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## PHONOLOGICAL PATTERNS IN THE SPEECH OF ENGLISH-POLISH BILINGUAL CHILDREN IN AUSTRALIA INITIAL FINDINGS

**Słowa klucze:** dwujęzyczność, fonologia dwujęzyczna, rozwój fonologiczny dwujęzycznych dzieci, dwujęzyczne procesy fonologiczne, diagnostyka fonologiczna dwujęzycznych dzieci, dwujęzyczność angielsko-polska, polsko-angielskie kontakty językowe, język polski w Australii

**Keywords:** bilingualism, bilingual phonology, phonological development of bilingual children, bilingual phonological patterns, phonological assessment of bilingual children, English-Polish bilingualism, English-Polish language contact, Polish language in Australia

### Streszczenie

Współczesne analizy wskazują na brak konsensusu w badaniach światowych odnośnie do różnic pomiędzy rozwojem fonologicznym dzieci jednojęzycznych a dwujęzycznych. Niektóre badania udowadniają brak znaczących różnic, inne natomiast pokazują, że dzieci dwujęzyczne popełniają błędy fonologiczne, które należałoby uznać za nietypowe dla dzieci jednojęzycznych. Jeśli istotnie fonologia dzieci dwujęzycznych podąża własną ścieżką rozwojową, ważne staje się jej poznanie w celu umożliwienia trafnej diagnozy logopedycznej dzieci dwujęzycznych. Niniejsze badania, przeprowadzone z grupą dziesięciorga angielsko-polskich dwujęzycznych dzieci w wieku przedszkolnym i wczesnoszkolnym w Australii, opisują i porównują substytucje fonologiczne obecne w mowie tych dzieci, kiedy mówią one po polsku i po angielsku. Badania z użyciem testów logopedycznych wykazały, że uczestniczące w nich dwujęzyczne dzieci posiadają odrębne, ale wzajemnie zależne od siebie systemy fonologiczne, zarazem różniące się od systemów dzieci jednojęzycznych. Odnotowano szereg błędów transferowych, szczególnie z języka angielskiego, czyli języka dominującego dla uczestników badań. Niektóre z procesów fonologicznych opisanych w niniejszej pracy, choć nietypowe lub opóźnione dla dzieci jednojęzycznych, mogą być typowe dla angielsko-polskich dwujęzycznych dzieci. Wiedza na temat tych procesów może umożliwić logopedom trafniej diagnozować mowę angielsko-polskich dwujęzycznych dzieci w Australii oraz w Polsce w przypadku reemigracji.

## 1. Introduction

Most empirical research indicates that bilingual children have two phonological systems which, however, differ from those of monolinguals (Paradis 2001; Keshavarz, Ingram 2002; Fabiano-Smith, Barlow 2010). There is much less agreement among researchers as to the extent of those differences, that is the degree of interaction between the two systems of the developing bilingual child. The results of Lin and Johnson's (2010) study of 5-year-old Mandarin-English bilingual children in an English-immersion program in Taiwan, albeit pointing to the interdependence of the two languages of a bilingual, failed to find significant differences between the bilingual and monolingual phonologies. The study demonstrated similar levels of phoneme accuracy and similar types and rates of phonological processes for bilinguals and their monolingual counterparts. The researchers described several "possible" Mandarin-influenced phonological patterns in English. Other studies also indicated either the lack of significant phonological differences between the bilingual and monolingual phonologies, e.g., Goldstein (2005, 2006) for Spanish-English and Paradis (2001) for French-English bilingual children, or a low-level interaction, e.g., Fabiano-Smith and Barlow (2010) for Spanish-English or Salameh, Nettelbladt and Norlin (2003) for Swedish-Arabic bilinguals.

