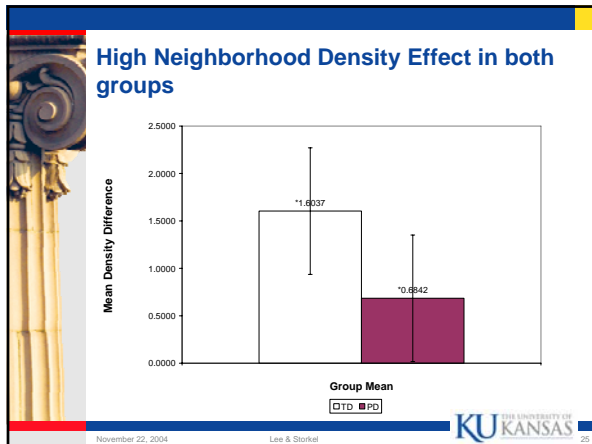


- ### Discussion: Frequency
- Variable frequency effect in TD
 - 1/2 High frequency advantage
 - Attributed to the frequent activation in recognizing, accessing, retrieving, or producing with high frequency words (Gierut, et al., 1999).
 - For the sake of communicative message (Macken & Ferguson, 1983)
 - 1/2 Low frequency advantage
 - Attributed to the flexibility of underlying lexical representation in infrequent words (vulnerable to sound change)
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- ### Discussion: Frequency
- Low frequency effect in PD
 - Attributed to the flexibility of underlying lexical representation in infrequent words (vulnerable to sound change).
 - More likely to show sound change in less well practiced environments.
 - Unwillingness to attempt to new sounds in a variety of phonological and lexical contexts.
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RESULT: Neighborhood Density

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- ### Discussion: Neighborhood Density
- High neighborhood density effect in both groups
 - Similar to past study (Stokel & Gierut, 2002).
 - The more phonologically detailed representations in high density neighborhoods.
 - Facilitate association between an existing lexical representations and new lexical representations.
 - A general property of sound acquisition.
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- ### SUMMARY
- Phonotactic Probability**
 - High phonotactic probability effect in TD
 - Variable phonotactic probability effect in PD
 - Frequency**
 - Variable frequency effect in TD
 - Low frequency effect in PD
 - Neighborhood Density**
 - High density effect in both TD and PD groups
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- ### CONCLUSION
- The findings from this study suggest that influences of phonological and lexical properties on sound productions may vary across TD and PD children.
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Acknowledgements

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Thank You!



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