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IRELAND
Introduction

- Research for the past 10 years with a focus on linguistic outcomes in LT toddlers longitudinally
- Phonological challenges occur in all cohorts cross-linguistically
- LT scenario maps on to
  - theoretical
  - research
  - clinical aspects
Participants

- Total Cohort of 74 TD toddlers
- Total of 24 LTs (14 boys and 10 girls) identified on the bases of restricted expressive vocabulary at intake (26-28 months)
- Matched 24 TDs (14 boys 10 girls)
- Monolingual Greek-Cypriot
ND Curve

99.9%

99.7%

68.2%

95.4%
Results [1]

Overall comparisons

![Graph 1: CYLEX PERCEPTION](image1)

![Graph 2: CYLEX PRODUCTION](image2)

![Graph 3: MLU-W](image3)

![Graph 4: SEGMENTS ESTABLISHED](image4)
Phonological challenges

Persistent use of word initial onset deletion (WIOD) followed by regressive assimilation (RASS) or consonant harmony
Example

[‘m i l o]-->[‘i l o]-->[‘l i l o]
Results

A mixed-design ANOVA for percentage of phonological process occurrence was used

- Group (TD vs. LT) as a between-subject variable
- Age level (30, 33, 36 months) and Phonological process (WIOD, RAS) as within subject variables
Results [1]

- Significant main effect of Group,
  - percentage of errors in phonological processes was significantly higher among participants in the LT compared to the TD group, $F(1,22) = 32.73, p < .001$.

- Significant main effect for Phonological Processes
  - higher percentage of WIOD cases compared to RAS across groups, $F(1,22) = 7.86, p < .05$.

- Significant interaction effect between Phonological Process and Group $F(1,22) = 12.10, p < .01$
  - indicated errors in Phonological Processes differed for TD and LT children.

- Significant interaction effect between Age and Phonological Process $F(1.50, 26.92) = 25.44, p < .01$,
  - percent of Phonological Processes differed across age levels.
WIOD for Group x Age

Estimated Marginal Mean of Initial Consonant Deletion (%)
RAS for Group \times Age

Estimated Marginal Means for RAS (%)

- % RAS
- GROUP: NLD, SLI-E
- Age: 30 months, 33 months, 36 months
Figures TD vs. LT for WIOD and RASS X age

Estimated Marginal Means for ICD (1) and RAS (2)

GROUP = NLD

GROUP = SLI-E

Phonological Process
1
2

%

age

30 months
33 months
36 months
Additional phonological data-LTs set 2 (Petinou & Armostis, 2017)

- Examined an additional group of LTs
- Examined analyzed speech longitudinally at earlier developmental stages
- Mapped existence of PP use in the form of WIOND and RASS
  - 28 versus 36 months
Results

PERCENTAGE OF PHONOLOGICAL PROCESS OCCURRENCE

Initial Onset Deletion
Regressive Assimilation
Correct onset production
Other substitutions
Interphases in Typically Developing Toddlers

- Do early phonetic abilities correlate with additional linguistic parameters, such as MLU-W and the Lexicon?

- If you have a rich PI what does it mean for your other skills?

- Is there a continuity?
Results [1]

- Synchronic relationship between language skills @ 28 months.

$$p < .01$$

$$p = .05$$

$$p < .01$$
Results [2]

- Synchronic relationship between language skills @ 36 months.

![Diagram showing relationships between various language skills with p-values (p < 0.05, p < 0.01, p = 0.05, p = 0.08).]
Summary [1]

- Interdependent relationship among linguistic subsystems 28 months
- Total number of phonemes correlate with
  - MLU and PI phonemes established in medial position (Petinou & Theodorou, 2015)
- Word Medial position correlates with
  - Phonemes initial position (Petinou & Okalidou, 2006)
- PI initial
  - Total number of words
Summary [2]

- Total number of phonemes correlates with
  - Word Medial
  - Word Initial

- Word Initial correlates with
  - Total number of different words

- Total number of different words correlates with
  - MLU
THE ACADEMIC COMFORT ZONE

Policeman: "This is where you lost your wallet?"

Man: "No, I lost it in the park. But this is where the light is."
THE ACADEMIC COMFORT ZONE

This is where you lost your wallet?

No, I lost it in the park, but this is where the light is.
Challenges

"So what's the problem here fellas? C'mon now -- it's only rocket science!"
Unexpected surprises
Neurophysiological data

- Neurophysiological paradigms allow the evaluation of neural underpinnings of chronic speech language and literacy challenges
- Converge to challenges related to phonological processing/discrimination difficulties
- LTs continue to show persistent phonological deficits as compared to lexical gains (Rescorla, 2011; Petinou & Okalidou, 2016)
- Persistent phonological challenges need to be addressed to identify underlying neurocognitive factors related to communication/literacy challenges
The present study

- Preliminary data on 6 year-olds with TD and LTs language history
- LTs diagnosed with persistent language delay and phonological impairment
- Examined phonological processing skills via ERP responses
- Odd ball paradigm including
  - Detection of phonological violations in real word minimal pair targets
Means for Audio & Visual responses

REACTION TIMES AND ACCURACY ODD BALL DISCRIMINATION

AUDIO TD VISUAL AUDIO LT VISUAL

AC RT Linear (RT)
Single Subject Intervention

- Single case studies can provide valuable information regarding intervention efficacy outcomes in children with speech sound disorders (SSD).
- Intervention Studies increase our theoretical knowledge regarding underlying processes influencing speech outcomes (e.g. Baker, et al., 2001).
The current study reports on phonological outcomes in a 5-year-old child diagnosed with SSD.