On the other hand, there are studies pointing to more substantial differences between the monolingual and bilingual phonological development. In their study of 16 Cantonese-English bilingual children, Dodd, So and Li (1996) found that the children developed error patterns that would be considered unusual for monolingual children. Holm and Dodd (1999), in a longitudinal study of two Cantonese-English bilingual 2-year-old children, also argued that the children used phonological processes that were atypical of monolingual developmental patterns. Goldstein (2006) explains the inconsistencies in the research of bilingual children's phonological development by underscoring the significant participant variation found in studies of this subject-matter. However, if bilingual children indeed follow a unique developmental path, there is a danger that many of them are misdiagnosed with phonological disorder. Some bilingual children, including English-Polish bilinguals, may receive speech therapy when they do not need it and some may not receive it when they actually do need it (Mennen, Stansfield 2006). A flawed interpretation of speech errors as "accent" resulting from using another language often is a reason for not recommending speech therapy (Hack, Marinova-Todd, Bernhardt 2012). Creating a knowledge base that can be used to construct protocols for the assessment of bilingual children's phonology is therefore an important task for researchers (Fabiano-Smith, Barlow 2010).

Triggered by the political and socio-demographic changes of recent decades, the debate around issues of bilingualism has started gathering currency in Polish linguistics and speech pathology literature. While there is already a body of literature

on bilingualism in general (Lipińska 2003), Polish language abroad (Miodunka 1990, 2003; Dębski 2009; Laskowski 2009; Sękowska 2010), and the dynamics of English-Polish language contact (Mańczak-Wohlfeld 2006), the specific issues of the development of children speaking Polish and other languages are only starting to receive attention (Cieszyńska 2003, Cieszyńska-Rożek 2010). Empirical studies of phonological development of such children are even scarcer. Laskowski (2009) described the interference of the dominant language on Polish language development in Swedish-Polish bilingual children in Sweden, and included a discussion of the domain of phonology. He concluded that the development of the Polish phonological system among those children was often disrupted and delayed, especially in regard to Polish fricatives and affricates. Ročławska-Daniluk (2011), in a study conducted with children attending a bilingual Polish-English kindergarten, found that phonemic awareness education conducted in Polish transferred poorly onto the corresponding skills being developed in English. Saran-Pasoń (2010) analysed the phonological development of successive and simultaneous bilinguals on a sample of Polish-English bilingual pre-schoolers. She concluded that the parallel bilinguals in her study acquired the phonological system more slowly than the successive bilinguals, and that the bilingual children in general were delayed in their Polish phonological development in comparison with their Polish monolingual counterparts.

The present study compares the use of phonological patterns in English and in Polish by preschool and early school-age English-Polish bilinguals in Australia, with the aim of identifying any bilingual patterns in their speech, focusing on their consonant systems<sup>1</sup>. It is believed that such information will inform phonological assessment of English-Polish bilingual children in Australia and those whose parents re-emigrate to Poland. In order to achieve this aim, it seems important to describe the phoneme substitution patterns present in the speech of such children, assess whether they are the same or different between the languages, and make comparisons with the normative descriptions in relation to English and Polish monolinguals. Consideration of both languages is important, since it is advantageous for bilingual children to be assessed in both their languages (Yavaş, Goldstein 1998). Phonological development of young children is characterised by phonological patterns, which are defined as “recognizable steps in the gradual articulatory adjustment of children’s speech to the adult norm” (Bauman-Waengler 2012: 84). Normative studies have identified phonological patterns which are typical of monolingual English-speaking children (Grunwell 1997; Dodd et al. 2003). Phonological development norms for monolingual Polish-speaking children are mainly descriptive, based on longitudinal studies of one child (Kaczmarek 1966) or larger samples (Demel 1987; Łobacz 1996). Most research of bilingual phonological development also notes cross-linguistic effects,

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1 The following sources provide thorough discussions of the Polish and English consonant systems: Ročławski 1976; Ladefoged, Maddieson 1996; Gussman 2007; Roach 2009).

defined by Goldstein, Fabiano and Washington (2005: 205) as “segments occurring in one language being used as substitutes in the other language”. Cross-linguistic effects are responsible for “accented” speech, which must be differentiated from pathological speech during assessment (Hack, Marinova-Todd, Bernhardt 2012). The focal questions in the present study were therefore as follows:

- 1) What phonological patterns are present in the Polish and English language data and how do they compare with normative descriptions for monolingual Polish and monolingual English-speaking children?
- 2) Are these patterns the same or different in each language?
- 3) Which of these patterns can be classified as cross-linguistic effects and which could be interpreted as symptoms of a speech delay or disorder?

## **2. Method**

### **2.1. Participants**

Ten children (4 females and 6 males) ranging in age from 5 to 7 years (mean age=6,2) took part in the research. This age range may not be the most interesting theoretically, since the child’s phonological development in L1 should be nearly concluded, but it is at this age that children are often assessed by speech pathologists, as they enter or are about to enter school. All the participants attended a major Polish Saturday school in suburban Melbourne, Australia. The convenience sample included all accessible pre-school or early school-age children at the school who were nominated by their teachers as relatively balanced English-Polish bilinguals, based on observation of school and out-of-school activity. According to parent reports, elicited through a brief survey including questions mainly related to the children’s development and use of languages, none of them had been diagnosed with a communication delay/impairment or had any sensory/cognitive disorder. The children were born in Australia and lived in ethnically diverse suburbs. Their parents were Poland-born immigrants and they used mainly Polish to communicate in the home environment. Although the children were exposed early on to both Polish and English, they can be described as sequential bilinguals, who first acquired Polish from their parents before learning English at kindergarten and school. All the parents, however, reported that English was their children’s dominant language.

### **2.2. Data gathering and analysis**

The data were collected on the premises of the school in the presence of either a parent or teacher in May–August 2014. Two phonological assessment tests were completed by each participant with a short break between the tests. A single-word pho-

nological test *Kwestionariusz badania mowy* (Billewicz, Ziolo 2012), containing 110 pictures, was used to gather Polish-language data. *The Articulation Survey* (Atkin, Fisher 1996), composed of 88 pictures, was used to gather English-language data. Both are popular tests targeting consonants in initial, medial and final positions in words. Children were asked to respond to questions such as “What is this, Adam?”. When a child was unable to provide an answer, the researcher used semantic cueing, e.g., “You eat soup from it” or phonetic cueing, e.g., “This is a p ...”. When a child was still unable to provide a response, they were asked to repeat the target word. All the sessions were recorded on an iPhone. The recordings were then transported to a PC-based transcription software, listened to multiple times and transcribed by the author using the International Phonetic Alphabet (IPA). Phonemic substitutions made by the participants were noted in the transcripts and analysed to identify patterns. At least two tokens of a specific pattern had to be present in the responses of a child in order to assign that pattern to the child. The analysis was mainly qualitative, as the aim of this exploratory research was to identify, describe and compare phonological patterns. Some numerical data regarding the frequency of these patterns were obtained, but they must be interpreted with great caution due to the small sample size and the small and unevenly distributed number of tokens of specific phonological patterns, elicited with the use of the single-word articulation tests.

The resulting phonological patterns are broad categories that differ among themselves with respect to their phonological status and significance for speech pathology diagnosis. Some patterns (e.g., depalatalisation in Polish or final devoicing in English) contain substitutions that potentially may lead to neutralisation of phonemic contrast and therefore be symptomatic of a phonological disorder. Other patterns (e.g., aspiration in Polish) are allophonic and substitutions contained therein could be regarded as articulation issues. Such considerations are taken into account and discussed in the ensuing results presentation.

### 3. Results

#### 3.1. Phonological substitutions in Polish

The bilingual research participants were identified to use 11 phonological patterns when they produced isolated words in Polish (Table 1). The four most common patterns were palatalisation, depalatalisation, fronting and aspiration, each used by more than 50% of the children. Retroflexion of /r/ was used by four children, and the other five phonological patterns were used marginally, i.e. by one or two children. Palatalisation, velar/palatal fronting, liquid simplification and cluster reduction are commonly observed in monolingual Polish-speaking children, whereas the remaining patterns are uncommon (Czaplewska, Milewski 2015).

Table 1. Phonological substitutions used by bilingual English-Polish children (N=10), assessed on the *Kwestionariusz badania mowy* (Billewicz, Zioło 2012).