A Focused Phonological Intervention regime incorporated

- a macro (general phonological analysis), and
- a micro (training on specific word targets). Increased intelligibility with a focus on decreasing phonological neighborhood density has been shown to have positive outcomes in children with phonological challenges (Storkel & Hoover, 2011).
Method

Phase 1: Set of single words

Phase 2: Wider range of single words

Phase 3: Connected speech

/kala’mari/ ‘squad’

/ka’lami/ ‘fishing rod’

/kala’maci/ ‘straw’
## Results

### A. Phonetic Inventory

<table>
<thead>
<tr>
<th></th>
<th>Phones</th>
<th>Clusters</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Initial position</td>
<td>Medial position</td>
</tr>
<tr>
<td>Pre Interv. Phase</td>
<td>m, j, k, kʰ, l, p, pʰ, v, ő, s, t, c, ç, mb, θ, γ, n, f, x, r, ts</td>
<td>m, t, tʰ, p, pʰ, f, ɿ, l, n, γ, v, ő, s, θ, k, j, c, cʰ, ç, r, z, nd, x, ts</td>
</tr>
<tr>
<td>Post Interv. Phase</td>
<td>m, j, k, kʰ, l, p, v, ő, s, t, tʰ, nd, c, cʰ, ç, b, θ, j, n, f, x, z, nd, ts</td>
<td>m, t, tʰ, p, f, ɿ, l, n, γ v, ő, s, θ, k, kʰ, j, c, r, z, x, nd, ts</td>
</tr>
</tbody>
</table>
## Results

### B. Phonological Processes

<table>
<thead>
<tr>
<th>Structural</th>
<th>Pre Interv.</th>
<th>Post Interv.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syllable reduction</td>
<td>7.26%</td>
<td>0%</td>
</tr>
<tr>
<td>Initial Consonant Deletion</td>
<td>9.50%</td>
<td>5.36%</td>
</tr>
<tr>
<td>Medial Consonant Deletion</td>
<td>8.94%</td>
<td>8.93%</td>
</tr>
<tr>
<td>Final Consonant Deletion</td>
<td>7.82%</td>
<td>8.93%</td>
</tr>
<tr>
<td>Cluster Deletion</td>
<td>6.15%</td>
<td>7.14%</td>
</tr>
<tr>
<td>Cluster Reduction</td>
<td>31.84%</td>
<td>39.29%</td>
</tr>
<tr>
<td>Metathesis</td>
<td>0.56%</td>
<td>0%</td>
</tr>
<tr>
<td>Syllable Reduplication</td>
<td>0.56%</td>
<td>0%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Systematic</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Substitution</td>
<td>11.17%</td>
<td>17.86%</td>
</tr>
<tr>
<td>Fronting</td>
<td>2.23%</td>
<td>1.79%</td>
</tr>
<tr>
<td>Backing</td>
<td>5.59%</td>
<td>5.36%</td>
</tr>
<tr>
<td>Devoicing</td>
<td>1.12%</td>
<td>3.57%</td>
</tr>
<tr>
<td>Stopping</td>
<td>1.12%</td>
<td>0%</td>
</tr>
</tbody>
</table>
Summary & Conclusion

- For some LTs phonological challenges continue way beyond the “recovery” period
- Patterns of phonological challenges may emerge
- Cross-language framework we need to identify and code commonalities and differences
- Develop a solid databank accessible to all in need
  - Theoretical perspective
  - Research
  - Intervention studies can be designed
Proposal [1]

- Speech Corpora are hard to obtain
- Confidentiality issues
- Heterogeneity of collection, coding analysis procedures
- Lack of knowledge regards to articulation, phonetics, phonology
- CUT databank corpora from 85 toddlers longitudinal data (TD, LTs, OME, CI)
- Logistics program for PCC, PP occurrence, PI, S STR data extraction
- Frequent Phonotactic Probability in child speech
- Extracting a database of Phonologically dense words
- EBP DMI
Proposal [2]

- Best practices in FAIR data storage
- Implementation of DELAD portal in CLARIN
  - Cyprus Research Foundation (Institution)
  - Provides pro gratis support and consulting services
- MSK Innovative Training Network
  - Data coding
  - Dissemination
  - Workshop
  - Educate practitioners
Thank you!!!

“Mr. Osborne, may I be excused?
My brain is full.”