Consonant Errors	Examples	No.
Palatalisation	/gzɨp/→ [gzɨp] “grzyb”, “mushroom”; /ʃafa/→ [eafa] “szafa”, “wardrobe”; /klutʂ/→ [klutɛ] “klucz”, “key”; /filizanka/→ [filizanka] “filizanka”, “coffee cup”; /ʃalik/→ [ʃalik] “szalik”, “scarf”; /tʂapka/→ [tʃapka] “czapka”, “cap”; /drabina/→ [drabɨna] “drabina”, “ladder”; /djabɛw/→ [djabʲɛw] “diabeł”, “devil”;	8
Depalatalisation	/huɛtafka/→ [hustafka] “huśtawka”, “see-saw”; /wɔkʲɛtɛ/→ [wɔkʲɛts] “łokieć”, “elbow”; /dzɛtɛi/→ [dzɛtɛi] “dzieci”, “children”; /miɛ/→ [mɨ] “miś”, “teddy bear”; /wazɛnka/→ [wazɛnka] “łazienka”, “bathroom”; /wɔkʲɛtɛ/→ [wɔkɛtʃ] “łokieć”, “elbow”; /bʲɛdrɔnka/→ [bɛdrɔnka] “biedronka”, “ladybug”; /kalaɸɔr/→ [kalaɸɔr] “kalafior”, “cauliflower”; /swɔɲ/→ [swɔn] “słoń”, “elephant”;	7
Fronting	/kubɛʂɛk/→ [kubɛtsɛk] “kubeczek”, “little mug”; /kʂɛswɔ/→ [ksɛswɔ] “krzesło”, “chair”; /zaba/→ [zaba] “zaba”, “frog”; /ɔʒɛxi/→ [ɔʒɛʃi] “orzechy”, “nuts”; /kukuɨdza/→ [tukuɨdza] “kukurydza”, “corn”;	7
Aspiration	/pajats/→ [pʰajats] “pajac”, “puppet”; /kubɛk/→ [kʰubɛk] “kubek”, “mug”;	6
Retroflexion	/garnek/→ [gamek] “garnek”, “pan”; /rɔgi/→ [ɹɔgi] “rogi”, “horns”;	4
Deaffrication	/pajatsʃ/→ [pajats] “pajac”, “puppet”; /wɔkʲɛtɛʃ/→ [wɔkɛtʃ] “łokieć”, “elbow”;	2
Velarisation	/pʲasɔɭ/→ [pʲasɔɭ] “parasol”, “umbrella”; /patɛɭna/→ [patɛɭna] “patelnia”, “frying pan”;	2
Liquid simplification	/riba/→ [liba] “ryba”, “fish”;	1
Affrication	/bʲɛdrɔnka/→ [bʲɛdzɔnka] “biedronka”, “ladybug”; /dɔɹɔɭɛli/→ [dzɔɹɔɭɛli] “dorośli”, “adults”;	1
Cluster reduction	/mawpka/→ [mawka] “małpka”, “little monkey”; /garnek/→ [garɛk] “garnek”, “pan”;	1
Final consonant deletion	/tɛlɛˈvizɔr/→ [ˈtɛlɛvizɔ:] “telewizor”, “television set”; /pɔˈmidɔr/→ [ˈpɔmidɔ:] “pomidor”, “tomato”;	1

The pattern of palatalisation in this study was not homogenous and included examples of different types of palatalisation issues experienced by the bilingual children. It contained substitutions such as prepalatal realisations of the Polish retroflex consonants /gzɨp/→[gzɨp] (“grzyb”, “mushroom”) or /klutʂ/→[klutɛ] (“klucz”, “key”), that is immaturities observed in monolingual Polish-language children, as well as palatalisations such as /djabɛw/→[djabʲɛw] (“diabeł”, “devil”), which are rather uncommon examples of surface palatalisation. With respect to palatalisation errors such as /ʃalik/→ [ʃalik] (“szalik”, “scarf”) and /tʂapka/→ [tʃapka] (“czapka”, “cap”), where the Polish retroflex sounds [ʂ, ʂɛ] were substituted with sounds approximat-

ing the English palato-alveolar [ʃ, tʃ], the speech pathologist would have to determine whether these errors are distortions of Polish phonemes (and therefore articulation errors) or a cross-linguistic effect, where sounds belonging to the Polish phonological system are substituted with English-language close equivalents. Fronting also contained substitutions characteristic of Polish monolingual development (/zaba/→[zaba] “zaba”, “frog” or /kuku.ɪdza/→[tuku.ɪdza] “kukurydza”, “corn”), and ones that would be considered unusual (/ɔʒɛxi/→[ɔʒɛʃi] “orzechy”, “nuts”) and could be interpreted as a transfer error, since /ʃ/ is an English-language phoneme that is absent in the Polish phonetic inventory.

The second most frequent phonological pattern found in the data was depalatalisation. Examples under this broad label also included several types of depalatalisation. There were substitutions of the Polish alveolo-palatal sounds with other Polish coronal sounds (/huctafka/→ [hustafka] “huśtawka”, “see-saw” or /wazɛnka/→ [wazɛnka] “łazienka”, “bathroom”) as well as substitutions of other palatalised consonants with hard ones (/kalafɔr/→[kalafɔr] “kalafior”, “cauliflower” or /swɔɲ/→[swɔɲ] “słoń”, “elephant”), which is uncommon in Polish developmental phonology (Sołtys-Chmielowicz 2008: 47). Examples of partial depalatalisation, such as /miɛ/→ [mɪʃ] (“miś”, “teddy bear”) were also frequent, and could be regarded as a cross-linguistic effect, since the English palato-alveolar /ʃ/, absent in the Polish inventory, has the same manner and a similar place of articulation to the Polish phoneme /ɛ/, described as alveolo-palatal (prepalatal). Polish monolingual children may completely depalatalise the phoneme /ɛ/ (Łukaszewicz, 2007), but the palato-alveolar /ʃ/ as a substitute of the alveolo-palatal /ɛ/ does not seem to occur. The most common cross-linguistic effect, however, was aspiration of voiceless plosives /k, t, p/ in word-initial or stressed onset positions, consistently used by six of the participating children.

The remaining patterns were less frequent. Four of the children inconsistently substituted the Polish trill /r/ with the English retroflex /ɻ/. Two of them also inconsistently used the velarised English-language version of /l/ (/patɛɫɲa/→ [patɛɫɲa] “patelnia”, “frying pan”). This transfer error could be due to the duplication of the allophonic distribution of the English language “dark” /ɫ/, that is in word final positions and never before a vowel, in the children’s Polish language system.

Two of the participants clearly deaffricated Polish affricate consonants and pronounced their components separately with an audible break between them (/pajat͡s/→ [pajats] “pajac”, “puppet”).<sup>2</sup> The /t͡s/sound is not part of the English-language phoneme inventory, and therefore may be difficult for children for whom English is a dominant language. Another participant substituted /d/ with the affricate /dʒ/. Affrication of /t/ and /d/ often occurs in English when these consonants are followed by /ɪ/, so this error pattern also could be interpreted as a cross-linguistic effect. The processes of liquid simplification /r/→ [l] and cluster reduction /wp, rn, bw/→[w, r, b]

2 Tie bars to mark affricates are used only where it is important for the analysis.



are common among Polish monolinguals and were applied in ways typical of Polish monolingual children. Finally, one child deleted the final /r/ and extended the preceding vowel in words such as “pomidor” and “telewizor” (/tɛlɛvɪzɔr/ → [tɛlɛvɪzɔ:] “telewizor”, “television”), which parallels the pronunciation of such English nouns as “labrador”. As in Australian English the phoneme /ɹ/ is silent in word-final positions, and generally before consonants, it is likely that the child has transferred this pattern onto his Polish phonological system.

All the Polish language phonological patterns identified in the data were either boarder-line age-appropriate or age-inappropriate. The phonological development of Polish monolingual children is typically completed by the age of 6–7 years (Demele 1987; Łobacz 1996; Dołęga 2003), with the exception of the phoneme /r/, which may not be fully mature until the age of 8 years (Dołęga 2003).

### 3.2. Phonological substitutions in English

Six phonological patterns were identified in the English-language data set (Table 2). Two of these patterns, final devoicing and simplification of the fricative /θ/, were used by nearly all of the participants; the other four, i.e. palatalisation, stopping, liquid simplification and fronting, were present in the data collected from either one or two children. All these patterns noted are phonological substitutions also identified among English-speaking monolingual children (James 2001; Grunwell 1997; Dodd et al. 2003).

Table 2. Phonological substitutions used by bilingual English-Polish children (N=10), assessed on the *Articulation survey* (Atkin, Fisher 1996).

Consonant errors	Examples	No.
Final devoicing	/dɒg/ → [dɒk] “dog”, “pies”; /d, dʒ, g, v, z/ → [t, tʃ, k, f, s]	9
Fricative simplification	/θʌm/ → [fʌm] “thumb”, “kciuk”;	8
Palatalisation	/fɪʃ/ → [fɪç] “fish”, “ryba”; /ʃu/ → [çu] “shoe”, “but”;	2
Stopping	/fɛðə/ → [fɛdə] “feather”, “piórko”;	2
Liquid simplification	/fɪɒg/ → /fwɒg/ “frog”, “żaba”;	1
Fronting	/fɪʃɪŋ/ → /fɪsɪŋ/ “fishing”, “łowienie”; /tʃɛə/ → /tɛə/ “chair”, “krzesło”;	1

Interestingly, devoicing of word-final voiced consonants was the most common substitution in the English-language data set. All but one of the participating bilingual children devoiced final plosives (/g, d/ → [k, t]), fricatives (/v, z/ → [f, s]) and affricates (/dʒ / → [tʃ]). Postvocalic devoicing errors are traditionally regarded as a de-



velopmental pattern (Bauman-Waengler 2012) which resolves by the age of 3–4 years (Grunwell 1997; Bowen 1998; James 2001). Since voicing provides phonological contrast necessary to distinguish meaning in English (“cub” and “cup”), voicing errors are diagnosed and treated when they persist beyond the age when typically developing children stop using them. In Polish, on the other hand, word final voicing contrast neutralisation is a natural process, and such productions would not be considered immature or pathological. There is a possibility that this error pattern is a result of language interdependence and a feature of English-Polish bilinguals.

Labialising the interdental voiceless fricative /θ/ → [f] was the second most common error made by the children. The voiceless interdental fricative is a late-developing sound that is used accurately by 75% of children by the age of 8 years (Kilminster, Laird 1978). It occurs commonly among monolingual English-speaking children, and was age-appropriate for the children in the research. Stopping (/ð/ → [d]), liquid simplification and fronting (/ʃ/ → [s]) also are common developmental patterns in monolingual children. Stopping of /ð/ and liquid simplification are suppressed late, that is after the age of 5, while fronting of fricatives and affricates such as /ʃ, tʃ/ (/ʃu/ → [su] “shoe”, “but”) is typically resolved by the age of 4–5 (Grunwell 1997), and it was marginally age-inappropriate for the participant in the study who used it. Finally, two children excessively palatalised the palato-alveolar fricative /ʃ/, so that it approached the quality of the Polish alveolo-palatal fricative /ɕ/ (/fɨ/ → [fɨɕ] “fish”, “ryba”). Palatalisation of /ʃ/ is a common misarticulation for English-monolingual children (Bauman-Waengler 2012). It is possible that it is also a characteristic of some English-Polish bilinguals, when it approaches in quality the Polish consonant /ɕ/.

#### 4. Discussion

The English-Polish bilingual children in the study made more phonological substitutions and used more phonological patterns when they spoke Polish than when they produced English words. This is a logical outcome for a group of children for whom English was a dominant language, although Polish was the first language they acquired. Overall, the set of phonological patterns identified in the Polish data differed from the one identified in English with some overlap (palatalisation, fronting and liquid simplification). When they named pictures in Polish, the children most frequently used phonological patterns typical of Polish monolingual speakers, e.g., palatalisation and fronting, but some of the bilingual children seemed to generalise those patterns onto sounds that typically would not be affected by these processes in the speech of monolingual Polish-speaking children. This phenomenon could be a developmental feature of English-Polish bilingual children.

The most affected classes of sounds in the current data were the Polish fricatives and affricates, which were either palatalised or depalatalised and/or fronted. It

seems that the English-Polish bilinguals may not have had enough exposure to the Polish language to learn to distinguish between the Polish /ɕ, ʑ, tɕ, dz/ and /ɕ, ʑ, tɕ, dz/, and between the Polish /ɕ, ʑ, tɕ, dz/ and the English /ʃ, ʒ, tʃ, dʒ/, or to develop the motor programs for their articulators, so that they use the correct tongue placement and accurate degree of palatalisation. The speech pathologist will have to conduct further assessments with children making such errors in order to determine whether the substitutions originate from phonological awareness deficit or articulation immaturity/impairment.

There were other patterns in the Polish data (aspiration, deaffrication, retroflexion, lateralisation and final consonant deletion) that are uncommon for Polish monolingual children. These patterns were possible cross-linguistic effects, either due to transfer of 1) English speech sounds (e.g., /ɹ/) into the Polish sound system, or English speech sounds (/l, p<sup>h</sup>/) that could be considered allophones of Polish sounds (/l, p/), or 2) an English pronunciation pattern, e.g., making the /ɹ/ silent in the word-final position (e.g., /pɒmɪdɔːr/ → [pɒmɪdɔ:] “pomidor”, “tomato”), or 3) due to the absence of a phoneme in the phonological inventory of the dominant language (/pajət̪/ → [pajats] “pajac”, “puppet”).

The phonological patterns that the bilingual children used in Polish in most part would be considered age-inappropriate by speech pathologists if they applied Polish-language monolingual development norms. This result echoes Laskowski’s (2009) observations about the significant delays that he noted in the development of the Polish phonological system in Swedish-Polish bilingual children in Sweden, but is contrary to previous studies involving other languages and younger participants, for example 3- to 4-year-old Spanish-English bilingual children (Fabiano-Smith, Barlow 2010).

When the children named pictures in English, they used the English-language developmental patterns. The excess palatalisation that the two participants used on the English fricative /ʃ/ is however interesting, because this pattern could be related to the frequent palatalisation errors observed in the Polish-language data, and well-documented among Polish-speaking monolinguals. The two children who palatalised fricatives in English also palatalised in Polish. Without a phonological assessment conducted in Polish, such palatalised productions of /ʃ/ would be regarded by the speech pathologist as a misarticulation of an English-language phoneme, while they might be symptomatic of a more systemic phonological confusion across the two language systems, and not being able to differentiate between the Polish /ɕ, ɕ/ and the English /ʃ/. The speech pathologist might have to work with the bilingual child to train them how to separate these sounds.

The most common pattern was devoicing of word-final consonants, used by 90% of the children with moderate consistency. Devoicing of word-final consonants is a developmental English-language pattern that is typically suppressed by the age of 3–4 in monolingual English-speaking children (James 2001; Bowen 1998; Grunwell

1997). Speech pathologists assessing children with profiles comparable to those in the study would therefore record it, which could contribute to the diagnosis of a phonological delay or even disorder. This pattern, however, might be a feature of developing English-Polish bilingual phonological systems. If indeed it is a specific bilingual feature, further research should be conducted to determine the age at which this pattern is typically suppressed. A contributing factor or an alternative explanation of this pattern must be however considered. Recent research demonstrates that word-final neutralisation of voicing contrast is becoming a feature of some varieties of English (Bauman-Waengler 2012), including those historically influenced by languages such as German, Dutch and Polish (Smith 2013). The remaining English-language monolingual patterns observed in the data were either age-appropriate (fricative /θ/ simplification, stopping of /ð/ and liquid substitution) or marginally age-inappropriate (fronting of the fricative /ʃ/ and affricate /tʃ/ noted in one child).

A brief analysis of individual child data confirms the separateness of the phonological systems of the bilinguals in the study and the asymmetrical development of their two phonologies. A 7-year-old boy Michał<sup>3</sup> inconsistently fronted Polish consonants /x/ and /k/, but no fronting of velar segments was recorded in his English-language data. We also can deduce from the data that suppression of a specific process in the dominant language does not guarantee its suppression in the second language. For example, Marysia, a six-year-old girl, did not reduce any consonant clusters in English, but she reduced some in Polish. Interestingly, in the case of Paweł, a 5-year-old boy, gliding of /ɪ/ was noted in English, but no liquid substitution was observed in his Polish. Krzyś, a six-year-old boy, was the only person who fronted fricatives both in English and Polish. Overall, the speech pathologist would have few opportunities to conduct treatment of specific error patterns in English with the hope that it would transfer onto the weaker language. Finally, the pattern of final consonant devoicing, possibly a feature of English-Polish bilingual development, could significantly lower a child's score on *The Articulation Survey*. Krzyś would receive a standard score below 55 if we included this pattern, which is below the 5<sup>th</sup> percentile rank of the population. However, if we decided to acknowledge that this is a typical English-Polish developmental error pattern and exclude it, his standard score would increase to 100 and a percentile rank of 50, which means that he performed equally well or better than 50% of his peers.

## 5. Conclusions

The present report paints a complex picture of the phonological skills of the typically developing English-Polish bilingual children in the study. Identifying phonological

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3 All first names used in this article are pseudonyms.

patterns in English-Polish bilingual children and grouping them as homogenous processes – especially those found in Polish, i.e. the weaker language – is a complicated task for the researcher and the speech pathologist because of the intermeshing of the two language systems. Overall, some level of interaction between the two phonological systems of the bilingual children was noted. It was evidenced by cross-linguistic transfers found in the English and Polish language data sets, but mainly from the dominant language into the weaker system. Some atypical patterns were also found in the data, which supports previous research suggesting the uniqueness of bilingual phonological development (Dodd, So, Li 1996; Holm, Dodd 1999). The devoicing errors in English could alert the speech pathologist enough to recommend further assessment or even treatment. The palatalisation errors in English, on the other hand, could be interpreted as misarticulations, while they could be a sign of inadequate phonological differentiation between the two languages. Any assessment relying exclusively on the Polish productions would be difficult, as symptoms of phonological impairment could be obscured by features interpreted as “accent” (Hack, Marinova-Todd, Bernhardt 2012). It seems that some of the patterns identified in the present research, although uncommon for monolingual children, are a feature of typically developing English-Polish bilingual phonology. Recognising these patterns will allow the speech pathologist to reduce the number of errors considered uncommon, possibly pathological.

Further studies involving a larger number of bilingual participants and monolingual control groups, and longitudinal research looking at the developmental paths of bilingual children acquiring Polish and other languages, from birth until school-entry time, are, however, required to confirm the presence of these patterns and the dynamics of their suppression. Future studies should also use tests and spoken language samples allowing to collect more tokens of specific phonological patterns. Quantitative analysis of larger data sets will allow to ascertain how stable and systemic the studied phonological substitutions are for individual participants and for the research samples and whole populations.

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## **Phonological patterns in the speech of English-Polish bilingual children in Australia.**

### **Initial Findings**

#### **Summary**

There is lack of agreement among world researchers in regards to the extent of differences between the phonological development of monolingual and bilingual children. While some research provides evidence for the lack of significant differences, other studies indicate that bilingual children make phonological errors which might be considered atypical of their monolingual counterparts. If indeed bilingual children follow a unique path in their phonological development, it is important to investigate this path in order to facilitate accurate phonological diagnosis of bilingual children by speech pathologists. The present research, conducted with a group of ten pre-school and early school-age English-Polish bilingual children in Australia, describes and compares the phonological patterns present in the speech of typically-developing children, when they speak English and Polish. Popular tests used by speech pathologists have demonstrated that the children have two separate but mutually dependent phonological systems, which are different from the systems of their monolingual peers. The research has noted a number of cross-linguistic errors, especially from English, that is the dominant language for the participants. Some of the phonological patterns identified in the study, although atypical of monolingual children, could be typical of English-Polish bilinguals. Knowledge about such patterns may facilitate accurate diagnosis of English-Polish bilingual children in Australia or in Poland if their parents decide to re-emigrate.